The Economic and Social Research Institute

SCHOOLING AND SEX ROLES:
Sex Differences in Subject Provision and Student Choice in Irish Post-Primary Schools

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THE ECONOMIC AND SOCIAL RESEARCH INSTITUTE

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<u>*ERRATUM*</u>

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Second paragraph (line 6): (Joint Managerial Body) has been omitted after the name Stella Mew.

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General Summary

This is in many respects a highly technical report which has had to be designed to suit a very variable readership: the specialist researcher, the educationalist, policy-makers, parents and the interested public, and those directly concerned with making the main policy decisions at an individual school level. For those who want to find out what our main findings and conclusions are, these are summarised in Chapters 10 and 11. In addition, each chapter ends with a short summary of the main results and conclusions. For those seeking to assess the evidence and the quality of the analysis underlying our conclusions we indicate in Chapter 10 where in the text the relevant evidence is provided. For those wishing to evaluate our assumptions, the selection of the main variables in our analysis and the reliability of samples and measurements, information provided in Chapters 1 and 2 would be essential reading.

Objectives

This report provides the results and conclusions of a very detailed investigation of the extent, nature and causes of sex differences in second-level educational provision and subject specialisation of girls and boys in Irish post-primary schools. The investigation was carried out in response to a request from the Employment Equality Agency and the Department of Labour on the basis of a proposal from the Women's Representative Committee (*Final Report,* 1978) to sponsor a research project on "the extent to which curricular differences may be contributing to inequality of opportunity for girls" (*ibid.* p. 37).

The final terms of reference agreed with a steering committee appointed by the EEA established four objectives for the study:

(1) To investigate the extent, nature and causes of differences amongst post-primary schools in their provision of certain subjects to male and female pupils; in particular the provision of Honours Maths, Science, Technical and Home Economics subjects.

(2) To investigate the extent and nature of sex differences in the manner in which subjects are allocated to male and female pupils within schools. Even

where subjects are provided by a school, differences can arise in the allocation of subjects to one or other sex in coeducational schools; or through systematic differences in allocating subjects in girls' and boys' schools.

(3) To investigate and, as far as possible, account for the nature and extent of differences in the choices made by girls and boys when given the option of choosing the same set of subjects.

(4) To indicate, in the light of the results of the study, what would be the most effective strategies for increasing the proportion of girls taking Maths, Science and Technical subjects.

Data and Methods

Four main sources of data were used in this study:

(1) Detailed examination records for the Group, Intermediate and Leaving Certificate examinations for the years 1965, 1968, 1972, 1975 and 1978, taken from a national sample of 125 secondary and 58 vocational schools. In total this gave us a sample of approximately 30,000 examination records. These data allowed us to examine in detail how the subjects taken by boys and girls in these examinations differed from each other as well as changed over this period. By aggregating these records to provide subject-provision profiles for schools, we are able to examine how the curricula of these schools had changed over that period, as well as which school characteristics accounted for variation and change in the curricula of schools.

(2) In a 50 per cent subsample of these schools (95 post-primary schools) we interviewed the Principal and Career Guidance Counsellors. These interviews provided the basic information on the curricular and subject allocation rules, etc., used within schools.

(3) In the same sample of schools we administered questionnaires to samples of Leaving Certificate and of Inter. Cert. pupils, and all those pupils in what the Principal identified as terminal Group Cert. classes. This gave us completed questionnaires for a national sample of approximately 10,000 second-level pupils. This provides us with the basic information on pupils' subject choices and on the main factors influencing pupil choices.

(4) Finally, for this same sample of schools we obtained extensive data on the characteristics of the teaching body in each school. For each teacher we obtained detailed information, from official records, on his or her degree or diploma qualifications, the identity of classes and subjects taught and other related information.

Our analysis of the nature and sources of sex differences in the rates of subject take-up in the different second-level public examinations is based on a research model which allows us to assess the relative importance of each of the three major factors mentioned above:

(i) *provision-differences,* in the provision of subjects in schools containing boys and girls (i.e., whether or not a specific subject is on the school's curriculum);

(ii) *allocation-differences* in the allocation of subjects taught in the school to boys and girls;

(iii) *choice-differences* between boys and girls in their choices of those subjects made available to them.

This model allows us to assess the relative influence of these three factors on the relative take-up of different Science, Commerce, Technical and other subjects by boys and girls in the main public examinations. It also allows us to indicate where one might most effectively intervene to change that situation.

The Context of Sex Differences in Education

We need to place the extent and nature of sex differences in subject take-up in second-level schools in the context of the overall educational and labour market inequalities of men and women; otherwise we may misinterpret their meaning and significance.

Girls are more likely than boys to complete second-level education. Their participation rate in the senior cycle of post-primary schools is substantially higher than that of boys and is also greater than most other EEC countries. Early school leaving is much more characteristic of boys. A high proportion of boys, however, drop out early from second-level schooling to enter apprenticeships, while almost no girls enter apprenticeship training or take up skilled manual or craft occupations. Of male school leavers who left before or at Inter. Cert. level, for instance, 30 per cent entered such apprenticeship or related training compared to less than 8 per cent of females.

Moreover, although more girls complete second-level education, substantially fewer go on to third level. Of those who do, fewer enter applied Science professional, technical or scientific courses in the Universities or Regional Technical Colleges (RTCs). Girls, on the other hand, are more likely to enter Arts, Commerce, Nursing and Teacher training and other related semi-professional training courses. In addition, girls' employment opportunities are concentrated in a relatively narrow range of female dominated white-collar occupations, their labour market opportunities being extremely constrained (see Chapter 3). Roughly two out of three working women are in occupations which are dominantly female in composition (Appendix Tables 10.5 and 10.6). This high degree of sex segregation of the labour market exists as part of a more widespread social and cultural system which clearly differentiates men's from women's roles in adult life. This sex role differentiation extends back to the early learning or socialisation experiences of male and female infants and it is also clearly represented in the cultural assumptions underlying the provision and allocation of subjects and general teaching programmes by the main educational institutions.

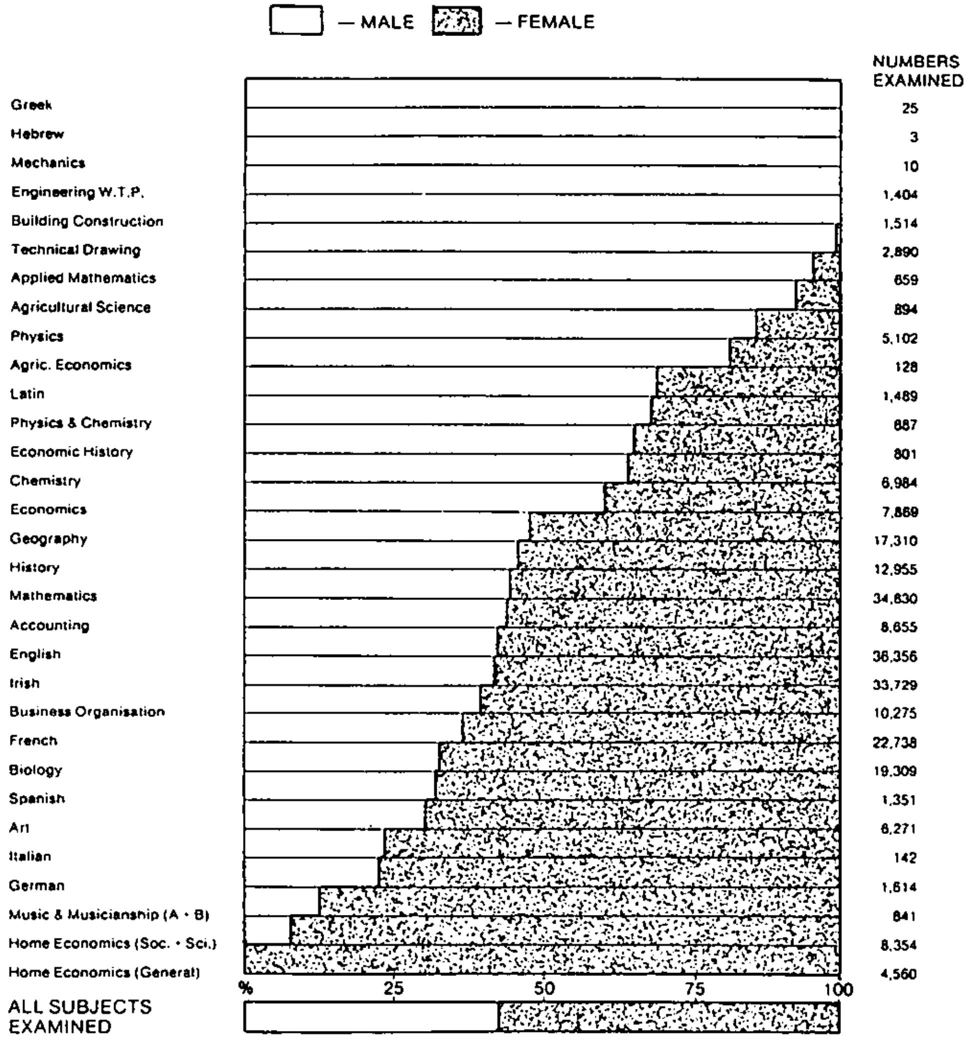
The results of such life long socialisation differences are clearly reflected in the self evaluations and attitudes of girls in second-level schools. Compared to boys, girls: (i) have more negative attitudes to Science and Maths; (ii) have significantly lower educational self images — even at the same level of academic performance; (iii) are significantly less competitive than boys; (iv) are far more involved in actual household and home-making roles than boys. But girls appear, however, to have been far more successfully integrated into school life — including its more academic aspects — than boys, having more positive feedback from teachers and experiencing a more supportive teacher-pupil environment than boys. Despite this more successful incorporation, however, they have, paradoxically, lower levels of educational or academic self-confidence than boys. Girls also have very different educational and occupational aspirations than equivalently educated boys — reproducing almost exactly the very segregated labour market position held by working women. Those differential attitudes and expectations have very important effects on subject choices.

Up to very recent times, around 90 per cent of young married women retired from paid employment on marriage or on the birth of the first child, the traditional husband-provider and housewife-mother division of labour characterising the great majority of Irish marriages. So that considered over the lifetime of a woman, her labour market role was of significantly less importance than that of a man. And the associated schooling of girls has been correspondingly less concerned with the relationship between the labour market and schooling qualifications, so that the provision and allocation of subjects to girls tends to be quite distinct as we shall see. But over the past decade a number of interlinked economic, technological, social and cultural changes have effectively destabilised that pattern; and prospective future changes in both the labour market and the work-home relationship pose a serious challenge to the conventional girls' education model.

Subject Take-up Differences between the Sexes

The following figure shows clearly the extent of sex differences in subject take-up at Leaving Cert. Boys tend to be disproportionately represented in most Science and Maths subjects (Physics, Chemistry, Applied Maths, Higher Maths), as well as in the Technical subjects; while girls are over-represented in modern languages, Art, Music and Home Economics. A similar pattern is evident at Inter. Cert., with Science, Higher Maths and the Technical subjects being "boys'" subjects; Languages and "Accomplishment" subjects being "girls'" subjects. In our analysis we attempted to account for such sex

Figure 1: *Percentage Participation in Leaving Certificate Examination Subjects, by sex in 1980.*



Source: Department of Education Statistical Report, 1979-80.

differences in take-up in terms of differences in the areas of provision, allocation and choice.

Provision

Our interest in the provision of subjects concentrated on two issues — to what extent do schools containing boys teach a different curriculum from schools containing girls, and what accounts for such differences.

There is substantially less curricular variation amongst schools at the junior cycle than at the senior cycle. At the junior cycle all schools teach Irish, English and Maths and most teach French, Commerce and Science. However, while the Technical subjects are almost universally represented in the vocational and community/comprehensive schools and, to a limited extent, in boys' and coed secondary schools, they are absent from girls' secondary schools.

At the senior cycle there is much more curricular variation. We were able to isolate, among our sample of 95 schools, six basic curricular types or "clusters" which adequately represented that variation. One of these clusters was made up almost wholly of vocational schools and another of community/comprehensive schools. The remaining four comprised secondary schools, two being made up mainly of boys' schools, the other two of girls' schools. The differences between these types of secondary school curricula could only partly be explained by variations in factors such as school size, age, location, composition of intake, and so on. We suggested that, as well as reflecting such variations, the clusters also reflected differences in the policies pursued by school decision-makers. In both the vocational and the community/comprehensive schools — with their distinctive curricula — decisions about the curriculum appear to be based on a common charter or general consensus on the goals of vocational and community/comprehensive schools. On the other hand, secondary schools show a much less clear-cut curricular logic, with basically four curricula types which reflect the outcomes of different strategies of curricula growth or of specialisation pursued by school decision-makers, or indeed of the absence of any clear curricular planning.

Taking the two most distinct school types for our purposes — boys' secondary and girls' secondary schools — they have distinct curricula, distinct organisational characteristics and each has a distinct ethos. Boys' schools tend to be smaller but are more highly specialised in Science, Honours Maths and Commerce subjects. They generally have a high achievement ethos which is shared by parents and teachers, but where teachers are, in general, relatively less important than parents. Girls' schools, on the other hand, have much less specialised curricula, with less Science and Commerce but more Languages and Accomplishment subjects. They have generally lower levels of achievement ethos but have teachers who are relatively more important than in boys' schools in affecting pupils' choices and aspirations.

Provision differences between secondary schools — both in the size of the curriculum and in the provision of Science subjects — are closely related to size of school, as one would expect. In neither case does school size explain more than half the variance in overall provision levels and less than one-third in the case of Science subjects. Increase in size over the decade 1968-1978 is not highly predictive of curricular growth. Besides size, the main social class characteristic of the school's pupil intake, whether the school was a boys', girls' or coed school, as well as the religious order running the school had independent influences on both curricular size and on curricular specialisation. But even taking all these environmental and formal organisational characteristics into consideration it became quite clear that a lot of freedom still existed for individual Principals, or decision-making coalitions within schools to determine their curricular priorities — particularly in schools where pupil (and teacher) numbers were increasing rapidly. It is clear from our results that some schools used these expanding opportunities innovatively and consciously, while others failed to capitalise on such resource additions.

Allocation

At the senior cycle, the most important school allocation policy concerns the academic prerequisites for pupils wishing to choose particular subjects. Such prerequisite rules for subjects such as Physics, Higher Maths, Chemistry and so on, show little difference between boys' and girls' schools. But because of the higher proportion of girls who have not sat for the required Inter. Cert. subject, a much higher proportion are excluded from senior cycle subjects. This is most marked in the case of the Technical subjects but is also very important in all Science subjects — 80 per cent of boys, but only 20 per cent of girls are obliged to take Science in the junior cycle; none of the boys but 13 per cent of the girls are not allowed to take the subject, and the remainder of each sex (20 per cent of boys, 66 per cent of girls) are given the option.

In general, therefore, allocation practices are of greater consequence at the junior cycle in determining rates of subject take-up; even for subject choices at the senior cycle level. Our analysis of allocation differences in five Inter. Cert. subjects showed major allocation differences in four of them: Science, Mechanical Drawing, Home Economics and Commerce. Science we have already dealt with. Mechanical Drawing is simply not allocated to the majority of girls in coed vocational, community and secondary schools. Home Economics is almost universally open to girls in coeducational schools but not usually to boys. On the one hand, in vocational and community /comprehensive schools, Commerce is often either not allocated to boys or placed as an alternative in a set of options to the Technical subjects; while, on the other hand, in boys' schools, Commerce may be allocated according to ability (which less commonly occurs in girls' schools) such that low and moderate ability boys are offered or allocated the subject, while high ability boys are not.

In general, therefore, allocation policies at junior and senior cycle level both discriminate directly between boys and girls in coed schools and, in addition, different rules of allocation hold in boys' and girls' secondary schools.

Choice

Sex difference in choice, at least for the seven Leaving Cert. subjects we analysed are generally greater than sex differences in provision or allocation. In the junior cycle, choice is generally less important, especially for boys, and thus allocation differences and provision factors among the subjects we analysed are correspondingly of greater weight. However, even here the rates of choice are clearly sex biased, particularly in Home Economics and Mechanical Drawing.

In Chapter 9 we deal with true rates of choice at some length, in examining factors influencing the choice of Higher Maths, Physics, Chemistry and Biology. Analysing what factors influenced those who chose or did not choose each of these subjects, when offered the opportunity, we found three factors to be common to both boys and girls. These were their level of examination performance in the Inter. Cert, their aspirations (particularly whether or not they aspired to a third-level Science course), and their attitudes towards the particular subject and to Maths and Science in general. These variables had somewhat different effects on each sex, and certain additional variables influenced one sex but not another. An example of the latter was the clear effect that the level of teacher expectations and support had on the girls' probability of choosing Higher Maths. This variable had no effect among boys.

The crucial question from a policy point of view is whether or not schools could influence these true rates of choice, since our research clearly indicates that increases in the rate of take-up of such non-traditional subjects among girls would depend very heavily on an increase in girls' true rate of subject choice. In the concluding part of Chapter 9 we demonstrate that schools (specifically, aspects of schools' ethos) could influence those variables which, in turn, influence the probability of a girl choosing a particular Leaving Cert. Science subject. It was particularly clear that teachers' expectations/support was an important independent influence on girls' choice of non-traditional subjects — and that such "teacher effects" were mediated by schools. It was also quite clear from our study of curricular and subject take-up changes in secondary schools between 1968 and 1978 that some schools — both coed and single sex — did succeed in substantially increasing *both* the provision and take-up of science subjects over that period.

Since the level of performance of pupils is also influenced by such organisational factors (Madaus, Kelleghan *et alia*, 1979; Rutter *et alia*, 1979), and individual performance levels are closely related to pupil choice (Chapter 9), it is clear that schools as corporate units can have independent influences on subject choice and performance levels.

It is clear also from many intervention programmes carried out in the USA and Britain that the subject attitudes and expectations of pupils and teachers are open to intervention. Some of these studies are reviewed in the final chapter where we examine some strategies of intervention which might be put into practice were one to attempt to change subject choice patterns.

Provision, Allocation and Choice

Perhaps the major finding to emerge from our analysis of the effects of provision, allocation and choice in determining sex differences in the rates of subject take-up was that, for most of the subjects analysed, although there were often pronounced sex differences in provision and allocation they were generally less than the sex differences in the pupils' own rates of choice. For example, in the case of Leaving Cert. Physics in our sample, 80 per cent of boys but only 33 per cent of girls were in schools teaching Physics to the 1980-81 Leaving Cert. class. Of these pupils in schools teaching Physics, 70 per cent of boys and only 58 per cent of girls were actually offered the subject. However, great as these sex differences are, we find that of those offered Physics, 53 per cent of boys but only 16 per cent of girls took it up. It is here that the greatest sex difference lies.

For individual subjects the relative importance of provision, allocation and choice varies widely. In some subjects, such as Biology, provision factors play only a minor role; whereas in others like Technical Drawing, provision is of major significance. Figure 10.1, page 293, illustrates the relative importance of each of these factors for each sex in determining the overall rate of take-up of six Leaving Certificate subjects among our sample. It also permits a ready comparison between the sexes of the effects of these factors.

Policy Implications

To achieve significant gains in the proportion of girls taking up non-traditional subjects would, therefore, require an integrated strategy of improving subject provision and changing allocation practices within schools; but mainly increasing the organisational and teaching support for such changes within the school, and positively changing pupils' and teachers' attitudes towards non-traditional subjects. Changes in the provision and allocation of non-traditional subjects *per se* would have little impact on take-up rates unless these changes were accompanied by such school ethos and pupil attitude changes. A detailed set of policy proposals are put forward in Chapter 11 and summarised at the end of that chapter.

CHAPTER 1

Introduction: The Objectives, Design and Rationale for the Study

We have three objectives in this introductory chapter: to outline the main objectives of the study and to briefly indicate the research procedures employed to answer these terms of reference; to provide the main rationale for the study by indicating the nature and extent of sex differences involved in second-level education and the consequences resulting; and finally to provide a short review of the main research findings on the underlying reasons for such sex differences in the type and level of education received.

Terms of Reference and Design of the Study

Up to very recently working women occupied a very particular and relatively unchanging position in the Irish labour force. They were disproportionately concentrated in certain "female" occupations, their average wages or salaries were significantly below those of men in comparative employment, and they almost universally retired from the labour force on marriage or on the birth of the first child. After school a short period of five to ten years was spent at work, but after marriage and childbirth up to 90 per cent of married women concentrated on a familial-parental career. The typical mother/homemaker — father/provider division of labour characterised the great majority of Irish marriages.

But over the past 20 years a series of economic, social and cultural changes has occurred which has led to a significant shift in that pattern: the marriage rate has increased markedly and fertility has declined, and consequently the period of intensive child rearing has been cut by up to seven or eight years; the proportion of younger married women staying on in the labour force has shown a sharp increase; the level of education of women particularly has risen rapidly; a growing proportion of older married women has become dissatisfied with the purely domestic role and wishes to return to paid employment — and the higher the level of education the greater the dissatisfaction, (Walsh and O'Toole, 1973). In addition, the nature and level of jobs available has changed even more radically for women than for men over the past two decades. And finally if we were to project recent labour force changes and work participation trends for married women over the coming ten years it appears to have even more serious implications for the education and training of women than of men.

Although it was not specifically those considerations that led the Women's Representative Committee to request a study of sexual inequalities in education in 1976 this concern formed part of a general European anxiety. This concern was articulated in the resolution of the EEC Council of Ministers of Education in February 1976: to identify the extent, type and character of inequalities in the education and training of girls in the second level of education.

Later in 1978 the Women's Representative Committee *(Final Report,* 1978) requested the Department of Labour to institute a study of sex differences in subject provision and choice in Irish post-primary schools, particularly at Leaving Certificate level. The main reason for this request was the belief that, despite educational developments, a great deal of educational inequality still existed, particularly in the curicula followed by girls and boys in post-primary schools, and that this educational inequality contributed significantly to subsequent inequalities in employment (*ibid.*, p.37). Agreement on the final terms of reference for the study was reached between the Employment Equality Agency (Department of Labour) and the ESRI in May, 1979. In this, the EEA acted in co-sponsorship with the Departments of Labour and Education, and with financial assistance from the EEC.[1] The study is, therefore, a response to national and EEC concern about sexual inequalities in educational provision and subject choice in Irish post-primary schools.

The study was given *three* major objectives:

1. To investigate the extent, nature and "causes" of sex differences in the school provision of subjects in Irish post-primary schools at the Group Certificate, Intermediate Certificate and Leaving Certificate levels. In summary, the main objective here could be restated as follows: given wide variation from school to school in the range, level, nature and "packaging" of subjects offered to boys and girls, what is the extent and nature of such sex differentiation in curricular provision by schools, and what are the major factors accounting for that variation?

In 1980, for example, only 54 per cent of girls took Science in the Intermediate Certificate examination compared to over 90 per cent of boys. Girls are barely represented in the number of pupils provided with, or taking up, any of the technical subjects in any second level examination. About four times the proportion of boys than girls take up Higher Maths in the Leaving Cert.

[1]Directorate General V, Employment, Social Affairs and Education.

and about eight times as many boys take up Physics. On the other hand, Home Economics, Art and Music are equally biased as girls' subjects. Obviously a very high degree of sex difference in subject take-up exists in these examinations. But what really accounts for these differences? Are they simply due to school provision differences, or — an equally plausible alternative hypothesis — are they due to spontaneously arising differences between boys and girls in subject choices amongst an equally available set of options put before them? If the former is true, policy is easily, though perhaps expensively, determined by additional subject provision. If the latter is the case then a very different set of policy options becomes relevant.

In order to examine provision differences amongst post-primary schools, and the extent to which an historically grounded provision differentiation by sex actually occurs in the system, a very detailed programme of work was agreed with the steering committee. This involved an examination of the pattern of change in subject provision in the different types of Irish post-primary schools over the preceding decade and a half — a period of very rapid change in Irish post-primary education.The extent of this change can be appreciated from the fact that between 1965 and 1980, the number of pupils in second-level schools more than doubled, while the number of candidates taking the Leaving Certificate examination — at the end of second-level education — more than trebled. If significant differences in subject provision policy exist amongst schools catering for girls and boys — even in 1981 only about 20 per cent of secondary-level pupils attended coeducational schools — such a study of changes in curricular provision by schools over such a crucial period of time should allow us to determine whether certain social, cultural and resource differences amongst schools are systematically related to these changes.

To answer this question, a stratified random sample[2] of one-fourth of all secondary schools was selected (125 schools in all). Intermediate Cert. (IC) exam results were extracted from the Department of Education files for half of all students doing the IC in these schools in 1976, 1973, 1970, 1965 and 1962. All of the Leaving Certificate (LC) records for this sample of students were also extracted and coded. A total of around 20,000 records were extracted.This gives us a time series of linked Intermediate Certificate and Leaving Cert. records in a national sample of boys', girls', and co-ed secondary schools over a crucial 15-year period. In addition to this 10,000 Group Certificate

[2]The population of Secondary schools — taken from the 1978 official List of Post-Primary Schools, was stratified by whether the school was fee-paying or free; Catholic or Protestant; Girls'; Boys'; Coed; and by three size groups; <300; 300-499; 500+; and by size of place. There were 81 cells in all of which 35 were empty. One in four samples were selected randomly — using random numbers. This gave us a fully proportional sample of 125 schools.

records were also extracted for the period 1965 to 1978 from a one in four sample (N=58) of vocational schools.

Basic information on the characteristics of these schools was subsequently added to the file: the size of school at each stage; the religious order that operated the school; whether a coed or single sex school; region; whether fee-paying or not, etc. The relationship between curricular variation and change and this set of school characteristics was then explored in detail.

2. The second objective is closely related to the first. Although provided in the school, not all subjects are offered on an equal basis to all pupils in the same year or class within a school. School managements make distinctions amongst pupils on the basis of ability, sex, or previous performance, and frequently allocate different sets of subjects to different categories of pupils: e.g., girls are not allowed to take technical subjects, boys are not allowed to take Home Economics; most boys are allocated Science, girls are given a choice; upper streams are allocated higher level Maths in some schools but given a choice in others; lower ability streams are not allocated French, and so on. Such schools determined constraints on choice — within the total set of subjects taught by the school — may be an extremely important source of subject/pupil differentiation that has very little to do with "choice" by pupils.

To examine the extent and nature of such school determined subject differentiation detailed interviews were carried out with principals and career guidance teachers in a national sample of post-primary schools. The reliability and comprehensiveness of the information on such school allocation rules — of pupils and subjects, etc. — was cross-checked. The information obtained from both respondents was amalgamated with that from a detailed administered questionnaire study carried out with Intermediate and Leaving Certificate students in the same schools.

As a result the extent, nature and significance of such "school allocation" procedures were extensively studied; as well as the way these rules varied by such basic school characteristics as single sex or coed schools, vocational or secondary schools, large or small schools, and so on.

3. Pupils can only choose within the set of subjects offered by the school. Whether the school offers the subject or not is outside the control of individual pupils. But within such school determined constraints the main question becomes: to what extent do boys and girls choose differently within the same or similar set of subject options offered? And if such student choice factors are important — what accounts for such sex differentiated choices?

Essentially the first two objectives deal with differences between schools.

The third focuses on differences amongst pupils within schools on their subject choices and on the factors explaining such differences. Boys and girls bring to post-primary schools a somewhat different set of educational skills, self conceptions, attitudes toward different subjects and their sex role appropriateness, as well as different life goals and expectations — marriage, childrearing, work and career. What is the nature and extent of these differences? And to what extent does such a sex differentiated culture explain sex differences in subject choice?

Our initial hypotheses, formulated on the basis of a review of the research literature, was that sex differences in subject choice could largely be explained in terms of the following factors:

(i) Differences amongst pupils in educational performance in crucial subjects.
(ii) Differences in sex role expectations: in occupational, career and marriage expectations, and in some current sex differentiating roles.
(iii) Sex differences in educationally relevant values, beliefs and attitudes:
  (a) senses of personal competency — particularly in Maths and Science;
  (b) attitudes toward different subjects on the curriculum;
  (c) sex differences in relation to classroom interaction and learning experiences — particularly the distribution of rewards and sanctions in the classroom;
  (d) "significant other" influences on choice and aspirations — particularly parents, teachers, peer group, etc.
(iv) The reinforcing effects of teacher and school influences on their sex differentiated attitudes and aspirations.

To investigate these and other hypotheses a detailed national survey of the subject choices made by pupils in the Group, Intermediate and Leaving Cert. examination classes, and of the school determined and individual factors related to these choices, was carried out in a random sample of post-primary schools in 1981. A total of around 4,000 Leaving Cert., 5,200 Inter. Cert. and 510 Group Cert. pupils were administered detailed questionnaires in their classes in the sampled schools, and an extensive analysis of the responses to these student questionnaires was carried out to test the validity of a number of alternative hypotheses purporting to explain pupil choice patterns.

This way of setting up the problem would appear to assume that the way in which schools provide and allocate subjects is attitudinally neutral and can be adequately represented by the formal school rules of subject allocation. In fact there has been extensive research documenting the significance of informal teacher expectations and influences on subject or level choices and performance (Maccoby and Jacklin, 1974; Safilios-Rothschild, 1979; Kelly, 1975, 1981). However, it was our view that in so far as such informal curricular influences operated within schools they would be adequately reflected in the differential attitudes and expectations of male and female pupils as well as in pupil perceptions of such teacher/school influences. By and large, these expectations were confirmed by our results, but we would be the first to admit that our approach does not fully elucidate the nature and extent of these "hidden curricular" influences operating within schools. Given our terms of reference, however, and the time and resource constraints under which we worked, we remain confident that to a large extent these indirect measurements of the "hidden curriculum" do adequately represent the effects, though not the nature, of the phenomenon.

In the following section we show that substantial sex differences exist in the subjects taken by boys and girls in the Intermediate and Leaving Cert.: whether these differences are due to differences in provision, allocation or choice will be explored in detail in Chapters 5 to 9.

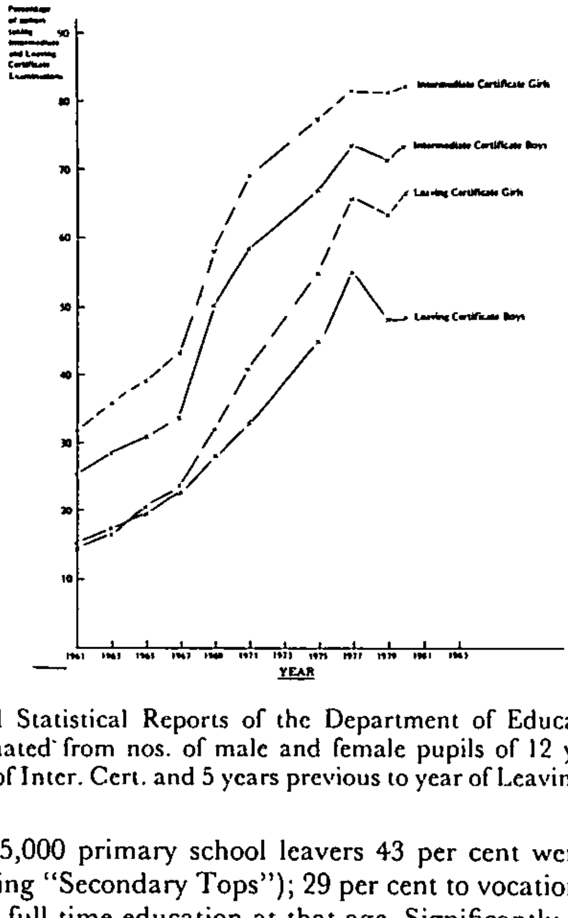
Sex Differences and Inequalities in the Curriculum

From a position in the mid-1960s when significantly fewer girls than boys completed the senior cycle of post-primary education, participation rates in almost all European countries in the senior cycle of second level have become roughly evenly balanced over the past decade (Eurostat, *Education and Training*, 1980). Significant differences continue to exist, however, in all countries in the type of institution attended — with boys being disproportionately concentrated in technical or vocational education, girls in domestic science and commercial subjects. Even in countries where there has been a progressive comprehensivisation of education, as in Great Britain, for instance, coed comprehensive schools still exhibit significant sex differences in the type of courses being followed. In such respects the fact of comprehensivisation and coeducation has had very little impact on the degree of sex differentiation (Byrne, 1978 (a), (b), (c); Kelly, 1981; Department of Education and Science (DES), 1975; Council of Europe, 1982).

Girls then are no longer at a serious disadvantage in regard to selective secondary education — indeed, if anything they are over-represented in academic type upper second-level courses. And even at third level, very significant progress has been made in participation rates, with small differences now remaining between the sexes in the overall participation rates in most European countries in the early stages of third-level education.

The differential participation of the sexes in third-level education will be covered in detail later but the trends in Figure 1 indicate clearly the substantial increase that has occurred in second-level participation rates and certification levels over the past 20 years in Ireland.

Figure 1: *Percentage of boys' and girls' cohorts who did the Intermediate and Leaving Certificate Examinations in 1961 to 1979*



Source: Annual Statistical Reports of the Department of Education. Maximum cohort size estimated from nos. of male and female pupils of 12 years old 3 years previous to year of Inter. Cert. and 5 years previous to year of Leaving Cert.

In 1963 of 55,000 primary school leavers 43 per cent went to secondary schools (including "Secondary Tops"); 29 per cent to vocational schools, and 28 per cent left full time education at that age. Significantly fewer girls than boys dropped out at that stage, but of those who proceeded substantially more girls went into academic secondary schools (*Investment in Education Report,* 1966, p.169). By 1980, of roughly 67,000 primary school leavers less than 1 per cent dropped out of school, 65 per cent went to secondary schools, 25 per cent to vocational schools and 10 per cent to the newer comprehensive/community schools. Substantially more boys than girls went to vocational schools and more girls went to secondary schools.

Such increasing rates of participation are very obvious in Figure 1: a very rapid growth in the participation of girls, particularly in the Intermediate and Leaving Certificate examination. Now more than 80 per cent of girls do the Intermediate Certificate and roughly two-thirds go on to do the Leaving Certificate. The participation rate for boys at second level is significantly lower and this sex difference has widened over the period, particularly at the senior cycle level. This trend toward increasing participation levels for girls in the senior cycle of post-primary schools has been true for most EEC countries in the 1970s (Eurostat, *Education and Training*, 1980, p.157).

But if increasing participation rates involve only increasing proportions of girls taking the traditionally "feminine" subjects in second- or third-level education, changing sex differences in participation rates would have less meaning. Indeed, in many respects, this appears to have occurred with increasing female domination of third-level teaching, paramedical and social science courses, with only slight improvement in the apprenticeship, management, technical or applied science areas. (See Eurostat, *Education and Training*, 1980; Council of Europe, 1982). So, at second and third level the main distinctions between the mainly feminine and masculine disciplines remain, though showing slight reductions in the male domination of Technical and Applied Science areas.

As we have seen, overt sex differentiation in curricular objectives and provision exist in most European countries (Byrne, 1978 (a) (b) (c); Council of Europe, 1982). These curricular arrangements significantly decrease the probability of girls taking up technical and scientific subjects particularly. They are based almost universally on historical distinctions in the career paths and family roles of men and women, although they may only very roughly reflect current differentials in the work and family roles of younger married women, and in most cases do not take into consideration the considerable shifts that are occurring in the labour market and in adult gender roles.

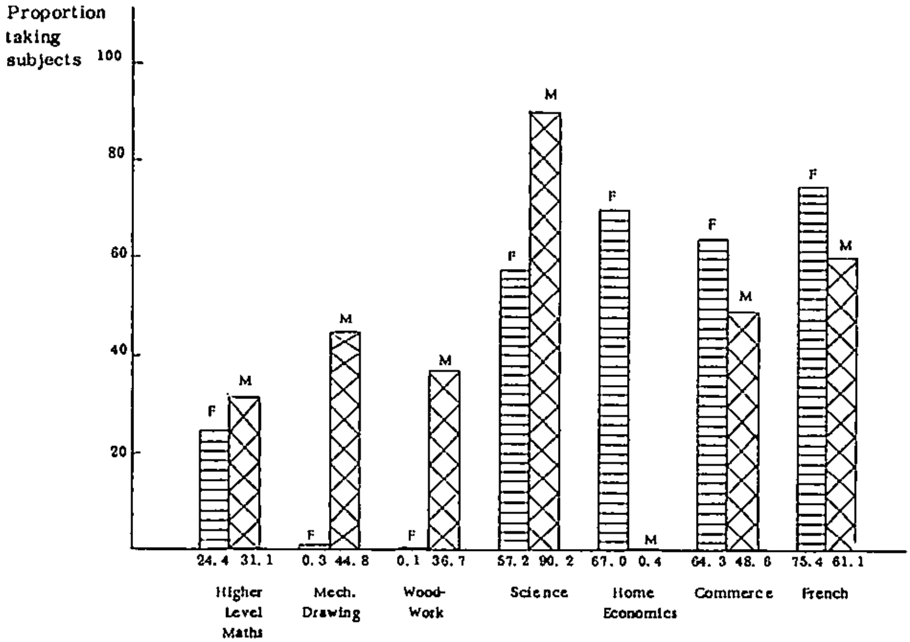
Nor has the marked trend toward comprehensive and coeducation made much of an impact. In the United Kingdom, for instance, despite a far reaching movement toward coeducation, sex differentiation in subject take up is very pronounced, in both the GCE and CSE examinations. By 1975, almost 80 per cent of secondary schools were coeducational, but within these schools, although there was supposed to be formal equal access to all subjects, less than 2 per cent of examinees in Technical Drawing in the GCE/CSE examinations in 1975 were female, and less than 1 per cent in Woodwork/Metalwork. The position in Physics, Chemistry, and Maths, although less male dominated, was also dominantly male (Department of Education and Science, 1975; Byrne, 1978 (a), pp 114-129).

The most recent reviews of curricular specialisation in European countries

(Byrne, 1978 (a) (b) (c); Council of Europe, 1982) show a very biased specialisation of males in the Technical, Physical and Applied Sciences, and Mathematics; and of girls in Biological Sciences, Languages and Social Sciences. Even in the Scandinavian countries (which have the most developed programmes to help equalise opportunities) despite a clear movement toward reducing inequality over the past decade, subject choice at second and at third level are still highly differentiated by sex: with Manual, Technical, Mathematics, Physical Science subjects dominated by boys; and Languages, Arts, Domestic Science by females. Specialisation in Commerce subjects show an interesting trend — its sex specific nature varies widely from country to country (Council of Europe, 1982).

The following two figures illustrate the position in Ireland, more detailed analysis being provided later. At the junior cycle, boys quite clearly dominate the technical subjects — Mechanical Drawing, Woodwork and Metalwork. A mere handful of girls take Mechanical Drawing, for instance, the most popular technical subject (see Figure 2). But even in Science and Higher Maths a quite

Figure 2: *Relative proportions of boys and girls taking different subjects in the Intermediate Certificate Examination in 1980*

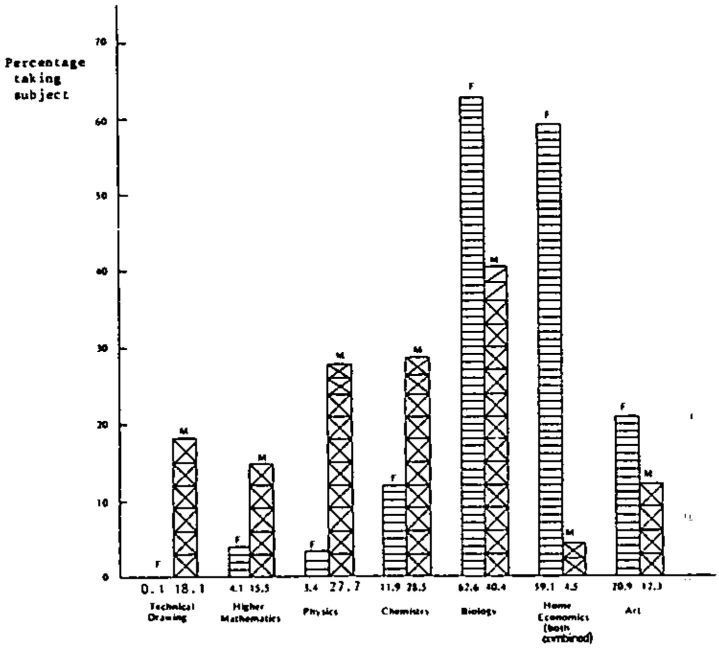


Source: 1979/80 Department of Education *Statistical Report;* this base being the total number of pupils taking the Leaving in 1980.

pronounced male bias occurs, with over 90 per cent of boys but less than 60 per cent of girls taking Science as a subject in the Intermediate Certificate. The reverse kind of bias occurs in Home Economics, Music and Art; and to a less pronounced extent in Modern Languages.

Subject bias in the Leaving Certificate is even more pronounced (see Figure 3). Almost no girls take any of the technical subjects while Higher Mathematics, Physics and Chemistry show a substantially larger sex differentiation than do Higher Mathematics or Science in the Intermediate Certificate. As pupils move from junior to senior cycle, greater sex differences occur. Even Science subjects themselves become sex differentiated — Biology showing a very clear female bias and Physics an even more pronounced male bias. Interestingly, the introduction of the Home Economics course (Social and Scientific) has resulted in a slightly less pronounced female bias at the Leaving Certificate level.

Figure 3: *Relative proportions of boys and girls taking different subjects in the Leaving Certificate Examination in 1980*



Source: 1979/80 Department of Education *Statistical Report*, the base being the total number of boys and girls taking the Leaving Certificate in that year.

Quite distinct patterns of subject specialisation, therefore, occur in Irish post-primary schools. The aim of this research report is to describe the extent and nature of these sex differences as well as to locate the source or "causes" of these sex biases. In the following section we briefly review the main research findings which bear on this question, and which form the basis of our conceptual approach to the research carried out.

Accounting for Sex Differences

What then are the main influences bringing about such sex differences in the educational experience and performance of the sexes? Since excellent reviews of the research literature exist elsewhere (Maccoby and Jacklin, 1974; Safilios-Rothschild, 1979; Kelly, 1980) our aim is simply to provide a sufficient foundation for our assumptions and conceptual approach to the detailed research described in the remainder of the monograph. In the following we focus initially on that research which attempts to explain sex differences in terms of cognitive and value differences as well as differences in social orientation. In later chapters we examine the effects of schooling on reinforcing such traditional sex role differentiation.

(a) Innate vs. Learned Differences Between the Sexes

The literature is in general agreement that whatever innate differences in personality and ability may exist between the sexes they are virtually impossible to abstract from socially learned and reinforced differences. Tresemer (1975, pp. 312-313) summarises some broad-ranging research on this topic, and concludes that in so far as there may be such innate differences, what is important is the significance attached to them. A large range of cultural interpretations has arisen from the same small biological difference. For many of the pairs of polarised attributes associated with men and women in our society, the opposite association has been upheld in another country. (See Davies and Meighan, 1975, p. 168.) This suggests that "masculine" and "feminine" characteristics are best seen as metaphors, culturally-evolved interpretations of physiological differences, which vary over historical and social circumstance (Lee and Gropper, 1974, p. 347).

There may be some genetic or biological basis for differences in mathematical and verbal abilities between boys and girls which is not as yet clearly identified or understood. Astin (1975, p. 80) summarises the main findings as follows:

1. Boys and girls do not differ systematically on measures of total or

composite cognitive abilities — that is, IQ measures. But girls tend to be superior on verbal abilities; boys, on spatial and mathematical abilities.
2. In general, of all three aptitudes, (Math., verbal, spatial), spatial relations emerge as one of the most consistent and strongly differentiating aptitudes between the sexes.
3. Studies that have examined genetic, hormonal, or differential brain development differences as possible determinants of differential cognitive functioning between the sexes are, as yet, inconclusive.

These cognitive differences obviously confer some advantage on boys in mathematics and physical science. Most of the comparative international work on this has shown a consistent advantage for boys in mathematical and scientific ability (see Kelly, *Girls and Science,* 1978). These differences, however, are rather minor compared to much larger cross-cultural differences in mathematics and science achievements, with girls in some countries considerably outstripping boys in others (see Kelly, 1978, p. 106).

Therefore, although cross-culturally consistent sex differences exist in certain aspects of cognition, these differences are very small when compared to the very wide differences in actual achievement observed within countries, as well as the even wider cross-cultural differences. Although it would, therefore, be very unreasonable to reject the hypothesis of genetically or biologically determined differences in spatio-visual and related cognitive abilities, these are relatively minor when compared to the extremely wide sex differences observed in mathematical and science performance, particularly when one takes into account the cross-cultural differences observed.

(b) The Influence of Parents and Early Learning of Gender Roles

A highly differentiated task, authority and social-emotional pattern of roles, based on age and sex, has characterised family and kinship structures in almost all societies over a very long period of time (Parsons and Bales, 1955; Goode, 1963). Cultural differentiation based on sex — with the instrumental-leadership roles being taken by males and the social-emotional by females — might not be as functional or as determinative as proposed by Parsons and Bales (1955), but deep seated cultural differences by sex exist in almost all cultures and result in the socialisation of even infant boys and girls into sex role models which are so deeply and so implicitly accepted that they appear to be outside the reflective consciousness of even "liberated" parents.

Socialisation into gender roles begins with the identification of physiological sex at birth, (e.g., colour-coding girls and boys). From the child's earliest experiences, learned gender attributes have a central place in its discovery of what or who it is. By the age of five, most children have strong sex-typed views on appropriate behaviours and expectations, and monitor their own behaviour in the light of these (see Hoffman, 1972; Kohle and Piliavin, 1976; and Parsons, Ruble, Hodges and Small, 1976). Parents' own attitudes are influential in this process, and traditional roles are difficult to escape. Even where parents are acting in a totally equalitarian fashion as Parson *et alia* (1976) remark, "still the children may extrapolate stereotypes from their culture. And in turn these stereotypic beliefs can influence children's perceptions of expectancies of others, perceptions of their own ability and performance, attributional patterns, and, ultimately, generalised expectancies for success" (op. cit., p. 54). Despite avowals of egalitarian intent in the education of the sexes two studies have shown that even "liberated" parents were often sending their children to different kinds of schools, and did not agree with broadening curricula to teach boys needlework or girls woodwork. Household tasks were similarly sex-typed (Sampson, 1976).

Parents in most cases play a very direct role in shaping their children's acceptable gender identification (see Lee and Gropper 1974, p. 387). Very young children showed least gender exclusiveness, playing readily, for instance, with "boys" or "girls" toys (Sampson, 1976, p. 15). But parental discipline and correction is administered differently to boys and girls. Mothers treat male and female infants differently: girls are expected to be more fragile, and are treated more protectively. Fathers especially discourage any "feminine" behaviour in sons while indulging this behaviour in girls (Moss, 1967; Davies and Meighan, 1975). Girls are less likely than boys to be given independence or support training at an early age, and, therefore, tend not to develop confidence in their coping ability as quickly as boys (Hoffman, 1972; Fitzgerald and Crites, 1980).

Children recognise from an early age that their sex is central to the way they think about themselves. The task performance by 6-8 year olds (playing with an asexual toy clown) is markedly affected by gender attribution of the task (see review in Davies and Meighan 1975, p. 169). By kindergarten age (4-5 years), Kohle and Piliavin (1976) found that boys and girls knew that their future career choice was governed by their sex. Like Looft (1971), the authors found that the girls' desired careers were mostly nurse or mother or other "caring" services. Both girls and boys perceived boys' career options to be wider and more adventurous, and shared the estimation of men as strong and competent and women as weak and less competent.

There is disagreement about the role of parents in shaping girls' and boys' ambition and independence. Manley (1977) summarises the relevant research (pp. 230-235), on the nature of boys' and girls' achievement motivation, and parents' role in its promotion. She suggests that parents' influence has different consequences for achievement motivation depending on whether they show warmth or hostility to boys and girls, and whether warmth is shown in a controlling or a permissive environment. Parental warmth was more often correlated with males' achievement orientation than with females'; parental permissiveness or absence of maternal intrusiveness seemed to be a more important factor for girls' than for boys' development orientation or ambition, though the father-daughter relationship may prove to be important. High levels of maternal nurturance typically generates "femininity" in girls, i.e., dependency, passivity, conformity (Mischel, 1970). The more creative of a group of doctorate-holding women mathematicians were alienated from their mothers and identified primarily with their fathers.

Parsons, Ruble, Hodges and Small (1976) summarised the evidence to explain the subjective and relatively covert psychological sources of differential expectancies of success:

(1) Culturally determined expectancies: by age five, sex-labelling affects children's performance of tasks and the stereotyping of man-strong, woman-weak, is incorporated into their behaviour. The expectations of "significant others" (parents, teachers, best friends) appear to be more consistent for boys; their self-perceptions are more consistent with their perception of the expectations of others. (2) Girls perceived their abilities as lower than boys in spite of the fact that girls on average performed better. This appears to occur in children as young as kindergarten age. (3) Frieze (1975) suggested that females' attribution of success to luck reinforces low expectations, with failures seen as "normal". Girls tend to accept and perpetuate low expectations in this way, attributing their failures internally, to lack of ability; and their successes unstably, to effort or luck. Boys' failure is attributed to lack of effort or poor luck; success to ability.

The main conclusions flowing from this research postulate that even accepting certain innate sex differences, these originating distinctions are considerably magnified by early socialisation into "taken for granted" sex differentiated roles. These differential expectations are often so deeply internalised, so taken for granted, that even "liberated" mothers clearly distinguish between infant boys and girls in their expectations, sanctioning and succouring behaviour. These differences in expectations not only result in young boys and girls thinking of themselves as being different but in girls tending to think of themselves as less able in certain crucial aspects. As a result, children carry to school with them clear sex differentiated expectations, as well as likely differences in reactions to teachers' expectations and the way they distribute rewards or sanctions.

(c) School Effects

The research on sex differentiated teaching has been so extensively reviewed elsewhere (Safilios-Rothschild, 1979, pp. 65-90; Kelly, 1975, 1981; Maccoby and Jacklin, 1974) that there is no need to repeat it here. Three aspects deserve attention, however: (i) sex differences in school provision have been shown to be very important — as between boys' and girls' schools, as well as sex *difference in subject and resource allocation within coeducational schools* (Byrne, 1978, (a) (b) (c); Kelly, 1978, 1981). Such clear sex differences in the provision of subjects — particularly in mathematics, science and technical subjects — are based on decisions made by school authorities. They allocate different curricula to boys and girls and by so doing endorse and reinforce traditional gender role differences. As Byrne (1978 (c)) has pointed out, Irish post-primary schooling is highly sex differentiated in this sense. (ii) Clear sex differences in allocation rules within coed schools have also been clearly demonstrated, with girls being allocated to "traditional female" subjects — Domestic Science, Art and Music, extra Languages, etc., and boys to Technical and Science subjects (see Byrne, 1978 (c)). As we shall see, marked school differences exist in these regards in both coed and single sex schools — e.g., in single sex schools an insistence that almost *all* boys do junior cycle Science while girls are given a choice, while in coed schools there are clear sex differences in the packaging of options for boys and girls.

The exclusive provision of Home Economics to girls and Woodwork or Metalwork to boys is widespread. The filtering of girls into arts rather than science subjects because they are more congruent with their gender-role is also prevalent (see Davies and Meighan, 1975; van der Bakker, 1974; Brock-Utne, 1981; for relevant information on British, Dutch and Norwegian schools). In many cases, the allocation of resources and subjects is decided on *grounds of sex. The British Ministry of Education had prescribed lower* standards for Science and Technical rooms in girls' schools than were prescribed for boys' schools (Davies and Meighan, 1975, p. 170). In Ireland a less serious Maths course was taught exclusively to girls up to the mid-1960s; the Group Cert. curriculum is still highly sex differentiated; the design of the Mechanical and Technical drawing syllabi is indirectly linked to other "male" subjects.

(d) *School Textbooks/Examinations*

Extensive research has been carried out in Britain (see Kelly, 1981, review), the United States (see review in Safilios-Rothschild, 1979, pp. 72-73), France (review by Michel, 1981; Beraud, 1975) and many other European countries on sex role stereotyping in school textbooks. They show it to be pervasive and in many cases quite retrograde — with parental roles so traditionally presented as to be out of keeping with current trends. This reinforcement of traditional stereotypes, of what are often currently inoperable adult sex role models, represents a form of inbuilt structural differentiation in the learning process which legitimises and solidifies traditional sex role allocations.

Such sex-typing in textbooks, which conveys "normal" views on behaviour to children in a non-explicit fashion — the majority of dominant characters in the illustrations, for instance, being male — appears to be the norm; women, when they appear at all, being portrayed as secondary characters. They are most often engaged in domestic activities, or in "caring" or service activities; rarely portrayed as at work outside the home, and virtually never in an equal capacity (in personality traits or occupational activity) to men. These role models serve to substantially reinforce traditional stereotypes (see review in Davies and Meighan, 1975, pp. 169—171; Council of Europe, 1982).

Examination and achievement tests have also been shown to be significantly sex-biased — particularly in Maths and Science. (see review by Safilios-Rothschild, op. cit., p. 73; and Kelly, 1980, pp. 25-26). Milton (1958) and Graf and Riddell (1972) find that girls did better in maths examination questions that referred to specifically feminine activities than on questions which were mathematically identical but framed in masculine or apparently neutral form. Questions using such feminine examples are extremely rare in examination questions.

(e) The Hidden Curriculum

Most of the above refers to explicit bias in school programmes. But what appears to be equally important are the implicit, taken for granted, distinctions made by teachers between boys and girls within and outside the classroom. The "two-thirds" rule as enunciated by Flouden but adapted by Spender (1981) dramatically, though probably exaggeratedly, indexes this: teachers spend two-thirds of their interaction time with boys in coed classes, and two-thirds of student initiated interaction is from boys (Spender, 1981; Wernerson, 1981; Claricoates, 1978; Kelly, 1978, 1981). Both the behaviour of pupils and the expectations of teachers appear to reinforce traditional sex role distinctions. Boys in coed classes appear to be more assertive, competitive and less accepting of authority. Girls appear to be more compliant and accepting of authority.

Parents, whatever their implicit role-expectations for boys and girls, treat their children as unique individuals (Parsons, Ruble, Hodges and Small, 1976, p. 55). Teachers, with a large number of children to control, are more prone to rely on stereotypes — more willing to generalise about the abilities of "boys" and "girls", as social categories (Davies and Meighan 1975, p. 174). Studies of teachers' expectations of the ideal pupil in junior classes show that they conform closely to the traditional female sex-role: interested, compliant and industrious. (See, Lee and Gropper, 1974, pp. 388—390; Safilios-Rothschild, 1979, pp. 65 ff.): and because of this congruence of "good-pupil" and female roles traditional patterns of sex-typed behaviour are reinforced. While teachers regarded girls as confirming more closely than boys to the model of the ideal pupil most teachers would nonetheless prefer to teach boys. They saw girls as more conscientious, neater, better at written work but they felt boys had better career prospects and were easier to get on with. (See Davies and Meighan 1975, pp. 174—5). As a consequence of these sex role differentiating processes the general tenor of research findings in this area indicates that girls — with their high conformity to "ideal pupil" expectation held by teachers — tend to be rewarded more frequently for this conformity. Even low achieving girls, by conforming more closely to ideal classroom and sex role behaviour norms, are much less sanctioned by teachers than equally low achieving boys who, most research reports show, are far more disruptive and difficult to control (Safilios-Rothschild, 1979, pp. 67-74).

However, although the level of rewards may be higher for girls the meaning of these "rewards" may be quite different. Teachers tend to respond differently to boys' and girls' performance. The achievement literature already referred to, suggests that teachers are more prone to attribute boys' failure to unstable causes such as lack of effort, and girls' to lack of ability. They also tend to criticise girls' work more pointedly, allowing girls to imbibe doubts about the intellectual quality of their work and abilities, whereas criticism of boys' work is directed in such a way as to allow them to dismiss even substantial criticism as not relevant to their innate abilities (Parsons, Ruble, Hodges and Small, 1976, p. 57).

(f) Effects of coeducation

The relative merits of coeducational and single sex schooling deserve careful assessment, especially with the increasing importance of our newer, mostly coeducational, community schools. This trend towards coeducation holds in most western countries despite a lack of consensus regarding its educational merits over single sex schooling.

One of the most influential British advocates of coeducation had been Dale (1969; 1971), whose 1971 study found that in Britain both teachers and students generally preferred coed schools. The atmosphere in coed schools was seen as more congenial and the students perceived the teachers as friendlier and more helpful. Single-sex schools, on the other hand, were seen as stricter and as placing more emphasis on discipline. In a later study, Dale and Miller (1972) found only a slight association between the type of school attended and first year university performance but that what effects there were tended to favour coeducated students. But most recent work (Dale, 1974; Department of Education and Science, 1975; Ormerod, 1975; Finn, 1980) has shown, however, that when the obvious social class differences between the single sex grammar or secondary schools, and coeducational comprehensive schools, are controlled for, sex biases in subject attitudes, preferences and choices still remain in coeducational schools and in many respects girls in coeducational schools are at a distinct disadvantage. Dale's (1974) revised review of research on the issue, for instance, indicated that girls in single sex schools were more likely to choose Science and Maths subjects. Ormerod's (1975) and Finn's (1980) studies showed that strong sex linked choices and levels of achievement, particularly in Science, were greater in coed schools.

A number of reasons were proposed to explain this. Boys and girls have different learning styles (Ormerod and Duckwork, 1975) — particularly in Science — and respond differently to various teaching strategies and types of teacher and evaluation-sanctioning practices which discriminate between boys and girls. Teachers appear to unwittingly adopt practices which encourage and advance boys and simultaneously reinforce girls' beliefs that they cannot do as well as boys in Maths and the Physical Sciences (Ormerod and Duckworth, 1975). This "polarisation thesis" in coed schools has been supported by observation studies of classroom interaction in coed schools which indicate a significant male bias in attention seeking, information giving, and in teacher evaluation and sanctioning behaviour (Spender, 1978; Spender and Sarah, 1980; reviews by Kelly, 1980; Safilios-Rothschild, 1979). As a result a greater polarisation of subject choices occurs amongst coed pupils.

Also in coed schools the saliency of sex role identity formation processes appears to be greater — bringing about greater sex role polarisation in these circumstances (Ormerod, 1975). A study by Coleman in the United States (1961) and a later one by Jones, Shallcrass and Dennis (1972) in New Zealand found that in coed schools there is a greater emphasis on popularity and on dating than in single-sex schools. Coleman argued that status in the adolescent society of coed schools is more dependent on popularity than on scholastic achievement. Allen (1978) also finds that pupils in a mixed school tend to reaffirm the traditional sex role stereotypes in their choice of subjects.

Overall, however, there is no universal agreement amongst researchers in this area, many studies — particularly American — finding no effective differences between the school types on a range of variables. Many of the individual studies, however, fail to control for very relevant variables in their comparison of single sex and coed schools — like the social class characteristics of the pupils — so that results have to be interpreted very carefully. Given the almost unanimous recent British results, however, the most reasonable hypothesis appears to be that in terms of subject choice, educational achievement, self attitudes and attitudes to Maths/Science, etc., that girls in coeducational schools are at somewhat of a disadvantage relative to girls in single sex schools — once other relevant variables have been controlled for (Dale, 1974; Department of Education and Science, 1975; Ormerod, 1975). Coeducation schools, therefore, although significantly advantaged in terms of curricular provision and efficiency, do not appear to have that significant advantage in terms of student take-up of subjects — particularly subjects that are clearly sex stereotyped — or in levels of education achievement. Nor does it necessarily have the advantage, for girls, of more spontaneous and successful socialisation into satisfactory adult sex roles or satisfactory educational self image that was originally claimed for it.

Although differentiated sex role socialisation has been proceeding since childhood it may be a mistake to assume that — even where such differentiated primary socialisation has crystallised into rather clearcut sex role identities by age 12/13 — the constituents of sex role identity (particularly the extent to which essentially sexist beliefs underlie it) have become so crystallised by secondary school age it is not open to change. Puberty/adolescence is a particular developmental period in which reflection upon childhood experiences and one's family socialisation experiences take place, that the identity crises force at least re-conceptualisation, if not a break, with former relationship concepts and associated patterns of thought and behaviour. It is in this period of potential contradictory expectations/messages that girls face far greater problems than boys — whose traditional roles are not threatened and are not open to such contradictory expectations about roles. For girls it is a time in which very diffuse and unsure expectations have to be crystallised into very concrete choices.

Significant sex differences in Mathematics and Science preference widen markedly in adolescence (see review by Kutner and Brogan, 1976; Kelly, 1978; Safilios-Rothschild, 1979) — precisely at a time of heightened awareness of gender identity. However, although beliefs in the "natural" ability and aptitude difference between the sexes is highly institutionalised in western society, identity formation in puberty and adolescene in modern industrial societies takes place in a much more isolated "breathing space" than was true in previous generations (Coleman, 1961). In this respect many schools facilitate change and others reinforce tradition – whether coed or single sex.

Teachers, the school organisation and peer influence connected to the school, vary in the extent to which they create "a space" for exploration of alternative role models. The school itself may be able to create an arena of achievement which allows girls to construct models of themselves along alternative lines to the traditional one but which still stay within the ideal framework of values. However, it may well be, as Bernstein (1975) has pointed out in another context, that schools cannot "compensate for society" in this way. Part of the objective of this study is to try to assess the significance of this school variation.

(g) Conclusion

The preceding briefly reviews the research available on factors explaining sex differences in type and level of educational and occupational achievement:— inherited and early socialisation differences, early schooling effects, the various influences on adolescent sex role identity formation, and institutional and social psychological factors likely to influence adolescent boys and girls in their educational and occupational choices.

The main variables used in the study and the hypothesised set of relationships amongst these have been briefly indicated in preceding paragraphs. Both "structural" (family background and school factors) and social psychological factors are posited as significant in curricular provision and subject choice. The underlying reasons for subject provision and allocation differences amongst schools will be explored in detail in Chapter 4 and the evidence assessed in Chapters 5 to 7. In regard to "subject choice" we have concentrated on sex differences in such "internalised variables" as: educational self-image; sense of mastery over subjects; extent of "initiative-taking" in classroom; attitudes toward own competence in maths and science; the nature of perceived sanctioning in the classroom, etc. In our own review of the literature these appeared to be the most important differentiating variables. And in our extensive pretesting all of these variables showed substantial sex differences and explanatory potential. The following, therefore, are the main hypotheses being proposed to explain why girls differ from boys in their choice of subjects – given equal chances to select a subject. Girls are hypothesised:

(i) to have lower educational self-images, and less confidence in themselves to achieve educational goals;
(ii) to have developed more negative attitudes to Mathematics and Science subjects and to have a lower sense of mastery over such difficult subjects;
(iii) to have more positive attitudes toward school, but at the same time to base this to a greater extent than boys on social rather than intellectual grounds;
(iv) to be less assertive in class and to be less sanctioned/rewarded for intellectual effort/achievement than boys;
(v) to have substantially different, and primarily traditional occupational/career and marriage/work expectations;
(vi) to have internalised relatively traditional familial/domestic role expectations and to have significantly higher levels of domestic responsibilities than their brothers.

It is further hypothesised that such sex differences in pupils' preceptions, attitudes and expectations are the main factors explaining the differential subject choices of boys and girls within the set of subject options offered within schools.

Summary

Having briefly stated our main research objectives we went on to describe the type of research undertaken to answer the terms of reference set for the study. We then gave a brief description of the type of sex differences present in subject specialisation in the Intermediate and Leaving Certificate examinations. And finally we provided a succinct summary of the main research findings on the underlying structural and social psychological factors explaining why boys and girls vary so much in their educational patterns.

In all of this, however, we have appeared to ignore the role of primary education in the formation of sex role identities and in educationally differentiating between the sexes. Our terms of reference, and time and resource constraints meant that we could not cover this area even in a cursory form. This we have left to future research. However, our review of the literature on sex role socialisation in schools refers to both primary and second-level education in both reinforcing traditional sex role socialisation within the family of origin and in acting itself as an independent socialisation agent. It would be very surprising if primary education in Ireland was less likely to reinforce such sex role stereotypes than has been found to be the case in other countries. The curriculum of primary schools, however, is much less variable and potentially less sex differentiated than is true of the second level, and, from the research evidence available, sex differences in Maths/Science competencies and attitudes are much less pronounced in primary education, or at the pre-puberty stage, than later. As a result one would expect the schooling process to be much more explicitly sex role differentiating at second level.

This study then, deals only in the second level. It has three main objectives: to describe and attempt to explain differences amongst post-primary schools in the type and level of subjects provided to boys and girls; to isolate the main differences between schools – whether single sex or coed – in the way they allocate subjects to boys and girls; and finally to describe and attempt to explain differences between boys and girls in their choices of subjects amongst the set offered by the school.

There are then two main levels of analysis employed: that of the school as an organisation, making decisions about what subjects to teach to boys and girls – first to *provide* them within the school, and secondly to *allocate* them differentially to boys and girls; and that of the pupil, choosing among the subjects offered by the school. In the first case, the school management makes the decision, and any school differences observed indicate the presence of generally widely shared values about the appropriateness of different subjects and subject packages for boys' and girls' education; values which may or may not be shared by their pupils. At the second, or pupil, level of analysis we are concerned primarily with those differential attitudes and expectations of girls and boys, which are the outcomes of highly differentiated socialisation processes in the family of origin, in primary school as well as in the reinforcing or counteracting influences encountered in second-level schooling. The main objectives of this research is to try and separate out and measure the nature and effects of these various influencing factors. In Chapter 5 we propose a model by which we attempt to do this. And in Chapters 5-8 we examine in detail the curricular provision and allocation problems of schools and how they affect the take-up of subjects by boys and girls. In Chapter 9 we attempt to explain why girls and boys differ in their choices of subjects amongst the set offered by the school. And in Chapter 11 we attempt to draw out the main policy implications that follow from our findings.

However, before we proceed to this analysis we need first to describe in more detail our research procedures. This is attempted in Chapter 2, where we also give some preliminary results of the differential attitudes and expectations of boys and girls. And secondly, we need to place the whole study in the overall context of the nature and extent of change in gender roles in Ireland, as well as in the context of the quite differentiated second-level educational system. This is attempted in Chapters 3 and 4 respectively.

CHAPTER 2

Research Procedures and Measurement of Pupil Attitudes

The evidence on which the conclusions of this study are based comes from three basic data sources which were assembled, coded and analysed in the course of the investigation: (i) Examination Records — a sample of some 30,000 examination records from a national sample of 125 secondary and 58 vocational schools for the crucial period of change in Irish post-primary education between 1965 and 1978; (ii) records coded from Timetable and Teacher Registration files in the Department of Education in a subsample of 95 schools taken from the above national sample; (iii) interviews with Principals, Career Guidance Counsellors, and samples of pupils from Group, Intermediate and Leaving Certificate classes in the same national sample of 95 post-primary schools. Details of the samples, interviews and coding procedures are given in the following sections.

In the course of the research it was necessary to construct a number of indices or "scales" or various kinds, particularly of pupils' attitudes and aspirations. Some details of these are given in the last section of this chapter. In addition some results from our survey of the different attitudes, beliefs and aspirations of the girls and boys surveyed are given.

Examination Records Study

There are 4 main objectives of the examination records study:

(i) To describe the differences amongst schools in the degree to which their subject provision distinguishes between girls and boys in single sex and coed secondary schools in the period from 1965 to 1978. For this purpose it was necessary to aggregate the individual pupil records to construct school level records of the number and type of subjects provided for pupils, as well as the proportionate take-up of these subjects by boys and girls within each school.

(ii) Examine the influence of certain school factors — like size of school, whether single sex or coed, whether the school remained as a private fee paying one after 1967 or not, etc. — on the range and content of the curriculum provided by schools, including the degree of sex differentiation involved.

(iii) To describe the extent and nature of change between 1968 and 1978 in curricular provision and subject take-up rates within schools, and to try to account for differences amongst schools in these respects; given that their pupil number and associated resources roughly doubled over the decade.

(iv) To describe the change in sex differences in subject provision and take-up in the vocational school Group Certificate course between 1965 and 1978; as well as the extent to which pupils stayed on in schools after Group Certificate to do the Intermediate and Leaving Certificate Examinations.

A proportionately stratified[3] random sample of 125 secondary schools was selected from the 531 recognised schools in the Department of Education's 1978 list. An equivalent sample of comprensive/community (11) and vocational schools (58) was also selected. Within these schools the Intermediate and Leaving Certificate and, in vocational schools, Group Certificate records of one-half of all candidates were extracted in each of the five sample years: 1978, 1975, 1972, 1968, 1965 for Leaving Certificate records[4]. For those candidates who completed both their Intermediate Certificate (IC) and Leaving Certificate (LC) in the same school within a two-year span, their linked IC/LC records were extracted. Ninety-six per cent of those completing their Leaving Certificate in the sampled schools had, in fact, completed their Intermediate Certificate in the same school two years previously. In total, roughly 14,000 linked LC/IC records, and an additional *c.*, 6,000 IC records were extracted for the period covered. These records give us a time series of linked IC and LC records in a national sample of boys', girls' and coed, secondary schools over a crucial 13 year period.

In addition to this a 50 per cent sample of Group Certificate records was extracted and coded in a one in four random sample (N=58) of vocational schools for the years 1965, 1968, 1972, 1975 and 1978. Roughly 10,000 Group Certificate records in all were extracted in the sample of vocational schools. Each student's grade on each subject examined was recorded, the accuracy of extraction being double checked. The eventual rate of error recorded being estimated to be less than 1 in 100,000 individual codes.

To answer our terms of reference, two levels of analysis are necesary:

(i) At a school level: to examine schools as systems of subject/teaching

3. Stratified by religion, fee paying or not, size of school, and whether girls', boys' or coed school.
4. All records of candidates with odd numbered birthdates were extracted.

provision. For this purpose a school record was constructed by adding or averaging all the pupils' LC and IC results within each school. This record included:

(a) The number and proportion of students within each school who took each subject at Honours and Pass level. This tells us what subjects were taken, and at what level they were taught; as well as the distribution of pupils across the subjects offered. A minimum of 3 pupils taking a particular subject at IC or LC level was assumed necessary before it was assumed that the school actually provided the subject.[5]

(b) The mean and standard deviation of the grades (scored by university entry points) received in each subject as well as the overall mean grade per school and its standard deviation.

(c) The extent to which "Scientific/Technical" as well as "Language", "Commercial" and other subject packages or specialities are offered by the school; as well as the extent to which pupils specialise in these subjects.

(d) Some characteristics of curricular provision peculiar to the school:
   (i) the extent of concentration of students' choice on particular subjects across the total curriculum offered; or the extent of "bunching" or scatter of pupils across the total range of subjects provided;
   (ii) the level of distinction between Lower and Higher level students in the school.

(e) Certain school level information — order; size of school; its location; whether girls', boys', or coed; whether in the Free Scheme or not; and the median social class origin of pupils (from pupil responses in the 1981 survey) was added on to the school record. The relationship between such school characteristics and subject provision/take-up or performance characteristics can be explored.

(ii) The second level of analysis is at the individual student level. We have, of course, very little information on the individual student other than sex, date of birth, type of school attended. However, we do have linked IC/LC records for almost all LC candidates. So, besides an interest in generalising about the characteristics of, and nature of change in, subject provision, subject take-up and subject performance at the IC and LC by boys and girls in different kinds of schools from 1965 to 1978, we can also study the relationship between junior and senior cycle subject choice/performance in the same schools over a rather crucial 13-year period. In 1968, for instance, only 2.6 per cent of girls

5. Since a 50 per cent sample of pupils was taken a 3 pupil minimum means on average, that 6 pupils in the year sampled took the subject — far too great a number to be provided with the subject in another school or on a casual basis.

did Higher Maths at the Leaving Certificate examination, although 13 per cent of girls had got Honours in the IC two years previously. By 1978 the proportion of girls doing Higher Maths in the LC had increased to 5 per cent, while the proportion doing higher level Maths at the IC in 1976 was 21 per cent. The retention rates had improved slightly. There is very wide variation amongst school types, however, in the extent of consistency in Maths/Science choices from junior to senior cycle. It will be possible to isolate some of these relationships in the analysis.

The sampling frame used includes only those schools that survived to 1978. However, where secondary schools had amalgamated between 1965 and 1978 the pre-existing set of co-operating schools was also included in the sample. Comprehensive and community schools have only come into existence since 1965. Of vocational schools, however, 6 per cent closed between 1968 and 1980 (from 262 to 246 schools). We did not, unfortunately, sample these closed schools so that the earlier 1960s sample of vocational schools is somewhat biased, particularly of the small rural schools which had been closed. This error, however, is likely to be very small.[6]

A comparison of sample estimates with the published population percentages taking different subjects in the Leaving Certificate and Group Certificate examinations in 1978 is given in Appendix Table 2.1. In general, the sample estimates are very close to the actual population figures. In the LC, the percentages doing Higher courses in our sample are generally between 2 to 5 percentage points higher than in the population. This is to be expected because we have only a sample of Leaving Certificate examinees in schools, compared to published population figures for all candidates in the examination including those not in full-time education who took one or two subjects in the examination.[7] The sample Group Certificate results refer only to candidates in vocational schools, compared to the population figures for all Group Certificate candidates. In this case the sample percentages are 12 to 16 percentage points below the population figures taking Irish, English and Maths. This sample obviously underrepresents the large number of Group Certificate examinees in secondary schools, now a rather large number. The proportions, however,

6. The following table summarises the net changes in the number of schools between 1967 and 1980.

	No. of Secondary Schools	*No. of Permanent Vocational Schools*	*No. of Comprehensive/ Community Schools*
1967/78	596	262	3
1979/80	559	246	45

7. The numbers doing each subject are all L C candidates. The denominator used, however, is the number of Leaving Cert. candidates in full-time education (i.e., 36,539 in 1980).

taking the practical-manual and commercial subjects are almost identical. In both cases, therefore, the sample statistics are very close to the population parameters. We can then be quite cônfident of the generalisability of the results.

School and Pupil Surveys

The schools surveyed were subsampled from the original examination records study — every second school being systematically selected. Because of their small number, but increasing importance, all comprehensive/community schools in the original sample were selected for interviewing purposes.

Table 2.1: *School sample characteristics*

	Secondary Schools	*Vocational Schools*	*Comprehensive and Community Schools*	*Total*
Exam Record Sample:	125 ($\frac{1}{4}$)*	58 ($\frac{1}{4}$)*	0	183
School Surveys Sample:	64 ($\frac{1}{8}$)*	27 ($\frac{1}{8}$)*	11 ($\frac{1}{4}$)*	102
Total in which Interviews were carried out:	57	27	11	95

*Sampling fractions used, comprehensive and community schools being over-sampled as indicated.

Of the total sample of 102 schools sampled, two had closed down in the previous year. We were refused access to five secondary schools — three girls' and two coeducational. In addition to this, one boys' school gave us access to the Intermediate Certificate but not to Leaving Certificate pupils. However, the overall refusal rate of 5 per cent appears reasonable.

The procedure used in approaching the selected schools was to write an introductory letter, enclosing details of the project. A phone call was then made to the Principal of each school, to discuss the project and the possibility of the school's participation. Where feasible, a date was then arranged. We tried to minimise disruption in the schools by interviewing the Principals and Career Guidance Counsellors while questionnaires were being administered in the classes, and by completing the survey work as quickly as possible. Generally, the reception given to us in the schools was very positive.

Of the total of 95 schools surveyed seven did not have a Leaving Certificate class in 1980/81, and one school refused access to the senior cycle pupils. This gives us a total of 87 schools with LC survey results. The breakdown of these schools by school type is given in Table 2.2 below.

Table 2.2: *Breakdown of schools by sex-category and type*

	Boys'	*Girls'*	*Coed*	*Total Number of Schools*
Secondary	19	21	16	56
Vocational	2	0	21	23
Community and Comprehensive	1	0	7	8
Total	22	21	44	87

In all, we interviewed 95 principals and 68 career guidance counsellors, and administered questionnaires to 9,643 pupils. Of the pupils 3,967 were in their final Leaving Certificate year, 5,166 were about to sit for their Intermediate Certificate and 510 were terminal Group Certificate pupils (i.e., were likely to leave school after the Group Certificate). Our procedure was to interview all of the final Leaving Certificate classes and the terminal Group Certificate classes in selected schools. When there were more than three Intermediate Certificate classes a disproportionate sampling method was employed to get a representative sample.[8]

8. The interviewers ascertained and recorded (a) the total number of Inter. Cert. classes and (b) the number of sets of classes which are completely equivalent in terms of the subject options open to them. Each such set of classes within the school was to be sampled. The classes within each set were ordered by ability or other relevant variables and the class for interview selected from the following table. This scheme means that at most five classes had to be interviewed. School and pupil level national estimates can be obtained by weighting each category of pupil by the relevant ratio by:

$$\frac{\text{No. of classes in school}}{\text{No. of classes sampled}}$$

Sampling of Classes in Inter. Cert.

Number of Classes in Set (n)	*No. to be Selected (s)*	*Identity of Classes to be Selected*
1, 2, 3	all	1, 2, 3
4	3	1, 2, 3
5	3	1, 3, 5
6	3	1, 3, 5
7	4	1, 3, 5, 7
8	4	1, 4, 6, 7
9	4	1, 4, 7, 9
10	5	1, 3, 5, 7, 9
11	5	1, 3, 5, 8, 11
12	5	1, 3, 6, 9, 11
13	5	1, 4, 7, 10, 13
14	5	1, 4, 6, 10, 14

Most of the interview schedules[9] had been extensively pretested in the pilot studies, but all had to go through a number of revisions before they were ready for fieldwork. This started in January 1981, working as four teams. On average, one school was completed per day by each team. Five different schedules in all were used within schools.

(i) Principal's Interview: this ranged from 1½ to 3 hours in length.
(ii) Career Guidance Teacher's Interview: roughly 1½ hours.
(iii) Questionnaire administered to Leaving Certificate classes (1 hour).
(iv) Questionnaire administered to Intermediate Certificate classes (1 hour).
(v) Questionnaire administered to terminal Group Certificate classes (1 hour).

Teacher Qualification Data

By courtesy of the Department of Education access was given to the school timetable files. From these precise details of the characteristics of teachers and of the subjects they taught were extracted for each of the 95 schools in our sample. For each teacher mentioned in the timetable the following were the main details extracted: registration number, position in school, whether full-time or part-time; number and identity of each examination and non-examination subject taught; number of hours taught per week; identity of subjects and number of hours spent teaching junior cycle subjects; identity of subjects and number of hours spent teaching senior cycle subjects, etc. This information allows us to identify teachers of all examination subjects in the junior and senior cycle classes, as well as their extent of concentration on particular subjects.

Once this information was extracted from the "timetable" file for each school the degree qualifications of identified teachers (given their registraton numbers) were extracted from the Teacher Registration files. Full qualifications data were available and recorded for around 85 per cent of full-time teachers in secondary and community schools from the Department's records. Except in a small minority of cases it was not possible to get equivalent qualifications data on part-time teachers. However, for the main examination subjects in which we were interested this was not a serious problem; the qualifications of around 90 per cent of teachers of Maths and Science, for instance, were identified in this way.

The qualifications records for teachers in vocational schools are kept by the

[9]The Leaving Certificate schedule is given in Appendix 1. Copies of the other interview schedules, etc., will be made available to interested researchers.

Vocational Education Committees. Again through the co-operation of the Department of Education all the relevant committees were approached and a roughly equivalent level of completeness and reliability of qualification records was achieved.

For secondary schools, both the comprehensiveness and reliability of the data appear to be high for most schools. By checking the number of teachers on the Department's files, for which full information is available, against the number returned by the Principal in our school interviews, the following table provides estimates of the completeness of the qualification records.

For all schools, qualification data are not available on 15 per cent of all full-time teachers — varying from 8 per cent of full-time teachers in vocational schools to 23 per cent in community schools. In the latter schools the main reason for incompleteness was the difficulty in tracing the original registration records for those teachers who had transferred from vocational schools. However, for the main subjects which interest us — Maths, Science and Commerce — full registration data were available for over 87 per cent of subject teachers. Part-time teachers were of variable importance across school types, as we can see from the following results (Table 2.3).

Twelve per cent of all teachers in the sampled schools are part-time. Vocational and convent secondary schools (both girls' and coed schools) appear to have an above average dependence on part-time teachers. Most part-time teachers, however, are in non-examination (Religion; Civics; Elocution; Physical Education (PE, etc.) or "cultural" subjects (Art, Music) in most schools. In many convent schools retired members of the order are involved. However, Higher Diploma of Education student teachers were also included here and in a small number of schools there appeared to have been an over-dependence on their services for teaching central examination subjects. Nevertheless, the great majority of part-time teachers are teaching the non-examination subjects. So, the percentage of Science or Maths teachers who are part-time is less than 4 per cent.

Overall, therefore, the data appear comprehensive and accurate and should provide a reasonably valid and reliable picture of the qualifications of teachers in the sampled schools as well as the subjects they teach in the junior and senior cycles.

Data Coding and Transformation

All of the data collected were coded in the conventional manner and data analysis was carried out through use of the computer. Besides the straightfor-

Table 2.3: *The Number of Full-time Teachers and Estimates of the Completeness of the Qualification Data on all Full-time Teachers, as well as of all Maths and Science Teachers in the 94 Sample Schools**.

Type of School	*Total No. of Full-time Teachers in School*	*No. of Full-time Teachers for whom all Registration Data are Available*	*% of all Full-time Teachers for whom Registration (qual.) Data are not Available*	*Total No. of Maths and Science Teachers in School*	*Percentage of all Full-time Maths and Science Teachers with Qualification Data Missing*
Girls' Secondary*	595	521	12.4	177	9.0
Boys' Secondary*	512	422	17.6	188	14.9
Coed Secondary*	251	208	17.1	76	14.5
Vocational Schools	490	453	7.6	133	15.0
Community Schools	428	328	23.4	108	10.2
Total	2276	1932	15.1	682	12.6

*One secondary school was excluded because it was not possible to get the relevant data on more than half the teachers.

Table 2.4: *Percentage of all Teachers in Schools who are Part-time*

	Secondary Schools			*Vocational*	*Community*
	Girls'	*Boys'*	*Coed*	*Schools*	*Schools*
			per cent		
Percentage of all teachers* who are part-time	14.0	7.4	13.1	19.0	4.5
Percentage of all Maths/Science teachers who are part-time	6.3	2.6	3.8	8.3	1.8

*Of all teachers mentioned in timetable returns. "Part-time" = all teachers not receiving an incremental salary in secondary schools.

ward direct coding of interview or record data the resultant individual codes were frequently combined to construct measures or indices of relevant concepts: e.g., the social class of origin of pupils, the extent of restrictiveness of a school's pupil intake policy, the number of subjects of various kinds taught by schools or taken by pupils. Most of these indices are described in detail when first introduced in this report. The most complex of these, however — attitudinal scales — require more detailed treatment.

Attitude Scales: Girls' and Boys' Attitudes

The attitude scales employed are Likert scales (see, Oppenheim, 1966, pp. 120-159). Simply stated these are summed (added) scores for an individual's scored responses to a series of linked or similar statements (questions) about particular issues, to which an individual may respond that she or he "Strongly Agrees" (Score 4); "Agrees" (Score 3); "Disagrees" (Score 2), or "Strongly Disagrees" (Score 1). If the scored responses to a set of such questions are highly or moderately intercorrelated (of a similar nature) they are assumed to be tapping an underlying consistent attitude toward the object measured. If there were five items involved, for instance, the final score would range from 5 (Strongly Disagree, 1 x 5 items) to 20 (Strongly Agree, 4 x 5 items). The main use of the scales was to measure pupils' attitudes on a number of dimensions which we have hypothesised to differentiate boys from girls in their educational role experiences (see Chapter 1):

(i) Attitudes toward (or "Preferences for") Mathematics or Science subjects as against Language or Literature subjects ("MATHLIT").
(ii) Attitudes towards one's own ability to achieve high standards (achievements) in one's own educational work relative to that of one's peers ("EDIMAGE").
(iii) The relevance or salience of utilitarian values (their "usefulness" to oneself) in choosing subjects ("UTILVAL").
(iv) Level of satisfaction with subjects chosen in the Leaving Certificate ("SUBJEVAL").
(v) Level of satisfaction with teachers' helpfulness in subject choice and with the associated approachableness and helpfulness of teachers ("TEACHVAL").
(vi) Level of assertiveness or competitiveness of pupils in pupil-teacher interaction in the classroom situation ("COMPETE").
(vii) Level of experienced reward/sanctioning for mainly intellectual work in classroom situations ("POSCLASS" and "SCHOLAR").
(viii) Level of experienced reward/sanctioning for mainly social and

behavioural lapses in classroom situation ("NEGCLASS" and "SOCIAL").

(ix) Extent to which pupil helps with household/housework tasks at home ("HHTASK").

The items which make up these scales were extensively pretested in the pilot phase of this project. The scalability of the items was checked using Factor Analysis and Likert Scaling techniques. Factor Analysis (Principal Factor with Varimax Rotation) was used for "hypothesis testing" purposes — to see whether the items "loaded" in the ways hypothesised. The reliability of the scales was tested using Cronbach's Alpha.[10] This measures the extent of covariation amongst items in the scale. The higher the extent of covariation amongst items in the scale, the greater the extent to which the items are tapping the same underlying dimension. Alpha varies in value from 0.0 to 1.0. For research purposes reliabilities over .80 are very high, those between .60 and .80 are highly acceptable, while Alpha values below .50 must be treated with caution since the items comprising the scale may be imperfect measures of the underlying dimension (Nunnally, 1967).

Descriptions of the most important scales resulting from our analysis of the 3,967 Leaving Cert. interviews are given below with details of the main sex differences found. The items included in the scales, their scoring and reliabilities are given in Appendix 2.2

(i) Attitudes to Maths and Science Subjects ("MATHLIT")

This scale measures the respondent's attitude towards or preference for Maths and Science subjects as opposed to Language and Literature subjects. Eight items (described in Appendix 2.2) were used in constructing the scale which has an Alpha of .77. Individual scores range in value from 1.00 (preference for Maths or Science subjects) to 2.00 (preference for Language or Literature subjects as opposed to Maths or Science). The higher the score the less favourable the attitude towards Maths/Science.

Boys have significantly more positive attitudes towards Maths and Science subjects than girls as can be seen in the following results. The only exception is Biology where girls think it more interesting and more useful and less difficult than boys.

Girls' attitudes towards Languages, on the other hand, are far more favourable than boys'; they are far more likely to consider them interesting, useful and less difficult. They also have more confidence dealing with them and get greater satisfaction out of them. As to Maths, direct questions do not reveal

[10]Alpha = $N\bar{r}/[1-\bar{r}(N-1)]$, where $\bar{r}$ = the mean inter-item correlation and, N = No. of items (Carmines and Zeller, 1979, p.44).

Table 2.5: *Percentage of girls and boys who think various subjects are "interesting"; "difficult"; "useful", in LC classes 1981 (sample of LC pupils, N=3,967)*

	Physics		*Biology*		*Irish*		*French*	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
	per cent							
Interesting? % Yes:	65	56	83	89	34	61	45	63
Difficult? % Yes:	47	53	55*	58*	64	55	62	51
Useful? % Yes:	84	74	86	94	41	62	86	92

All sex differences (except*) are statistically significant at p<·01.

any significant sex difference. But when questions are phrased more indirectly marked sex differences appear, with girls, on average, feeling less confident and less able to cope with more difficult mathematical problems (see Appendix 2). Average sex differences on the "MATHLIT" scale are given below for boys and girls in 4 different school types.

Table 2.6: *Averages scores of boys and girls in different school types on* "MATHLIT" *scale (overall average score=1.50). Score of 1.0 indicates high preference for Maths/Science, 2.0 of preferences for Language/Literature subjects.*

	Single Sex Secondary		*Coed Secondary*		*Vocational School*		*Community/Comprehensive*	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
Averagescore on "MATHLIT" scale	1.43	1.53	1.49	1.56	1.49	1.52	1.50 (p<·01)	1.50

Except for the community and comprehensive schools, boys in all school types have more positive attitudes towards Maths and Science subjects than girls, with boys in single sex secondary schools the most positive of all. The girls with the most positive attitudes are those in the community and comprehensive schools, and the least positive in secondary schools; the greatest sex difference, therefore, occurring in single sex secondary schools.

These results, therefore, lend strong support to research findings from other countries which have almost consistently found much less favourable attitudes to Maths and Science amongst teenage girls, and an almost reverse sex bias in attitudes towards Language/Literature subjects. However, our results do not support British findings (Ormerod, 1981; Department of Education and Science, 1975) on the polarisation of attitudes, preferences and choices in coeducational schools when compared to those of boys and girls educated in single sex schools. In our case almost the exact reverse occurs with the greatest sex differences occurring in single sex schools, a general finding which tends to hold up even when the more obvious class differences between pupils attending these schools are controlled for.

(ii) Educational Self-Image ("EDIMAGE")

This measure attempts to index an individual's self assessed ability or confidence in one's ability to meet high performance expectations. Using the same procedures, and based again on the extensive pilot testing, a 5 item Likert scale was successfully constructed to index this dimension. The overall reliability of the scale was very high: Alpha=.73. The full details of the scale and its construction are given in Appendix 2.2. The scale ranges from a score of 1.0 (very high self-evaluation) to a score of 4.0 (very low self-evaluation), with an average score of 2.40.

Girls on average have significantly lower self images than boys ($p<.01$), although the variance within each sex is far more socially significant than the differences between them. The differences between the sexes can be illustrated by the responses of boys and girls to 2 questions dealing with the ranking of themselves relative to their class peers.

Table 2.7: *Percentage distribution of pupils in responses to their relative class placement (leaving cert. sample).*

Question: "In your Inter. Cert./Leaving Cert., class, how would you (have) place(d) yourself?"		*In Inter. Cert. Class*		*In Leaving Cert. Class*	
		Boys per cent	*Girls per cent*	*Boys per cent*	*Girls per cent*
1. At the top of the class		19	15	14	9
2. Well above average		28	20	24	17
3. Just a little above average		28	22	30	22
4. Just at the average		19	38	26	46
5. A little below average		5	4	5	6
6. Well below average		2	1	2	1
Total	%:	100	100	100	100
	No.:	1811	2078	1837	2096
Significance of differences between sexes:		$p<.001$		$p<.001$	

Boys are far more likely to rank themselves at the top of their classes — 38 per cent of boys rating themselves at least as "well above the average" for their Leaving Certificate Class as compared to 26 per cent of girls so optimistically opinionated. The girls' distribution, however, although significantly different, is more modest than boys but is also objectively more defensible —

if the pupils' own current class is taken as the relevant comparison group: with 68 and 75 per cent of boys ranking themselves above the average of their Leaving and preceding Intermediate Certificate class compared to 48 and 57 per cent respectively of girls.

Boys in all school types have higher educational self images than girls do but the difference, as in "MATHLIT" is greatest in the single sex secondary sector.

Table 2.8: *Average Scores of Boys and Girls in 4 School Types on the* "EDIMAGE" *Scale (Overall Average = 2.40). Scores of 1.0 Indicate a Very High Self evaluation, of 3.0 or Higher a Very Low Self-image.*

	Single sex secondary		*Coed Secondary*		*Vocational School*		*Community/ Comprehensive*	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
Average scores on "EDIMAGE" scale	2.24	2.51	2.34	2.50	2.35	2.40	2.30	2.50 ($p<.01$)

Interestingly, girls in vocational schools have higher self images relative to their peers than girls in any of the other school types, while girls in secondary schools have the lowest. Again here there is no support for the coed polarisation hypothesis, with single sex education showing the greatest sex difference; boys here being the most self-confident and girls the least.

There is no sex difference, however, in the correlation between overall examination performance in the Intermediate Certificate Inter. Cert. Grade* Point Average (IGPA) and one's score on the Educational Self Image scale: $r=.50$ for boys, and $r=.51$ for girls. In other words, the extent of under or overestimation of one's educational ability *relative* to one's examination performance is roughly the same for both sexes, although self-evaluation is consistently higher for boys at all points of the performance scale. Here again the results strongly support the research results reviewed in Chapter 1. Girls on average have significantly lower levels of educational self-confidence — even at the same level of demonstrated performance.

(iii) Sex Differences in Classroom, or Pupil-Teacher Interaction

Most recent observation studies of classroom interaction in coeducational schools have shown a consistent tendency for boys to get more attention from teachers — both positive and negative (Council of Europe 1982; Kelly, 1981; Safilios-Rothschild, 1979). This is partly because boys are perceived to be more demanding and more competitive while girls are more attentive, responsible and industrious; therefore needing less teacher time. Consequently, the level of teacher sanctioning behaviour is reported as being higher for boys: boys receiving both more positive and negative feedback than girls (Maccoby and Jacklin, 1974, p. 335).

In our pilot studies we attempted to measure those three dimensions of pupil-teacher interaction: (a) frequency and nature of interaction and sanctioning/reward for scholastic performance; (b) sanctioning/reward for social-behavioural misdemeanours, and (c) the level of pupil assertiveness. The pilot studies yielded three discernible scales along these dimensions. The most discriminable of these items were included in the final pupil questionnaire (Questions 26, items 1-12; and Q. 34, items 1-8). However, the Factor Analysis and subsequent scaling of responses to those 20 items yielded 2 moderately reliable scales: level of perceived educationally rewarding classroom interaction with teachers ("POSCLASS", Alpha=.63) and level of perceived negative sanctioning received from teachers ("NEGCLASS", Alpha=.54). A third, but poorly reliable scale ("COMPETE", Alpha=.41) was constructed which measured the extent of pupils assertiveness and tolerance of others' assertiveness in classroom interaction.

Besides the "POSCLASS" and "NEGCLASS" scales, two other pupil-teacher interaction scales were constructed using the same items — but organised differently — to tap slightly different aspects of classroom interaction. The conceptual distinction is between such evaluation, sanctioning for intellectual-performance behaviour, and for social-behavioural misdemeanours, etc. Research evidence indicates significant sex differences in pupil teacher interaction in these respects. In order to examine this aspect of classroom interaction in the context of sex differences the "SCHOLAR" and "SOCIAL" scales were constructed. On the content of items — "face validity" — these two scales (Appendix 2, Sections (vi) to (x)) are clearly more valid indices of our concepts than 'POSCLASS' or 'NEGCLASS'. They are, however, significantly less reliable than those latter scales, SCHOLAR having an Alpha of .51 and SOCIAL an Alpha of .49. They are, however, very highly correlated with their alternates (r>.80), and in the following we use the alternate scales since they are more reliable.

(a) Perceptions of Frequency of Interaction with teachers and the Level of Rewards for Achievement in Class ("POSCLASS").

On all of the five items included in this scale, girls' responses indicated that they were significantly more likely to be asked and to answer questions in class and to be more positively rewarded for and stimulated by such classroom participation.

Table 2.9: *Percentage Distribution of Female and Male Pupils by Responses to Six Items Dealing with Pupil-Teacher Interaction and Rewards for Achievement in Class*

	†(C365)* "I always try to answer questions in class"		(C437).* "How often have you been told that your work is good?"**		(C439)* "How often have you been asked questions in class?"**		(C442) "How often have you felt stimulated & interested in class?"**		(C444) "How often have you been unable to express fully what you mean?"**		(C441)* "Have you been praised because your written work is tidy and done on time?"	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
1. Very often	16	18	3	4	16	20	8	10	9	8	2	4
2. Often	51	57	16	21	46	47	29	35	23	24	10	14
3. Few times	28	23	61	64	35	32	48	45	49	52	38	40
4. Never	5	2	20	12	3	1	15	9	19	15	50	42
Total %	100	100	100	100	100	100	100	100	100	100	100	100
No.	1839	2084	1837	2090	1840	2085	1836	2080	1844	2083	1842	2084
	p<.001		p<.001		p<.001		p<.001		p<.01		p<.001	
	r=–09		r=–.11		r=–.07		r=–.10		r=–.03		r=.–09	

*Items included in scale.

**A second Likert scale "scholar" was constructed using these items and an additional one 443 "How often . . "have you been told that your work is poor?". This scale in our view more validly (on the basis of content) measures the underlying concept although it has lower reliability (Alpha=.51).

†The numbers above each item refer to card and columns used for coding purposes and are found on the right hand margin of the Questionnaire Appendix 1.

In the following table the mean final scores on 'POSCLASS' for girls and boys in different school types are given. (See Appendix 2.2 vii for details.)

Table 2.10: *Average Scores of Boys and Girls on Scale Measuring Perceived Classroom Participation/Rewards in 5 School Types. Range from 1.0 to 4.0, the Lower the Score the Greater the Level of Reward.*

Average Score	*Boys in Boys' Schools*	*Girls in Girls' Schools*	*Coed Secondary School*		*Vocational Coed*		*Community School*	
			Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
Level of Academic Participation/Rewards, ("POSCLASS"):	2.72	2.58	2.73	2.56	*2.52*	*2.37*	2.68	2.59

($p<.01$)

Contrary to the hypothesis girls have on average — and consistently across all school types — higher levels of perceived scholastic rewards than boys. On average, they find that classroom interaction is a much more rewarding experience than do boys. And consistently, for both sexes, vocational school pupils have the highest levels of perceived rewards and secondary schools the lowest. No significant difference in mean scores occurs between single sex and coed secondary schools — both have the lowest perceived level of reward. And interestingly here also, pupils in vocational schools show the highest levels of classroom interaction/rewards.

The research work underlying the hypothesis was based mainly on observation studies of classroom interaction in coed schools. In terms of pupils' perceptions, however, the hypothesis does not fit Irish classrooms. We do not know, however, what the expected standard is against which pupils are evaluating their interaction with teachers: i.e., "often", for instance, has only a meaning in terms of some expected or "normal" frequency. Boys, in general, but particularly secondary school boys — who tend to come from more middle class homes than others — may expect more rewarding interaction with teachers. As a result, their assessment of what is a "normal" level of reward will be higher than that of others; i.e., their lower perception of reward could be due to higher expectations. However, in relation to their expectations, girls *feel* significantly more rewarded in their educational work than boys do in all school types.

(b) Perceptions of correction in classroom — mainly for poor work presentation or misdemeanours ("NEGCLASS")

The three items scaled under this heading do not unambiguously tap sanctioning for social or behavioural matters (See Appendix 2.2, viii, for details of items). The main difference between this and the previous scale is that the former items index positive interaction while this scale indexes negative interaction or correction by the teacher.

Table 2.11: *Percentage Distribution of Responses by Girls and Boys in LC Classes, 3 Items Dealing with Perception of Teacher Sanctioning for Mainly Behavioural Matters*

Response Categories:	*(438) "How often have you been blamed because your work is untidy?"*		*(440) "How often have you been blamed for misbehaving?"*		*(443) "How often have you been told that your work is poor?"*	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
	per cent	*per cent*	*per cent*	*per cent*	*per cent*	*per cent*
1. Very often:	2	1	5	2	2	0
2. Often:	5	2	8	4	4	3
3. A few times:	29	15	39	29	42	37
4. Never:	64	82	48	66	52	60
Total per cent	100	100	100	100	100	100
No.	1835	2083	1842	2081	1841	2084
	$p < .001$ $r = .20$		$p < .001$ $r = .20$		$p < .001$ $r = .09$	

Sex differences here are more pronounced than in the former case. Again boys are more "in the firing line" — they may come less in contact with teachers by meeting with their academic expectations but they certainly appear to be far more in contact for *not* meeting expectations. The results here, however, could be seen to lend support to research findings in classroom studies that girls tend to be more conforming, responsive, neater and more responsible than boys. Several studies suggest that boys tend to be criticised much more ferquently than girls (Safilios-Rathschild 1979, p. 74). This hypothesis at least receives support. It may well be, of course, that boys are being more actively policed for not meeting expectations while girls, with the same complaint, are being ignored. Thus, the underlying reason for the difference in scores may be that negative sanctions are being more actively employed when boys fail to meet academic expectations than in the case of girls. These various interpretations can only be checked, however, through actual observation studies.

As the following table shows, there is very little difference in the average scores of pupils across school types with the amount of negative sanctioning experienced by boys being consistently higher.

Table: 2.12: *Average Scores of Girls and Boys on the Perceived Level of Correction by Teacher for Classroom Behaviour. The Lower the Scores the Higher the Level of Teacher Correction or Negative Sanctioning*

	Boys in Boys' Schools	*Girls in Girls' Schools*	*Coed Secondary Schools*		*Vocational Coed*		*Community Schools*	
			Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
Average scale value	3.44	3.68	3.33	3.66	3.42	3.70	3.43	3.60

$(p < .01)$

(c) Assertiveness/Competitiveness in Classrooms

Research work consistently reports high levels of competitiveness and assertiveness amongst boys in class, particularly in studies of pupil-teacher interaction in coed schools. Four items were included in the final questionnaire which were designed to tap this dimension — at least in so far as pupils perceptions about and attitudes towards their own level of assertiveness and their tolerance of competitive assertiveness by others in class are reflected in their response. However, the overall reliability of the scale is low: Alpha = .41. The overall scale ranges from a score of 1.0, which occurs when respondents are actively averse to competitiveness in classroom interaction; to a score of 4.0 which occurs when respondents are highly competitive. The average score is 2.33, standard deviation (sd) = .57. There are very significant differneces between the sexes and school types as we can see from the following.

Table 2.13: *Average scores on competitiveness by sex and school type. The higher the scores the greater the competitiveness*

	Secondary Single Sex		Secondary Coed		Vocational Coed		Community Coed	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
Average Score	2.46	2.25	2.34	2.19	2.37	2.21	2.31	2.36
No. Pupils:	1122	1308	210	346	174	156	217	255

$p < .001$

Except for community schools where mean differences are not significant, boys have consistently higher levels of reported competitiveness than girls — with boys in single sex (Sec.) schools being the most competitive and in community schools the least. Except for girls in community schools, which have the highest level of assertiveness, other school differences amongst girls are not significantly different from each other.

(d) Subject Choice and Pupil-Teacher Interaction

We asked pupils two sets of questions to assess: (i) their degree of satisfaction with subjects chosen ("SUBJEVAL"), and (ii) their satisfaction with or evaluation of the help they received from teachers in choosing their subjects, as well as the general approachability and supportiveness of teachers ("TEACHVAL"). The items used were mostly adapted from Reid *et alia*, (1974, pp. 91-99) and are given in Appendix 2.2 (iii, iv). In both cases scale values range from 1.0, low satisfaction, to 4.0, very high satisfaction levels. (Alpha=.70 for SUBJEVAL and .69 for TEACHVAL).

There are no significant differences by sex or school type in levels of satisfaction with subjects chosen. There is a generally high level of satisfaction with choice, the mean score being 2.86 (on average "disagreeing" with all the negative items, etc.) and a standard deviation of .53.

There are very significant differences, however, in terms of teacher evaluation.

Table 2.14: *Mean (Average) Score on* "TEACHVAL" *Scale for Each Sex and School Type. The Higher the Score the Greater the Level of Satisfaction*

	Single Sex Secondary Schools		Coed Secondary Schools		Coed Vocational Schools		Coed Community Schools	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
Average:	2.56	2.68	2.62	2.62	2.56	2.70	2.61	2.73
No.	1142	1328	214	354	178	159	220	262

$p < .001$

Girls on average have significantly higher levels of satisfaction than boys with teachers. This is so even within the coeducational vocational and community schools, though not in the coeducational secondary schools. As in some previous scales, differences amongst boys in different schools are minimal. There are some differences amongst girls, with those in the community schools being most satisfied and those in the coed secondary schools least satisfied.

Although girls, therefore, have substantially more choice at both Inter. and Leaving Certificate levels and are less rigidly ascribed to classes and subjects than are boys they have roughly equivalent levels of satisfaction with subjects chosen; but they have far more positive attitudes towards their teachers than boys — even in the same schools and the same classes. This latter finding supports those earlier reported which showed that girls in these schools felt more rewarded for academic effort, less sanctioned for misdemeanours and felt that pupil-teacher interaction was more academically responsive.

So taking the 5 scales with classroom and pupil interaction we find:

(i) Girls are more positively rewarded for academic work and less sanctioned for misdemeanours than boys.

(ii) Boys appear to be more policed for both academic and behavioural misdemeanours; and also appear to be sanctioned to a greater extent for poor work, poor presentation and behavioural misdemeanours.

(iii) In all schools, except the new community schools, girls are significantly less assertive and less supportive of assertiveness in classroom pupil-pupil and pupil-teacher interaction.

(iv) Girls, on average, have significantly higher levels of satisfaction with teacher supportiveness and with the general approachableness of teachers.

(iv) Salience of Utilitarian Values in Subject Choice

This scale measures the extent to which pupils report that utilitarian values were important in subject choice. Four items were included, with a moderate (Alpha = .50) reliability (see Appendix 2.2, vi). There is a sex difference in the importance of utilitarian values in subject choice but its magnitude is very small. What difference there is tends to favour girls in secondary schools — girls, on average, being more utilitarian in their subject choice — and boys in coed, vocational and community schools. The questions asked, however, referred mainly to immediate post-school job achievement goals and the immediacy of such goals is, in fact, as these attitudes indicate: boys in single sex secondary schools are least likely to enter the labour market on leaving school, while the *opposite* is the case in vocational schools and to some extent community schools (see Chapter 3).

Table 2.15: *Average Scores for Girls and Boys on* "UTILVAL" *Scale in 4 School Types. Scores Range from 1.0 (High Utilitarian) to 3.0 (Low Utilitarian).*

	Single Sex		*Coed Sec. Schools*		*Coed Vocational Schools*		*Coed Community Schools*	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
Average Score	1.79	1.71	1.71	1.71	1.45	1.50	1.67	1.73
No. of pupils	1142	1328	214	354	178	159	221	262

$p < .01$

Low utilitarian values are characteristic of children from middle, particularly upper middle, class backgrounds who take the more academic College or University preparatory courses. Utilitarian viewpoints are more characteristic of children from working class backgrounds who enter the labour market directly on leaving school. Sex as such does not appear to be that consistently related.

(v) *Socialisation into Sex Roles: Sex Differences in Pupils' Beliefs about Appropriate Sex Roles. and their Actual Household Roles within their Families*

A number of separate attitudinal questions were asked of pupils about their beliefs about sex differences in educational policies and their expectations regarding future marriage, childrearing and economic provider roles. The details of their expectations about future familial/work roles are reported in the next chapter. Here two separate aspects of current roles are examined: pupils' beliefs and values about sex differentiated education and the actual household roles that, as daughters and sons, they play in their own families.

First, two very direct questions were asked (C 522, C 525 Appendix 1).

(i) "Do you think that girls should have a different education from boys?"
Yes ( ) No ( )
Give reason ______________________________

(ii) "Do you think that girls should have different careers from boys?"
Yes ( ) No ( )
Give reason ______________________________

Table 2.16: *Percentage of Girls and Boys who Respond "yes" to Two Questions Dealing with Beliefs about Girls' Education and Career*

	Single Sex Secondary		*Coed Secondary*		*Coed Vocational*		*Coed Community*	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
	per cent	*per cent*	*per cent*	*per cent*	*per cent*	*per cent*	*per cent*	*per cent*
1. Percentage who believe that girls should have a different education from boys:	16.9 (34)	9.2 (48)	6.4 (38)	4.9 (42)	11.7 (30)	10.5 (37)	6.5 (40)	6.7 (41)
2. Percentage who believe that girls should have a different career from boys:	26.7 (26)	16.3 (34)	29.4 (24)	18.4 (32)	25.2 (27)	11.9 (28)	20.3 (30)	12.3 (32)

Figures in parentheses refer to percentage of respondents who explained their "reasons" by using normative statements, i.e., "should" or "should not" etc.

Although there are clearly significant sex differences in responses to the question on education, these are not very substantial except for those in single sex secondary schools. Around 90 per cent of all other boys and girls reject sexist beliefs about education. Boys in single sex secondary schools are the most sexist in their beliefs, although even here over 80 per cent reject sexist beliefs. Interestingly, sex differences in coeducational schools are minimal in this respect.

The nature of the reasons given for holding these attitudes is substantially more sex differentiated than the attitudes themselves. These responses were coded as "normative" or ideologically supported if the words "should" or "should not", or an equivalent imperative or strong preference statements, were used. In girls' responses these were usually statements like "girls should have the same rights and opportunities as boys". Girls are more likely to give strong normatively phrased reasons for rejecting sexist beliefs and, significantly, girls in single sex schools appear to be the most normatively committed in these respects. Girls in vocational schools, on the other hand, are not only more sexist in their beliefs but are also less likely to give normative reasons for their beliefs.

The general pattern of views on careers for girls provides much more conservative replies — particularly for those in secondary schools — although even here around 75 per cent of both sexes rejected stereotyped views. Sex differences are also far more marked in this case and such differences occur in all schools. Again both boys and girls in the newer community schools have the least sexist beliefs while both sexes in secondary schools are the most sexist. Secondary school boys are the most sexist of all groups.

Again here girls respond in a more normatively structured manner than boys. This is the case in all school types but particularly in single sex schools. There is no support in either case for the polarisation hypothesis in coeducational schools: in fact there is a slight tendency for sex differences to be less in coed schools. Despite such sex and school differences, however, the overall impression is of a dominant ideology of sexual equality, with around 80 per cent of boys and 90 per cent of girls holding equalitarian views.

In their current actual task roles within the household, however, boys and girls are quite highly differentiated. A 10 item scale (HHTASK) was constructed to measure this dimension from the Leaving Cert pupils' responses (see Appendix 2.2, xi). The items referred to daily or weekly household tasks and asked the frequency with which the respondent helped carry them out. A response scale of 5 responses was allowed — from "daily" (=5) to "never" (=1).

The responses to all ten items were highly to moderately intercorrelated and they jointly formed a highly reliable (Alpha = .83) Likert Scale, with very high "face validity" on the basis of the commensense meaning of the individual items. The summed scores on all items responded to were divided by the number of applicable items to yield final scores which ranged from 1.0 where pupils have no participation in household tasks, to 5.0 where pupils have very high participation in housekeeping tasks. The average score was 2.56 with a standard deviation of .81. The following shows the mean scores for boys and girls in each school type.

Table 2.17: *Average Scores and Standard Deviation, of Male and Female Pupils on Household Tasks Scale in 4 School Types. The Higher the Score the Greater the Participation.*

	Single Sex Secondary Schools		*Coed Secondary Schools*		*Coed Vocational Schools*		*Coed Community Schools*	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
1. Mean (Average) score on Household Tasks Scale	2.14	2.84	2.15	3.03	2.25	3.27	2.10	2.99

$p < .001$

Sex differences are highly significant, boys on average doing tasks once or twice in the preceding two weeks, while girls on average have carried out tasks 3-5 times over the same period. Very little difference exists amongst boys in any kind of school. Significant differences, however, exist amongst schools for girls, with those in single sex secondary schools being least helpful at home and girls in coeducational vocational schools being most helpful. Sex differences are greater in coeducational schools—being greatest in the vocational schools and least in the single sex schools. Social class of origin has more to do with these school and sex differences, however, than school type. Secondary schools, particularly single sex secondary schools, are predominantly middle class schools, and vocational schools are predominantly working class or small farmer. It appears that working class girls (in vocational schools) have many more household tasks to do than others; while boys of all classes are equally unhelpful in household tasks. In consequence, sex differences are least in single sex middle class secondary schools and greatest in the coed vocational (working class) schools.

The relationship of academic performance — in this case measured by the average examination grade received in the Inter. Certificate examination (coded as in the University points system), sex role attitudes and helpfulness in household tasks are as follows:

	Sex Role Attitudes	*Household Task Performance*
Correlation with Grade Point Average in Inter. Cert.	Boys: +.02	−.03
	Girls: +.16	−.15

There is no relationship for boys, but for girls, those with higher Inter. Cert. grades have less sexist attitudes and are significantly less helpful at housekeeping. It may be the case that low achieving girls have possible alternative, or compensating, roles in housekeeping and courtship in which they can achieve when they are doing rather badly at school; rather like the alternative achievement arena in family farming that exists for low achieving boys from farm origins (see Haller, 1959). Low achieving girls being more helpful at home, accommodate themselves to a potentially more rewarding alternative role.

Conclusions

Generally, the range, reliability and adequacy of the various surveys undertaken — examination records, teacher qualifications, school interviews with Principals, Career Guidance Counsellors and pupils — appears to be sufficiently comprehensive and accurate to meet our needs. The examination records study has put together a large file of 30,000 examination records from a large sample of schools and pupils from the early 1960s to the late 1970s. The analysis of these records, at both the school and pupil level can provide us with very detailed information on the extent and nature of curriculum change and subject choices within schools over a crucial 15 year period in Irish education. Analysis of the data on the qualifications and teaching responsibilities of teachers in a subsample of these schools, when used in conjunction with data from the examination records and school interviews in the same set of schools allows us to study the relationship between teacher qualifications, school curriculum and student choice rates and characteristics. These relationships will be explored in detail in Chapter 8. The interviews with Principals, Guidance Counsellors and pupils allow us to relate school and pupil background characteristics to subject choices and performance levels. This will be done at both the individual pupil level and at the school level in Chapters 5-9.

The results of the attitude scales show that girls: (i) have more negative attitudes to Science and Maths; (ii) have significantly lower educational self images — even at the same level of academic performance; (iii) have, however, more positive feedback from teachers on academic performance than boys, and have higher levels of self reported initiative taking in class; (iv) have a lower sense of teacher policing of low performance, and lesser levels of perceived teacher sanctions for classroom misdemeanours, and are more satisfied with teacher helpfulness and approachableness; (v) are significantly less competitive than boys — except in the newer community schools; (vi) are substantially less stereotyped or sexist in their educational and occupational beliefs and more ideologically motivated in their rejection of such stereotypes; (vii) but are, nevertheless, far more involved in actual household or Housekeeping roles than boys. With the exception of the clear Maths/Science biases, therefore, these Leaving Cert. girls appear to have been far more successfully integrated into school life — including its more academic aspects — than boys. Despite that more successful incorporation however, they have, paradoxically, lower levels of educational or academic self-confidence than boys. They also maintain significantly different attitudes towards the same subjects than boys. The effects of these differential attitudes and aspirations on subject choices will be explored in detail in Chapter 9.

CHAPTER 3

Gender Roles in Ireland: Family, Work and Education

Before we proceed to the main analysis we need to place it in the context of the actual position women occupy in economic and social life in Ireland, and make an estimate of the likely roles that the current generation of male and female school leavers will play in adult life. We need to do this from the perspective of what roles are now being played by young women and men in economic and social (primarily familial) life; and to what extent the expectations of school leavers correspond with that reality.

In this chapter we attempt this by doing four things: (i) Describe the pattern of adult sex role differences in Ireland in work and familial life, the extent of change that has occurred in this respect over the past two decades, and its relationship to the general EEC pattern. (ii) Summarise the main sex differences in educational patterns at second and third level, as well as changes that have occurred in these respects over the past two decades. (iii) Describe the nature of sex differences in the movement from school to work for those who leave the educational system at different stages, and examine the job pattern of social class and differences in these respects. The allocation of positions in the labour market is highly sex differentiated but is also very closely linked to social class of origin and to the type of second- and third-level education received. The main outlines of the structure of education, work and family roles are given in the second, third and fourth sections of this chapter. (iv) But boys and girls currently in school do not necessarily reproduce the patterns of their parents or even of their older siblings — change is always going on. To what extent do the expectations of those boys and girls who are about to leave post-primary schools correspond with the reality of the familial-occupational roles actually played by their older peers? Some clear indications of this from our Leaving Certificate sample are given in the last section of this chapter.

The main data sources employed are, respectively, the official Irish and EEC published statistics on employment by sex and marital status, the responses of pupils surveyed in the course of this project — their intentions and expectations about education, work and family life. The way differences in their social background affect these expectations is also explored.

(i) Marriage and Paid Employment

From a situation in the 1950s when the marriage rate was extremely low — with the highest recorded rates of non-marriage in the world (Walsh, 1968) — the rate of marriage increased rapidly over the 1960s and 1970s. By the late 1970s the Irish marriage rate had almost attained the average European level — with around 90 per cent of all women marrying.

Table 3.1: *Percentage of females ever married in four age groups in 1961, 1966, 1971 and 1979*

Age Groups	*1961*	*1966*	*1971*	*1979*
20 – 24	21.8	25.2	31.1	33.7
25 – 29	54.9	62.2	68.8	72.1
30 – 34	70.4	75.9	80.6	85.5
35 – 44	77.3	79.6	82.5	87.7

Sources: Census of Population of Ireland, Volume II; 1961, 1966, 1971, 1979. Table 7A in 1961, 1966 and 1971 and Table 6B in 1979.

In the early 1960s about half of younger women (25-29) were married, rising to slightly over two-thirds of those in their early 30s; with about 20 per cent never marrying. By the later 1970s three out of four of the younger women (25-29) and almost nine out of ten of the older (35-44) were married. Only about 10 per cent remained unmarried. A quite dramatic shift in the familial status of younger women has occurred over the two decades. Marriage had become increasingly popular and was occurring at a much younger age.

For most economic purposes housework and childrearing tasks in the home are not regarded as "productive labour", in that they are not counted in estimating the national product (Walsh and O'Toole, 1973, p.11). Since up to very recently, married women conventionally retired from the labour force at marriage or on the birth of the first child, the "economically active" proportion of all married women was extremely low in Ireland.

Table 3.2: *Percentage of all married women, aged 15 and over, who were "gainfully occupied" in Ireland: 1961, 1966, 1971, 1977, and 1979*

	1961	*1966*	*1971*	*1977*	*1979*
Married women in the Irish labour force as percentage of all married women:	5.2	5.3	7.5	14.2	15.2

Source: Census of Population of Ireland, 1961, 1966, 1971; *Labour Force Survey,* 1977, 1979.

As Table 3.2 shows there was an unusually low and very stable participation rate of married women up to 1971, but there was substantial change after that date; the rate doubling between 1971 and 1979.

As Walsh and O'Toole (1973, pp. 11-12) have pointed out the traditionally low married participation rate must have been related to the traditionally high female celibacy rates and to later average marriage ages. As the popularity of marriage increased, and the age of marriage declined, educational participation rates also showed a very rapid increase. These combined changes led to a sustained decline in the supply of single female labour. And this decline, paradoxically, increased the opportunities and the attractiveness of jobs for married women outside the home (ibid. p.11). Whatever the reason it is quite clear from the results in Table 3.2 that the Walsh (op. cit.) predictions are borne out in many respects.

If we consider the younger age group this change is even more dramatic. Between 1971 and 1979 married women in the early twenties (20-24) increased their participation rate from 15 to 29 per cent; and the age group 25-29 from 11 to 19 per cent (Source: *Census of Population,* 1971; and *Labour Force Survey,* 1979). If that rate of increase was sustained into the 1980s about a third of young (20-24) married women would have been working by 1981, and something over 40 per cent by 1986. Even if the rate of increase moderates in the 1980s it will still mean a very substantial increase in participation in a very short period.

Although participation has increased markedly it is still the lowest of all EEC countries. At around 40 per cent of the European average it is, however, only slightly below the position in the Netherlands, Luxembourg and Italy. In all countries the rate has been consistently increasing from the 1960s onwards. Denmark, Britain and France have the highest participation rates, but even in these countries the rate had been increasing up to the late 1970s.

Given the rapid increase in the marriage rate, the decline in the marriage age, the significant increase in the costs of establishing a new household (see NESC Report No. 62, 1981, pp. 43-52), the rather large extent to which married women working at home wanted to return to the labour force (Walsh and O'Toole, 1973), and the fact that the Irish participation rates are so low, one would expect a continuing increase in the married participation rate. Associated with this one would hypothesise a significant shift in the occupational-familial aspirations or expectations of school girls about to enter the labour force: the actual social changes in adult life being reflected in their anticipated or expected roles.

Given also that the married participation rate is so highly related to education, with the participation rate of those with university/professional qualifications being over three times greater than those with a primary education only (ibid., p. 38), increasing levels of education of younger women

Table 3.3: *Labour Force Participation Rate of Married Women in Nine EEC Countries, 1975, 1977, 1979*

By Main Type of Market and Household Activity:		*West Germany*	*France*	*Italy*	*Nether-lands*	*Belgium*	*Luxem-bourg*	*UK*	*Ireland*	*Denmark*	*European Nine*
(i) Fully Employed or Unemployed (and seeking full-time employment)	1975:	36.3	41.5	20.4	15.5	32.5	20.9	47.5	13.8	48.9	35.1
	1977:	36.8	44.3	23.8	17.8	33.8	21.2	48.1	14.2	52.7	36.8
	1979:	36.8	46.2	25.2	19.9	36.7	22.0	46.4	15.9	59.0	37.4

Source: Labour Force Sample Surveys, 1975, 1977 and 1979; EEC Eurostat, *Economic and Social Position of Women in the Community, 1981.*

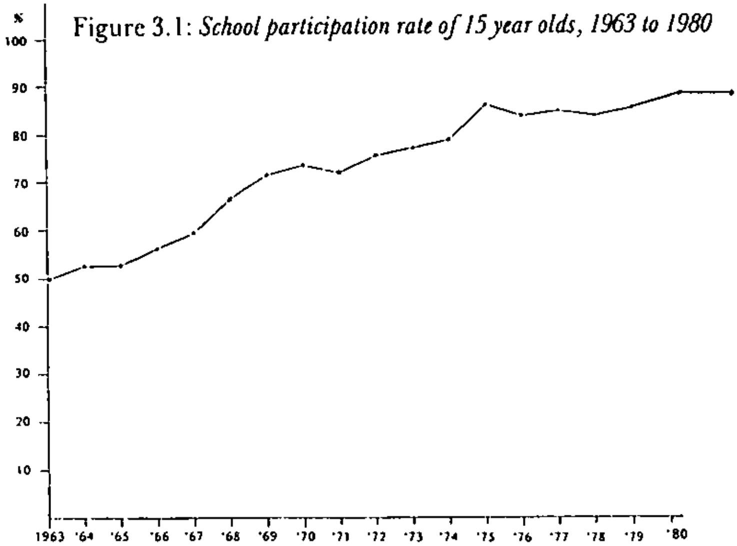
would, one would hypothesise, lead to increasing propensities to remain in the workforce on marriage.

Although the participation of married women in the labour force has been increasing they occupy a very particular and to a large extent, a subordinate position within it. Substantial occupational differentiation by sex has been documented for most western societies (Oppenheim, 1970; Williams, 1976). Within Ireland the extent of labour market segmentation (Kreckel, 1980) by sex is very marked (Blackwell, 1983). However, before we examine the particular labour market position of women we need to examine their educational pattern in some detail.

(ii) *Sex Differences in Educational Patterns*

Teenage educational participation rates increased very gradually up to and including the early 1960s. By that stage about half of 15 year olds were still in school. Between 1965 and 1970 the rate of participation increased very rapidly, from less than half to around 70 per cent. This plateau was held for about two years, but the rate gradually increased again to over 85 per cent by 1979. Although the official school leaving age had been raised to 15 in 1972, around 12 per cent still appear to be dropping out before 15 — the great majority of these, however, in their 14th year.[11] These participation rates as Tussing, (1978, p.90), has pointed out, compare very favourably with those of other EEC and OECD countries.

Figure 3.1: *School participation rate of 15 year olds, 1963 to 1980*



Source: Tussing, 1978, p.93 up to 1974; Department of Education *Statistical Reports* after 1974.

[11]The participation rate of 14 year olds in 1979 was 95 per cent, and of 13 year olds 99 per cent.

As can be seen from Figure 1 (Chapter 1) and in Figure 3.2, participation rates increased even more rapidly at the senior cycle level. By the mid-1960s about one-fifth of the cohort went on to do the Leaving Certificate, with slightly more boys going on to complete the senior cycle. But by the late 1960s this position had reversed. A very rapid increase in participation rates occurred for both sexes after the introduction of the "Free Scheme" in 1967, the rate of increase being much faster for girls. This comparative advantage had become even more marked, however, by 1981 when two-thirds of the female cohort but only half of the male cohort went on to do the Leaving Certificate. After 1977 the upward trend is reversed for boys, the proportion doing the examination declining by about 4 percentage points after 1977, and increasing again only after 1980. For girls the rate continued to increase up to 1981, (see Figure 3.2).

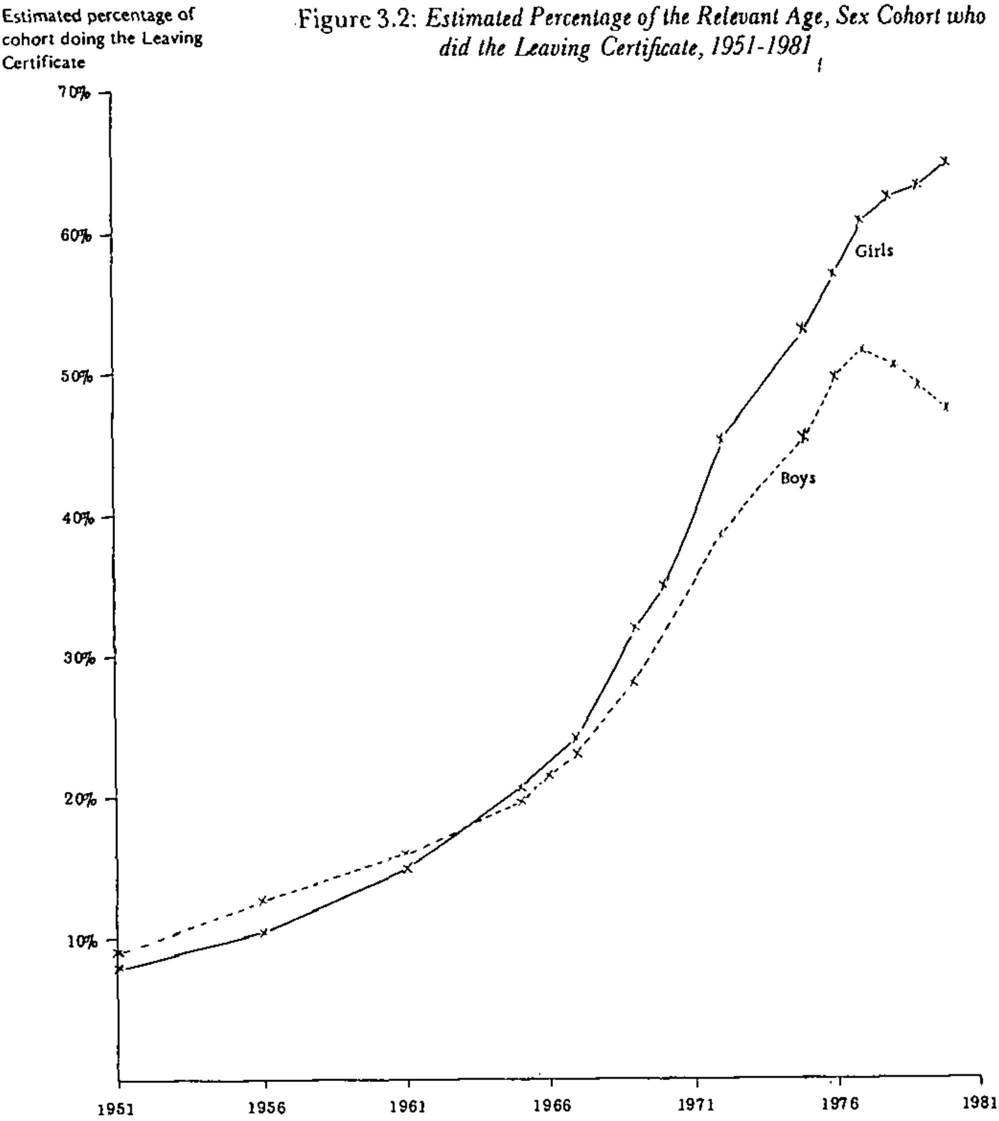
Despite the very rapid increase in participation rates in the 1960s the distribution of pupils amongst secondary and vocational schools remained relatively stable throughout the decade (Table 3.4). Between 73 and 74 per cent of all second-level students were attending secondary schools in both 1960 and 1970. In the meantime, comprehensive and community schools had come on stream and were absorbing about 2 per cent of both boys and girls by 1972. By 1979/1980 the picture had changed: now only 62 per cent of boys but over 78 per cent of girls were attending secondary schools, while the proportion attending comprehensive/community schools had increased to 9 per cent for boys and 8 per cent for girls. In both decades the proportion of boys attending vocational schools had remained relatively stable while that of girls had substantially declined. The number of boys attending vocational schools had

Table 3.4: *Number of Pupils Following Full-time Second-level courses in Different Schools*

Year	*Secondary*		*Vocational*		*Comprehensive/Community*	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
1960/1961	39,600	37,200	14,700	11,900	—	—
1966/1967	51,000	52,500	22,900	15,600	400	400
1969/1970	66,300	78,300	31,800	19,100	700	700
1972/1973	71,600	90,000	36,800	21,000	2,800	2,300
1977/1978	84,300	108,500	40,800	19,100	10,400	9,100
1979/1980	86,200	112,500	39,300	19,400	13,076	11,536
Percentage Increases:						
1967/1980	69%	114%	72%	24%	—	—
1972/1980	20%	25%	7%	−8%	467%	502%

Sources: Annual *Statistical Reports* of the Department of Education, Government Publication Office, Dublin 1.

Figure 3.2: *Estimated Percentage of the Relevant Age, Sex Cohort who did the Leaving Certificate, 1951-1981*



Source: Annual Leaving Certificate candidate numbers as published by the Department of Education. Cohort size estimated on the basis of a median age of LC candidate at 17.5, and the original cohort numbers estimated from figures calculated to represent number of males and females of median age 12.5, five years previous to the LC year. The 1971 and 1979 Census is used for appropriate years. The numerator, however, is the more problematic number — as estimates of "repeats" and more adult candidates are not given. Mortality is not estimated. The figures overestimate the rate by an undetermined, but likely to be small, amount, and the overestimate appears to be about equal for both sexes.

increased from 1970 to 1977, declining slightly since then. The numbers of girls attending vocational schools, however, declined slightly after 1972.

The introduction of the "Free Scheme" in 1967 appears to have mainly benefited secondary schools — since it was geared to providing the full 5-6 year general education course free at the point of use to all comers. Vocational schools had, of course, been free all along but, up to 1966, had been prevented from providing such a general education, their role had been largely confined to the provision of a "general and practical training in preparation for employment in trades etc. . ." (Vocational Education Act, 1930, quoted in Coolahan, 1981, p.97) and usually terminating in the Group Certificate examination after a two year course. As a result, vocational schools had a much more difficult adjustment to make in providing a fully integrated 5-6 year general education course than had the secondary school sector which had been doing this — with fees — up to 1967. For these and other reasons — perhaps the greater spread and the greater availability of the female religious orders — the main expansion in girls second-level education, was taken up by secondary schools. Up to 1972 their increase in female pupil intake was more than double that of vocational schools. And after 1973 the number of girls in vocational schools fell slightly while that in girls' secondary schools continued to increase. Vocational schools were much more successful, however, in incorporating boys — the relative share of the increasing cohort of boys attending second-level schools was roughly evenly shared between secondary and vocational schools.

However, since the late 1960s the development of new second level schools has been virtually restricted to community and comprehensive schools. There have been extensive amalgamations in the secondary school sector — with almost no new secondary or vocational schools being built — indeed, the number of secondary and vocational schools has declined by about 10 per cent since the late 1960s.

If we examine the mobility of primary school leavers in the mid-1960s and the late 1970s, perhaps the trends become more obvious (Table 3.5). First, the drop-out rate at primary level, which stood at about a third of the total cohort in the early 1960s, has declined to less than 1 per cent by the mid-1970s. Secondly, almost the same proportion of the male cohort has gone on to vocational schools throughout the whole period. Indeed, roughly half the male cohort now goes on to vocational or comprehensive/community schools — compared to less than a third in the early 1960s. Girls' education, however, has become more academically directed over the whole period, the proportion of girls being educated in vocational schools markedly declining. Sex differences in the type of second-level education received have, therefore, been growing.

Table 3.5: *Estimated percentage of primary school leavers in 1963, 1975/1976 and 1979/1980, who went to different kinds of post-primary schools or who dropped out at primary level*

Year	Total number of primary school leavers		Estimated percentage who went to different kinds of schools in the subsequent year						Estimated percentage who dropped out of school	
			Secondary		Vocational		Community/ Comprehensive			
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
					per cent					
1963*	55,000		37	49	32	26	—	—	31	25
1971/1972	29,600	29,300	58	76	34	14	3	2	4	4
1975/1976	33,900	32,600	55	73	37	18	8	7	Less than 1%	
1979/1980	34,800	32,200	56	74	34	17	10	9	Less than 1%	

**Investment in Education Report*, 1966, p. 169. Later years from Department of Education, *Statistical Reports*.

In the main, sex differences in participation rates are greatest in vocational schools, to which over twice as many boys as girls have gone on completing primary education and within which, as we shall see (see Byrne, 1978, (a), (b), (c)), curricular differences by sex are maximised. The only schools which show a relatively even share of boys and girls are the new comprehensive and community schools.

If we follow up a cohort of mid-1970s national school leavers, the trends become even clearer. This is attempted in Table 3.6. Starting with a 13 year old cohort in 1974/1975, 11 to 14 per cent were still in primary school, and less than 1 per cent had already left school. Of the remainder, girls had disproportionately gone (68 per cent) to secondary school. Only about half of the boys did so, most of the remainder (30 per cent) going to vocational schools. By the following year drop-out rates had increased to 4 per cent, but the number in vocational schools was increased by latecomers from primary school. However, these had declined considerably in the subsequent year, at age 16, when about 38 per cent of boys and 26 per cent of girls had left school. Most of the drop-out occurred from vocational schools, with less than half of the original boys' classes left.

By age 17, 59 per cent of the original cohort of boys and 43 per cent of the girls' cohort had already left school — for most girls on completing the senior cycle level. But by that stage 8 per cent of the original cohort of boys and 16 per cent of the girls had gone on for further training beyond second-level or on to third-level. And at that stage also the proportionate decline was roughly equal in all second-level schools.

Table 3.6: *Estimates of the nature of educational mobility over six years: taking a cohort of 13-year-olds in 1974/1975, to their position as 18 year-olds in 1979/1980*

*Age (Estimated Year)**		*Not in School*	*Still in National School*	*Secondary School*	*Vocational School*	*Comprehensive/ Community School*	*Secretarial Pre-employment & other Tech. courses*	*Third Level*	*Original Cohort Size*
13-year-olds (1974/1975):	Boys	(1.2%)	4,400 (14%)	15,800 (50%)	9,500 (30%)	1,800 (6%)	—	—	31,800
	Girls	(0.7%)	3,400 (11%)	20,800 (68%)	4,500 (15%)	1,400 (5%)	—	—	30,500
14-year-olds (1975/1976):	Boys	(4%)	1,100 (3%)	16,200 (51%)	11,000 (35%)	2,100 (7%)	—	—	
	Girls	(4%)	950 (3%)	21,600 (71%)	5,000 (16%)	1,500 (5%)	—	—	
15-year-olds (1976/1977):	Boys	(17.5%)	400 (1%)	15,100 (47%)	9,000 (28%)	1,700 (5%)	—	—	
	Girls	(15.0%)	280 (1%)	19,800 (65%)	4,300 (14%)	1,400 (5%)	—	—	
16-year-olds (1977/1978):	Boys	(38%)	280 (1%)	12,800 (40%)	5,300 (17%)	1,300 (4%)	100		
	Girls	(26%)	207 (1%)	17,200 (56%)	3,800 (12%)	1,400 (5%)	200		
17-year-olds (1978/1979):	Boys	(59%)	161 (0.5%)	7,812 (25%)	2,110 (7%)	682 (2%)	866 (3%)	1,492 (5%)	
	Girls	(43%)	145 (0.5%)	10,154 (33%)	1,479 (5%)	782 (3%)	3,248 (11%)	1,523 (5%)	
18-year-olds (1979/1980):	Boys	(79%)	22 (—)	1,309 (4%)	553 (2%)	161 (0.5%)	629 (2%)	4,121 (13%)	
	Girls	(69%)	46 (—)	1,406 (4%)	373 (1%)	144 (0.5%)	3,708 (12%)	3,735 (12%)	

*Cannot go back before 1974: Department records do not provide relevant age distribution by type of school and course attended.

By age 18, around 80 per cent of boys and 70 per cent of girls had already left second-level schools. But at the other extreme about 15 per cent of boys but 23 per cent of girls had gone on for further training or to third-level. A majority of the girls in fact proceeded to secretarial-commercial courses — primarily in vocational schools, or to nursing or teaching training; while a majority of the boys go on to university or technical colleges.

The participation in, and the drop-out of pupils from, the successive levels of education is, therefore, highly sex selective, and the consequent paths of entry to the labour market are quite distinct for each sex. A much higher proportion of girls stay on much longer at second-level, and their education takes a much more academic form. But on completion they are slightly less likely to go on to third-level, taking short pre-employment courses equipping them for rather segregated clerical positions within the labour market. A much higher proportion of boys enter the labour market at much earlier stages. These are, on average, much more technically or vocationally educated and are far more likely to take manual jobs or enter apprenticeships. But for those who complete second-level a much higher proportion of boys go on to third-level courses, which, again, are quite sex differentiated. These different patterns of education and labour market entry are, however, highly class-related. This is discussed in the following section.

(iii) Social Class and Sex Selectivities in Education.

In the following tables we make an estimate of the sex and social class composition of early and late school leavers. Two data sources are used here; first, that made available to us from the NMS[12] *School Leavers Surveys*; and secondly, our own national samples of pupils in terminal Group Cert., Inter. Cert., and Leaving Cert. classes. These school samples are described in the previous chapter.

In the following (Table 3.7) we give the percentage breakdown of educational intentions for each sex at the three stages covered. At all stages up to the Leaving Cert. girls are far more likely to intend staying on at school — in keeping with their actual participation rates. In the "terminal" Group Cert. classes three out of four boys but only two out of five girls intend to leave school at that stage. Of the boys who intend to leave at that stage two out of three aspire to apprenticeships — a rather unrealistic level of aspiration, however, for many of them, given the most recent data on the increasing educational levels of apprentices.

At Inter. Cert. levels much the same pattern of sex differences occur, though only a minority intend to leave school at this stage — about a third of the

[12]N.M.S.=National Manpower Service, annual *School Leavers Surveys*.

boys, but only one-sixth of the girls. Again, it is mainly apprenticeships which attract the boys, while girls intend to pursue a clerical/commercial training course before looking for work.

Table 3.7: *Educational and work intentions of pupils in the three national pupil samples. Percentage of boys and girls at each stage who intend to stay on in school or intend to work*

Educational/occupational intentions of pupils	*Terminal Group Cert. Sample*		*Inter. Cert. Sample*		*Leaving Cert. Sample*	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
			per cent			
1. Intending to go on to next stage in education	25	60	70	83	67*	59*
2. Enter apprenticeship	48	7	21	3		
3. To do pre-employment or secretarial courses	9	18	2	10		
4. Enter family business or farm	1	—	1	—	33	41
5. Look for job straight away	15	12	5	3		
6. Other	2	3	2	2		
Total Percentage:	100	100	100	100	100	100
Number:	354	128	2,658	2,343	1,844	2,083

*As similar questions were not appropriate to Leaving Cert. the nearest equivalent was used.

At Leaving Cert. level, a slightly higher percentage of boys (67%) than of girls (59%) aspire to higher education. Although girls are, therefore, much more likely to continue on in school up to 17 or 18, they are in fact less likely to go on to third-level education. The intentions people have about their future roles are not directly translatable into actual behaviour, however (see Hannan, 1970). If they were, about 20 per cent of the relevant cohort of boys and 18 per cent of girls would go on to university (i.e., the Leaving Cert. sample weighted by the percentage of the original cohort going on to the Leaving Cert.). In the session 1979/80 only about 12 per cent of the relevant male cohort and only about 10 per cent of the relevant female cohort went on to university — the actual rate being significantly below intentions. While these sex differences are not very great they do reverse the preceding educational patterns. If one adds other third-level institutions (excluding nursing training) the trends become even more remarkably sex biased. The RTCs especially are highly male biased in entry and student body.[13]

[13]In the academic year 1979/80, only 34 per cent of third-level students in Regional Technical Colleges, and 28 per cent of those in Colleges of Technology were women and within both sets of colleges Engineering and Technology were almost completely male dominated. Dept. of Educ., *Stats. Repl.*, 1979/80, p. 115.

Overall then, girls are less likely to leave school before completing the Leaving Cert. programme, but are also less likely to take up third-level courses. However, as well as sex differences in this area there are also differences associated with social class of origin — though its effects crucially depend on one's sex. The following results show this clearly.

Intending early drop-outs at Group Cert. level are very class selective: with 69 per cent of boys and 82 per cent of girls being from working class or small farm backgrounds. At Intermediate Certificate level intending drop-outs are slightly less working class in origin — 58 per cent of the boys and 72 per cent of the girls being from working or small farm class origins. At Leaving Certificate level all pupils are dominantly middle class, especially boys. But even here those who intend to go on to university are significantly less likely to come from working class origins than those who are satisfied with a second-level qualification only. Of those satisfied with a second-level qualification 44 per cent of boys and 60 per cent of girls are from working class or small farm origins, whereas of those intending to go to university only 24 per cent of the boys but 35 per cent of the girls are from these class backgrounds.

In other words as one goes up the educational ladder one encounters a progressively more middle class environment. By the time of university entry one is almost seven times more likely if a boy, and almost nine times more likely if a girl to be from an upper middle class or large farm background than one's earlier schoolgoing companions who droped out of school before doing the Intermediate Certificate.

These class and sex selectivities are more comprehensively indexed in the following table. It is based on a special tabulation from the 1981 NMS, *School Leavers Survey,* and shows the social class origins of pupils who actually left school at various stages of their post-primary education in the school year 1979/80. Again the same pattern emerges — early school leavers are disproportionatley selected from working class or small farm origins, while later school leavers became increasingly middle class in composition. For instance, while over two-thirds of early school leavers came from working class origins only a quarter of those who proceeded as far as the Leaving Certificate did so. Girls are less than half as likely as boys to drop out of school before the Intermediate Certificate — 11 per cent of girls, 24 per cent of boys. But the girls who do drop-out at that stage are more likely to come from working class origins than the boys who drop out. The same sex diferences in class selectivities occur at the Intermediate Certificate level. Girls are far less likely to leave at this stage but those who do drop out at this stage are again more likely to come from working class origins. (See also Appendix Table 3.2.)

Table 3.8: *Percentage distribution by social class of boys and girls who intend to leave school at Group Cert. Inter. Cert. and Leaving Cert. levels*

*Social Class Characteristics of Pupils**	*Group Cert Pupils:* Of the 75 per cent who intend to drop out of school after Group Cert. Stage		*Inter Cert. Pupils:* Of the 24 per cent who intend to drop out of school after Inter. Cert. Stage		*Leaving Cert. Pupils' Sample:* Those intending to complete second level only		Those intending to proceed to 3rd level college or nursing		Those intending to go to university	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
	%		%		%		%		%	
Upper middle class	7.1	3.9	12.0	6.7	26.7	17.5	32.4	21.7	48.7	38.2
Lower middle class	24.3	17.6	29.7	21.0	29.3	22.8	33.6	28.9	27.0	26.5
Upper working class	36.0	37.3	29.6	39.0	31.4	41.5	25.3	34.7	19.9	25.3
Lower working class	32.6	45.1	28.7	33.3	12.7	18.2	8.8	14.7	4.4	10.0
Total: Percentage:	100	100	100	100	100	100	100	100	100	100
Total: Number:	267	51	764	372	574	779	411	651	793	558

*This is a summarised and modified "Hall-Jones" social status classification: (i) Upper midle = Professionally Qualified, Managerial/executives; Farmers over 100 acres; (ii) Lower middle = Inspectional/Supervisory — Higher and Lower Grades, Routine Grades of non-manual, Farmers of 50–100 acres; (iii) Upper Working = Skilled manual, Farmers of 30–50 acres; (iv) Lower working = semi-skilled and routine manual workers, plus farmers of less than 30 acres.

Table 3.9: *Percentage distribution by social class of origin of male and female post primary school leavers who left school at different levels*

Social Class Characteristic	Stage at which Respondents Completed their Second Level Education							
	Pre-Group Cert Level or at Group Cert. Level		*Inter. Cert. Level*		*Leaving Cert. Level*		*Total*	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
				per cent				
1. Upper Middle	1.1	0.0	2.7	1.6	11.8	9.9	6.9	7.3
2. Farmers* and Lr. Middle Class	35.4	29.3	47.3	38.8	61.0	62.7	51.2	54.5
3. Upr. Working Class	22.9	19.8	26.0	29.3	15.7	14.2	20.1	17.5
4. Lr. Working Class	40.6	50.9	24.0	30.3	11.6	13.2	21.7	20.4
%	100	100	100	100	100	100	100	100
Total: No.	271	116	292	188	559	737	1122	1041

Source: Special tabulation from National Manpower Service, *School Leavers Survey*, 1981.

*The coding of "father's occupation" is as in the previous table, except that as Farmers were not identified by size of farms they are *all* assigned to category 2.

Thus, at each social class level "drop-out" rates for boys are higher than for girls — but the lower the social class of origin the greater the sex difference. For example, boys from middle class origins are between 4 and 12 percentage points more likely to drop-out than are girls, while among those from lower working class origins boys have a drop-out rate which is between 14 to 18 percentage points higher.

To a large extent, however, this advantage accruing to girls disappears at third level, as can be seen from the following:

Table 3.10: *Percentage of Male and Female School Leavers (1980) from Each Class Background Who had Completed the Leaving Certificate in 1980, who Went on for Further (All 3rd Level) Education in 1981.*

Social Background of Pupils	*Of those with the Leaving Certificate, Percentage from Each Class Background Who went on to Third-Level Education or Training*	
	M	*F*
1. Upper middle class	68.1% (69)*	48.6% (72)
2. Lower middle class and farmers	44.3% (341)	43.0% (381)
3. Upper working class	37.5% (88)	23.4% (77)
4. Lower working class	31.7% (63)	18.9% (74)

*Figures in parentheses refer to sample sizes. $X^2 = 94.4$; df = 9, $p \leqslant .001$
Source: NMS, *School Leavers Survey*, 1981, special tabulation.

Although, for all social classes, girls are more likely to reach Leaving Certificate than are boys, at third level the picture is reversed, as Table 3.10 shows. Girls are universally less likely to have proceeded from the Leaving Certificate to further education or training than are boys. These sex differences are greatest in the upper middle class, least in the lower middle class. However, this latter class includes farmers, among whom girls are slightly more likely than boys to continue to third level (Clancy, 1982).

In second-level education, therefore, girls are significantly advantaged in terms of early school leaving — only half as many girls drop out of school at an early stage. Or in terms of completing the senior cycle, almost 50 per cent more girls than boys do the Leaving Certificate. But of those who complete second level, substantially fewer girls actually go on for third level education. Of the original cohort, however, the relative proportions are roughly balanced. In the following two sections these sex differences are seen to be even more marked in third-level studies, as well as in the subsequent type and level of jobs taken up.

(iv) *Sex Differences in Third-Level Education*

Although the relative proportions of the cohort of girls and boys who went on to third-level education or training are roughly equal, the type of education or training received varied widely, as the following figures clearly show:

Table 3.11: *Destination of sample of 1980 school leavers who had completed the Leaving Certificate; and type of 3rd level courses taken in Universities or RTCs*

	Leaving Cert. Subsample		Of those in Third Level: Type of 3rd Level Course Taken				
				Those in Universities		Those in RTCs	
Type of 3rd Level Institution Attended	*Male*	*Female*	*Type of 3rd Level Course*	*Male*	*Female*	*Male*	*Female*
	per cent			*per cent*			
To University:	26.4	11.3	Arts:	20.4	46.1	2.0	12.5
To RTCs:	19.1	8.9	Commerce:	9.3	7.3	18.4	13.4
To Teaching Training:	0.7	6.0	Professional:	11.4	14.0	0.6	1.5
To Nursing:	0.1	7.8	Engineering/ Science:	46.2	31.4	54.6	20.5
To Secretarial:	0.0	4.0	Other:	12.8	1.1	24.3	52.1
To Other 3rd Level or Training (AnCO etc.)	10.4	14.0					
No further Educ. or Training	43.4	48.1					
Total %	100	100	*Total* %	100	100	100	100
No.	565	613	No.	170	69	132	62

Source: NMS, *School Leavers Survey,* 1981.

Boys who had completed their Leaving Certificate in the NMS sample were more than twice as likely as girls to have entered University or RTCs. However, since boys are almost 30 per cent less likely to complete second-level this considerably exaggerates the overall differential. In fact, in the 1979-80 school year about 12 per cent of the relevant cohort of boys and 10 per cent of the relevant cohort of girls went on to University (Higher Education Authority, (HEA) *Accounts and Students Statistics* 1979-80).*

What is, however, far more important than any differential in rates of attendance at third-level is the sex difference in type of courses taken. Girls are disproportionately concentrated in teacher training, nursing and secretarial courses. And, within University and Technical Colleges, they are far more likely to enter Arts or professional type courses, while boys are far more likely to enter Engineering or Applied Science courses. The following results show this sex bias even more clearly.

*As estimated from original cohort size.

Table 3.12: *Ratio of male to female first year entrants and primary and post-graduate degree holders in 1979-80 (No. of males per female)*

	First Year Entrants 1980		*Primary Degrees 1979*		*Post-graduate Degrees 1979*	
Arts	.588	(1618)	.663	(1137)	1.352	(88)
Social Science	.432	(95)	.114	(88)	1.000	(4)
Commerce (incl. Econ. and Soc. Studies)	1.958	(269)	2.371	(210)	19.500	(4)
Law	1.392	(112)	2.033	(90)	2.800	(5)
Science	1.058	(462)	1.357	(300)	2.655	(29)
Engineering	8.935	(62)	18.233	(30)	27.667	(3)
Medicine/Dentistry	1.095	(241)	2.163	(166)	2.750	(4)
Vet./Agr./Forestry	4.239	(46)	6.522	(23)	41.000	(1)

Source: HEA, *Accounts and Student Statistics,* 1979-80.

A highly sex differentiated course structure exists within the University system. Male dominated faculties such as Engineering and Architecture show a 9 to 1 male/female ratio at undergraduate level, and a 28 to 1 ratio at a post-graduate level. Veterinary and Agricultural Science are slightly less male dominated at undergraduate level, but at graduate level there are still 41 males to 1 female amongst the students. Economics Commerce and Law have a significantly less male emphasis at 1½ or 2 to 1. But while Law retains this position at the graduate level, Commerce is still dominantly male, at 20 to 1, at higher degree level. Science, Medicine, and Dentistry have the least male emphasis at the undergraduate level and have become increasingly less so over the past few years, but at graduate level the situation is still male selective at the ratio of 2 or 3 to 1 in 1979.

Only the traditional Arts subjects and Social Science — predominantly Social Work — show a consistent female bias at the undergraduate level with about one male to every two female undergraduates. Even here, however, at the graduate level the situation is reversed, with females being significantly under-represented.

However, the extent of sex differentiation has substantially declined over the past decade, particularly in the past 5 years, as can be seen by comparing the above figures with those for 1976/77 in Appendix 3, Table 3.1. While the situation in Arts and Social Science has remained relatively static there has been a substantial increase in female undergraduate participation in Engineering, Agriculture/Veterinary, Medicine, Law, Science and Commerce. At graduate level, however, sex differences are still as pronounced as in the mid-1970s.

This clear sex bias by faculty or training course or job is unlikely to be due exclusively to second-level school channeling effects on subject choice, or on examination performance and, therefore, to essentially educational or curricular constraints imposed by the second-level school system. While it may well be that a suitable balance of entry subjects and examination performances was not achieved by girls for the applied Science and Commerce faculties, for instance, we cannot assume that the relatively low take-up of those subjects by girls is due mainly to their lack of provision. The lack of provision by schools may reflect only biased historical patterns of choice by girls. Given very high "points" requirements for entry to Medicine — where the uptake is roughly evenly balanced between the sexes — sex differences in second-level performance certainly cannot be an important discriminator.

It appears likely, therefore, that such sex biases occur also at a much more "individualistic" level; in the choices and proclivities of individual students. Occupational aspirations and marriage or career plans are highly sex differentiated even amongst those who go on to third level. Girls are not only less likely to go on for third-level education, but, even when they do, they choose options that are traditionally associated with female achievement models — teaching, medical and paramedical, social work, administrative options. The process by which this high degree of sex differentiated educational and occupational allocation occurs appears, therefore, to be highly institutionalised — both in the behaviour of educational institutions and in the attitudes, aspirations and expectations of individuals.

In the following section we examine the degree of sex differentiation in the labour market, that is, the extent to which it is segemented by basically "male" or basically "female" occupational boundaries: a non-competitive market in which males mainly compete with males and females with females, but also one which is quite restrictive of career mobility for women.

However, the traditional patterning of male and female roles may not be as solidly established as the current pattern of roles may suggest, particularly the conventional pattern of movement from the labour market on marriage. As we have seen this pattern has shown significant interruptions in recent years — particularly amongst younger women. In the final section of this chapter we, therefore, examine the extent to which girls and boys in their final year of second level schooling share these traditional expectations.

(v) *Sex Segregation in the Labour Market*

As we have seen, then, the pattern of further educational and occupational entry for girls is substantially different from that of boys. Girls are far more likely to stay on in second-level education to completion — boys to drop out earlier. As a result, boys (at 14%) on average have slightly higher levels of unemployment than girls (11%) in the year subsequent to leaving school although there is no significant difference between the sexes when level of education is controlled. The important variable is level of education achieved, not sex. Almost 30 per cent of those school leavers with no educational certificate are unemployed, compared to around 8 per cent of those with a Leaving Certificate. So, because significantly fewer girls leave school early, fewer remain unemployed (NMS Survey, 1981).

Table 3.13: *Employment status of school leavers one year subsequent to completing their second-level education, by level of education*

		Pre Group Cert. (Left without any Educ. Quals.)		*With Group Cert. or Intermediate Cert.*		*With Leaving Cert.*		*Total*	
		M	*F*	*M*	*F*	*M*	*F*	*M*	*F*
		per cent		*per cent*		*per cent*		*per cent*	
1) Employed		68.1	63.4	77.7	71.4	46.7	58.5	60.8	61.6
2) Unemployed or seeking first job		29.7	29.0	17.5	13.4	8.6	8.0	14.3	11.0
3) Third-level student or further training		0	0	2.4	12.5	43.8	31.4	23.3	24.8
4) Other		2.2	7.5	2.4	2.7	0.9	2.1	1.6	2.6
	%	100	100	100	100	100	100	100	100
Total	No.	138	93	417	224	580	752	1136	106

Source: NMS — *School Leavers Survey*, 1981.

Substantially more girls, therefore, complete second-level education. Of those far more also enter employment on completing their education, or take up short worker training courses — mainly for office work; and far fewer remain unemployed. Whether their more prolonged and more academic education results from greater demand for female clerical labour and consequent adjustment of the school system to meet that demand, there is no doubt that the increasing levels of education of girls in the late 1960s and early 1970s coincided with an equivalent rapid growth in white collar employment in Industry, Services and the Public Service (see Rottman and Hannan *et al.*, 1982). Up to the early 1980s, in fact, it appears that labour market demand and educational system supply is more evenly matched for girls than for boys. Supply, however, appears to be more generous for girls than for boys, i.e., unfilled places in vocational schools and the very rapid expansion of girls secondary schools' places. Although interesting, these questions will have to await further research, however. What is important here is the extent and nature of the educational difference, as well as the differential paths of labour market entry.

The extent of labour market segmentation amongst young workers is clearly indicated in the following figure taken from the 1971 Census. The distribution of young (20-24) females is substantially different from that of males. Almost two-thirds of young female workers (20-24) enter or are employed in non-manual or white collar occupations — the great majority in clerical capacities, usually in ones that do not have extended career possibilities. A further 14 to 15 per cent are employed as service workers — shop or counter assistants, etc., of various kinds. Of all younger female workers, therefore, over three out of four are employed in non-manual or service employment. This is true, however, of only one in three younger male workers. Younger men are much more concentrated in manual or farm employment (63%), particularly skilled manual work (27%); and, if non-manual, are much more likely to be employed in professional, technical and trainee managerial positions. A very high proportion of young women, therefore, are employed in non-career line junior

Table 3.14: *Some selected characteristics of the occupations held by gainfully occupied young (aged 20-24) and middle aged (40-44) female and male workers in 1971. Percentage in selected socio-economic groups*

By Socio-Economic Group		*Aged 20-24*		*Aged 40-44*	
		Females	*Males*	*Females*	*Males*
		per cent		*per cent*	
Higher Professionals		2	2	8	4
Lower Professionals		14*	4	15*	3
Employers, Managers, Salaried Employees		0.4	3	4	9
Intermediate non-manual		46	17	29	9
Other non-manual (Service workers etc.)		15	9	17	11
Skilled Manual		5	27	4	18
Other Manual		16	19	15	15
Agricultural		2	18	8	32
Total	%	100	100	100	100
	No.	68,408	97,800	14,693	74,507

Source: Census of Population of Ireland, 1971, Volume V. Table 6 and Table 1B.
*Mostly nurses, teachers etc.

non-manual positions, or as professionals — such as teachers and nurses — they have limited career opportunities.

In fact, 71 per cent of all young working women (20-24) are in occupations where over two-thirds of their age peers are women — a very clear female segmentation of the labour force, (Kreckel, 1980). A high degree of occupational differentiation by sex, therefore, occurs in the Irish economy. This is not an unexpected finding given the very high degree of sex differentiation found in almost all western societies which have been industrialised for a much longer time period than Ireland (Gross, 1967; Oppenheim, 1970; Fogarty *et al*, 1971; Williams, 1976)

However, it should not be taken from this that women, on entering the labour market, are seriously discriminated against in terms of unemployment levels, initial income levels or the quality of first job entered. In fact, in all of these respects young women, by and large, do better than young men: a substantially higher proportion of young men enter the labour market with poor educational or training qualifications, a higher proportion remain unemployed and a much higher proportion find employment in routine manual work — with significantly poorer conditions of work, very poor promotion prospects and poorer income levels.

A special tabulation of the 1981 NMS *School Leavers Survey* was carried out relating the status of current occupation of school leavers to level of education achieved. As we can see from the following table, taken from these results,

Table 3.15: *Of those in employment, level of occupation achieved in one year after leaving school (1981) by level ofeducation achieved in school*

		Stage at which pupil completed education					
Level of Occupation achieved		*Before or at Group Cert Level*		*Inter Cert Level*		*Leaving Cert Level*	
		Male	*Female*	*Male*	*Female*	*Male*	*Female*
		per cent	*per cent*	*per cent*	*per cent*	*per cent*	*per cent*
(1) Upper Non-Manual (1-3):		0.5	1.2	2.1	3.5	16.0	17.8
(2) LowerNon-Manual (4–5):		12.8	40.2	23.5	70.7	42.8	73.0
(3) Skilled Manual (6):		48.5	4.9	51.7	6.4	20.6	1.7
(4) Semi–and Unskilled Manual (7–8):		38.2	53.7	22.3	20.4	21.1	7.8
Total	%	100	100	100	100	100	100
	No.	196	82	238	142	276	460

Source: NMS *School Leavers Survey* 1981.

a very clear sex distinction occurs in occupational placement at all levels of education achieved. At Group Cert. level or lower, around 90 per cent of boys but less than 60 per cent of girls are in manual or service occupations. Even with such low levels of education, over 40 per cent of girls are in junior secretarial/clerical positions. At Inter Cert. level around three out of four girls are in such non-manual occupations, compared to around one in four boys. While at Leaving Cert. level over 90 per cent of girls compared to less than 60 per cent boys got non-manual jobs. At this stage of the educational and work process with around 80 per cent of the cohort in employment, girls are clearly advantaged: being concentrated in generally better paid non-manual occupations, and they are also advantaged, as we have seen, in overall unemployment levels.

In conclusion, therefore, girls' initial entry point to the Irish labour market is generally better placed than that for boys — at least as judged from those who enter directly from second-level education. Although their future earning and career prospects are not nearly as good as that for men, in general, young women who enter the labour market directly from second-level education start their work life with more prestigious and generally better paid positions than young men. These positions, however, have very short promotion ladders.

Most clerical positions have only two or at most three career grades and do not generally provide access to managerial positions. And, taking all female workers as a group, their average wage or salary levels are substantially below those of the closest comparable male occupations (Blackwell, 1983). The initial female advantage on entry to the labour market is very quickly eroded as males complete their apprenticeship and enter, or are promoted, to positions that are much better rewarded. And of that proportion of the cohort who go on for further training beyond second level, a clear and immediate advantage of males is obvious, a higher proportion of boys go on to University or Technical College and are prepared for entry to professional, technical and managerial positions in the economy, while girls disproportionately enter, and are trained for, professional positions like nurses or teachers, which have more limited income and career opportunities. Given that their average level of education is higher — with almost 70 per cent of girls completing second-level education, compared to around 50 per cent for boys — this initial advantage appears to be relatively quickly eroded. This clearly raises the question of sex differences, in expected and actual roles in the economy and in the family, and the extent to which the traditional division of labour is incorporated into the attitudes and expectations of young women and men about to complete their second-level education.

Given the substantial changes in the educational and occupational position of women that has been described, as well as the significant increases in the percentage of young "dual-career" (work-family) married women, one would expect that young women in second-level schools at the present time would have significantly different aspirations about the future pattern of their spousal and work roles than had their elders. This question is explored in detail in the next section.

(vi) *Cultural Differences*

If sex differences in familial and occupational careers have been so marked in Ireland, and for such a long time period, it is likely that a very sex differentiated system of beliefs, values and expectations about appropriate gender roles is widely shared in the society; and that most young boys and girls are being socialised by parents, peer groups and teachers, etc., into rather traditional adult role expectations. It is apparent in studies of familial interaction in Ireland (Hannan and Katsiaouni, 1977; O'Connor, 1980) that although there has been a significant shift from the traditional segregated and patriarchical role system within the family, that change has been toward a still highly differential system which maintains the traditional distinction between the "male provider" role and female "homemaker" role. As we have seen the extent of "dual career" families is very limited in Ireland: at most, 15 per cent of all married women have full or part-time employment outside the home, although the proportion of younger married women is substantially higher. There have been, however, significant indications of some dissatisfaction with the traditional familial model. Almost a quarter of the non-working married women in Walsh and O'Toole's (1973) study had some intention to return to the labour force, and the higher the level of education the greater the participation in the labour force, and the greater the intention to return to it after childrearing was completed. Between 40 and 50 per cent of married women with university or professional-technical qualifications were working (full or part-time) — compared to an average rate of 15 per cent. And, of those not working, about half of the most highly educated thought it probable they would return to work. In the sample of Leaving Cert. pupils in this study roughly 20 per cent of the mothers of pupils were working full or part-time. We do not know the attitudes of those not working but, given the extent of economic and social change over the 1970s, one would at least expect the 1973 results to have remained constant.

One would, therefore, expect that the majority of female students in second-level schools, although with significantly less traditional expectations than the actual occupational positions of their mothers suggest, would still not be aiming at a full-time career in the labour market; the majority seeing career and parenthood as mutually exclusive options for women. In the following two tables we give the results of interviews with a large national sample of

Table 3.16: *Sex differences in marriage expectations, and in aspirations to combine work with marriage and childrearing (Leaving Cert. Sample, 1981)*

	Percentage expecting to marry	*Expected median age of marriage*	*Expectations about combining work, marriage and childrearing roles, on marrige and birth of child*			*Perceptions of future spouse's expectations*
			(i) *Would give up job to mind children on a full time basis*	(ii) *Would combine part-time working with minding children while spouse worked full time*	(iii) *Would continue to work full time while spouse would give up work to mind children full time*	*"You would give up work (full time or part-time) while spouse would work full time or part-time?"*
	per cent	*Years*	*per cent*	*per cent*	*per cent*	*per cent*
Girls (N=2015)	97.0	25.0	50.1	40.0	0.2	92.0
Boys (N=1715)	96.0	25.9	2.9	5.9	63.6	12.0

girls and boys in their Leaving Cert. year in the sampled schools in 1981. The first table indicates the sex differences in expectations about combining work and marriage; the second indicating expectations about level and type of occupational aspiration.

A marked sex differentiated pattern emerges. Marriage expectations are almost universal — although expected age of marriage for girls is significantly higher than expected. About two-thirds of the boys but only half of the girls have completely conventional views about the male provider" and "female homemaker" roles. A further 40 per cent of girls, however, aspire to combine part-time work with full time home-making/parenting duties. Less than 10 per cent of girls aspire to "a dual career family" model, but almost 20 per cent of boys said they would aspire to a non-traditional spousal-occupational role, agreeing to work part-time, for instance, to look after children.

Table 3.17: *Level and type of educational and occupational aspirations of Leaving Cert. pupils in sample, 1981*

	Level of educational aspirations		*Level of occupational aspirations*		*Type of occupational aspirations*	
	Percentage aspiring to university	*Percentage with no aspirations beyond Leaving Certificate*	*Percentage aspiring to professional occupations*	*Percentage aspiring to Intermediate Non-manual (i.e., mostly clerical) jobs*	*Percentage aspiring to jobs that require Higher Maths*	*Percentage aspiring to jobs that are predominantly female in composition*
Boys (N=1844)	43.5	33.4	35.3	6.6	13.0	17.2
Girls (N=2083)	27.1	40.9	9.4	23.8	1.4	74.6

The predominant pattern however is clearly traditional. Given these sex differences it is not surprising to find that very pronounced gender differences in occupational aspirations occur. Marked sex differences exist in the level and type of educational and occupational goals. Boys are 50 per cent more likely than girls to aspire to University and four times more likely to aspire to professional occcupations. Girls' aspirations tend to be much more limited to lower professional (teaching and nursing) occupations or to clerical occupations; as well as to jobs that are predominantly staffed by women. The clear labour market segmentation is being almost exactly reproduced in these girls' expectations. Around three-quarters of girls in the Leaving Cert. sample aspire to female dominated jobs,[14] compared to around one in six boys. Boys also are far more likely to aspire to jobs that actually require Higher Maths as an entry requirement (mostly Engineering) and to jobs that are technical-scientific in their characteristics.

In other words, despite the very obvious shift in the level of participation of women in the labour force and some significant shifts in their educational "preparation" for the labour market there is an extremely clear cut sex bias in occupational goals and expectations. In terms of level and type of their educational and occupational goals girls' orientations are directed toward traditional occupational outlets, the great majority aiming at the very traditional clerical and "caring" occupations (teaching and nursing).

Given these marked sex differences in both the saliency and level of occupational goals, and the significantly greater emphasis on familial/domestic responsibilities amongst girls, one would expect substantial differences in the perceived function of second-level education as well as in the perception of the utility of different subjects and subject packages amongst boys and girls. This question, however, will not be explored until Chapter 9.

Marked differences, however, exist amongst girls themselves in these respects: 10 per cent have very "liberated" views of the relationship of marriage and work, 40 per cent have views which emphasise the continuing saliency of, at least, part-time work. Nevertheless, the orthodox view of married women's responsibilities still prevails and it constitutes the expectations of the majority.

As has been found in most research (Bayer, 1969; Aneshensel and Rosen, 1980) variations in such career-marriage expectations are significantly related to type and level of educational and occupational aspiration and, therefore, to subject choice. These relationships will be explored in detail in later chapters, particularly Chapter 9. What is important here is to emphasise the traditionality of the majority of girls' aspirations, and the very clear distinction between these and boys' expectations. But also to point out the significant minority of girls who have non-traditional expectations about work and family roles: over a third of the Leaving Cert. girls expect to combine at least part-time work

[14]Female dominated occupations are those where over 65 per cent of workers, aged 20-24, in the occupation were female in 1971: (1) *Leather and Textile Workers:* Boot and Shoe Makers (factory); Spinners etc.; Knitting, Hoisery machine Operators; Tailors and Dressmakers, Sewers and Machinists. (2) *Food, Beverage and Tobacco Workers:* Makers of Tobacco Products. (3) *Storekeepers, Packers and Bottlers:* Packers and Bottlers. (4) *Clerical Workers:* Typists and Clerks. (5) *Service Workers:* Housekeepers and School Matrons, Waiters and Waitresses, Maids and Related Workers, Barbers and Hairdressers, Hospital and Ward Attendants. (6) *Professional and Technical Workers:* Religious, Teachers, Nurses, "Other Medical Workers" (excluding Doctors, etc.). Calculated from Table 5 of the *Census of Population*, 1971, Volume V.

with marriage and childrearing duties, one in four to non-female or non-stereotyped jobs, and one in ten to professional-technical occupations, etc.

Conclusions

The naïve assumption that girls' education has directly deleterious effects on job opportunities — in levels of unemployment, and in the status of, and income from employment — immediately on leaving school is not supported by this research. In fact, post-school unemployment rates are lower amongst girls, primarily because a higher proportion of girls complete second-level education. Unemployment rates are 3-4 times greater amongst those leaving school before the completion of the junior cycle than those completing the senior cycle, and girls are 50 per cent more likely to complete the senior cycle. As a reflection of their generally higher levels of education, as well as because of differences in labour market demand, a much higher proportion of girls who enter the labour market immediately on leaving school get non-manual jobs which, in terms of their status and income, receive, on average, higher rewards than equivalent boys.

However, this initial advantage is quickly eroded. Boys initial wage rates are disproportionately reduced by their high proportion in apprenticeships — where starting wage levels are very low — and their greater propensity to start off in lower level employments which, however, allow for greater wage and career mobility. So that although initial entry earnings are higher for girls overall wage levels for female labour varies between two-thirds and three-quarters of that for male labour in comparable employment. (See Blackwell, 1983).

Both manufacturing and service employment for young women (15-24) has shown a disproportionate decline over the past decade — in textiles, personal and other service occupations. But there has been a compensating disproportionate expansion in lower non-manual employment for women; in clerical-secretarial, semi-professional, and commercial occupations (see Table 3.18 and Appendix 10, Table 4). From our point of view, therefore, girls' education has adapted to labour market demand changes more successfully than has boys' education over the past decade. Given shifts in labour market demand there is, in fact, a much higher degree of structural misfit between educational output and work availability for boys than for girls. This, however, relates only to those 70 to 75 per cent of pupils who enter the labour market directly from second-level education.

Although this is so, however, the jobs taken up by girls are very highly sex segregated, with almost 70 per cent of girls entering job categories that are dominantly female in workforce composition: secretarial-clerical, teaching, paramedical, certain types of service employment, etc. In addition to this labour market segregation, up to 70 per cent of young women retire from the labour force on marriage or on the birth of the first child. This pattern of generally segregated schooling, segregated occupational induction, and early withdrawal from paid employment on marriage has become highly institutionalised in Irish educational and occupational placement practice, as well as in the anticipatory socialisation of girls into this pattern.

The main character of this path of movement from schooling into the workforce, and from work to family responsibilities, has changed substantially for young women over the past two decades, however. There has been a very significant contraction in employment in the production and service sectors of the economy: in agriculture, in some sectors of industry and in some services — particularly personal services. But there has been a compensating growth in commercial, professional and semi-professional employment as well as in public administration. Those white collar jobs expanded demand for female labour: clerical-secretarial or semi-professional jobs like teaching or nursing, etc. (see Table 3.18 below). Relative to males the decline in employment for females in production has been lower and the expansion in the opportunities in lower white collar employment has been much greater.

Table 3.18: *Some broad occupational characteristics of young (15-24) male and female workers 1961-1979*

		Year								*Percentage Point Change*	
		1961		*1971*		*1975*		*1979*		*1961–1979*	
Broad Occupational Group		*F.* %	*M.* %	*F.* %	*M.* %	*F.* %	*M.*	*F.* %	*M.* %	*F.* %	*M.* %
(1) Agriculture + All Producers + Labourers:		29	68	24	64	21	62	20	60	−9	−8
(2) Transport:		6	9	6	8	6	8	4	7	−2	−2
(3) Commerce:		14	9	13	9	12	9	13	11	−1	+2
(4) Service:		22	3	15	4	10	4	13	4	−7	+1
(5) Clerical:		20	5	31	7	37	7	35	7	+15	+2
(6) Professional/ Technical:		9	3	11	5	14	6	14	6	+5	+3
(7) Other:		1	4	0.5	3	—	5	1	4	—	—
Total	*per cent*	100	100	100	100	100	100	100	100	100	100
	No. (000)	118.0	156.7	129.9	169.7	129.7	162.6	142.6	185.1		

Sources: Tables 1A and 1B, *Census of Population,* Vol.,V, 1961, 1971; *Labour Force Survey 1979.*

In addition to this increasing demand for female labour and the general upgrading of the status of female jobs — from semi-skilled manual jobs in industry and personal service employment, etc., to lower non-manual employment — the participation rate of young married women in employment has also increased markedly, doubling in the 1971/79 period. This no doubt reflects underlying cultural and economic changes. The combined effects of rapid industrialisation, urbanisation, substantial increases in the level of education of younger women, increasing marriage rates and declining marriage ages, declining fertility and age of completion of childbearing and so on, has substantially altered the economic, social and cultural environment in which young women construct their work, courtship and family and community roles.

Despite these rapid changes, however, it appears that girls' second-level schooling has more successfully adapted to this rapid labour market changes than has boys' education — at least, as indexed by initial job placement figures. Fewer girls remain unemployed after the first year of working life, and they are relatively better positioned — in terms of status and income level — in their first job.

From a policy point of view, therefore, the issue is not one of underachievement in terms of general educational level or initial job placement but the very high degree of sex differentiation in education and in job placement with very limited promotion or career prospects in the jobs entered by young women; as well as the very low proportion of high achieving girls who aspire to, or enter, training for professional, technical, and managerial positions in the society at large. The issue of the technological vulnerability of office — clerical or service employment, where young female employment is overconcentrated, is also crucial.

Males, therefore, are both more likely to enter unskilled and semi-skilled manual jobs, and more likely to become unemployed. But they are also far more likely to become qualified as skilled manual workers and to take up jobs leading to careers in management, professional, technical and senior administrative positions. Although women, therefore, are less likely to become unemployed or to enter low-paid manual employment they are almost completely absent from craft or skilled manual jobs as well as from senior positions in the labour market.This pattern is not apparently due to their restricted or interrupted careers but to their different entry points to the labour force, to their preceding educational history, and to a very high degree of sex segregation in the market itself. Class differences in educational and job opportunities are wider among boys than among girls, since fewer young women are found at the extremes: pre-Group Cert. school leaving, and unskilled manual employment or unemployment, on the one hand, and in appropriate third-level education and higher professional or managerial employment, on the other.

The details of the differential educational history of boys and girls in second-level schools is analysed in detail in the following 5 chapters. In Chapter 9 we return to pupils own attitudes and aspirations and their relationships to choice of subjects.

CHAPTER 4

The Organisation and Differentiation of Post-Primary Education in Ireland

This chapter provides a brief introduction to the system of post-primary education in Ireland, as well as an historical overview of sex differences in the type of education received in secondary, community and vocational schools. We first provide a brief description of the ownership, managerial structure and main social characteristics of pupils in the different post-primary schools (see Coolahan, 1981; Tussing, 1978). For those unfamiliar with the system, this provides a general overview of the organisational context within which differential curricular provision and subject choice occurs. Secondly, we describe the nature and extent of recent changes in curricular provision in secondary and vocational schools.

Post-primary schools are mainly single sex, although most of the newer schools are coeducational. Even in coed schools, however, substantial sex differences in curricular provision and subject take-up occur, particularly in vocational schools. The extent to which such sex differences in subject provision and take-up occur in Irish secondary and vocational schools is explored in this chapter, as well as the extent of change that has occurred in these respects over the past few decades.

The Organisation of Post-Primary Schools

Second-level education in Ireland is of three main types: secondary, vocational and community/comprehensive. Each has its own distinctive character, and the Department of Education, which holds overall responsibility for the planning, financing and regulation of education in Ireland, has a different relationship with each type of school. In 1980-81 there were 818 second-level schools, 524 secondary schools, 3 secondary tops, 246 vocational schools and 49 comprehensive or community schools. Seventy per cent of all second level pupils were in secondary schools, 21 per cent in vocational schools and 9 per cent in community-comprehensive schools.

Virtually all pupils experience some form of second-level education, as school attendance is compulsory until the age of 15. Most pupils transfer from primary level at 12 or 13 years of age. The full second-level course is normally of five years' duration and terminates with the Leaving Certificate examination, which tests two years of senior cycle study. The junior cycle is a three-year course of study leading to the Intermediate Certificate examination. Both these examinations may be taken in a wide range of subjects — academic, technical and artistic. The Group Certificate examination may be taken after two, or sometimes three, years of second-level studies: its syllabi constitute a subset of Intermediate Certificate subjects, but its emphasis is mainly practical.

The existence of two junior cycle examinations with differing emphases is a heritage of differentiation over many decades between mainly academic and mainly practical education, each of which was catered for in a separate sector: private secondary schools developed rather like grammar schools or gymnasia; the public vocational schools specialised in trades, agricultural, domestic and secretarial training. The Intermediate and Leaving Certificate examinations were developed for the secondary sector, and the Group Certificate for the vocational sector. Until the mid-1960s the two year Group Certificate course was the terminal examination for almost all full time vocational school pupils. The course of study was not integrated with that of the Intermediate or Leaving Certificate curricula.

Vocational schools were the only "free" schools up to 1967 recruiting pupils mainly from small farm or working class origins, or those of lower academic ability who were seen by their parents as unsuited for the academic curricula of the secondary schools. This bipartite system of education — the academic and mainly middle class secondary schools and the technical and generally working class nature of the vocational school — was more obvious up to the mid-1960s when a relatively low proportion of the cohort went on to post-primary schools and thus curricula and student body were quite distinctive.

In the last fifteen years, however, a number of policies were directed towards overcoming this duality: the extension of free second-level education to all, the development of a more comprehensive curriculum, the integration of the Group, Intermediate and Leaving Certificate curricula and, finally, the development of the new comprehensive schools. These policies have been promoted in three ways: first, vocational schools were permitted to offer the Intermediate and Leaving Certificate examinations, whose curricula were substantially revised to accommodate technical and practical subjects. Secondly, in 1967 free second-level education was introduced. Thirdly, a new type of school was introduced, which would offer the full range of subjects and examinations in a single centre: this is the "comprehensive" or later, the "community" school; originally intended, from its inception in 1963, to be the model for most new second-level schools. Most of these new schools, however, were set up in newly expanding urban areas. In the older communities with established schools a sustained attempt was made in the late 1960s and early 1970s to persuade smaller schools to amalgamate to form a new community school or to co-operate in providing a fully comprehensive curriculum to every community. This latter policy, however, had limited success and has not been pursued actively in the last decade.

(i) *Size and Managerial Charactristics of the Three Sectors*

Much of the difficulty in effecting structural changes in the post-primary education system lies in the diversity of the system, or systems. Secondary, vocational and comprehensive or community schools are organised quite independently of one another, except in so far as they are jointly regulated by the Department of Education.

The Secondary School Sector

Secondary schools have their origins in the late 18th and early 19th century: they developed as "voluntary" schools, privately or corporatelv owned. Until the early 1960s they were minimally financed by the state. They may now be almost totally state-financed, but they remain "private" in that buildings and land remain the property of those who operate the schools. A striking feature of the secondary sector is its denominational character. About 88 per cent are owned and controlled by Catholic religious institutes (nuns, brothers and priests); 6 per cent belong to other religious denominations, mostly the Church of Ireland; the remaining 6 per cent are owned either privately or corporately by lay Catholics. Of the schools run by Catholic religious institutes, 280 are owned and controlled by teaching sisters, 122 by teaching brothers and 65 by priests.

These figures, however, give little indication of the range in size of these religious orders and congregations. Among the schools run by nuns (over half the total number), the largest congregation (Mercy) alone — although composed of several independent units — controls about one-fifth of all secondary schools. The largest congregation of brothers (Christian Brothers) controls about 15 per cent of the total. The three largest teaching congregations (including Presentation) combined own about 45 per cent of all secondary schools. Yet there are 35 congregations of nuns and seven of brothers. Among priests, a distinction should be drawn between religious order priests — of whom there are 18 orders owning 34 schools — and diocesan priests, who operate the 31 boys' diocesan schools. Of a total of 60 men's and women's congregations, owning or managing : econd-level schools, 37 control only one or two schools each.

While religious-run schools constitute the great majority of secondary schools, the number of religious teaching staff has been declining steadily, nuns constituting a much higher proportion of female teachers than do priests and brothers of male teachers.

The proportion of religious teachers has declined from 60 per cent of the total in 1942, to 34 per cent in 1971. In 1971 the overall teaching force was three times as large as that of 1942 (Ó Buachalla, 1980). Tussing (1978) estimated that by 1986 only about 20 per cent of teachers in secondary schools would be religious (p. 61). But even by 1978-79 the ratio of religious to lay (incremental) teachers in secondary schools was down to 20 per cent.[15]

In our own sample of secondary schools the religious as a percentage of all incremental teachers in 1981 was only 16 per cent — 20 in girls' schools and 13 in boys'. Even if we include non-incremental teachers the overall percentage only reaches 18.

Table 4.1: *Percentage of permanent and non-permanent teachers who are religious in secondary, vocational and community schools*

	Secondary Schools		*Vocational Schools*		*Comp./Community Schools*	
	Permanent (Incremental) Teachers	*Non-Incremental Teachers*	*Permanent Teachers*	*Non-Permanent Teachers*	*Permanent Teachers*	*Non-Permanent Teachers*
Male Teachers	12.6	45.5	1.2	63.2	3.2	44.4
Female Teachers	19.6	26.1	2.0	15.8	9.4	11.1
All Teachers	16.1	32.4	1.5	44.2	6.2	22.2
Total No. of Teachers	1431	204	548	95	421	27

In vocational schools religious are down to less than 2 per cent of all permanent full-time teachers and in community schools to 6 per cent. Obviously the very rapid increase in pupil/teacher numbers has led to a faster erosion of the prominence of religious in the teaching body than had been anticipated, though not of their dominance in principalships.

Congregations are involved in education to serve a wide range of religious, social and educational objectives. These orientations became a significant factor when in 1967 secondary schools were called upon to decide whether they would continue to charge fees, or whether they would take part in the state Free Education Scheme. This provided schools with an equivalent amount in direct state grants to what had been raised by schools in the lower fees range. Roughly 10 per cent of Catholic religious and lay schools are not

[15]Due primarily to a much greater increase in the population of pupils and teachers in secondary schools than had been estimated by Tussing (1978). *Source: Statistical Report*, 1978-79. By the school year 1980-81 the percentage was reduced to 18, (*Statistical Report*, 1980-81, p. 66).

in the Scheme. These are usually distinguished by the particular educational philosophy and social group orientation of the religious order — they are mainly highly academic and cater primarily for upper middle class pupils. But a number of religious orders like the Christian Brothers or the Presentation order, which were primarily established for the education of the poor, maintain a small number of private fee-paying schools. A separate grant scheme is available for the 23 schools of Protestant denominations, all of which remain fee-paying. Here fees are charged (sometimes quite substantial fees), but state funding is used to provide scholarships for those from lower income backgrounds.

Principals and managers of secondary schools (often the same person) have the power of appointment of teaching staff. Some schools — among them the Protestant schools — have a Board of Governors or Board of Management, in whom overall responsibility for the school is vested. The religious order or Board normally appoints the Principal, who runs the school in trust for the religious order or the Board, members of which do not intervene in day-to-day administration. With a few exceptions almost all Principals of religious owned schools are themselves religious.

The Vocational Sector

The Vocational Education Act of 1930 consolidated the various pre-existing schemes for technical instruction into one system and established a new scheme for practical "continuation education" for young people between the ages of 14 and 16. The administration of the system was to lie in local Vocational Educational Committees of 14 members, up to eight of whom were to be elected members of the local authority — the others being appointed from local employers, trade unions, religious and other persons interested in education (McElligot, 1966, pp. 104–106; Coolahan, 1981, pp. 96–97). Each committee is then elected or appointed by the local authority and holds office for the same period as the elected authority. Once established, however, the VEC is independent of the local authority.

One of the main functions of the new scheme was to provide "continuation education" — "to continue and supplement education provided in elementary schools, and includes general and practical training in preparation for employment in trades, manufacturing, agriculture, commerce and other industrial pursuits" (Vocational Education Act, 1930). Vocational education was, therefore explicitly geared to providing post-primary education for those not going to secondary schools. As the important Departmental Memorandum (V.40, 1942) put it — "The immediate purpose of day continuation education, as organised under the Vocational Education Act, is to prepare boys and girls who have to start early in life for the occupations which are open to them".

These occupations require primarily manual skills, and "continuation courses have, therefore, a correspondingly practical bias": training for skilled and semi-skilled manual occupations for boys and in commercial courses and domestic economy for girls. In both cases the design of the courses was based on a considered evaluation of the educational and training needs of young boys and girls entering the local labour market or the domestic economy. And, this, in terms of the quite marked sex role division of labour that was current at the time, posited a quite separate education for boys and girls. Both social class and sex role distinctions were, therefore, built into the provision of vocational education from the beginning. And up to 1966 a quite separate curriculum and examination structure existed for vocational schools — vocational schools not providing the non-academic Intermediate and Leaving Certificate courses. After 1966, however, with the integration of the Group Certificate and Intermediate Certificate curricula and the provision of these more extended and more academic courses, the relative isolation of vocational schools markedly declined; so that by 1980/81 approximately 85 per cent of all vocational schools provided a fully integrated junior and senior cycle curriculum. The curriculum provided, however, as we shall see, is still markedly different from that of the conventional secondary schools'.

There are 38 VECs responsible for a total of 242 vocational schools providing second-level general education courses, one for each county council area and one in each of five county boroughs and six towns. The number of schools for which each VEC is responsible varies greatly. Dublin city and Cork county VECs have by far the largest number, with 21 and 19 schools, respectively. County Galway with 16 and Mayo with 13 are the next largest. But over half the VECs have responsibility for seven schools or fewer, in some local authority areas vocational education having a very minor presence — six providing less than 15 per cent of second-level education places, for instance. (*Statistical Report,* 1980/81, p. 41).

The administration of vocational schools is attended to by the Chief Executive Officer (CEO) of the VEC. The CEO is responsible to the VEC for the organisation and administration of the scheme and all the schools within the jurisdiction. The CEO is appointed by the Local (Authority) Appointments Commission and must, in addition to administering the schools, ensure that the VEC abides by statutory rules in its procedures, appointments and expenditure. The minutes of all VEC meetings are submitted to the Department of Education for information and any necessary action.

The teaching staff of vocational schools is accredited to the relevant VEC, not to the individual school, and the VEC has the power to transfer teachers, or to spread their services over more than one school within its jurisdiction. Principals and vice-principals, however, are appointed to a specific school.

These appointments are made by a Selection Board of the VEC, on which Department officials sit for senior appointments.

There is one other form of vocational school for which the VEC is responsible: the Community College. VECs are empowered to appoint a Board of Management — a sub-committee of the VEC — to administer individual vocational schools; all the Dublin vocational schools, for example, have Boards of Management. A Community College is a vocational school with a Board of Management somewhat analogous to that of a community school, and which has also a similar orientation with respect to its curriculum and to the utilisation of school facilities by local residents, etc. The Board of Management, however, unlike that of a community school, is a subcommittee of the VEC and may be delegated as much power over appointments and expenditure as the VEC chooses. Its relationship to the Department of Education is, however, quite different to that of a community school.

The Comprehensive and Community School Sector

The educational objectives and curricula of these two types of school are very similar. Their differences lie in managerial structure and in their provision of facilities for community residents, and not in pedagogical orientation. These schools were conceived of as a means of integrating the provisions of secondary and vocational schools: but other ideals, such as making more efficient use of resources, and opening access to the schools to local residents — by making them into community and adult education centres —were also implicit in their educational orientation.

Comprehensive schools were introduced in 1963, and the first four schools opened in 1966. Eleven more comprehensive schools were sanctioned by 1972 — some in areas in which there had never previously been a post-primary school, such as new suburbs, but others resulted from the amalgamations of existing schools. After this date no new comprehensives were approved. One distinguishing feature of a comprehensive school is the composition of its Board of Management: there are usually three members: (at least) one nominee of the Bishop of the predominant denomination in the locality, one nominee of the Department of Education, and one nominee of the VEC.

From 1972 similar schools which were built *ab initio,* or which amalgamated, became "community schools". The Boards of Management of these schools, it was eventually agreed, would have eleven members:

— three nominees of the relevant religious congregation (assurance of these places was given even where there had not previously been a secondary school in the locality).

— Three nominees of the local VEC.

— Two elected parents of children attending the school.
— Two teachers elected from among the school staff.
— The Principal who shall be a non-voting member (see Coolahan, 1981, pp. 219–220).

In exchange for a contribution to construction costs, the religious congregation and the local authority are vested with trusteeship of the school, ownership of which remains with the Minister for Education. The Board of Management of a comprehensive or community school makes teacher appointments and administers the school's budget. It has much the same formal functions as a manager in a secondary school, but tends to be far more active and powerful. It differs from the Board of Management of a VEC's Community College in that it is not responsible in turn to any higher authority, other than the Department, in the execution of its functions.

Comprehensive and community schools have no formal intermediate bodies mediating between the individual school and the Department, as have secondary and vocational schools. Almost all secondary schools are incorporated within larger, formally organised bodies — the central authorities of a religious order; the Conference of Convent Secondary Schools, the Catholic and the Irish Headmasters Associations, the Teaching Brothers Association, etc. And these bodies form into a larger Federation of managerial bodies — the Joint Managerial Body. The Irish Vocational Educational Association has a somewhat equivalent function for the vocational system. Both are important as lobbying and policy development bodies.

Some Comparative Characteristics of the Three School Types:

(i) *Curricular Authority:* The different school systems vary widely, therefore, in the extent to which they are incorporated within larger hierarchically organised bodies; and, therefore, the extent to which individual school managements are free to set or change objectives, and free to reallocate or mobilise resources to such changing objectives, etc. In the 95 schools sampled, interviews were carried out with the Principals, part of which was concerned with her/his decision-making autonomy. A large number of questions were asked to tap this dimension: autonomy in deciding on pupil categorisation and class allocation, adding or dropping subjects from the curriculum, looking for donations from parents, etc. (See footnote 9, Chapter 6.) For our purposes the responses to seven of those items formed an almost perfect Guttman Scale (CR = .92).[16] This scale ranges from 1.0 to 7.0, the larger the score the greater the degree of autonomy.

[16] Coefficient of reproducibility: this is a measure of the extent to which the respondent's scale score is a predictor of the response pattern. A coeficient of reproducibility higher than .9 is generally considered to indicate a highly reliable scale.

Table 4.2: *Mean (Average) level of decision-making autonomy of principals in 5 different school types.*

	Secondary Schools			Vocational	Community	
	Boys'	Girls'	Coed	Schools	Schools	Total
Average Score	4.66	5.12	3.93	2.95	2.49	3.88
Standard Deviation	1.47	1.02	1.97	0.94	1.20	1.63
No. of Schools	20	20	17	26	12	95

($p < .05$)

The extent of independence or autonomy that secondary school Principals enjoy is significantly greater than that of vocational or community school Principals — only in matters of major expenditure which would require substantial borrowings or major change or alterations in the order's priority or policy, does the Principal have to refer matters to higher authority. The Principal does not have a Board of Management to which decisions have to be referred. Only in the case of the Protestant coed schools (mean value for autonomy of 2.73) does this occur, and in this case the Heads are as constrained by Boards of Management as are the community schools. Both vocational and community school Principals are very clearly constrained by the need to refer many matters, that secondary school Principals regard as minor budgetary or internal management matters, to the CEO, VEC, or Board of Management etc. As a result while curricular decision making in Catholic secondary schools is largely a function of individual school Principals it is much more constrained by higher authority in community, vocational and Protestant schools.

(ii) *Social Composition of Schools:* The rationalisation of the second-level education system which was undertaken in the mid-to-late 1960s attempted to overcome the educational and social differentiation between secondary and vocational schools. The success of the Department in promoting comprehensive provisions may be seen from Appendix Table 4.1. Given that the larger urban areas are well provided with comprehensive facilities — albeit usually in different schools — the result of rationalisation has been: (i) a reduction from 17 to 5 per cent of catchment areas with boys' or girls' only secondary school provision; (ii) a slight increase — from 13 to 18 per cent — of areas with both boys' and girls' single sex secondary school provision; (iii) an approximate stability, at 23 per cent, of areas with a coed vocational school and (iv) a significant increase to 10 per cent in comprehensive/community school provision.

Although there is now much greater mobility between sectors, and much the same curriculum is taught to both secondary and vocational schools, vocational schools continue to cater mainly for pupils from working class or small farm origins and their new entrants have a disproportionate share of those with educational disabilities. And secondary schools, particularly boys' secondary schools, are much more middle class and selective in composition. Comprehensive and community schools were established to cater for both sexes and to span all variations in social origin and ability levels. But, while in some areas the comprehensive or community school is the only second-level institution available, in the cities and towns, choice of schools exists.

In the absence of zoning of schools' catchment areas by the Department, the composition of a vocational or community school's intake depends on its ability to compete with other schools in the catchment area. If the more able pupils are being "creamed off" by other schools, the newer community schools may find that their position is no different from that of many vocational schools which have traditionally experienced this kind of competition. Parental choice is the ultimate arbiter of the success of comprehensive and community schools to achieve their objectives when there is such competition: while they must adhere to universality of intake, they must also be able to satisfy parents that the discipline of the school is satisfactory, that its "ethos" is good, and that the examination results of the most academically able pupils can rival those attained in secondary schools. Given that these schools have to fight against the traditional stereotypes of the vocational school it is often an unequal competition.

The composition of the intake of secondary schools also varies greatly. Where a secondary school is the only post-primary school in the locality (provided that it takes part in the Free Education Scheme and thus does not charge fees), it must cater for all the local demand, and the school's attributes will be determined by the class composition of the area it serves. Where more than one school exists, a differentiation in function can develop, the distinctive orientations of different religious congregations usually leading to some degree of specialisation, however involuntary, on the part of the schools' management. Outside the larger urban areas, however, the usual secondary school distinction is by sex not class.

To get an accurate idea of the extent of social class differences among school types we would need detailed information on the social class backgrounds of new entrants to these schools, as well as information on early leaving rates and their class distinguishing characteristics. Since we do not possess that detail in our survey the following two tables give us an approximation. First, those doing the Intermediate Certificate. As we have seen, they comprise roughly 75 per cent of the cohort of boys and 85 per cent of the cohort of girls in 1981 — some educational and social class selection has, therefore, already occurred. The figures given below, however, give some indication of the level of social class distinction involved.

Table 4.3: *The class composition of the 3 different school types. Percentage of Inter. Cert. pupils from different class backgrounds*

Social Class of Pupils*		Secondary		Vocational		Community		Total	
		F	M	F	M	F	M	F	M
					per cent				
1 Upper Middle		18	32	8	9	13	15	16	25
2 Lower Middle		38	40	22	28	31	33	35	36
3 Upper Working		26	18	31	32	31	27	27	22
4 Lower Working		19	11	39	31	26	26	21	17
Total	%	100	100	100	100	100	100	100	100
	No.	2,223	2,015	250	587	282	431	2,755	3,033

*(1) Professionally qualified, managerial or executive positions and farmers with over 100 acres; (2) Senior supervisory, intermediate non-manual workers, and farmers 50-100 acres; (3) Skilled manual workers, and farmers 30-50 acres; (4) Semi- and unskilled manual workers, and farmers under 30 acres.

(*Source:* Responses of Inter. Cert. pupils in 1981 schools survey.)

Two major distinctions are obvious: (a) vocational schools cater mainly for working class and small (<30 acres) farm pupils. Even given the disproportionate drop out of pupils from these backgrounds before the Intermediate Certificate, two out of three of their pupils come from these backgrounds. Secondary schools are dominantly middle class, particularly for boys; while the class distribution in the newer community and comprehensive schools is more balanced. (b) Social class distinctions among schools catering for boys are more marked than among those catering for girls; boys' secondary schools being the most middle class of all school types.

And corresponding to these social class differences amongst schools are equivalent differences in the concentration of educational and social problems amongst their pupils. Although based only on the estimates of Principals and Career Guidance Counsellors in these schools the following estimates indicate school differences that are similar to those which were made previously by Swan (1978).

Obviously a much higher proportion of vocational schools have pupils with educational problems than do secondary schools. Around half of the com-

Table 4.4: *Distribution of Schools by proportion of students who (i) are estimated to have serious literacy (Lit.) and (ii) numeracy (Num.) problems*

Estimated per cent of pupil intake who have serious literacy and numeracy problems		*Secondary Schools*		*Vocational Schools*		*Community Schools*	
		Lit.	*Num.*	*Lit.*	*Num.*	*Lit.*	*Num.*
				per cent			
1. < 10%		68	66	29	29	17	8
2. 10 — 15%		9	11	0	4	42	42
3. 15 — 25%		16	16	42	46	17	25
4. > 25%		7	7	29	21	25	25
Total	%	100	100	100	100	100	100
	No.	57	57	26	26	12	12

Source: Responses of Principals in 1981 School Surveys. The responses of the Guidance Counsellors were very similar.

munity school but over two-thirds of the vocational school Principals reported that over 15 per cent of school entrants had serious numeracy and literacy problems, compared to less than a quarter of secondary school Principals. Part of the explanation for this is, of course, the varying social class characteristics of the pupil intake in the three school types; but also a strongly held belief amongst vocational school Principals, and Guidance Counsellors particularly, that stiff competition exists amongst schools for the more academically able pupils and that, by and large, they suffer pretty badly from such "creaming off" practices by others. (See Table 4.5.)

Almost all vocational school Principals felt there was serious competition for pupils, and over 6 out of 10 felt that their school suffered badly from other

Table 4.5: *Extent of perceived competition and extent to which principals report that other neighbourhood schools "cream off" the more able pupils*

	Secondary Schools	*Vocational Schools*	*Community Schools*
1. Percentage who say there is competition for pupils	28	96	50
2. Percentage who say that other schools "cream off" the better pupils:			
(i) A good deal	5	65	17
(ii) Somewhat	11	23	25
(iii) Do not	35	4	25
3. Percentage who say they get the better pupils:	28	8	0

schools "creaming off" the more able pupils. At the other extreme, only 1/4 secondary school principals felt there was competition and only 1/6 felt they lost out through it. Community schools occupied a middle position in these respects. Thus the process of educational selection occurring amongst the different school systems appears to leave the vocational sector with a high proportion of pupils from working class origins and of pupils with serious educational disabilities.

The Curricula of Post-primary Schools

The curricula of the three school systems are, within broad limits, set down by the Department of Education, as indeed is the syllabus for each individual subject. To be grant-aided by the Department, schools *must* teach within the range of subjects recognised. The Department of Education for instance, provides detailed syllabi for a list of subjects which must be offered as part of a secondary school curriculum. In 1981-82 these were: (i) Irish; (ii) English; (iii) History and Geography; (iv) Mathematics; (v) Science, a language other than Irish and English, Commerce or a subject in the Business Studies group (senior cycle); (vi) Civics, and (vii) Physical Education (as non-examination subjects) (*Rules and Programmes,* 1981-82, p. 13). These obligatory subjects have remained unaltered for some considerable time although syllabi have changed.

In addition, "recognised" junior cycle pupils must follow a recognised course in the first four of the above particular subjects, and take not less than two others from a further approved list of 16 recognised subjects.[17] If pupils do not meet these requirements they may not be recognised for purposes of grant-aiding the school. Since the average pupil takes 8 subjects in the Intermediate Certificate, however, this regulation allows a very considerable range of choice for school and pupils. The recognised list includes 9 Language and Literature subjects; Science and Maths; Commerce; 3 Manual-Technical subjects; Home Economics, Art and Music; History and Geography. It, therefore, offers a very wide range of possibilities for school and pupil specialisation.

At the senior cycle level 31 subjects are recognised and detailed syllabi provided for them. Here the range of possibilities is far wider than in the junior cycle since the Department insists only that Irish be taken as a subject and that 4 other subjects be taken from the list of 30 recognised subjects: 9

[17]Latin, Greek, Classical Studies, Hebrew, French, German, Spanish, Italian, Science (Syllabus A or E), Home Economics, Music and Musicianship (A or B), Art, Woodwork, Metalwork, Mechanical Drawing, Commerce.

Languages; 6 Science-Maths subjects; 4 Economics or Business Studies subjects; 5 Technical or Applied Science subjects; and 4 Home Economics, Art and Music subjects. Again, since the average student takes only 7 subjects for the Leaving Certificate, both schools and pupils are allowed very wide ranges within which they can choose to specialise.

The *Group Certificate* curriculum has been integrated with that of the Intermediate Certificate since the mid-1960s. The curriculum is, therefore, designed to constitute "two-thirds" of an Intermediate Certificate course, which may be taken after three years. Candidates for the Group Certificate must follow the specified courses in Irish, English, Civics and the practical subjects in one of the following five groups: General Commerce (3 subjects); Secretarial Commerce (3 subjects); Home Economics (3 subjects); Manual Training (3 subjects); Rural Science (3 subjects). A range of other general subjects, co-ordinated with the Intermediate Certificate, may also be taken. The total number of subjects from which the selection is made is 26 (*Rules and Programmes for the Day Vocational Certificate Examinations*, 1981/82.)

Sex differentiation was officially institutionalised in both vocational and secondary schools. Secondary school curricula up to 1978, for instance, had an obligatory component of "Home Economics" in schools for girls (p.13, *Rules and Programmes for Secondary Schools* , 1977/78). A separate "Elementary Maths" course was taught exclusively to girls up to 1969 when the explicitly sex biased curriculum was terminated. And while Technical Drawing does not formally require it, many coed schools teach it to emphasise its links to exclusively male technical subjects — so effectively excluding girls from it. But it is in Domestic Science or Home Economics that the clearest sex diffentiation occurs. From the late 1940s to the late 1960s almost all girls doing the Leaving Certificate took Domestic Science or the Physiology/Hygiene course. The subjects concerned related very clearly to the traditionally accepted domestic and child rearing roles of women, and which were formally institutionalised in courses which were directed only to girls or which were labelled or promoted in ways that strengthened that association.

These formal curricular or syllabus distinctions by sex are most marked in the vocational school or Group Cert. curriculum. The "groups" of subjects are clearly separated on the basis of adult sex role work distinctions; the "Manual" and "Rural Science" group being dominantly male while the Commerce and Domestic Science subjects are dominantly female. In other words, the arrangement of the curriculum itself, not to speak of the individual subject or syllabus boundaries, are clearly sex-role reinforcing.

The following table illustrates the curricular distinctions involved, indicating the relative provision of different subjects to boys and girls in the 3 different school types. Judged over all subjects the dominant impression of secondary schools is of a relatively homogenous curriculum in Science, Maths, French and Commerce. Clearly, however, provision is biased toward additional Languages and the "accomplishment subjects" for girls; while technical subjects are somewhat more prominent for boys. Since over 80 per cent of secondary pupils are in single sex schools these curricular distinctions are clearly determined by school provision differences, decisions taken by the management of boys' and girls' schools.

Table 4.6: *The percentage of schools of each type providing 10 representative subjects of the Intermediate Certificate to Boys and Girls in 1979/80*

	Secondary Schools		*Vocational Schools*		*Comp./Community Schools*	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
			per cent			
Maths/Science						
Higher Maths	97	94	54	51	74	76
Science A	97	93	56	47	79	78
Languages						
French	98	99	79	86	98	98
German	17	36	2	1	30	35
Commerce	89	86	34	95	96	96
Technical Subjects						
Mechanical Drawing	58	7	99	14	96	54
Woodwork	52	1	100	12	98	39
Accomplishment Subjects						
Home Economics	12	93	20	98	47	96
Art	66	89	53	52	87	98
Music	34	62	11	13	51	61
No. of Schools	308	333	232	219	47	46

Source: Statistical Report, Department of Education, 1980.

The great majority of vocational schools, however, are nominally co-educational. Clearly, however, the reality is a quite high level of formal distinction by sex in subject allocation within these schools. While almost all boys can take the Technical subjects only one in seven or eight girls can. On the other hand boys, are almost equally excluded from Commerce and Domestic Science. Again, schools appear to be making decisions here. And, as in Commerce, these decisions involve varying levels of arbitrariness in which, as we shall see, the decisions of schools may not correspond with those of pupils. The newer comprehensive and community schools, however, are formally much more open and have a much more comprehensive curricula than other schools — except the larger vocational schools — being as strong in Science, Languages and Commerce subjects as secondary schools and being as well provided in the Technical and Accomplishment subjects as vocational schools. It is only in the Technical and Home Economics subjects that any significant sex differences arise, though even here these differences are less pronounced than in vocational schools. Since almost all these schools are coinstitutional or coeducational, clearly formal school rules are being used to discriminate between boys and girls.

Substantial curricular distinctions by sex, therefore, exist in each school type: the mainly single sex secondary sector showing substantial differences in the provision of subjects — boys' schools being particularly strong in Technical subjects and in the Sciences and Higher Maths; and girls' schools in Home Economics and the Accomplishment subjects. Sex differences in subject availability in the mainly coeducational or coinstitutional vocational and community/comprehensive schools cannot be due to school provision; the clearcut sex differences observed in the availability of Technical, Home Economics and Commerce subjects must, therefore, be due to the way subjects are allocated within the schools. As we shall see in the following section these sex differences in the provision, allocation and take-up of subjects have a very long history in Irish education.

(iii) *Coeducation:* In Ireland, single-sex education has generally been taken to be a more desirable educational practice than coeducation. The involvement of single-sex religious institutes in the provision of secondary schooling, initiated, reflected and perpetuated this preference. As a result, only about 7 per cent of secondary school pupils were in coeducational schools in 1961. Vocational and community schools have been generally coeducational, although there is usually substantial sex segregation within these schools so that many of them operate as coinstitutional rather than as genuine coeducational schools.

Coeducation became a policy issue with the move to rationalise second-level education during the 1960s. In many areas, a number of small second-level schools existed, teaching boys and girls separately. If resources were to be used with maximum effectiveness, small single sex schools would have to amalgamate, or at least agree to co-operate effectively, and differences between small secondary and vocational schools would have to be resolved. Integration into larger schools seemed the obvious answer.

As a result of such changes many religious and lay Catholic schools have become coeducational over the past two decades. Most of these started off as small convent schools located in rural areas in the west and south-west of the country. Their small size and even the possibility of closure, had they remained as single sex schools, combined with the need to provide a post-primary education for local boys, were the main underlying reasons for becoming coeducational. Some orders, notably Mercy and Presentation, appear to have been particularly sensitive to these changing needs. Other congregations, however, are bound by their charter to teach only pupils of one sex. The Christian Brothers, with 83 boys' schools, are the most significant of these. Other male orders, however, like the De la Salle, are not bound by such formal rules and have positively adapted to coeducation.

The Protestant secondary schools as a body began to rationalise their system in the second half of the 1960s. These schools were scattered around the country, often with very small enrolments. In 1965 there were almost 50 Protestant schools. By 1978-79 there were only 23 Protestant secondary schools and two "Protestant" comprehensives. The process of amalgamation involved not only re-building, but adjustment to integrated education. The joint body of the Protestant denominations, the Secondary Education Committee, oversaw the re-organisation and the transition appears to have been accomplished smoothly. The new amalgamated schools are generally large and almost exclusively coeducational.

The following table shows the results of these various movements over the 1960s and 1970s. The percentage of pupils in coed secondary schools grew from 7 to 19 per cent from 1961 to 1980.

Table 4.7: *Percentage of pupils in coeducational schools in 1970 and 1980*

	Secondary Schools		*Vocational Schools*		*Comp/comm. Schools*		*Total*	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
					per cent			
1960/61	6.3	8.0	—	—	—	—	—	—
1969/70	12.0	16.1	77.1	90.4	100	100	31.8	28.8
1979/80	19.0	19.4	87.8	91.0	89.4	95.4	45.1	37.3

Source: Relevant Lists of Recognised Secondary Schools, Department of Education.

Vocational and community schools have always been predominantly mixed sex in pupil composition, but the extent of this has increased to over 90 per cent of pupils attending in 1980. So, given the slight increase in coeducation in secondary schools, and the growing importance of community schools, the overall percentage of boys and girls in coed schools has been increased to over 45 per cent of boys and 37 per cent of girls in all second-level schools.

Although the great majority of vocational schools are attended by both boys and girls, it would be misleading to describe them as coeducational schools: from their inception in 1930 to the revisions in educational thinking in the mid-1960s, they could best be described as coinstitutional. Construction of separate buildings for boys and girls would not, in most areas, have been justified by the enrolment. In the larger centres, however — Dublin in particular — vocational schools are more likely to be single sex. Of the 246 vocational schools in the country, for instance, only 20 are single sex, and 12 of these are in Dublin city out of a total of 22 schools there. But in rural areas or in smaller centres, vocational schools, although supposedly coed, were often constructed with separate entrances for boys and girls, both sexes spending little time together within the school building. The practical subjects (homecraft and handicraft, etc.) were sex-specific, all boys taking one set of options, all girls the other. All pupils took the general subjects — but in many centres, these too were single sex classes, and if numbers were insufficient in any subject, age groups rather than the sexes might be combined.

Since the 1960s, coeducation in the general subjects has been more usual. These subjects have assumed far greater importance than previously in vocational schools. Since they became entitled from 1966 to take the Intermediate Certificate examination they are now central instead of peripheral to vocational schooling. But the practical subjects remain single sex, and the traditional sex-appropriateness of those subjects is still the basis on which pupils are allocated.

The underlying philosophy of comprehensive and community schooling emphasises coeducation. There is, however, one pair of comprehensive schools, a boys' and a girls' (in Ballymun, Dublin) which was planned as separate schools for junior cycle classes. But even here a separate coed senior cycle school is provided. With one further exception all other comprehensive and community schools are coeducational. But the curriculum of these schools is drawn from that available to secondary and vocational schools, and the tendency to reproduce traditional subject-options for boys and girls is marked. The fact of coeducation alone does not dispel sex-typed curricular allocations.

Whether, in fact, such changes have had any influence on reducing sex differences in the type of education received cannot clearly be assumed as we have seen. The extent to which change has occurred will be explored in the next section where we examine the extent of change in sex differentiation in actual subject take-up in the Inter. and Leaving Cert. examination over the past few decades.

Sex Differences in Subject Take-up in the Intermediate and Leaving Certificate Examinations: 1937-1977

Sex differences in the provision and take-up of subjects in the main state examinations have a very long history in Irish second-level education. When compared to the curriculum of primary schools sex differences at second level are very marked. At junior cycle level in secondary schools the great majority of pupils take 8 examination subjects—4 to 5 of which, however, are obligatory: Irish, English, Maths, History/Geography. So, in the following, one should keep this common core in mind, accounting for roughly half the subjects all pupils take. The only differential possible within that core of obligatory subjects in recent times is in level—particularly in higher and lower Maths. At earlier periods a much clearer sex distinction in Maths syllabi existed, however.

In the Group Certificate programme in vocational schools the approved course requires an obligatory core of Irish and English, which all pupils must take. Pupils choose at least 2 other subjects from the 5 "groups" of subjects already indicated, in addition to 3 or 4 more subjects to be chosen from a total list of 26 subjects provided. In providing information on pupil take-up of subjects in the Group Cert. examination, the Department of Education does not provide a breakdown by sex—so in this report we provide it from our own study of the Group Certificate examination records. In the following three subsections we examine sex differentation in subject differentation in the Inter., Leaving and Group Certificate examinations.

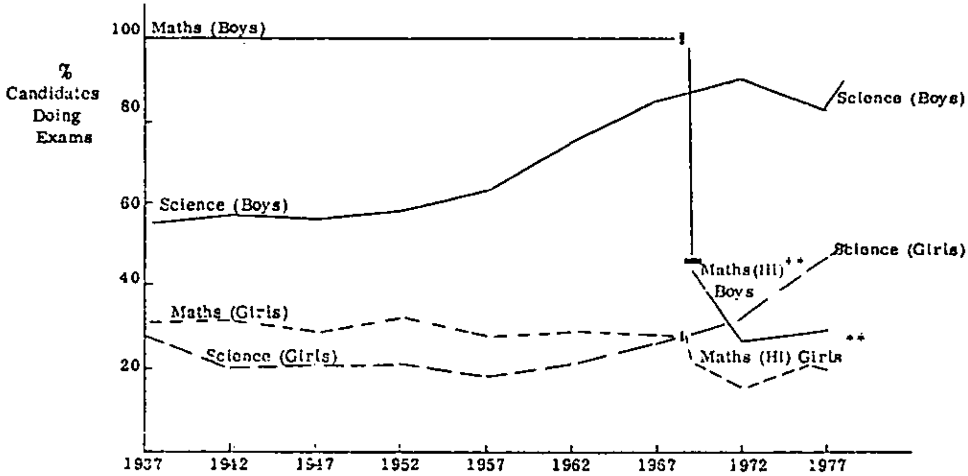
The Inter. Cert. 1937-1977

The following data are taken from the published statistics on examination results. They broadly indicate the nature and extent of sex differentation in subjects taken in the junior cycle level in secondary schools over a 40-year period. We focus on 4 main indicator subjects: Maths, Science, Commerce and Mechanical Drawing.

Figure 4.1 illustrates the popularity of Maths and Science subjects for boys and girls. Sex bias is quite clearly illustrated by Maths. Up to 1969 a separate lower standard Maths course—"elementry Maths", was explicitly designed for girls, as the *Rules and Programmes* of the Department of Education indicates. Around two-thirds of girls consistently took that course, while all boys took the standard course. In 1969 the Maths course was divided into two—Higher and Lower level—and the explicitly sex biased curriculum was terminated. And whereas previously sex differences in the Maths curriculum stood almost at 70 percentage points, these differences have since been reduced to less than 7 percentage points in the 1980 examination[18] (31% boys, 24% girls). A substantial decline in sex differentiation has, therefore, occured.

[18]This explicit recognition of a sex biased curriculum, however, did not end in 1969. Up to 1978, a recognised secondary school for girls "must include instruction in a syllabus approved by the Minister in . . . . Home Economics" *(Rules and Programmes for Secondary Schools,* p.13).

Figure 4.1: *Percentage of Girls and Boys doing Maths and Science in the Intermediate Certificate 1937-1977 (Break —//— 1968-69).*



Source: Department of Education *Statistical Report* for relevant years.

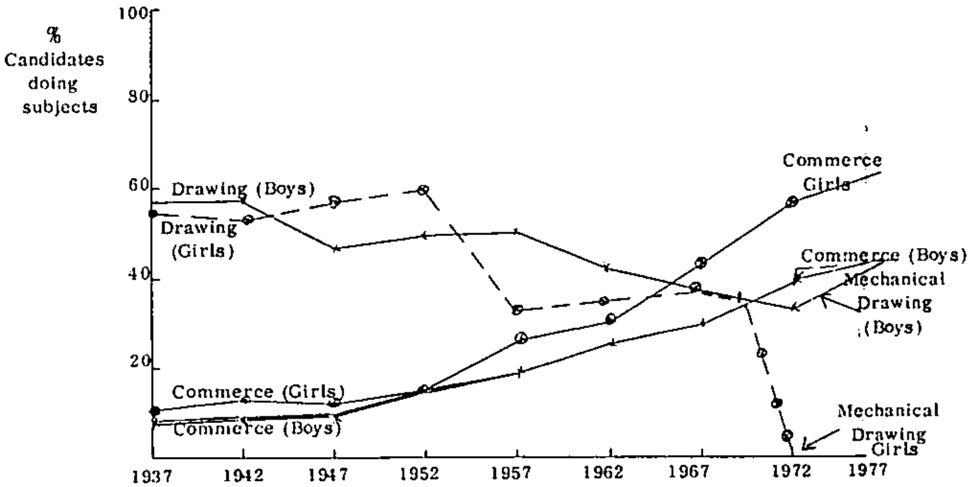
**Maths (Hi) at this stage refers to Higher Maths. Previously it referred to the General Maths course.

And at senior cycle level the initial consequence of such a biased junior cycle Maths provision had meant that up to one in three girls did not take Maths of any sort in the Leaving Certificate in the mid-1960s. But by 1980 this had decreased to one in fourteen. At both junior and senior cycle, therefore, sex differences in Maths teaching have been substantially reduced.

Science shows an equally consistent sex biased pattern of take-up right from the 1930s. Indeed, sex differences widened in the 1960s, but the girls' rate increased substantially in the 1970s to narrow the gap; which still stood, however, at 33 percentage points in 1980. At that stage almost all boys (90%) took Science whereas only around half the girls did so (57%). Science differences are, therefore, far wider than Maths.

Commerce subjects exhibit a slight female bias which has become somewhat more marked in the 1960s and 1970s as its overall popularity rapidly increased, as we can clearly see from the following (Fig. 4.2). The rate of increase has been substantially greater for girls than for boys in the late 1960s and 1970s. And Drawing, which had shown no consistent sex bias in take-up until the revision of the syllabus in 1968-69 has exhibited a very substantial sex bias subsequently. It diverged into an almost completely male-dominated Mechan-

Figure 4.2: *Percentage of Girls and Boys doing Drawing, Mechanical Drawing, and Commerce in the Inter. Cert. 1937-1977 (Break — // — 1968-69)*



Source: Department of Education *Statistical Report* for relevant years.

ical Drawing option and a somewhat less marked but still female-dominated alternate Art option. Female take-up of Mechanical Drawing — the most popular of the technical subjects — only reached 0.2 per cent of all females examined in 1980.

Other subjects show an equally sex differentiated pattern: *Art* was first introduced in the mid-1950s and has always been dominated by girls, especially since the removal of Drawing from the examination curriculum. In 1978, the relative difference between girls and boys taking Art was 21.4 percentage points. The underlying trend, in the case of girls, has been an initial decline in popularity, followed by a jump of over 30 per cent in 1969 — coinciding with the switch from Drawing — and a slight rise since then. *Music* has only become significant in the 1970s and exhibits a quite marked increase in its relative popularity for girls — to 22 per cent of total female examinees in 1980. But boys' rate of uptake has been much smaller, reaching only 6 per cent by 1980.

Many other subjects also show a clear sex bias in take-up. French has always been a predominantly "girls" subject, although less so now than 30 years ago. The difference in its relative popularity among girls and boys has declined significantly from 61.1 percentage points in 1939 to 14 percentage points in 1980. The underlying trend in the case of boys was fairly stable until 1957, after which it began to rise steadily. Its rising popularity coincided with an almost balanced decline in the male take-up of Latin and Greek. The proportion of girls taking French has actually dropped since 1937 — the trend was downwards until 1952, after which it rose again, showing a temporary downward fluctuation in 1968 and 1969 as in the case of boys.

Changes in the relative popularity of other subjects can be explained more satisfactorily in terms of the patterns already discussed: the increasing significance of Science and Commerce is counterbalanced by the decline in Greek and Latin for boys; Drawing, and to some extent, Latin and French, for girls.

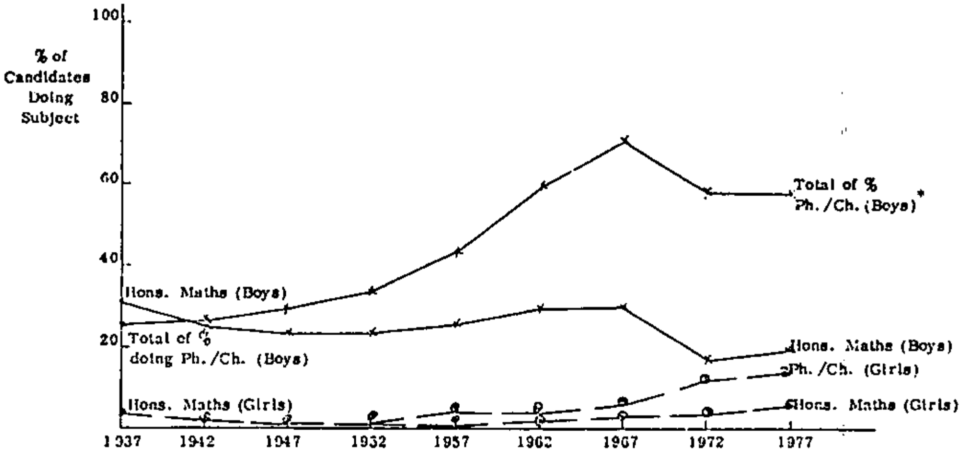
The greatest sex differential, however, is in Domestic Science or Home Economics. This grew in significance from 40 per cent of girls in 1942 to 76 per cent in 1962; 73 per cent in 1972 to 77 per cent in 1980. At no stage did more than 1 per cent of boys take this subject. On the boys' side, with the revision of the Group Certificate curriculum and its integration with the Intermediate Certificate curriculum, an equal but opposite sex bias occurs with Woodwork and Metalwork from 1969 onwards: with 25 and 19 per cent of boys taking the two subjects in that year. This has increased to 37 per cent and 21 per cent, respectively, by 1980. The proportion of girls taking these subjects has never exceeded 1 per cent. The homecrafts, "female", and handicrafts, "male", dichotomy is, therefore, very deeply established in Irish education.

To summarise, the relative popularity of Science and Maths subjects has shown some convergence in the 1970s — perhaps, surprisingly, the male bias showing the greatest decline in Maths. Commerce subjects have never been particularly sex differentiated except in vocational schools. But Mechanical Drawing and Art have, in fact, grown to be substantially sex differentiated in the 1970s — where this was not quite as pronounced in the 1960s. But of all subjects, Home Economics, Woodwork and Metalwork display the greatest differences. And these latter differences have been growing in significance in the 1970s as the more comprehensive curriculum gained in popularity.

Sex Differences in Subject Choice at Senior Cycle (Leaving Certificate) level, 1937–1977

In the following we take a number of "indicator" subjects: Higher Maths, Science, Technical Drawing, Art and Home Economics and examine changes in sex differentation of take-up rates over time. Increasingly higher proportions of boys have taken Higher Maths, Physics and Chemistry, and in the latter years technical and practical subjects, since 1937. In some cases sex differences

Figure 4.3: *Relative Proportion of Boys and Girls doing Higher Maths, Physics and /or Chemistry in Leaving Cert., 1937–1977*

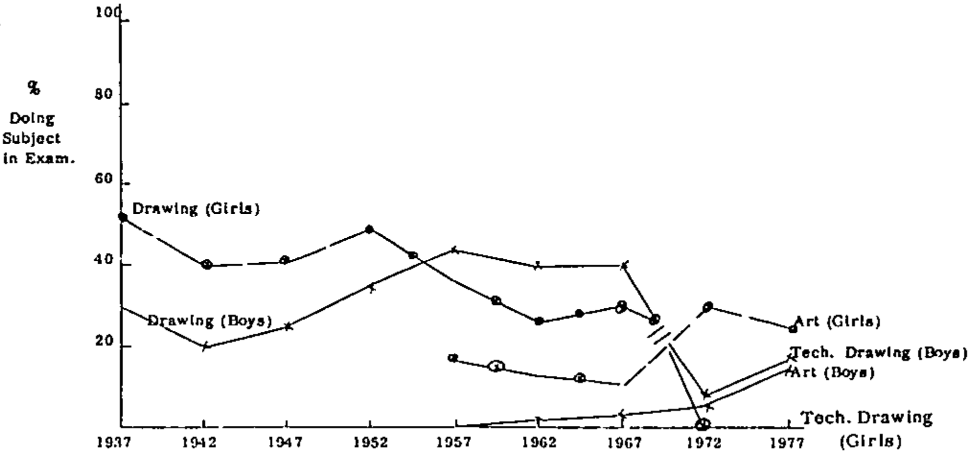


Source: Department of Education, *Statistical Report* for relevant years.
*% taking Physics and Chemistry combined.

have actually widened — as in Physics, Chemistry, Technical Drawing and practical subjects. In others, originally very wide sex differences have been reduced: Higher Maths, History and Geography, Art, Biology, etc., as well as in the traditional specialist "female" subjects of Domestic Science and Music. The first figure shows changes in the percentage of boys and girls taking Higher Maths., Physics and Chemistry.

The increasing popularity of the Physical Sciences for boys is quite clearly illustrated; an increase, however, that is only shared in by girls to a very moderate extent in the 1970s. Despite such a moderate increase in the proportion of girls doing these subjects, there is a substantial increase in the number of girls doing them. The rapid increase in participation rates in the late 1960s and early 1970s had apparently made it impossible for boys' schools to expand their Maths/Science teaching to keep pace: the take-up rate declined rapidly between 1967 and 1972 but subsequently stabilised at around 60 per cent for Physics and Chemistry and 15–17 per cent for Higher Maths. In girls' schools, however, both the volume and rate of Maths/Science take-up increased up to 1977/78. After 1977, however, there has been a substantial decline in the take-up of Higher Maths for both sexes — primarily indicating its declining utility in university grants and entry points. But while the take-up of the Physical Sciences has stabilised for boys it has continued to increase

Figure 4.4: *Relative Proportion of Boys/Girls doing Drawing, Technical Drawing and Art, 1937–1977*



Source: Department of Education *Statistical Report* for relevant years.

amongst girls.[19] Sex differences here, however, are still amongst the most marked in the whole senior cycle curriculum. But the Technical subjects are even more sex biased as can be seen in Figure 4.4.

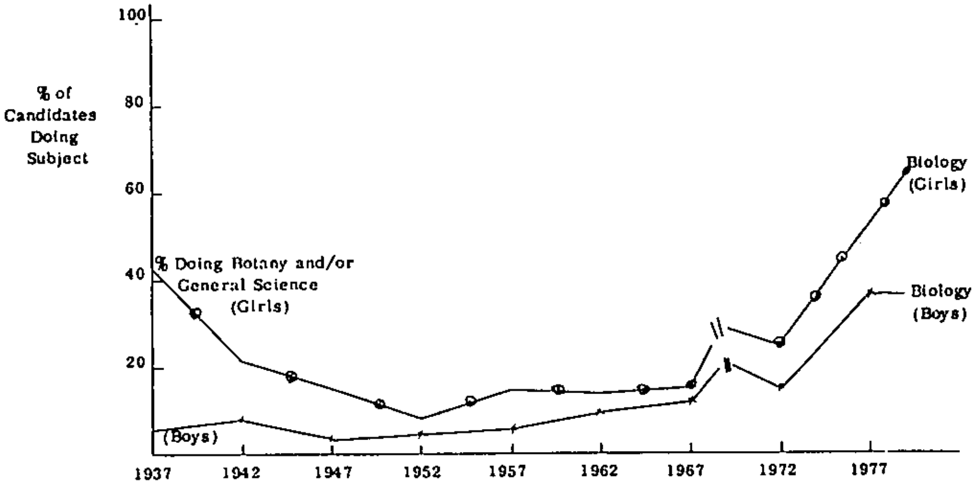
Up to the 1950s Drawing was a dominantly female subject. Afterwards, however, the subject became dominantly male oriented, particularly after 1969 when the curriculum was changed to emphasise its technical usages; and Art, which incorporated some of the previous Drawing syllabus, became dominantly female. The introduction of the other technical subjects to the Leaving Certificate — Building Construction and Engineering Workshop — correspondingly increased sex bias as almost no girls take these subjects — only 17 girls taking the most popular, Technical Drawing, in 1980, for instance.

If boys dominate the Maths and Physical Science options girls have been disproportionately concentrated in the biological sciences and in Home Economics, Art, Music and to some extent in Languages.

[19]No. of candidates taking 4 subjects in the Leaving Cert. in recent years.

Year	*Physics*		*Chemistry*		*Higher Maths*		*Biology*	
	F	M	F	M	F	M	F	M
1977	589	4067	1888	4908	1030	3062	9887	5984
1979	639	4324	2074	4373	924	2583	12239	5988
1980	694	4408	2460	4524	847	2461	12899	6410

Figure 4.5: *Relative Proportion of Boys/Girls doing Botany and/or General Science, Biology in Leaving Certificate 1937—1977*



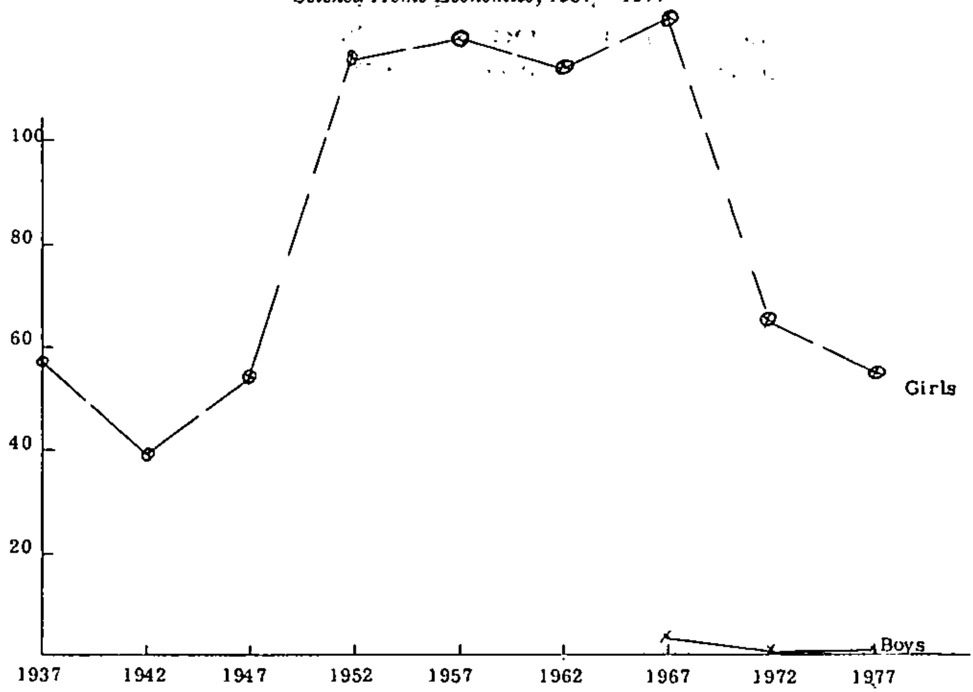
Source: Department of Education *Statistical Report* for relevant years.

Despite its image, Botany/Biology has not been remarkably sex biased since the early 1950s. In the 1930s and 1940s both Botany and General Science were perceived as relatively softer scientific options than Physics/Chemistry and were dominantly female. But from that time onwards, although showing a slight female bias, sex differences in take-up had not been very great up to the mid-1970s when they widened very considerably again. The boys' rate rose to 40 per cent by 1980 while the girls' rate increased to 62 per cent. The sex differences are now almost as wide as they were in the 1930s.

It is in the Physiology/Hygiene and Domestic Science/Home Economics subjects — designed to a large extent for the homemaking and maternal roles — that sex differences in take-up are maximised. A miniscule proportion of boys has taken these subjects at any stage; while from the late 1940s to the late 1960s one or other of these subjects was taken by almost every girl doing the Leaving Certificate; from the early 1950s to late 1960s up to 25 per cent of girls taking two Domestic Science subjects. The subjects are oriented to general housekeeping and child-rearing tasks or roles: Physiology, Hygiene, Nutrition, Housekeeping, Home Economics (general). This is not, however, equally true of the newer Home Economics (Social and Scientific) course, when 4 per cent of boys took the subject in 1980.

If girls, however, were underrepresented in Maths and Science subjects in the earlier period, they were not only overrepresented in Domestic Science but also in most of the Language and Literature subjects. Higher Irish, Higher

Figure 4.6: *Relative Proportion of Boys/Girls doing Physiology and Hygiene* and/or Domestic Science/Home Economics, 1937—1977*



Source: Department of Education *Statistical Report* for relevant years.
*Up to the syllabus revision it was possible to take both subjects, hence rates greater than 100 per cent.

English and Higher or Lower French were clearly female dominated in the early period. And by 1980 although Leaving Certificate boys were more academically selected, girls were slightly more likely to do Higher Irish (23 per cent male, 27 per cent female); equally likely to do Higher English (46/47 per cent), and significantly more likely to do Higher and Lower French (53 per cent male and 69 per cent female).

Although no significant sex difference exists in Commerce subjects, the trends are interesting. The subjects become significant only in the 1950s. By 1952, 11 per cent of boys and 9 per cent of girls were taking the subject. This had increased to 19 and 11 per cent, respectively, by 1963 and to 35 and 29 per cent, respectively, by 1969. After 1970 the single subject, Commerce, was broken up into four subjects: Accounting, Business Organisation, Economics and Economic History. By 1972, over 50 per cent of male candidates and only slightly fewer female candidates had taken one or more of these subjects. And by the late 1970s these proportions had increased to around ¾ boys and ⅔ girls.

Both proportions have increased very dramatically — with an increasing male bias, particularly in Accountancy and Economics. Although younger women predominate in secretarial/commercial jobs, their educational preparation in secondary schools, at least, shows no such bias.

In conclusion, therefore, examination of aggregate subject choices at senior cycle level over a 40-year period indicates: (i) a significant overall decline in sex differences in subject take-up, although many subject differences are still substantial; (ii) a persistent differential in Maths/Science take-up — with a slight decline in the later period; (iii) the increasing significance of Science and Commerce subjects in the curriculum; (iv) Technical subjects, since they were introduced, have been dominantly chosen by males; but (v) some previously almost exclusive "female subjects" like Biology and even Home Economics have become less dominantly female — though differences are still very great; (vi) the relative popularity of the Language and Literature options for females has declined; (vii) girls appear to spread their choices more widely than boys, the only dominant female speciality being Domestic Science.

Sex Differences in Vocational Schools: 1965—1978

Up to the late 1960s vocational school programmes were highly vocationally oriented. Boys' performance in the Group Certificate examination was the normal entry requirement for acceptance into skilled manual apprenticeships, while the majority of girls entered clerical and commercial employment. Even by 1975 the proportion of apprentices registered with AnCO as having only a Group Certificate was 45 per cent, or Group Certificate and less — with an educational exemption — 62 per cent of all apprentices. Between 1975 and 1980 these percentages had declined to 28 and 35 per cent respectively.[20] And the percentage of apprentices with the Leaving Certificate had increased from 3 to 15 per cent. Increasingly, the Group Certificate is becoming less and less acceptable as a passport to employment, even in those skilled trades towards which many of its courses are designed.

In this section our main purpose is to describe the extent of change in the curricula of vocational schools since the mid-1960s, to describe the degree to which this is sex differentiated as well as the extent to which its previously vocationally oriented curriculum has now become integrated with the academic Intermediate Certificate and Leaving Certificate courses, previously characteristic only of the secondary school sector. The main data source used is our sample of Group Certificate records extracted from a random sample (N=58) of vocational schools for the years 1965, 1968, 1972, 1975 and 1978.

[20]Figures kindly suplied by Dr. A.P. O'Reilly, Manager, Research and Planning, AnCO — The Industrial Training Authority.

The main Departmental examination for vocational school students is still the Group Certificate examination, so called because of the requirement to take one of five specialist groups of subjects: Manual Training, Commercial/Secretarial (2), Domestic Science and Rural Science. Since 1966 this examination has shared a basic core curriculum with the Intermediate Certificate examination. This includes a generally common first year curriculum of very similar content and standards to the Intermediate Certificate course. The Intermediate Certificate course was equally adjusted to allow for normal progression from Group to Intermediate Certificate, with the former examination being taken at the end of the second year and the Intermediate at the end of the third.

The relative importance of vocational school students doing the Intermediate and Leaving Certificates can be gauged from the results presented in the following table. These figures are estimated from our sampling of the unpublished Departmental examinations records.

Table 4.8: *Frequency and percentage distribution of leaving certificate and intermediate certificate examinees in 1978, 1976, 1975 and 1973. Estimates based on sample results*

	Leaving Certificate 1978		*Leaving Certificate* 1975		*Intermediate Certificate* 1976		1973	
	Nos.	%	Nos.	%	Nos.	%	Nos.	%
In Secondary Schools	30,071	82	25,501	86	35,900	74	31,800	79
In Vocational Schools	4,485	12	2,730	9	10,000	21	7,600	19
In Comprehensive/ Community Schools	2,218	6	1,286	4	2,580	5	860	2

We estimate that in 1978 12 per cent of all Leaving Certificate candidates came from vocational schools. This had grown from 9 per cent in 1975 and from zero in the late 1960s. Even by 1978, however, only a small proportion of vocational school students went on to the Intermediate Certificate examination. There were about 18,000 students in the relevant entry cohort (1975) in vocational schools (*Statistical Report,* 1975/76, p. 53). If we take 18,000 as the maximum single year cohort size in these years about 56 per cent of these potential third year students went on to the Intermediate Certificate in 1978. But only about 25 per cent of the initial cohort would have then gone on to do the Leaving Certificate. By 1981, however, these continuation rates had shown a considerable growth.

As to the Group Certificate examination, 18,400 candidates were examined in 1978. Of those, we would estimate that about 15,000 came from vocational schools, around 85 per cent of the initial entry cohort.

It was possible to collate the records of the 1975 Group Certificate candidates in the 58 sample vocational schools with the 1976 Intermediate Certificate and the 1978 Leaving Certificate results for the same schools. Of the initial 1,856 Group Certificate candidates in 1975 only 36 per cent (i.e., 671) went on to the Intermediate Certificate in the following year in the same schools. However, an additional 461 candidates did the Intermediate Certificate in these schools who had not previously done the Group Certificate there. In other words, if we assume that these had been in a different and more academic stream than the Group Certificate candidates — a normal practice now in vocational schools — it would appear that about one-fifth of all *second year* vocational school students had been segregated in purely academic streams. Taking both "streams", therefore, and including an estimated 15 per cent drop out of pupils before the Group Cert., it would appear that around 42 per cent of all vocational school entrants survived to the Inter. Cert., in 1976. But of the initial 1975 Group Certificate stream we estimated that only 11 per cent went on to the Leaving Certificate in 1978.

To conclude, the Group Certificate examination was still a terminal examination for over half of all vocational school entrants in the late 1970s. It was not generally used as a stage towards higher level qualifications except for a minority. Indeed, it appears that in many (11/58) vocational schools — particularly the larger urban ones — the Group Certificate class is quite clearly treated as a lower ability stream with almost nobody going on to the Intermediate Certificate; while those in the Intermediate Certificate stream do not take the Group Certificate examination at all. Quite obviously the two curricula had not been completely integrated by that time.

There are many vocational schools, however, where such an integrated programme is successful. In 20 of the 58 schools sampled, over 50 per cent of Group Certificate candidates went on to the Intermediate Certificate, but only eight of these schools had more than 50 per cent of their Intermediate Certificate students go on to the Leaving Certificate examination. Most of the vocational schools with the more successful integrated curricula are small rural schools in areas without competing secondary schools.

By 1981, however, the position had markedly changed. We would estimate that by 1981 about 24 per cent of boys and 9 per cent of girls who entered vocational schools in the preceding 2 to 3 years were allocated to terminal Group Cert. classes. The others were allocated either to a separate Inter. Cert. programme — usually the higher streams in large urban schools — or to a fully integrated Group — Inter. Cert. system. However, a significant proportion of the latter dropped out before doing the Inter. Cert. — in total about 15 to 19 per cent of both sexes. In total, therefore, we would estimate that about 66 per cent of boys and 75 per cent of girls in vocational schools now do the Inter Cert.[21]

Sex Differences in Subject Take-up

Unfortunately the published Departmental statistics on Group Certificate examination results have never given a breakdown by sex. In the following table we provide this breakdown for the sample results from 1965 to 1978. If we omit the "core subjects" of Irish, English, Maths — which are taken by most students doing the examination — sex differences in vocational schools are even more marked than in secondary schools; as we might guess from the published information on access to these subjects; and very little change has occurred in this respect since 1965.

The practical manual subjects of Woodwork and Metalwork and the related subject of Mechanical Drawing are done almost exclusively by boys, while almost all of the Domestic Science and General Commerce/Secretarial subjects are equally reserved for girls. There has been very little change in these respects since the 1960s.

Vocational schools, therefore, although formally coeducational, in most cases appear to be far more sex differentiated in their curriculum (and probably in their syllabus structure) than the secondary schools, which are dominantly single sex. Doubtless part of this greater sex bias in the vocational school curriculum is structural. The dominant non-core subjects — omitting Irish, English, Maths., — in vocational schools are those "practical" subjects which show the clearest sex bias also in secondary schools. While these subjects, however, dominate in vocational schools they are only of minor significance in secondary schools. These essentially skill training courses, some of which without further apprenticeship — like typewriting and shorthand — equip one directly with relevant and saleable skills for work roles, have no equivalent in most secondary school curricula. Indeed, many vocational schools provide such work preparation courses for girls who have already completed their Intermediate Certificate or Leaving Certificate examinations in secondary schools.

As we have already pointed out the structure of the Group Certificate Examination encourages those sex differences. To be eligible for admission to the Day Vocational Certificate Examinations a pupil must: (a) have entered for examination in the subjects of at least one of the groups (specified below)

[21]In Community schools figures are significantly better with only 10 and 7 per cent of boys and girls respectively in terminal Group Cert. classes and a total dropout of 25 per cent boys and 18 per cent girls before the Inter Cert. exam.

Table 4.9: *Percentages of boys and girls (in sample schools) taking different subjects in the group certificate examination, 1965-1978.*

Subject (N)	1965 *Boys* (685)	1965 *Girls* (482)	1968 *Boys* (1,194)	1968 *Girls* (728)	1972 *Boys* (1,409)	1972 *Girls* (857)	1975 *Boys* (1,305)	1975 *Girls* (834)	1978 *Boys* (1,215)	1978 *Girls* (919)
Irish	91	88	93	96	81	61	71	55	60	69
English	84	72	93	90	86	69	84	65	71	88
Maths	75	—	87	18	85	47	83	54	75	72
History	—	—	—	—	0.1	—	0.2	—	39	44
Geography	—	—	—	—	—	—	—	—	42	45
Hist./Geography	—	—	22	20	45	37	49	35	0.1	0.0
Science A	—	—	30	2	46	3	48	7	36	21
French	—	—	—	8	6	30	17	31	16	37
German	—	—	—	—	1	—	—	—	1	0.0
Art and Drawing	34	2	43	5	43	16	52	17	40	36
Mech. Drawing	87	—	93	0	86	—	84	1.4	65	0.0
Woodwork	88	—	93	0	86	—	78	0.0	65	0.5
Metalwork	74	—	65	0	69	—	64	0.0	54	0.0
Mechanics/Heat	44	—	24	0	—	—	0.1	0.0	1.1	0.0
Magnetism/Electricity	44	—	14	0	—	—	—	—	—	—
Rural Science	28	—	35	2	35	7	30	7	31	23
Domestic Science	—	24	—	33	—	31	—	35	0.1	45
Acct. Bookkeeping	1	62	—	78	1	73	2	65	2.5	85
Commerce	1	65	—	81	1	77	2	68	3.5	94
Commercial Arithmetic	1	62	—	68	1	31	1	23	3.9	31.4
Typewriting—Sec.	—	15	—	24	0.1	22	1	23	0.2	32.9
Typewriting—General	—	46	—	39	0.2	22	0.3	22	0.2	44
Shorthand—Sec.	—	15	—	24	0.1	22	0.4	23	0.2	31
Shorthand—General	1	36	—	25	0.2	16	0.2	21	0.2	32
Business Methods	—	9	—	14	—	12	—	—	—	—
Cookery	—	38	—	46	—	41	—	41	0.9	53
Sewing	—	31	—	42	0.1	39	—	41	0.1	49
Laundry and Home Management	—	29	—	34	0.1	33	—	34	0.0	38
Household	—	5	—	7	—	0.1	—	—	—	—

(*Rules and Programme for the Day Vocational Certificate Examination*, p. vi.) The group of subjects specified are as follows:

(i) *Commerce — General:* (a) Bookkeeping; (b) Commerce; (c) Commercial Arithmetic *or* Mathematics.
(ii) *Commerce — Secretarial:* (a) Commerce; (b) Shorthand — (Secretarial); (c) Typewriting — (Secretarial).
(iii) *Domestic Science:* (a) Cookery; (b) Needlework; (c) Laundry-work and Home Management *or* Domestic Science (written).
(iv) *Manual Training:* (a) Woodwork *or* Metalwork; (b) Mechanical Drawing or Art.
(v) *Rural Science:* (a) Rural Science; (b) Woodwork *or* Metalwork.

The groups are almost classically sex differentiated, with traditional male specialisation in handicraft subjects, and traditional female specialisation in homecraft and Commercial/Secretarial subjects. Not only, therefore, are the individual subject boundaries themselves traditionally sex linked but their formal packaging further emphasises these distinctions. It would take a very singular girl to take the male dominant Technical courses and an equally single-minded boy to enter the female Commercial/Secretarial specialist courses in most vocational schools.

Nevertheless, some change has occurred. This is partly due to an expansion of the language/humanities curriculum to equip vocational school students to proceed further with their education, at least on to the Intermediate Certificate. This had been one of the main original aims of the 1966 Curricular reform policy. As one can readily see from the results given in Table 4.9 the expansion in these academic courses has markedly increased the number of subjects taken jointly by boys and girls. Besides Irish and English, History, Geography, Science and French have been taken by increasingly less differentiated proportions of male and female candidates. Maths and Art/Drawing, both of which had been markedly male biased subjects in the 1960s, had become relatively undifferentiated by the late 1970s. Maths is the most interesting and telling change. No girls took the ordinary Maths course in 1965. All of them took the much lower level Commercial Arithmetic course. By 1978 there was no difference in the proportion of boys and girls taking the ordinary Maths course.

There has been almost no change, however, in the specialist subject groups. Indeed the Commercial/Secretarial and Domestic Science groupings have become even more strongly dominated by girls. And while the proportion of boys in the Manual/Technical subjects has declined, there are still almost no girls taking these subjects.

Except for the core subjects, therefore, vocational school coeducation is clearly a misnomer — boys and girls are even more clearly segregated than in secondary schools. Besides the reasons due to design — the original 1930s Act and its implementation clearly reflected the sex role ideologies then dominant — there are many other structural reasons why the vocational schools are such. Some of these have already been mentioned — the different kind of curricula and the grouping of subjects. Other significant differences also exist. They recruit students from class backgrounds that are considerably more educationally and economically disadvantaged than those going to secondary schools. A very high proportion of their first year pupils have serious literacy and numeracy problems. (See Swan, 1978). There also appears to be undoubtedly greater constraints on space use, on facilities and on equipment provision, as well as on teacher availability in the practical subjects which are characteristic of vocational schools, than is true in the majority of Maths and Language and Literature subjects taught in secondary schools. As a result, even if a vocational school wished to change from an inherited sex differentiated pattern of provision it would have somewhat greater difficulty in doing so.

Whatever the reason for these sex differences their extent and their invariance are so obvious that there is no need for further analysis; there being no variance to explain.

Summary

1. Post-primary education in Ireland is divided into three separate sectors which differ in origins, organisation, intake and curricular emphasis. The private secondary schools have their origins in the early nineteenth century and provide a five year academic, or grammar school type, education which traditionally provided the route into University education. Since 1967 the great majority of them provided "free education", though they still remain mainly middle class in pupil composition. The vocational schools were established in the 1930s to provide a very practical education, much more oriented to preparing pupils for their adult work and familial roles. And, from the beginning they have, therefore, been designed to be highly sex differentiated in their curricula. The community and comprehensive schools were established in an attempt to bridge the gap between the secondary and vocational sectors — mainly in terms of providing a comprehensive curriculum and in caterng for pupils of both sexes and all backgrounds and ability levels. This move towards a more uniform second-level sector has thus far been largely confined to areas where new schools have been needed or where small schools have amalgamated.

2. The three school types are, in general, quite distinct in the social class composition of their pupil intake. Secondary schools, particularly boys' secondary schools, are the most middle class in composition while vocational

school pupils are disproportionately recruited from working class or small farm origins. They have, consequently, the largest proportion of remedial problems and also the largest drop-out rates.

3. These differences between sectors have their correlates in subject provision at both junior and senior cycle levels, with an emphasis on practical and technical subjects in the vocational sector and an academic emphasis in the secondary sector. The newer community schools are generally larger and provide a more comprehensive curriculum. The sources and types of sex biases in provision are different for each school type: the single sex secondary schools provide extra Science and Maths in boys' schools and Home Economics and extra Languages in girls' schools, and the vocational and community schools differentially allocate Technical subjects to boys and Accomplishment subjects to girls.

4. The location and basis of curricular decision making varies widely across schools. Secondary school Principals have by far the most autonomy in such decisions. For most curricular decisions they are not subordinate to higher authorities — provided no significant increase in resources is required. So, as they increased their pupil and teacher numbers over the past 15 years they were generally much freer to decide on what subject was to be dropped from, or added to, the curriculum than their peers in vocational and community schools. Both in terms of their autonomy and of the much more clearcut objectives of the school, community and vocational school Principals felt most constrained in those curricular decisions as to what subject was to be added, or dropped, as school numbers increased over the 1968-1981 period.

Compared to these latter constraints affecting the Head's autonomy the Heads of secondary schools are much freer in curricular decision making. The educational objectives of the religious order concerned, however, as well as the character of the main social group being catered for by the order, are bound to influence such local curricular decisions. Orders like the Mercy, Presentation or Christian Brothers whose charters emphasise "the education of the poor" are bound to have different curricular priorities to those orders whose educational charters and social mission are much more middle class and elitist in orientation. And, of course, if an order has mainly directed its efforts towards a working class or small farmer target group, educational demands from parents will be much less pressing and much less specific than from upper middle class parents or from those whose dominant aspiration is to ensure rapid upward mobility for their children. Distinct social class differences exist in the clientele of vocational, community and secondary schools; but the variance in these respects within the secondary school sector is almost as great as that between secondary and vocational schools in general.

5. The recognised curricula of all second level schools is very wide — for

most schools the number of recognised subjects is more than double the number they actually teach. Given that schools have more than doubled their pupil/teacher numbers over the past 15 years they have had ample opportunity to both expand and structure their curricula in ways that would reflect their objectives and needs.

The differential results of this process of curricular development are clearly visible in the high degree of sex bias in provision of Technical, Domestic Science, Languages, and Art and Music subjects in single sex secondary schools. Provision, however, is not simply a matter of the school having the subject available for teaching; it may decide not to allocate it to particular categories of its pupils. And as we see in Table 4.6 and 4.9, it is clear that such a process operates widely in vocational schools where Technical subjects are not allocated to girls, and Commerce and Domestic Science subjects are not apparently allocated to boys. A pupil obviously cannot take up a subject if it is not provided by the school, or, if provided, is not allocated to the pupil category of which she/he is a member. Obviously both processes are important. The relative importance of both these factors, as well as the substantial role of pupil choice amongst subject options that are equally available, will be explored in depth in the following chapters.

6. These sex biases in the provision and allocation of subjects by secondary and vocational schools have a rather long history. In fact in some respects — particularly in Maths and the Sciences — sex differences have narrowed over the past 20 years. In other respects, however, and particularly in Technical subjects, sex differences have widened with the revision of some Technical syllabi.

CHAPTER 5

Provision, Allocation and Choice in Subject Take-Up

In this chapter we have three aims; first, to describe the overall sex differences in the rates of take-up of Inter. and Leaving Certificate subjects; second, to present the model that will guide our analyses in the remainder of this monograph; and, finally, to apply this model to twelve Inter. and Leaving Certificate subjects.

Differences in Rates of Subject Take-Up

So far we have discussed sex differences in the rates of subject take-up in only a general manner, pointing to the broad areas of differences — Science and Technical subjects taken disproportionately by boys, Languages and the "Accomplishment" subjects such as Home Economics, Art and Music, by girls. In this section of the paper we shall look at these differences more closely, and attempt to measure their extent. Using information from the Department of Education's *Statistical Report* 1979-80, we show in Tables 5.1 and 5.2 the proportion of pupils of each sex taking the most common Inter. and Leaving Cert. subjects. These figures (in Columns (1) and (2)) are arrived at by dividing the number of boys and girls sitting for a specific subject in the exam. by the total number of boys and girls who sat for the Inter. and Leaving Cert. In Column (3) we report the ratio of the proportion of boys taking the subject to the proportion of girls taking it. So, a score of 1.00 shows that equal proportions of both sexes are taking the subject, a score of greater than one indicates that more boys than girls take it, while the opposite is the case for a score of less than one. In Column (4), the logarithm of this ratio is reported. A positive score is associated with a "boys'" subject, negative with a "girls'", while zero indicates parity. The advantage of logarithms over the simple ratio is that we can compare the *absolute* size of one ratio against another. Thus, a subject with a log-ratio score of 0.27 shows the same degree of disproportion in take-up as one with a score of −0.27, except that the former favours boys, the latter girls. So, for example, in the Leaving Cert., Physics (log ratio 2.11) and Home Economics (Social and Scientific) (log ratio −2.12) show approximately equal amounts of sex-bias in take-up, though Physics favours boys, Home Economics, girls.

Table 5.1: *Proportions of Boys and Girls taking Inter. Cert. Subjects, Their Ratio and Their Log-Ratio, 1979-80*

	(1) *Boys*	(2) *Girls*	(3) (1)/(2)	(4) *log*
Higher Maths	.31	.24	1.27	0.24
Science (A)	.80	.52	1.52	0.42
Commerce	.49	.66	0.73	−0.31
Mechanical Drawing	.45	.00	160.07	5.08
Woodwork	.37	.00	428.01	6.06
Metalwork	.21	.00	2846.89	7.95
French	.56	.71	0.80	−0.22
German	.03	.10	0.33	−1.11
Spanish	.04	.05	0.73	−0.31
Home Economics	.00	.70	0.01	−4.61
Art	.27	.47	0.57	−0.56
Music (A)	.06	.20	0.29	−1.24

Source: Department of Education, *Statistical Report*, 1979-80, pp. 56-57.

Table 5.2: *Proportions of Boys and Girls taking Leaving Cert. Subjects, Their Ratio and Their Log-Ratio, 1979-80*

	(1) *Boys*	(2) *Girls*	(3) (1)/(2)	(4) log_e (3)
Higher Maths	.15	.04	3.78	1.33
Physics	.28	.03	8.26	2.11
Chemistry	.28	.10	2.84	1.04
Biology	.40	.62	0.65	−0.43
Applied Maths	.04	.00	29.30	3.38
Accounting	.24	.23	1.03	0.03
Business Organisation	.26	.30	0.87	−0.14
Economics	.30	.15	1.98	0.68
Technical Drawing	.18	.00	219.74	5.39
Building Construction	.10	.00	982.97	6.89
Engineering W'shop	.09	.00	1824.21	7.51
French	.53	.69	0.76	−0.27
German	.02	.06	0.40	−0.92
Spanish	.03	.04	0.64	−0.45
Home Economics (Gen.)	.00	.22	0.01	−4.61
Home Economics (S & S)	.04	.37	0.12	−2.12
Art	.12	.21	0.58	−0.54
Music	.01	.04	0.19	−1.66
History	.38	.34	1.11	0.10
Geography	.53	.43	1.21	0.19

Source: Department of Education, *Statistical Report* 1979-80, pp. 56, 58, 59.

Turning to the tables themselves, we see that at Inter. Cert., Science and Higher Maths, as well as the Technical Subjects, favour boys, while Modern Languages, the Accomplishment Subjects and Commerce favour girls. The smallest differences lie in Higher Maths, Science, Commerce, French, Spanish and Art, the largest in Home Economics (taken by almost no boys) and the Technical Subjects (taken by almost no girls). A very similar pattern is evident at Leaving Cert.; in particular it can be seen that the log-ratios for Home Economics (General), Art, and the Technical Subjects are virtually the same as at Inter. Cert. Again, the pattern is one of boys being over-represented in the Sciences (excepting Biology but including Higher Maths), the Technical Subjects and also in Economics (which is the most popular Commerce subject among boys but the least popular among girls). Girls are over-represented in Biology, the Languages and in the Accomplishment Subjects (although some boys do take Home Economics (Social and Scientific)). In Accounting and Business Organisation, History and Geography, take-up rates are roughly equal. While only two subjects (Music and the two Home Economics) have log-ratios below minus one, seven have ratios above plus one; these are the Science subjects (Higher Maths, Physics, Chemistry, Applied Maths) and the three Technical Subjects. Thus, of the most sex-biased subjects in take-up, the majority favour boys.

Comparing Inter. with Leaving Cert., in Music (favouring girls) and the Sciences the differences in take-up widen as we move from one to the other, though they remain much the same in Languages and Technical subjects. In Commerce the sex bias in favour of girls at Inter. Cert. disappears by Leaving Cert., to be replaced by a bias favouring boys in Economics.

If we contrast the different educational sectors — secondary, vocational and community/comprehensive — we find that the sex biases in take-up show some interesting variation. In Table 5.3, we show the proportion of pupils of each sex in the junior cycle taking certain Inter. Cert. subjects, according to school type, and also the log-ratio of these proportions.

These figures are obtained from different sources than for Tables 5.1 and 5.2. The Department of Education statistics do not break down examination tables by school type; thus these figures are based on the proportion of students at either junior or senior cycle taking a particular subject. This tends to be higher than the proportion who actually take the subject at the exam.

If we begin with Inter. Cert. Science, we see that the sex differences in take-up are much less in vocational and community schools than in secondary schools. To a great extent, this is due to the very high rate of Science take-up among boys in secondary schools, not found in the other two types; for, if we examine the girls' figures, we see that girls in secondary schools are still more likely to take Science than those in vocational or community schools, despite the great sex difference in take-up rates. In Higher Maths, community and secondary schools share a common position: the rather discrepant result for vocational schools may be due to the very low proportion of either sex that take the subject.

Table 5.3: *Proportions of Each Sex Taking Certain Subjects in the Junior Cycle, and Their Log-ratio, broken Down by School Sector*

	Secondary			*Vocational*			*Community*		
	Boys	*Girls*	*Log Ratio*	*Boys*	*Girls*	*Log Ratio*	*Boys*	*Girls*	*Log Ratio*
Higher Maths	.62	.56	0.11	.12	.15	−0.25	.30	.27	0.11
Science (A)	.92	.59	0.45	.50	.40	0.23	.60	.51	0.17
Commerce	.66	.64	0.02	.15	.92	−1.82	.41	.64	−0.45
M.D.	.30	.00	5.66	.97	.04	3.11	.78	.12	1.84
Woodwork	.25	.00	7.86	.91	.05	3.01	.57	.07	2.08
Metalwork	.04	.00	6.66	.82	.03	3.50	.45	.04	2.89
French	.79	.85	−0.08	.35	.66	−0.64	.51	.70	−0.32
German	.05	.11	−0.88	.01	.00	1.94	.04	.08	−0.57
Spanish	.06	.06	−0.09	.01	.01	−1.03	.02	.02	0.10
Home Economics	.01	.67	−4.70	.05	.96	−2.88	.07	.87	−2.53
Art	.32	.54	−0.53	.45	.54	−0.17	.36	.59	−0.49
Music	.15	.33	−0.82	.06	.09	−0.39	.21	.41	−0.67

Source: Department of Education, *Statistical Reports,* 1979-80, pp. 45-52.

In the Technical subjects and Home Economics, vocational and community schools have higher rates of take-up than secondary schools, and also show less sex bias in take-up. In the Languages the opposite is the case — lower rates of take-up in vocational and community schools and more sex bias. In Music, rates of take-up in these schools are generally lower than in secondary schools (except for girls in community schools) and sex bias is also less. In Art, girls' take-up rates are remarkably constant across all three sectors, with boys in vocational schools having the highest take-up among their sex. Here again, secondary schools show most bias in take-up. Perhaps most interesting, however, is Commerce. We have seen that, at Inter. Cert., there is a moderate bias favouring girls. In the junior cycle as a whole this is true of community schools, but in secondary schools rates are roughly equal. In vocational schools, however, commerce is almost purely a girls' subject; 92 per cent of girls take it against about 15 per cent of boys.

Turning now to Table 5.4 which reports comparable figures for the senior cycle, we see that the pattern of bias in Science subjects (Biology favouring girls, the rest favouring boys) is repeated across all three sectors. Among boys, take-up is greatest in secondary, then community, and lastly vocational schools, with the exception of Biology whose high rate of take-up in vocational schools arises, no doubt, from its being the only Science subject on many vocational schools' curricula. For girls, Science take-up rates are roughly equal in secondary and community schools and are higher here than in vocational schools, again with the exception of Biology. In the latter schools, Higher Maths take-up is very low (largely due to its absence from the curriculum, as we shall discover) but approximately equal for the sexes. Aside from this, and also excluding Biology, sex differences in take-up for the remaining Sciences are highest in vocational schools, lowest in community schools.

Table 5.4: *Proportions of Each Sex Taking Certain Subjects in the Senior Cycle and their Log-ratio, Broken Down by School Sector*

	Secondary			*Vocational*			*Community*		
	Boys	*Girls*	*Log Ratio*	*Boys*	*Girls*	*Log Ratio*	*Boys*	*Girls*	*Log Ratio*
Higher Maths	.30	.12	0.93	.09	.08	0.18	.19	.10	0.68
Physics	.30	.04	2.03	.16	.02	2.12	.25	.04	1.76
Chemistry	.33	.13	0.92	.10	.03	1.21	.20	.10	0.62
Biology	.39	.60	−0.42	.49	.62	−0.23	.35	.61	−0.57
Applied Maths	.04	.00	3.40	.02	.00	4.38	.03	.00	1.89
Accounting	.27	.22	0.21	.06	.41	−2.00	.15	.22	−0.36
Business Organisation	.27	.29	−0.07	.11	.40	−1.27	.22	.32	−0.36
Economics	.33	.15	0.79	.12	.22	−0.60	.18	.17	0.38
T.D.	.08	.00	4.33	.75	.00	5.14	.37	.02	3.15
Building Construction	.03	.00		.47	.00	5.75	.25	.00	6.02
Engineering W'shop	.01	.00		.52	.00	5.34	.23	.00	5.03
French	.56	.71	−0.23	.21	.60	−1.04	.37	.62	−0.51
German	.03	.06	−0.71	.01	.01	0.18	.03	.06	−0.60
Spanish	.03	.05	−0.49	.01	.02	−0.95	.02	.01	0.20
Home Economics (Gen.)	.01	.20	−3.32	.00	.41	−6.23	.01	.25	−3.22
Home Economics (S & S)	.01	.33	−3.80	.01	.32	−3.49	.04	.36	−2.29
Art	.11	.20	−0.65	.17	.24	−0.31	.15	.24	−0.45
Music	.02	.07	−1.31	.01	.02	−0.33	.01	.08	−2.23
History	.41	.36	0.12	.22	.26	−0.15	.35	.29	0.19
Geography	.54	.45	0.19	.36	.33	0.08	.52	.38	0.30

Source: Department of Education, *Statistical Reports*, 1979-80, pp. 45-52.

Overall, the major sex differences occur in the Sciences, the Technical Subjects and the Accomplishment subjects, though Languages also show a fairly clear pattern of domination in take-up by girls. Only in TD in community schools does more than half of one per cent of girls take any technical subject: among boys take-up rates are highest in vocational schools and very low in secondary schools, again largely due to lack of provision. However, it is perhaps in the Commerce subjects that the most interesting differences arise. Whereas we saw in Table 5.2 that, overall, at Leaving Cert., only Economics showed any clear sex bias (in favour of boys), in Table 5.4, it is clear that this is the net result of contradictory patterns across the school sectors. While Economics is a "boys'" subject in secondary and community schools it is, like the other two Commerce subjects, a "girls'" subject in the vocational schools. In the community schools, Accounting and Business Organisation are also taken disproportionately by girls. In both vocational and community schools these can be regarded as continuations of the disproportionate take-up of junior cycle Commerce. It seems plausible to assume (and we will produce evidence on this point later) that in vocational schools and, to a lesser extent, community schools, Commerce and Technical subjects are being categorised as mutually exclusive, oriented towards girls and boys, respectively.

In summary then, we can point to some clear patterns of sex bias in subject take-up, with the Languages and Accomplishment subjects and Biology being taken by a disproportionate number of girls, and the Sciences and Technical Subjects being taken by a disproportionate number of boys. However, there are two important points to note here;

(i) Although some subjects (such as the Sciences) show a consistent direction of bias towards one particular sex in all three school sectors, the actual degree of bias can vary between them, so that, for example, the degree of sex bias in the take-up of Inter. Cert. Science is much less in vocational than in secondary schools;

(ii) There are certain subjects which, although biased in each sector, show a different direction to this bias depending on the sector. For example, Economics is a male dominated subject in secondary schools but female dominated in vocational schools.

These two points are prima facie evidence of the role that schools play in determining sex bias in subject take-up, and they also suggest that if we were to examine individual coeducational schools, the degree of variation in the sex bias in the take-up of subjects would be at least as great, if not greater.

An Analytical Model of Subject Take-up

A number of possible explanations of, for example, the low rate of take-up of Leaving Cert. Physics among girls, or the low rate of take-up of Home Economics among boys, have been advanced (and discussed in Chapter One). Provision factors (whether or not the school teaches the subject), allocation rules (which pupils are allowed to take a particular subject), teachers' attitudes (often operating implicitly), and pupils' own preferences, all appear to have some role to play in accounting for these differences. Our goal is to assign a relative importance to each of these factors in determining the differences in subject take-up between the sexes.

Rather than apply this analysis to all the Leaving and Inter. Cert. subjects — which would have been quite impractical — we have chosen a number of each for investigation. These are shown in Table 5.5. These subjects were chosen to represent those dominated in take-up by one sex or the other (with Leaving Cert. History as a comparative yardstick) and to avoid unnecessary duplication. For example, even a cursory examination of levels of provision and allocation will show that broadly the same factors account for the differential rates of take-up of Building Construction, Engineering Workshop and Technical Drawing. The same holds for the three Inter. Cert. Technical Subjects. Hence, only Mechanical Drawing (MD) and Technical Drawing (TD) are subject to this particular analysis.

Explanatory Framework

Initially, for each of the twelve subjects shown in Table 5.5, we shall look at the influence of differences in subject provision and allocation in explaining the sex differences in the rates of take-up of these subjects. Having done that, we shall (in Chapters 6 and 7) investigate differences between schools in the

Table 5.5: *Subjects Selected for Analysis of Factors Determining Take-up*

Level	*Subjects taken disproportionately by boys*	*Subjects taken dispro-portionately by girls*	*Subjects with roughly equal rates of take-up between the sexes*
Inter. Cert.	Higher Maths Science Mechanical Drawing	Commerce Home Economics	
Leaving Cert.	Higher Maths Physics Chemistry Technical Drawing	Home Economics (Social Scientific) Biology	History

central area of subject provision and in the development of curricula. Finally (in Chapter 9), we shall examine rates of subject take-up and, in those cases where pupil choice appears to be significant, investigate whether certain characteristics of pupils themselves lead them to choose or not choose particular subjects.

Provision and Allocation Constraints on Subject Take-up

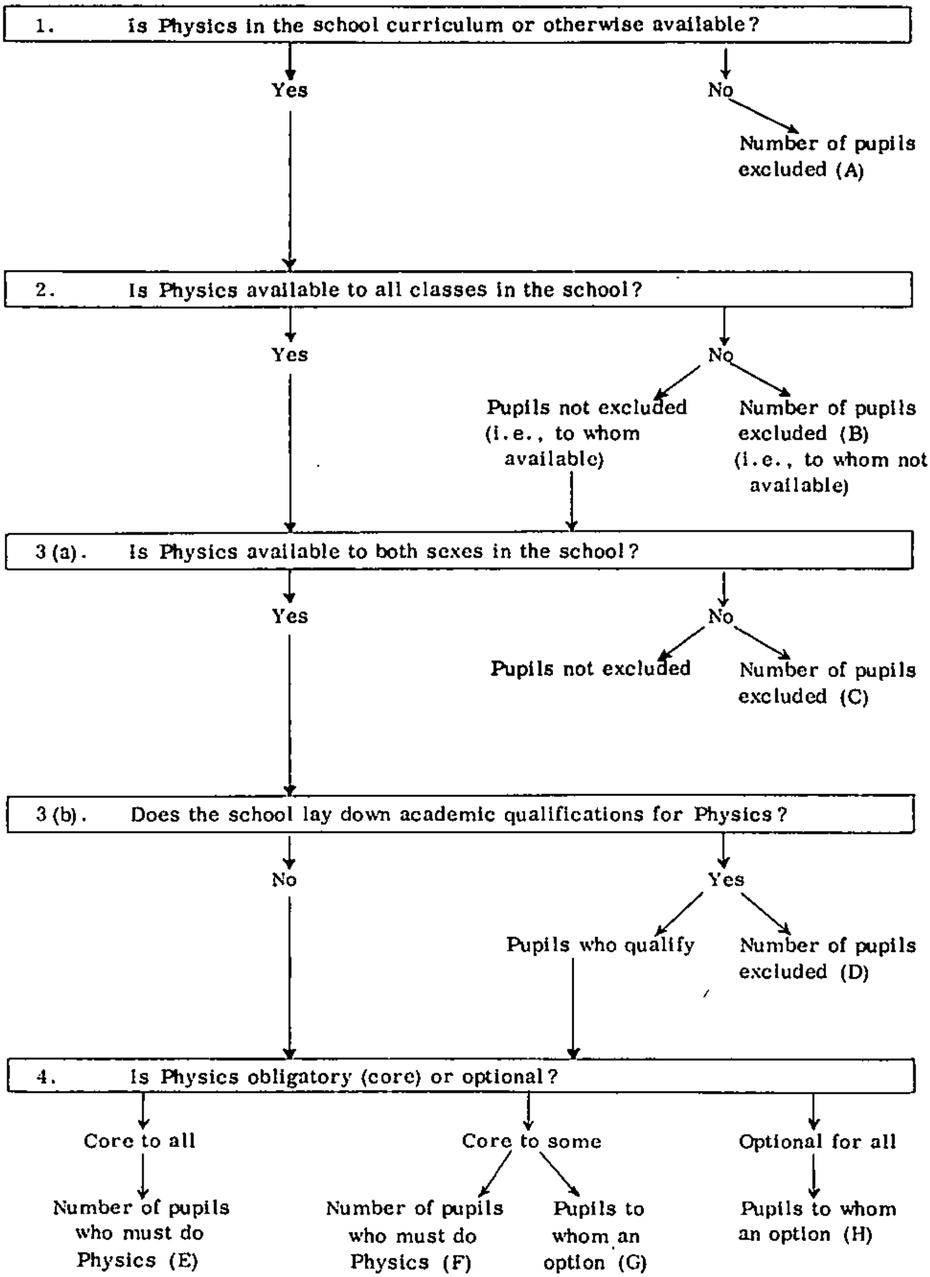
(a) *Leaving Certificate Subjects*

The model we use to examine the broad constraints on take-up that can be attributed to school provision and allocation is shown in Figure 5.1. This refers specifically to Physics, but was applied, in fact, to all seven Leaving Certificate subjects. This flow chart illustrates, in logical order, the factors that act to exclude pupils from taking the subject. It begins with the most basic question: is Physics taught in the school or not? Clearly, for those schools in which the answer is no, pupils will be unable to take the subject. The total number of pupils in the Leaving Cert. sample excluded in this way are labelled (A). In our terminology, these pupils are excluded because of the school provision factor. In those schools where Physics is taught, we then move to ask whether it is open to all classes or not. If it is not, then some pupils will retain the possibility of taking it while others (labelled (B)) will be excluded. A similar question is then asked on the basis of sex. This, of course, only applies in the case of coeducational schools. Where the subject is by rule restricted to only one sex, then the numbers so excluded fall under (C).

In many schools, in order to take certain Leaving Certificate subjects, a pupil must meet some form of academic requirement. In most cases this requires that the pupil has followed a course in the same, or a related subject, up to Inter. Cert. In many cases, the pupil must have passed, or even obtained a specific grade in that subject, in order to meet the school's requirements. For example, in many schools pupils taking Leaving Certificate Higher Maths are required to have at least passed Inter. Cert. Higher Maths. Broadly speaking, those Leaving Cert. subjects most commonly restricted in this way tend to be those considered difficult by teachers and pupils, such as Physics or Higher Maths, and those that require a base of already acquired specialised skills such as French or the Technical subjects. Those subjects which appear to be most openly accessible in this respect are the Humanities, History, Geography, some Commercial subjects such as Business Organisation, and Languages such as Spanish.

In our interviews with principals, we were able to determine the qualifications, if any, that each school regarded as necessary for pupils who wanted to take Higher Maths, Physics, Chemistry, Accounting, Building Construction

Figure 5.1: *Flow Chart: Some Constraints on the Choice of Physics*



and Technical Drawing. In the majority of cases these were expressed in terms of a necessary grade in one or more Inter. Cert. subjects: a grade B or better at Inter. Cert. Higher Maths in order to do Higher Maths at Leaving Cert., for example.

Those pupils who were excluded from taking the particular subject because they did not meet these criteria (for whatever reason) are labelled (D) in Figure 5.1. In total, those pupils labelled (B), (C) or (D) may be said to be excluded from the subject because of school allocation policies.

Finally, for those pupils who qualified to take the subject, the question is posed — is Physics core (that is, is it obligatory for them) or is it optional? Those pupils for whom it is obligatory are labelled (E) and (F); those pupils who are given the choice are (G) and (H). Pupils in categories (E) and (F) are thus obliged to take the subject because of school allocation policies.

In summary then, this model serves to allocate each member of the entire Leaving Cert. sample into one of six groups. Four of these (groups (A) to (D)) are groups formed on the basis of their exclusion from the subject. Members of (A) are excluded because of provision, members of (B), (C) and (D) because of school allocation policies. A further group ((E) and (F)) must take the subject, and finally, and most importantly, (G) and (H) form that group to whom the subject is open to them to choose.

The effects of these three broad factors — provision, allocation and choice — which we have advanced as determining rates of take-up carry different implications. Provision factors relate to a decision by school management, or whatever body is responsible for establishing a school's curriculum, either to provide or not provide a particular subject. Similarly, allocation factors can be seen as the product of a decision by school management about who shall or shall not be permitted to take a subject. In both allocation and provision, our primary interest is in those practices which, directly or otherwise, make distinctions between the sexes, as in, for example, the absence of Home Economics from the curricula of most boys' schools, or the allocation, within many coeducational schools, of Home Economics to girls and Technical subjects to boys. Such decisions reflect, in most instances, taken-for-granted assumptions about what subjects are appropriate to boys and girls, on the basis of beliefs about sex roles. Indeed, they are so taken for granted that these decisions are often not so much consciously taken, as determined by default. Such assumptions and beliefs are widely shared among teachers, Principals, parents and pupils. For example, we shall see later in this chapter, that in the take-up of certain Leaving Certificate science subjects, sex differences in the rate of choice of these subjects among pupils are actually greater than the sex differences in their provision or allocation by school managements. A corollary of this is, because these views about sex roles are so pervasive, merely altering the mechanics of subject provision and allocation will not, for most of the subjects we shall analyse, make major inroads into the sex-imbalance in their rates of take-up.

We are aware, of course, that a model such as that set out in Figure 5.1 represents the normative *de jure* as opposed to the substantive, *de facto*, situation. For example, there will always be exceptions permitted to any rule of academic qualifications; similarly, there will always be cases of pupils who, while they are supposed to be obliged to take a subject, are excused from it. We believe that the level of error or inaccuracy introduced in this way is sufficiently small to make the analysis meaningful. Of more importance, however, is the deviation between normative and substantive in regard to the allocation of subjects by sex. For example, while girls may formally be permitted to choose a particular subject, there may be pressure upon them within the school — specifically from teachers and peers — such that, in fact, either they are unable to choose it, or choosing it requires a level of dedication to the subject not necessary among boys. These sorts of problems will be dealt with in our analysis of choice *per se*.

Provision, Allocation and Choice

The results of the application of this model to the seven Leaving Cert. subjects listed in Table 5.5 are given in Table 5.6. This table, and all those in the rest of this chapter dealing with the Leaving Certificate, is based upon 86 out of the 95 schools in the sample. The loss of nine schools is caused by the absence of Leaving Certificate classes in five cases, a refusal to permit interviewing of those classes in one case, and three cases in which information was not gathered (or was not applicable) on the manner of subject allocation. This reduced the weighted sample size[22] to 1,684 boys, 1,943 girls.

The figures in parentheses in Table 5.6 are percentages of this sample size, and their comparison shows the relative importance of the various provision and allocation factors. Taking Higher Maths as an example, it can be seen that a larger percentage of girls than boys are excluded from taking the subject by virtue of being in schools that do not teach it (17.0 per cent against 8.1 per cent of boys) and in classes that are not offered it (10.4 per cent against 2.2 per cent). Additionally, 51.9 per cent of girls as against 42.0 per cent of boys do not meet school academic criteria for taking the subject. The result is that 47.6 per cent of boys either must take the subject (1.2 per cent) or may choose it (46.4 per cent) against 20.7 per cent of girls (none of whom is obliged to take

[22]The figures are weighted to counteract the over-representation of community schools in the sample. All results for the Leaving Cert. pupils in Chapters 5, 6 and 9 are based on these weighted figures.

Table 5.6: *Provision, Allocation and Choice Factors in the Take-up of Seven Leaving Certificate Subjects. (Figures in Parentheses are Percentages of Total Sample Size)*

	Categorisation as in Figure 5.1	*Higher Maths*				*Physics*				*Chemistry*			
		Boys		*Girls*		*Boys*		*Girls*		*Boys*		*Girls*	
Total Sample	—	1,684		1,943		1,684		1,943		1,684		1,943	
Excluded because subject not on curriculum	A	137.0	(8.1)	329.5	(17.0)	330.5	(19.6)	1,309.5	(67.4)	334.0	(19.8)	454.0	(23.4)
Excluded because subject not allocated to class	B	37.0	(2.2)	203.0	(10.4)	68.0	(4.0)	68.0	(3.5)	68.0	(4.0)	107.0	(5.5)
Excluded because subject not allocated to sex	C	0		0		0		0		0		0	
Excluded because failed to meet academic criteria	D	708.0	(42.0)	1,008.0	(51.9)	336.5	(20.0)	195.0	(10.0)	209.0	(12.4)	475.0	(24.4)
Pupils who must take the subject	E,F	20.0	(1.2)	0		48.0	(2.9)	0		143.0[1]	(8.5)	0	
Pupils who may choose the subject	G,H	782.0	(46.4)	402.0	(20.7)	901.0	(53.5)	370.5	(19.1)	930.0	(55.2)	907.0	(46.7)
Total:	—	1,684.0	(99.9)	1,943.0	(100.0)	1,684.0	(100.0)	1,943.0	(100.0)	1,684.0	(99.9)	1,943.0	(100.0)
Pupils choosing the subject	—	381.0	(22.6)	69.0	(3.6)	477.0	(28.3)	61.5	(3.2)	405.0	(24.0)	249.5	(12.8)
Total taking the subject	—	401.0	(23.8)	69.0	(3.6)	525.0	(31.2)	61.5	(3.2)	538.0	(31.9)	249.5	(12.8)

Table 5.6: *Continued.*

	Biology				*History*				*Technical Drawing*				*Home Economics (Soc. & Sci.)*			
	Boys		*Girls*		*Boys*		*Girls*		*Boys*		*Girls*		*Boys*		*Girls*	
Total Sample	1,684		1,943		1,684		1,943		1,684		1,943		1,684		1,943	
Excluded because subject not on curriculum	147.5	(8.8)	6.5	(0.3)	302.5	(18.0)	148.5	(7.6)	908.5	(53.9)	1,611.5	(82.9)	1,294.0	(76.8)	128.5	(6.6)
Excluded because subject not allocated to class	96.0	(5.7)	0		0		0		48.0	(2.9)	0		0		87.0	(4.5)
Excluded because subject not allocated to sex	22.0	(1.3)	0		0		0		0		105.0	(5.4)	49.0	(2.9)	0	
Excluded because failed to meet academic criteria	0		0		0		0		275.0	(16.3)	204.0	(10.5)	0		0	
Pupils who must take the subject	104.0[2]	(6.2)	258.0[3]	(13.3)	70.0[1]	(4.2)	31.0[5]	(1.6)	123.0[6]	(7.3)	0		0		71.0[7]	(3.7)
Pupils who may choose the subject	1,314.5	(78.1)	1,678.5	(86.4)	1,311.5	(77.9)	1,763.5	(90.8)	329.5	(19.6)	22.5	(1.2)	341.0	(20.2)	1,656.5	(85.3)
Total:	1,684.0	(100.1)	1,943.0	(100.0)	1,684.0	(100.1)	1,943.0	(100.0)	1,684.0	(100.0)	1,943.0	(100.0)	1,684.0	(99.9)	1,943.0	(100.1)
Pupils choosing the subject	653.0	(38.8)	932.5	(48.0)	493.5	(29.3)	589.0	(30.3)	185.5	(11.0)	2.0	(0.1)	22.0	(1.3)	737.0	(37.9)
Total taking the subject	765.0	(44.9)	1,181.5	(60.8)	540.5	(32.1)	615.0	(31.7)	295.5	(17.5)	2.0	(0.1)	22.0	(1.3)	804.0	(41.4)

The numbers of those who, formally, must take the subject, who do in fact take it are less than the numbers shown in row 6 of the table in all cases where the figure is given a superscript. The correct figures are: 1 — 133; 2 — 103; 3 — 249; 4 — 47; 5 — 26; 6 — 110; 7 — 67.

it). Finally, 22.6 per cent of boys and 3.6 per cent of girls actually choose Higher Maths.[23]

The main use of Table 5.6 lies in its permitting us to isolate, for each subject, what the important factors are in determining rates of take-up among each sex. We can do this, initially, by examining the four sources of exclusion, A to D. It will be immediately evident that for all subjects, formal exclusion on the basis of pupil sex *per se* is relatively unimportant. This may seem surprising, given that subjects such as Technical Drawing and Home Economics are considered to be, respectively, "boys'" and "girls'" subjects, and as Table 5.6 shows, the percentage of pupils able to choose these subjects shows marked sex differences. However, it can be seen also that the exclusion of boys from Home Economics is brought about by two factors — the lack of provision in schools (A), and the low proportion of boys who, although given the option of Home Economics, actually choose to take it (22 out of 341). In the case of TD, the situation is a little different. This time girls are disproportionately in schools without TD, but even of those who are in schools that teach it, the number offered TD is very small. This is mainly because girls do not meet the qualifying criteria to do TD — usually the requirement is that any pupil wanting to do TD should have done MD to Inter. Cert. Thus, one major source of attrition among girls can be traced back to Inter. Cert. subject allocation and/or choice.

Turning now to the other exclusionary factors, we can see that they vary in strength across the range of Leaving Certificate subjects. Thus, the percentages excluded because the subject is not on the curriculum show very little difference by sex in the cases of Chemistry and Biology. Subjects favouring boys in this respect are, in increasing degree of sex disparity, Higher Maths, TD and

[23]The use of the term "choose" when applied to Higher Maths is something of an oversimplification. In contrast to the other subjects under analysis, Higher Maths is not offered as part of an option package, that is, to be chosen or not from among a set of generally mutually exclusive subjects. Rather the "choice" lies between Lower or Higher level Maths, and it seems to be the case that the extent of choice offered to the pupils as to which level he/she should take is much less than that offered to a pupil in choosing between alternative subjects. In Maths academic ability seems to play a more important role in leading schools to decide who shall take (rather that who *may* take) Higher Maths. The problem, in fact, centres on the allocation of the two levels of Maths to pupils. In the vast majority of schools Maths is "set", so that, formally, at any rate, pupils of any class or stream may take either level of course, providing that, if they want to take the Higher course, they meet the academic requirements of the school. In practice, however, there seem also to be constraints placed upon the movement of those pupils who meet such requirements against their taking the lower course. Thus, the extent of choice open to those pupils who meet the qualifying criteria may be very restricted. Two consequences of this can be pointed to. Firstly, ability should be a stronger predictor of which pupils among those who qualify to take Higher Maths actually do take it than in the cases of subjects with more scope for pupil choice. We shall see in Chapter 9 that this is, in fact, the case. Secondly, it is our impression that those schools with instrumentally orientated science-based curricula (schools which, as we explain in Chapter 6, we designate as cluster 2 and cluster 6 schools), which are overwhelmingly boys' secondary schools, have much stronger informal constraints against the downward movement of high ability pupils to the Lower Maths course. This should account, in some part, for the observed differences in take-up rates among boys and girls who qualify to take Higher Maths.

Physics (where the differences in provision are 80.4 per cent of boys in schools where Physics is taught against only 32.6 per cent of girls). Those subjects favouring girls are History and Home Economics; the disparity in provision between the sexes for the latter is greatest of all our seven subjects.

Given these differences, we should expect that they would be reflected in the percentages of boys, girls and coeducational schools teaching these subjects. These are given in Table 5.7. Despite the fact that schools are not of uniform size, and coeducational schools are not of uniform sex-mix, the picture we obtain by comparing Columns one and two of Table 5.7 is markedly similar to what we glean from Table 5.6.[24] Boys' schools are more likely than girls'

Table 5.7: *Number of Schools Offering Each of Seven Leaving Certificate Subjects to the 1980-81 Leaving Cert. Class by School Sex-mix at Leaving Cert.*
(Percentages in Parentheses)

		School Type	
	Boys'	*Girls'*	*Coeducational*
Sample Size	24	23	39
Higher Maths	22 (91.7)	17 (73.9)	23 (59.0)
Physics	19 (79.2)	8 (34.8)	12 (30.6)
Chemistry	20 (83.3)	17 (73.9)	12 (30.8)
Biology	18 (75.0)	23 (100.0)	38 (97.4)
History	21 (84.0)	22 (95.7)	26 (66.7)
TD	8 (33.3)	0 (00.0)	31 (79.5)
Home Economics (S & S)	1 (4.2)	22 (95.7)	27 (69.2)

[24]An important distinction, however, lies between those schools who actually offer a given subject to the current Leaving Cert. class — which is what Table 5.7 reports — and the number of schools who claim to have that subject on their curriculum, which may be much greater, as Table 5.7a shows. Thus, for example, although only 12 coeducational schools offered Physics to their 1980-81 Leaving Cert. class, 21 coeducational schools claim to have it on their curriculum. We must also note that the division of schools by sex-mix refers to the 1980-81 Leaving Cert. class and not to the school as a whole.

Table 5.7a: *Number of schools providing each of seven Leaving Certificate subjects by school sex-mix at Leaving Certificate*
(percentages of sample size in parentheses)

		School Type	
	Boys'	*Girls'*	*Coeducational*
Sample size	24	23	39
Higher Maths	24 (100.0)	17 (73.9)	24 (61.5)
Physics	22 (91.7)	11 (47.8)	21 (53.8)
Chemistry	21 (87.5)	17 (73.9)	12 (30.8)
Biology	18 (75.0)	23 (100.0)	39 (100.0)
History	23 (95.8)	23 (100.0)	28 (71.8)
Technical Drawing	8 (33.3)	1 (4.3)	31 (79.5)
Home Economics (S & S)	1 (4.2)	22 (95.7)	27 (69.2)

schools to provide Higher Maths, Physics and TD, while the reverse is the case for Biology, Home Economics and, a little surprisingly, History. Again, Chemistry shows very little difference. Although not directly relevant to us at the moment, it is worth noting the low rates of provision of the Sciences (except Biology) in coeducational schools, and their high rates of provision of Home Economics and TD. The difference in provision between schools and school types is an issue to which we shall turn in more detail in Chapter 6.

If we turn to Table 5.8, we see that the low rate of Science provision in coeducational schools is largely due to low provision rates in vocational schools. Table 5.8 shows the national proportion of each sex in secondary, vocational and community/comprehensive schools who are in schools offering the seven subjects under analysis, to their sex.

Table 5.8: *Proportions of Boys and Girls in the Senior Cycle of Secondary, Vocational and Community/Comprehensive Schools in Schools Offering each of Seven Leaving Certificate Subjects to their Sex*

School Type	*Secondary I Boys*	*II Girls*	*Ratio I/II*	*Vocational III Boys*	*IV Girls*	*Ratio III/IV*	*Community/ Comprehensive V Boys*	*VI Girls*	*Ratio V/VI*
Higher Maths	.94	.77	1.22	.46	.35	1.31	.78	.68	1.15
Physics	.90	.44	2.05	.36	.14	2.57	.81	.65	1.25
Chemistry	.92	.82	1.12	.31	.22	1.41	.80	.75	1.07
Biology	.91	.97	0.94	.86	.91	0.95	1.00	1.00	1.00
History	.95	.96	1.00	.55	.61	0.90	.97	.98	1.00
Technical Drawing	.39	.02	19.50	.94	.06	15.67	.95	.38	2.50
Home Economics (S & S)	.06	.82	0.07	.08	.47	0.17	.31	.75	0.41
N	27,819	37,850		6,298	4,763		3,052	3,422	

Source: Department of Education, *Statistical Reports*, 1979-80, pp. 47-8.

The published figures do not permit a separation of coeducational from single sex secondary schools.

The overall pattern of provision is, as we should expect, that boys are better provided for in Higher Maths, Physics, Chemistry and Technical Drawing. Girls are at an advantage in Home Economics and Biology (except in community schools where provision is equal) and provision in History is roughly equal, except in vocational schools where girls are favoured. However, it is also apparent from Table 5.8 that in all cases the sex differences in proportions offered each of these subjects are least in community schools and greatest in vocational schools (except in TD and Home Economics where the differences in the secondary schools are greater). This is despite the fact that the vast bulk of vocational schools, like the community/comprehensive schools, are coeducational. In other words, sex differences in the proportion of pupils offered these subjects in secondary schools will be due in part to differences in provision *between* single sex schools and in part to differences in the allocation of these subjects to boys and girls *within* coeducational secondary schools. On the other hand, in community/comprehensive and vocational schools, the sex differences in proportions offered these subjects must be due almost wholly to sex differences in subject allocation *within* schools.

We conclude, therefore, that in vocational schools, in particular, the allocation of subjects is markedly sex-specific. However, as we shall see later, this need not arise through a direct process of allocating subjects according to sex at the Leaving Cert.; rather, it is more likely to be the consequence of direct allocation according to sex of Inter. Cert. subjects, such that, for example, because girls were not allowed to take MD, they cannot possibly meet the criteria required for TD.

However, turning to Table 5.6 once again, we see that differences in allocation of our seven Leaving Cert. subjects according to school class and sex are not of major importance in determining the final rates of subject take-up. Only in the cases of Higher Maths and Biology is the difference between boys and girls in the proportion of pupils excluded greater than five percentage points.

Of considerably greater significance is the exclusion of pupils because they failed to meet academic criteria. This is of relevance in Higher Maths, Physics, Chemistry and TD. Although we did not enquire specifically into the criteria for the other three subjects, in the majority of schools they appeared to be much more accessible and generally more open than the former subjects. On this basis we have assumed that Biology, History and Home Economics should be regarded as open to all pupils without any qualifying criteria attached to them.

In examining Higher Maths, Physics, Chemistry and TD, it is apparent that, in all cases, failure to meet academic criteria was a major exclusionary factor for both sexes. In a sense, however, Table 5.6 gives something of a false impression of its relative importance for the two sexes, since the effect of this factor depends, to a degree, upon the strength of the previous exclusionary factors. So, for example, in the case of Physics, exclusion because of a failure to meet academic criteria appears less important for girls than for boys — and so it is, at least in the attrition of the entire sample, where exclusion because of lack of provision is of overwhelming importance. If, however, we turn to Table 5.9 this shows the number of pupils who are excluded because of a failure to meet academic criteria, expressed as a percentage of those pupils in schools and classes where Higher Maths, Physics and Chemistry are available.

An examination of Table 5.9 shows that, for all three subjects, among those

Table 5.9: *Of those Pupils in Schools where the Subject is Available, Percentages who are Excluded by Failure to meet Academic Criteria; and Percentages of those who have not Sat for the Prerequisite Inter. Cert. Subject.*

Subject	*Of those to whom Subject is Available — percentage Excluded because of Failure to meet Academic Criteria (a)*		*Percentage of (a) who Did not Take:*			
			Inter. Cert. Higher Maths		*Inter. Cert. Science*	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
Higher Maths	47	71	75	86	—	—
Physics	26	34	—	—	22	57
Chemistry	16	34	—	—	30	72

pupils in classes offered these subjects, girls are far more heavily excluded than boys by virtue of their failure to meet the necessary academic requirements. The degree of exclusion brought about in this way will depend on three factors:

(1) the criteria set up by schools;
(2) the number of pupils taking the criterion subject;
(3) the level of performance of these pupils in that subject.

If we try to explain the different degrees of exclusion of the two sexes by these three factors, we can arrive at some fairly clear conclusions. In the first place our data show no significant differences between boys', girls' or coeducational schools in the difficulty of the criteria set up for these subjects. Secondly, the criterion subjects, are, in these cases, Higher Maths Inter. Cert. for Higher Maths Leaving Cert.; Inter. Cert. Science for Physics and Chemistry. Thus, if we turn to Table 5.9, we can see that for all three subjects, the percentages of those excluded from a particular Leaving Cert. subject because they had not even sat for the requisite Inter. Cert. are greater for girls than boys — markedly so in the cases of Physics and Chemistry. We can attribute the ineligibility of such pupils either to pre-emptive curricular *allocation* (they were not allowed to take the necessary Inter. Cert. subject) or to pre-emptive curricular *choice* (they chose not to take that subject). We will deal with these questions in some detail when we come to analyse our five Inter. Cert. subjects. At this point, however, we can say that, according to our Inter. Cert. survey, four out of five male pupils are obliged to take Inter. Cert. Science, whereas, although almost all girls have the option of taking it, very few are obliged to take it; and, as an option, it is frequently placed as an alternative to what are considered traditional "girls'" subjects — Home Economics, Music, Art and so forth.

The last of our three explanatory factors — differences in the level of Inter. Cert. performance in the criteria subjects — cannot be held to have any particularly marked effect. Although, over the sample as a whole, boys do better, on average, than girls in Inter. Cert. Higher Maths, this difference is slight. In Inter. Cert. Science A, girls perform, overall, rather better than boys (Department of Education, *Statistical Reports)*. However, female candidates in Science A are less numerous than males, and are probably therefore, more highly selected. In Science E, which is taken by relatively few pupils, boys perform better than girls.

To summarise the foregoing few paragraphs: in the three subjects we have examined, failure to meet qualifying criteria is an important form of exclusion for both sexes but takes a disproportionately severe toll of girls. This disproportion is almost wholly due to the differences in the rates of take-up of the necessary Inter. Cert. subjects. We have not included TD in this discussion for the simple reason that the disproportions involved are so extreme and relatively obvious. Given that, in our entire Leaving Cert. sample, only 0.4 per cent of girls had taken Inter. Cert. MD, it is obvious that virtually all those formally offered TD will be excluded because of their failure to meet the criteria, and this will be almost entirely due to their not having taken MD up to Inter. Cert.

Obligatory and Optional Subjects: the Role of Choice

In only two cases does the fact of a subject's being obligatory have a large effect on the relative rates of take-up by the sexes — these are Chemistry (favouring boys) and Biology (favouring girls). The discrepancy between the sexes in the case of TD has, as it were, already been made irrelevant by the large-scale exclusion of girls from the subject.

In all seven cases, choice is of more importance in determining take-up than is compulsion. One virtue of the model we have applied in this analysis is that it enables us to determine which pupils, out of the entire sample, are in a position to choose to do the subject (these are labelled G and H in Figure 5.1 and Table 5.6). Thus, when we discuss the role of pupil choice in subject take-up it is this subsample we shall be concerned with, derived as it is from the entire sample, allowing for the effects of provision and allocation. The rate of choice of this subsample — that is, the number choosing the subject expressed as a percentage of those who may choose it — we shall call the "true rate of subject choice". This is shown in Table 5.10, together with the ratio of the boys' to the girls' rate. From this it is evident that the true rate of subject choice shows marked sex differences in all subjects except Biology and History, boys' rates exceeding girls' in Higher Maths, Physics, Chemistry and TD.

It may, however, be argued that our assumptions regarding the absence of

Table 5.10: *Those Pupils Choosing the Subject as a Percentage of those who may choose it (i.e. "true rate of choice")*

Subject	*Boys*	*Girls*	*Ratio Boys/Girls*	*Subject*	*Boys*	*Girls*	*Ratio Boys/Girls*
Higher Maths	48.7	17.2	2.8	History	37.6	33.4	1.1
Physics	52.9	16.6	3.2	Technical Drawing	56.3	8.9	6.3
Chemistry	43.5	27.5	1.6				
Biology	49.7	55.6	0.9	Home Economics	6.5	44.5	0.1

any necessary qualifying criteria for pupils to take Leaving Cert. Home Economics and Biology, are unrealistic. Accordingly, if we assume that taking Inter. Cert. Home Economics and Inter. Cert. Science are, respectively, prerequisites for Leaving Cert. Home Economics and Biology, the true rates of choice, as shown in Table 5.10, would have to be altered. For Biology, these rates would be 49.2 per cent for boys and 75.5 per cent for girls. In other words, although the rate is unchanged for boys, the sex difference widens because of the large increase in the girls' rate. This indicates that not having taken Inter. Cert. Science is a deterrent when it comes to Biology for girls, but not for boys. This will be discussed more fully in Chapter 9, where we will see that achievement at Inter. Cert. is negatively related to Biology take-up among boys, and positively related among girls.[25] Of course, in Higher Maths, Physics and Chemistry we assume that, in general, only those who have attained the grade required by their school in Inter. Cert. Higher Maths and Science will be in a position to choose these subjects.

The Importance of Provision, Allocation and Choice and Sex Differences in these Factors

Having described our model of provision, allocation and choice, we will now examine the relative importance of the exclusionary factors we have isolated in determining rates of take-up, and the extent of the sex differences in the effects of these factors.

Earlier we noted that, of the factors labelled A to D in Figure 5.1 and Table 5.6, lack of school provision, A, and failure to meet academic criteria, D, appeared to be the most important. If we add to these the failure of pupils to choose the particular subject, these three factors together account for virtually all of the percentage of the sample excluded from taking any subject, as Table 5.11 shows. This is a reduced version of Table 5.6, and it shows us the relative

[25] In the case of Home Economics (Social and Scientific) none of the males taking this subject had taken Inter. Cert. Home Economics.

Table 5.11: *Percentage of each Sex Excluded from Subject due to Provision, Academic Requirements and Choice*

	Higher Maths		*Physics*		*Chemistry*		*Biology*		*History*		*Technical Drawing*		*Home Economics*	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
Provision (A)	8.1	17.0	19.6	67.4	19.8	23.4	8.8	0.3	18.0	7.6	53.9	82.9	76.8	6.6
Failure to meet academic requirements (D)	42.0	51.9	20.0	10.0	12.4	24.4	—	—	—	—	16.3	10.5	—	—
Failure to choose subject	23.8	17.1	25.2	15.9	31.2	33.9	39.3	38.4	48.6	60.5	8.6	1.1	18.9	47.4

significance, for any subject and within one sex, of these three exclusion factors. Since the percentages are relative, the importance of one factor is linked to that of another. Furthermore, it is not a good source of comparisons between the sexes. For example, although Table 5.11 allows us to compare the relative importance of choice as against other factors for boys' take-up, with its relative importance for girls' take-up, it tells us nothing of differences between the sexes in the true rates of choice. To do this we need to examine Table 5.10. Thus we see, for example, that although the role of choice in determining the take-up of TD is relatively slight for both sexes (from Table 5.11) there are, nevertheless, marked sex-differences in the true rate of choice of TD (from Table 5.10). For Chemistry, the importance of choice appears quite considerable and roughly equal for both sexes (Table 5.11) but, in fact, the true rate of choice (Table 5.10) again varies widely between them.

Table 5.11 shows fairly clearly that for subjects such as TD, Home Economics for boys and Physics for girls, provision factors are of major importance, while for Biology, History, boys' TD and girls' Home Economics, choice is crucial. In the case of Chemistry and boys' Physics provision, failure to meet academic criteria and choice are all important in excluding pupils from these subjects, with the latter, in all cases, accounting for the largest proportion of the loss. Finally, for Higher Maths, failure to meet academic criteria is, as we might expect, of greatest importance.

If we turn now to Table 5.12, we see the degree of sex difference in the effects of these three exclusionary factors. The sex difference in provision is the ratio of the percentage of boys in schools where the subject is provided, to the percentage of girls in schools where the subject is provided. The sex difference in meeting academic requirements is again a boy/girl ratio but this time of those in schools where the subject is provided who meet the academic requirements to take it. Finally, the sex difference in choice is the ratio of the boys' true rate of choice to that of the girls.

Table 5.12: *Sex Differences in Provision, Academic Requirements and Choice (Ratio of Boys/Girls)*

	Higher Maths	*Physics*	*Chemistry*	*Biology*	*History*	*TD*	*Home Economics*
Provision (A)	1.11	2.47	1.05	0.92	0.88	2.70	0.25
Academic Requirements (D)	1.86	2.14	1.28	—	—	6.26	—
True rate of Subject choice	2.83	3.19	1.58	0.89	1.13	6.33	0.15

In Table 5.12 a score of one indicates no sex difference, while a score greater than one shows a bias in favour of boys, a score of less than one a bias favouring girls. It can be seen that sex differences in the true rate of subject choice are greater than sex differences in either provision or in the meeting of academic requirements (with the single exception of History, where provision differences and true rate of choice differences are equal but operate in different directions — provision favouring girls, choice boys). A similar finding has been reported in England and Wales (Department of Education and Science, 1975) where the sex differences in the take-up of the Physical Sciences were greater than in their provision. Such a finding suggests that an increase in Science provision for girls would yield relatively low returns in terms of subject take-up unless girls' true rates of choice were to increase.

If we now examine Tables 5.11 and 5.12 together, we can see which exclusion factors are both important and show a clear sex bias. Thus, for example, while the sex differences in Biology provision are marked, in fact provision is relatively unimportant for both sexes in determining the percentage excluded from taking Biology (Table 5.11). But, provision is clearly sex biased and also important as a determinant of take-up rates in Physics, TD and Home Economics. Failure to qualify is both important and sex biased in Higher Maths, Physics and Chemistry. Finally, those subjects in which choice is important for both sexes and in which the rate of choice varies widely between them, are Higher Maths, Physics and Chemistry.

Some Possible Results of Intervention

Before going on to analyse both differential rates of choice and differential rates of subject provision, we want first to use Table 5.6 and the discussion of the foregoing section to examine some likely results of various forms of intervention aimed at narrowing the sex differences in take-up of those subjects in our analysis. So far we have identified three agents of exclusion from taking these subjects — these are (a) the lack of school provision; (b) pupils' failure to meet school academic criteria; (c) pupils' failure to choose the subject. Let us now examine the consequences of equalising rates between the sexes in each of these areas separately, by making girls' rates equal to boys' in Higher Maths, Physics, Chemistry and TD. We assume that, in doing this, all else is held constant. To give an example: suppose that in the case of Higher Maths, the percentage of girls in schools where this subject is not available was reduced from 17.0 per cent to 8.1 per cent — that is, equal to the boys' rate; then if the percentage of girls in schools where the subject is available but who fail to meet academic criteria remained constant and the percentage of girls who do meet the criteria and who choose Higher Maths also remained constant, the result would be that 77 girls or 3.96 per cent would, using our previous figures, take the subject. Conversely, if the true rate of choice of girls (shown in Table 5.10) could be made equal to that of boys, then, all other things being equal, 196 girls (10.1 per cent) would take the subject. This estimate is arrived at simply by multiplying the rate for boys in Table 5.10 (48.7 per cent) by the 402 girls who qualify to choose Higher Maths. Finally, if the proportion of girls who, although in schools where that subject is taught, do not qualify to choose it, were reduced from 1,008.5 out of 1,410.5 (71 per cent) to 46.9 per cent (the corresponding figure for boys) then all other things remaining unchanged, 114 girls or 5.9 per cent of the sample, would take Higher Maths. These estimates and comparable ones for Physics, Chemistry and TD are shown in Table 5.13. The results are fairly clear; as we would expect, it is in the area of the true rate of subject choice that equalisation would have the most impact, and, in addition, no one of these three strategies of intervention would serve to increase the percentage rate of take-up among girls to equal that of boys. The closest one comes to such equality is in Chemistry; if the girls' true rate of choice equalled that of boys, the gap in take-up by choice would be quite small.

Although the kind of exercise set out in Table 5.13 is quite useful in assessing the likely consequences of these different forms of intervention, it is somewhat simplistic. In particular, two assumptions on which it is based cannot be supposed to hold in reality. First, these different exclusion factors are probably not independent of each other, and secondly, rates of take-up of the two sexes are not independent of each other. To give an example of the former; if one takes the total number of girls doing Physics (70) and then examines Table 5.7 it can be seen that 20 schools offered Physics to girls in 1980–1981 and, of these, eight were single sex schools. If we examine the number taking Physics

Table 5.13: *Estimates of the number of Girls Choosing to take Certain Subjects under Three Possible Independent Forms of Intervention Assuming All else Remained Constant (Percentage of Sample in Parentheses)*

	Higher Maths		*Physics*		*Chemistry*		*Technical Drawing*	
(1) Equalising provision	76.5	(3.9)	151.6	(7.8)	261.0	(13.4)	5.4	(0.3)
(2) Equalising exclusion because of failure to meet criteria	113.8	(5.9)	69.3	(3.6)	318.1	(16.4)	12.5	(0.6)
(3) Equalising true rate of choice	195.8	(10.1)	196.1	(10.1)	395.0	(20.3)	12.7	(0.7)
(4) Actual take-up (girls)	69.0	(3.6)	61.5	(3.2)	249.5	(12.8)	2.0	(0.1)
(5) Actual take-up (boys)	381.0	(22.6)	477.0	(28.3)	405.0	(24.0)	195.5	(11.0)

in these schools, we find that these are extremely small. This suggests a certain favourableness on the part of the school management or administration in regard to Physics, in so far as they are willing to provide a subject for which there appears to be little demand. Conversely it may be that such low rates of take-up per school would, in fact, discourage other schools — particularly girls' schools — from adding Physics to the curriculum.

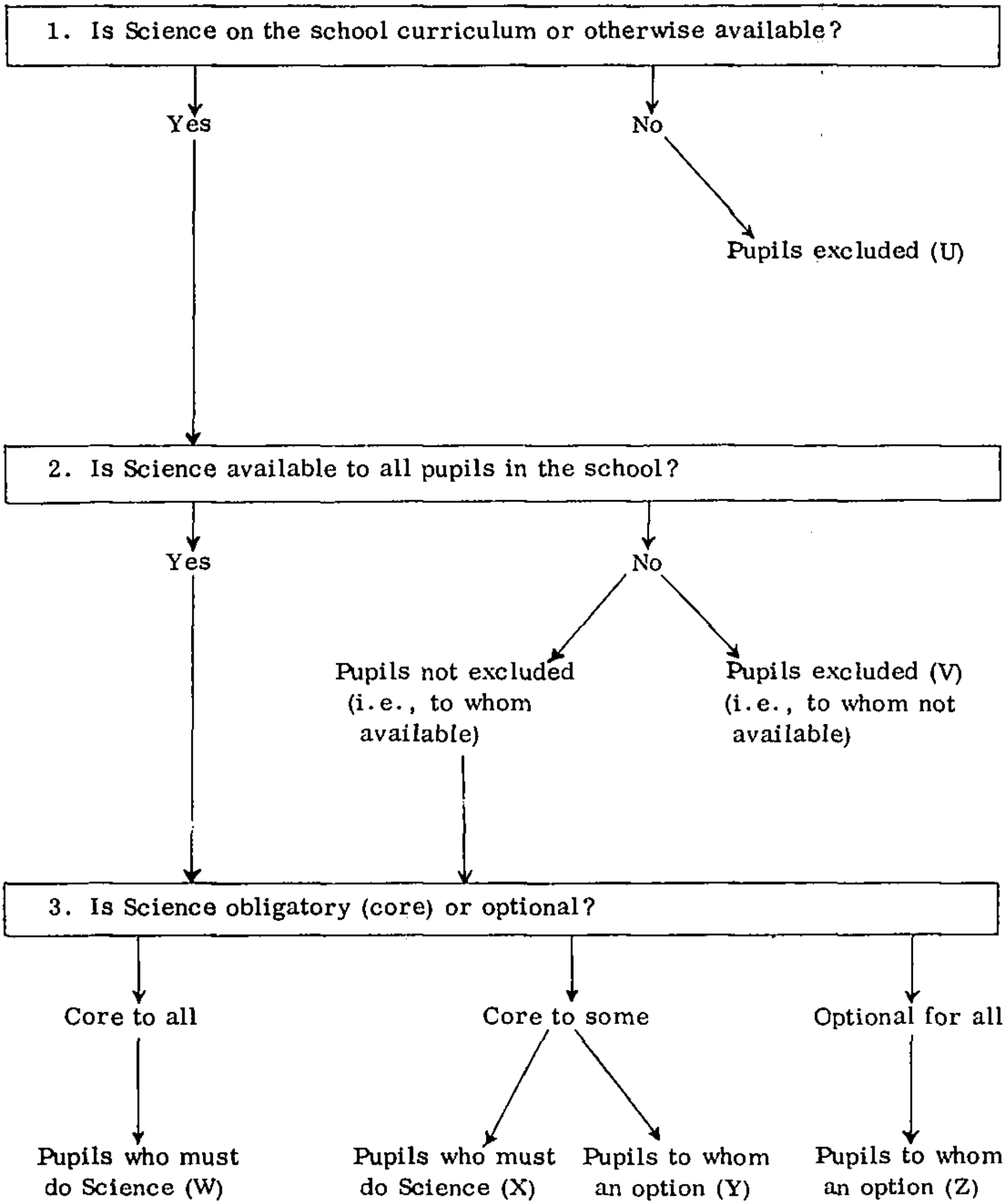
In the comparisons with boys' take-up given in Table 5.13, it was assumed that moves to increase girls' take-up would leave the former unaltered. This seems a debatable assumption, to say the least, when applied to coeducational schools. For example, in so far as increasing provision for girls in Higher Maths, Physics or Chemistry would mean introducing these subjects into coeducational schools that currently do not provide them, the likely main beneficiaries of this, given current patterns of choice and take-up, would be boys, and thus, the overall picture could show greater, not less, sex differences.

Despite these *caveats*, Tables 5.6 and 5.13 do show that girls are disadvantaged in the areas of school provision and in their exclusion because of a failure to meet academic requirements (which can, in turn, be traced back to the allocation of Inter. Cert. subjects), and that some measure of equalisation in both these respects would go some way to levelling up rates of take-up by the sexes. On the other hand, it is likely that neither of these courses of action, either taken singly or indeed together, would have a really marked effect on final rates of take-up unless there was some equalisation of the true rates of subject choice.

Intermediate Certificate Subjects

The method of analysing factors influencing the take-up rate of Inter. Cert. subjects closely follows that adopted for the Leaving Cert. Again, we shall be concerned with the relative significance of the three areas of provision, allocation and choice, and the specific model we shall use, shown in Figure 5.2, is based very closely on that developed for the Leaving Cert. analysis. It will be immediately evident, however, that this model is rather simpler. The initial question again concerns school provision. Using Science as our example we ask whether or not it is available in the school. The second question relates to allocation — to which pupils is Science made available — as does the third, which deals with the method of making the subject available, as either a core or optional subject. It will be noted that we have simplified our earlier distinction regarding the groups to which a subject is made available (to specific classes or specific sexes); this is because it did not always prove possible to carry out such a disaggregation at this level with the necessary degree of accuracy. We have also, of necessity, abandoned the question

Figure 5.2: *Flow Chart: Some Constraints on the Take-up of Inter Cert Science*



relating to academic qualifications attached to taking the subject. Again we have labelled groups of pupils according to their sources of exclusion from the subject (U and V) and the manner in which the subject is offered to them, as core (W and X) or option (Y and Z). Finally we must re-enter the qualification with which we prefaced our discussion of the Leaving Cert. analysis: this model represents the normative rather better than the substantive picture. In this case the chief source of error this introduces is in the numbers taking the subjects as core. As with the Leaving Cert. not all of those who formally must do a subject, in fact do. Again, however, the error this introduces is relatively slight.

Provision, Allocation and Choice

The results of the application of this model to the five Inter. Cert. subjects listed in Table 5.1 are shown in Table 5.14. This table, and all those in the rest of this chapter dealing with the Inter. Cert, is based on 91 out of the 95 schools in the sample. The four excluded schools either had no Inter. Cert. pupils in 1980-1981 (two cases) or information about the manner of subject allocation was not applicable (one case) or the school did not teach the Inter. Cert. course (one case). This gave a weighted sample size of 3,168 boys, 2,826 girls.[26]

As we noted earlier in the case of Leaving Cert. Higher Maths, the use of the term pupil "choice" in the taking of Inter. Cert. Higher Maths is somewhat questionable. Although choice presumably plays a part in determining the eventual rate of take-up, it would seem that, when compared with other subjects, the amount of additional constraint (not captured in Figures 5.1 or 5.2) on the pupil is markedly greater. In this case, then, in Figure 5.2, we have not distinguished between core and option in Inter. Cert. Higher Maths; rather we have entered the figure for the number of pupils to whom the subject is, formally, available. Similarly, the figure given as the number choosing Higher Maths must, in effect, be seen as the number taking it, whether out of choice or compulsion.

In examining Table 5.14 one distinction is immediately apparent; that is, between Mechanical Drawing (MD) and Home Economics on the one hand, and, Higher Maths, Science and Commerce on the other. In the former subjects there are very marked sex differences in school provision: the rates of exclusion, on this basis, for boys in Home Economics (63.4 per cent excluded) and girls in MD (66.9 per cent) are virtually equal. The patterns of provision of these two subjects, however, do not form mirror images. In particular, while

[26]In this case the sample was weighted not only to counteract the over-representation of community schools but also to adjust for the under-representation of schools with a large number of Inter. Cert. classes, where the classes were sampled according to the method described in Chapter 2.

Table 5.14: *Provision, Allocation and Choice Factors in the Take-Up of Five Inter Cert Subjects (Percentages of Total Sample Size in Parentheses)*

	Categorisation as in Figure 5.2	*Higher Maths*		*Science*		*Commerce*		*Mechanical Drawing*		*Home Economics*	
		Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
Total Sample:		3168	2826	3168	2826	3168	2826	3168	2826	3168	2826
Excluded because subject not on curriculum:	U	6 (0.2)	33 (1.2)	0	17 (0.6)	521 (16.4)	105 (3.7)	1179 (37.2)	1891 (66.9)	2007 (63.4)	43 (1.5)
Excluded because subject not allocated to these pupils:	V	470 (14.8)	473 (16.7)	0	366 (13.0)	558 (17.6)	77 (2.7)	127 (4.0)	545 (19.3)	713 (22.5)	0
Pupils who must take the subject:	W, X	2692 (85.0)	2320 (82.1)	2530 (79.9)	593 (21.0)	972 (30.7)	595 (21.1)	782 (24.7)	0	0	482 (17.1)
Pupils who may choose the subject:	Y, Z			634 (20.0)	1850 (65.6)	1117 (35.3)	2049 (72.5)	1080 (34.1)	390 (13.8)	448 (14.1)	2301 (81.4)
TOTAL:		3168 (100.0)	2826 (100.0)	3168 (99.9)	2826 (100.1)	3168 (100.0)	2826 (100.0)	3168 (100.0)	2826 (100.0)	3168 (100.0)	2826 (100.0)
Pupils choosing subject:		1428 (46.0)	916 (32.4)	464 (14.6)	1049 (37.1)	436 (13.8)	1232 (43.6)	741 (23.4)	39 (1.4)	10 (0.3)	1481 (52.4)
Total taking the subject:		1428 (46.0)	916 (32.4)	2950 (93.1)	1687 (59.7)	1401 (44.2)	1781 (63.0)	1503 (47.4)	45 (1.6)	24 (0.8)	1956 (69.2)

Home Economics is available to almost every girl in the sample, in MD provision factors exclude over one-third of boys. The difference is clearly due to the presence of Home Economics in all girls' schools, and the absence, for the most part, of MD in single sex boys' secondary schools. The distribution of the five subjects according to school sex-mix is given in Table 5.15. The percentage of girls not allocated MD is also roughly equal to the percentages of boys not allocated Home Economics. Overall, the pattern of take-up of these subjects by each sex seems to be a consequence of the distribution of these subjects over school types and their timetabling. In schools where the two subjects appear on the curriculum (i.e., in coeducational schools) there is, in general, either a formal (by making the subjects core to a specific sex) or tacitly assumed allocation of boys to MD and girls to Home Economics. In a number of schools it is impossible for a boy to take Home Economics (and a girl to take MD) because these subjects are simply not offered to these sexes and this is reflected in the sex imbalance in pupil allocation (V in Table 5.14); in other cases, because the two subjects are timetabled against each other, the formal offering of, say, Home Economics to a boy tends to require that he chooses not to do MD. As a consequence he will also be likely to be excluded from Woodwork and Metalwork, since schools generally require MD to be taken with either or both of these.

Table 5.15a: *Number of schools providing each of five Intermediate Certificate subjects by school sex-mix at Inter Cert (percentages of sample size in parentheses)*

	School Type		
	Boys'	*Girls'*	*Coeducational*
Sample size	26	23	42
Higher Maths	26	22	39
Science	26	22	42
Commerce	22	21	39
Mechanical Drawing	15	1	38
Home Economics	1	23	40

Turning to Commerce, Science and Higher Maths, only in the former is there a noticeable sex-difference in school provision (favouring girls) and even here it is far less marked than in the case of MD or Home Economics. In general, however, as Table 5.15 shows, there are very high rates of provision of Higher Maths, Science and Commerce in all three types of school. In both

Commerce and Science there are sex differences in the allocation of subjects to pupils within schools where these subjects are taught; in Science this favours boys, in Commerce girls. The net result of the equality of these two factors in the case of Higher Maths is that roughly equal percentages of boys and girls have, formally at any rate, Higher Maths open to them. On the other hand, in Science, all boys have the subject available to them while 86 per cent of girls are in a similar position. In Commerce, 93 per cent of girls have the subject available to them, compared with 66 per cent of boys. In Commerce this ratio of availability (93/66) is roughly equal to the ratio of percentages taking the subject (63/44). On the other hand, in Science the sex differences in overall take-up (59.7 per cent of girls as against 93.1 per cent of boys) are much greater than the net differences in availability. This can be accounted for by two factors; first, the differences in the percentages obliged to take the subject, and, secondly, differences in the "true rates of choice".[27]

As Table 5.16 shows, while for boys Science is overwhelmingly a core or obligatory subject, for girls it is overwhelmingly an option. As a result, we would expect that the rate of take-up for girls would be much lower than that for boys. However, the divergence between the sexes is increased by the lower

[27]The proportion in each sex who are in schools offering these five Inter. Cert. subjects to their sex are shown below, broken down by school type. It should be noted that this table and Table 5.8 in the text do not indicate the proportions of each sex who are actually offered the subject in each type of school. As we have attempted to show, there is a crucial difference between, for example, the number of girls in schools where Science is taught to girls and the number of girls given the opportunity to take science.

Table 5.15b: *Proportions of boys and girls in the Junior Cycle of Secondary, Vocational and Comunity/Comprehensive schools in schools offering Each of Five Inter. Cert. Subjects to their Sex*

	Secondary		*Vocational*		*Community/Comprehensive*	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
Higher Maths	.99	.95	.58	.81	.82	.89
Science A	.98	.92	.67	.57	.77	.85
Commerce	.94	.90	.38	.97	.98	.92
Mechanical Drawing	.60	.04	.99	.16	.97	.10
Home Economics	.06	.96	.22	.98	.49	.97

Source: Department of Education, *Statistical Report* 1979-80, pp 45-6.

As with the Senior Cycle Sciences, so in Higher Maths and Science vocational schools display the largest sex differences. In Commerce, however, this difference is particularly noteworthy, since Commerce shows little sex difference in the secondary and community sectors. In MD and Home Economics, secondary schools with the lowest levels of provision, show the most marked sex differences, but such differences are still very clear in the coeducational vocational and community comprehensive schools. As with the Leaving Cert. subjects, given that most of the vocational and community schools are coeducational, these sex differences must be attributed to allocation practices within schools. Unlike at Leaving Cert., however, where these arise indirectly, much of the Inter Cert. sex difference arises because one sex is not given the option of doing a particular subject. Indeed, we shall see later (as in Table 6.3) that, in many vocational schools, Inter. Cert. subjects are allocated specifically on the basis of sex.

true rate of choice of girls (shown in Table 5.17); that is, out of every 100 boys offered Science as an option, roughly 73, on average, choose to do it, as against 57 girls in comparable circumstances. One major reason for this difference in the true rate of choice is undoubtedly the manner in which the subject is offered to girls; specifically the kinds of subjects that they are being asked to choose Science in preference to. As an example, Table 5.18 shows the option packaging of Science in 12 single sex girls' schools. From this it can be seen that in six cases the pupils were asked to make a direct choice between Science or Home Economics, and in a further six cases Science was offered as an alternative to one or more subjects traditionally popular among girls. In other words, not only are boys generally obliged to take Science to Inter. Cert., but girls, if they wish to take Science, are being asked to choose it in preference to subjects traditionally popular among girls.

Table 5.16: *Ratio of those pupils to whom subject is core to those to whom subject is an option*

Subject	*Core/Option*	
	Boys	*Girls*
Science	3.99	0.32
Commerce	0.87	0.29
Mechanical Drawing	0.72	—
Home Economics	—	0.21

Table 5.17: *Of those pupils to whom subject is offered as option, percentage choosing to take it (true rate of choice)*

Subject	*Boys*	*Girls*
Science	73.19	56.70
Commerce	39.03	60.13
Mechanical Drawing	68.61	10.00
Home Economics	2.23	64.36

It is quite clear that these factors account for the differences in the percentages of boys and girls who fail to meet the academic criteria for Leaving Cert. Physics and Chemistry. For both these subjects we saw (in Table 5.9) that, of those who failed to meet the necessary criteria, a far higher proportion of girls than of boys had not taken Inter. Cert. Science. The findings of the preceding few paragraphs show why this is so. To emphasise the point, the differential treatment received by the sexes in access to, and the mode of offering Inter.

Cert. Science leads not simply to an imbalance in the take-up of that subject, but is a major cause of the imbalance in the take-up of Leaving Cert. Physics and Chemistry.

Table 5.18a: *Science Options in 12 Girls' Schools*

Science or	Number of Schools
Home Economics	6
Commerce	1
Commerce or Art or Mechanical Drawing	1
Home Economics or Commerce	1
Home Economics or Art or Commerce	1
Home Economics or Art or Commerce or Music	1
(3 from) Home Economics, German, Commerce, Art, French, Music, Latin	1

The broad difference between the sexes at Inter. Cert. in their freedom to choose subjects (as shown by Table 5.16) may be taken to be representative, at an aggregate level, of differences in the philosophy guiding boys' and girls' education. The principles underlying boys' education would appear to be far more specific than those underlying girls in the sense that boys are more likely to have less choice in their Inter. Cert. subjects than girls, and this in turn, suggests a conception of boys' education (as more instrumentally orientated, inculcating specific areas of knowledge, orientated to a practical end, that of a job or further education) not wholly applicable to girls.[28]

[28]While the relative absence of choice at Inter. Cert. among boys when compared with girls is one element in what appears to be a difference in the educational philosophy applied to the two sexes, there are other differences. In particular, boys' schools practice, on average, a more rigid streaming of their pupils, as Table 5.18b shows, and as this table also shows, they are, with the exception of vocational schools, most likely to use this streaming as a basis on which to allocate subjects to pupils (the higher score for vocational schools is probably the result of their greater heterogeneity of ability levels within the school).

Table 5.18b: *Percentages of schools of different types with streamed or banded Inter. Cert. classes 1978-9, and the percentage of such schools that allocate subjects to classes on the basis of banding or streaming*

*School Type**	*N*	*Streamed/ Banded*	*Different subjects offered to classes on this basis*
Boys'	24	70.8	82.4
Girls'	22	45.5	70.0
Coeducational Secondary	17	41.2	71.4
Coeducational Vocational	23	52.2	91.7
Coeducational Community/Comprehensive	9	44.4	75.0

*based on overall school sex-mix.

Sex Differences in Allocation

In MD and Home Economics, major factors giving rise to the sex discrepancies in overall take-up are the differences in school provision and differences in pupil allocation. So, even when boys find themselves in schools where Home Economics is taught, they are not likely to be offered the opportunity of taking it; the same holds, to a slightly lesser degree, for girls and MD.

The relative importance to each sex of exclusion on the basis of allocation of the subject can be seen in Table 5.19. In Higher Maths, for example, of those pupils who are in schools where this subject is offered, roughly equal percentages of each sex are excluded as a result of the lack of allocation of Higher Maths to pupils within the school. The other subjects fall into two groups — those where the allocation disadvantages girls (Science and MD) and those where it disadvantages boys (Commerce and Home Economics). We suggest that two principles underlie the allocation of subjects to pupils; these are, first, allocation according to ability level, and, secondly, allocation according to sex. That the latter will lead to sex differences in the rates of take-up of a subject is obvious; however, the former principle will also lead to this result in so far as it is applied differently in boys' and girls' schools. This is most marked in the case of Science. The 366 girls to whom Science is not allocated are overwhelmingly located in the lower streams of single sex schools. By contrast, however, boys in the lower streams of boys' schools are not excluded from Science in this way (in fact no boys are formally excluded from Science); so, the differential application between boys' and girls' schools of the first principle of allocation (according to ability level) is wholly responsible for the difference between the sexes in respect of Science, shown in Table 5.19.

Table 5.19: *Of those Pupils in Schools where Subject is Taught, Percentage of Each Sex Excluded by Allocation Rules*

	Males	*Females*	*Ratio Males/Females*
Higher Maths	14.9	16.9	0.88
Science	0	13.0	—
Commerce	21.1	2.8	7.54
MD	6.4	58.3	0.12
Home Economics	61.4	0	—

In the cases of MD and Home Economics, allocation according to sex is, as we pointed out earlier, the principle underlying the allocation of these subjects to pupils. For Commerce the situation appears to be the reverse of that for Science; that is, of the 558 boys excluded from Commerce on the basis of school allocation rules, 441 of these are in single sex schools. Thus, it appears that allocation according to ability level (with Commerce aimed primarily at moderate or weak ability pupils) within boys' schools is mainly responsible for excluding these pupils. This allocation of Commerce according to ability is not, however, found in girls' schools.

Provision, Allocation and Choice: A Summary

At this point it may be useful to summarise our findings about the relative importance of provision, allocation and choice in determining the different rates of take-up of the Inter. Cert. subjects in our analysis.

In the case of MD and Home Economics, although true rates of choice between the sexes differ widely, this is not very important in contributing to the sex differences in overall take-up. This is because, in these subjects, the major factors giving rise to the sex differences in take-up are school provision and subject allocation. In Science the sex difference in take-up is due in some part to differences in the true rate of choice (Table 5.17) but for the most part to differences in allocation: more girls than boys are entirely excluded from the subject, and fewer girls than boys are obliged to take it.

In Commerce the sex differences in overall take-up rates are the net result of the operation of four factors, three favouring girls, one favouring boys. Subject provision, true rates of choice and allocation practices (in the sense of the exclusion of pupils from the subject) all favour girls, while allocation practices in the sense of whether pupils are obliged to take the subject or not, favour boys.

In Higher Maths the sex difference in take-up is due to one factor, namely, the discrepancy in the percentages of those to whom the subject is available who actually take it. If "choice" were an appropriate word to use in the case of Higher Maths, we should call this the sex difference in the true rate of choice (53.05 per cent for boys, 39.48 per cent for girls). In all other respects — provision and allocation — sex differences here are minimal. Since we have argued that the scope for pupil choice is limited in the case of Inter. Cert. Higher Maths, decisions made by the school authorities — Principals or teachers — must bear a large share of the responsibility for the sex differences in take-up rates. One plausible suggestion as to why 53 per cent of "eligible" boys take Higher Maths, as against 39 per cent of girls, is that the instrumental, job-seeking orientation of the school, associated with boys' rather than girls' schools, is responsible. Given this orientation, high ability boys are obliged to take the Higher level course. Where such an orientation is absent — as seems to be true of girls' schools — the compulsion to take the Higher course is lacking.

Some Possible Results of Intervention

Table 5.20 shows some estimates of the results of carrying out various forms of intervention in order to equalise the rates of take-up of each sex of the four subjects shown. The same assumptions apply here as to our earlier Leaving Cert. estimates; chiefly this means that we assume each equalisation in a specific area is undertaken holding all else constant. Table 5.20 splits into two halves; the results for Science and Mechanical Drawing give estimates of the percentages of girls that would be expected to take the subjects if their rates in each of the four intervention strategies were made equal to those of boys. For Commerce and Home Economics the figures are for boys, under an assumption of an equalisation of their rates to those of girls. In other words, for the four subjects we are presenting estimates for that sex which is currently under-represented in take-up. Two cells of the table are empty, these are for Science under strategy (a) (equalising rates of provision) and for Commerce under strategy (c). In the former case the strategy would have no appreciable effect (since rates of school provision by sex are virtually equal), while in the latter case strategy (c) would decrease the percentage of boys taking the subject, since in this one respect in Commerce boys are at an advantage.

In strategies (a) and (b) we have assumed that the pupils who are, under our estimates, not now excluded, (that is who, under the equalisation are now given access to the subject) would be offered the subject as an option, not as core. Had we assumed that some or all would be offered the subject as core then, of course, our estimate of the percentage taking the subject would have increased accordingly. Strategy (c) is somewhat cryptically explained in Table 5.20; more fully what we did was to equalise between the sexes the ratio (shown in Table 5.16):

$$\frac{\text{Pupils offered subject as core}}{\text{Pupils offered subject as option}}$$

Thus, for Science and MD we set the girls' score on this ratio equal to the boys', and vice versa for Commerce and Home Economics.

Turning to the results of this exercise we can see that, first, correction in those areas of greatest discrepancy yields the best improvement in rates of take-up, as we should expect. Thus, for example, in the case of Commerce the disadvantages suffered by boys in provision, allocation and true rate of choice are approximately equal and thus corrective measures in any one area yield an equivalent result. In Science the largest sex difference is in the core/option ratio and corrective action here yields the greatest increase in take-up. Again, however, we should bear in mind the distinction we drew earlier in discussing the Leaving Cert., between the areas that show the largest sex differences and the areas that account for the largest attrition among the sample.

Table 5.20: *Some Possible Results of Independent Forms of Intervention: Four Inter. Cert. Subjects*

	Estimates of overall rate of take-up (as percentage of sample) that would result from (a) – (d)			
	Girls		*Boys*	
Intervention	*Science*	*MD*	*Commerce*	*Home Economics*
(a) Equalising rates of provision	—	4.35	49.44	1.69
(b) Equalising rates of pupil exclusion	65.45	2.90	50.28	0.82
(c) Equalising distribution of pupils across option/core distinction	78.96	6.60	—	2.68
(d) Equalising true rates of choice	68.91	9.50	51.9	9.1
Current rate of take-up:				
Boys	93.1	47.4	44.2	0.8
Girls	59.7	1.6	63.0	69.2

(See text for a full explanation of estimates.)

So, in MD and Home Economics the greatest sex differences are in true rates of take-up but the provision and allocation factors account for the vast majority of attrition among both sexes.

Secondly, we see that no single strategy serves to close the gap between the sexes fully; again we should have expected this from Table 5.14. However, in regard to Science we can point to an interesting contrast with the Leaving Cert. subjects we analysed in Table 5.13. In the case of Inter. Cert. MD and Home Economics it is clear that any combination of strategies that does not include an improvement in, respectively, girls' and boys' true rates of choice, will have little impact on narrowing the sex differences in overall take-up. Earlier we noted much the same with reference to Leaving Cert. Higher Maths, Physics, Chemistry and TD. In contrast to these subjects, Science take-up rates could be virtually equalised without any "alteration" of true-rates of choice. By applying strategies (a), (b) and (c) simultaneously, the take-up rate for girls would rise to 91.3 per cent even assuming their true rate of choice remained constant.

This leads to a final point in regard to these estimates and those for the Leaving Cert. The sex difference in true rates of choice is, for most of the subjects we have been examining, a crucial cause of the overall sex differences in rates of take-up, and any equalisation of these latter rates will, with the one exception alluded to, either require the equalisation of these true rates or, as an alternative which we have not yet examined, some compensatory action. One possibility is that the generally lower true rates of choice of girls might be compensated for by making the subject obligatory to a larger proportion of girls than boys. Such a course of action would be far more feasible at Inter. than Leaving Cert., since in the latter the importance of obligation in the taking of subjects is minor. Furthermore, as Table 5.16 showed, in the ratio of pupils taking Science or Commerce as core to those taking them as options, there is already an imbalance favouring boys. If this imbalance were reversed (i.e., not simply removed by equalisation) then, in the case of Science, female rates of overall take-up would be considerably closer to those of boys.[29]

The need for such a compensatory strategy would arise, of course, because of the apparent intractability of the problem of equalising true rates of choice. While there are clearly obstacles to equalising rates of provision (chiefly financial) and to equalising rates of allocation (chiefly organisational or logistic) these are, in some sense, more concrete and easily apprehended than the obstacles to equalising true rates of choice. Such obstacles are largely attitudinal, and any radical solution to the problem must take us beyond the formal organisation of the school, and indeed, beyond the school itself. In Chapter 9 we shall discuss some of the pupil characteristics that lead to the different rates of true choice between the sexes, and, even if we cannot, as a result, suggest a clear-cut strategy for equalising these rates, we shall, one hopes, have a better idea of their causes.

Leaving Cert. and Inter. Cert.: Some Comparisons

To conclude this chapter, then, we shall draw some broad comparisons between Leaving and Inter. Cert. in the role of provision, allocation and choice factors in determining overall rates of subject take-up.

We have already discussed the role of Inter. Cert. take-up in determining, in part, Leaving Cert. take-up. The nature of the links between, for example, Inter. Cert. and Leaving Cert. Higher Maths; Inter. Cert. Science and Leaving Cert. Physics or Chemistry; MD and TD, are such that the take-up of the

[29]It is important to note, however, that in regard to the estimated effects of changes in provision rates, etc., and the feasibility of various strategies aimed at increasing female rates of Science subject take-up, possibly by reducing the present freedom of girls to choose their subjects, we are not making any recommendations that these courses of action should be pursued. We are simply presenting suggestions as to what, if such ends are considered desirable, might be done to attain them.

Leaving Cert. subject can be seen to be partly composed of a consequence of the sex differences in take-up of the Inter. Cert. subject and partly of sex differences (for example, in provision and allocation) that are independent of the Inter. Cert. position. We may thus see sex differences as partly cumulative, and it is not, therefore, surprising that these are wider in the senior cycle than the lower.

Except for MD and Home Economics, of the subjects we have examined; provision differences between the sexes tend to be less at Inter. than Leaving Cert. This is no doubt due to the smaller number of Inter. Cert. subjects and the smaller degree of variation in the range of Inter. Cert. subjects taught by different schools. Inter. Cert. provides much more of a core course (though this is truer for boys than girls) than Leaving Cert., which permits greater specialisation. As a consequence, the role of pupil choice is far less important at the Inter. Cert. level (though again this is truer for boys than girls) and much more emphasis is placed on the role played by the school in its allocation of the subject, either through excluding pupils from it or obliging them to take it. This suggests (and a comparison of Tables 5.13 and 5.20 would tend to support this) that inducing changes in the overall rates of take-up by manipulating school allocation policies will be more feasible at the Inter. than the Leaving Cert.

Conclusions and Summary of Findings

To attempt to summarise the total content of the foregoing chapter would be unrealistic; in this conclusion we seek to draw attention only to the main findings of the chapter and to those which will prove relevant to the discussions in subsequent chapters.

1. In examining national rates of subject take-up according to sex, we distinguished between

   (i) those subjects where the direction of the sex bias in take-up was constant across all three types of school but varied in strength;
   (ii) those subjects where the direction of the sex bias varied according to school type.

Both these findings constitute prima facie evidence to suggest that schools themselves must take some responsibility for the overall sex differences in the take-up of subjects which they teach.

2. We outlined three major factors which determine the numbers of pupils of each sex taking a given subject. These we termed (*a*) Provision;

(*b*) Allocation; and (*c*) Choice. Provision relates to whether or not the school teaches the subject, allocation to the manner in which the subject is allocated to pupils within the school; and choice refers to the individual choices of pupils as to whether or not to take subjects which they are offered. Provision and allocation are thus factors directly under the control of the school itself, whereas choice is predominantly a pupil factor.

Since our interest is in sex differences in take-up, we incorporated these three factors into a model in order to assess the relative importance of each for pupils of both sexes. We applied this model to a set of seven Leaving Certificate and five Inter Certificate subjects in our subsequent analyses.

3. Leaving Cert. findings:

(i) There are major differences between the sexes in the level of provision to pupils of Physics, the Technical Subjects, and, to a lesser extent, Higher Maths (in all these cases boys are better provided for than girls) and of Home Economics (provision here favouring girls).

(ii) There are also important sex differences in the way in which subjects are allocated to pupils within schools. In the case of the Leaving Cert. Sciences (except Biology) and the Leaving Cert. Technical subjects, the disadvantages suffered by girls in allocation are very largely due to their failure to meet the academic requirements established by the school for these subjects, because they have not taken the Inter. Cert. counterpart of the subject — for example, they have not taken Inter. Cert. Science and, therefore, cannot opt for Leaving Cert. Physics. A consequence of this is, in general, boys have a much wider choice of Leaving Certificate subjects. This difference comes about largely for two reasons. In the case of Inter. Cert. Science, almost all boys are required to take it, whereas, although almost all girls may take it if they wish, it is presented to them as an optional subject, and frequently must be chosen in preference to traditional "girls'" subjects such as Home Economics. This practice leads to an early exclusion of girls from the Sciences. On the other hand, in the case of a subject like MD (which is a prerequisite for Leaving Certificate TD) a large proportion of girls who are in schools where the subject is taught are not offered it (they are usually required to take a subject like Home Economics instead) and where they are, it is, like Science, often placed as an option against subjects such as Home Economics and Commerce, Art or Music.

(iii) In the final stage of our model we looked at the rates of subject choice among those pupils who were in schools where the particular subject was taught and who were allocated the subject as an option. Here we found that what we termed the "true rate of subject choice" showed very pronounced sex differences, such that Higher Maths, Physics, Chemistry and TD had much higher rates of choice among boys than girls, and Home Economics had a much higher rate of choice among girls (although it should be pointed out that the numbers of boys in a position to choose Home Economics and the numbers of girls able to choose TD were very small).

(iv) Although there are differences between the sexes in provision and allocation in the subjects we analysed, these differences are, in six out of our seven Leaving Certificate subjects, less than the sex differences in the true rate of choice. In other words, the sex difference in pupils' own choices was greater than in either the provision or allocation of subjects to them. This finding suggests that simply increasing the provision or allocation of a subject to whichever sex currently shows the lower rate of take-up will not automatically lead to a substantial reduction in the sex differences in take-up. Our estimates, while rather crude, suggested that the success (in terms of increasing female take-up of subjects like the Leaving Cert. Sciences) of policies of increased provision and allocation to girls depends, crucially, upon an increase in the number of girls who, when given the opportunity, actually choose these subjects.

4. Inter Cert findings:

(i) Among the five Inter Cert subjects we analysed, differences in provision were of major consequence only in the cases of MD and Home Economics.

(ii) While the importance of provision differences is, overall, less at Inter. than at Leaving Certificate level, the role of school allocation policies is probably more important than at the higher level. There are sex differences in the allocation of both Home Economics and MD to pupils, and in the allocation of Commerce and Science. In the case of Commerce, boys are less favourably placed than girls, in that the subject is not made available to a large number of boys who are in schools where it is taught. We suggested that this was due, in large part, to the fact that high ability boys in boys' single sex schools are not given the chance of taking Commerce. In the case of Science, as we saw, it is core for most boys but optional for most girls. In addition, it tends not to be offered at all to low ability girls, whereas it is offered (and is often obligatory) for low ability boys.

(iii) At Inter Cert. pupil choice is a less significant factor in determining the overall rate of subject take-up than it is at Leaving Cert. (though there are sex differences in the true rates of choice of all the subjects we examined). Only in Higher Maths did choice appear to be the most sex-biased process in the take-up of the subject, and we entered a number of caveats about the use of the term choice in this context. It was argued that the higher rate of choice here among boys may well have less to do with pupils' own choices than with the choices made for them in schools. Boys are more likely to be required to take Higher Maths because, we suggested, boys' education, in general, tends to be more instrumentally orientated towards the labour market that is girls'.

(iv) Finally, these sex differences in take-up at Inter Cert have clear consequences for future Leaving Certificate choices. Because choice is less important at Inter. Cert., however, more could be done to reduce existing sex differences in take-up by adjusting provision and allocation factors.

The results of this chapter provide us with guidelines that our analysis will follow in the two subsequent chapters. In the next two chapters we shall look at school factors influencing Leaving Cert. curricular provision. In Chapter 9 we shall turn to an examination of pupil characteristics associated with the choice of particular Leaving Cert. subjects.

CHAPTER 6

Subject Provision: Differences between Schools

In chapter 5 we presented a model to account for the overall rates of take-up of subjects in terms of three major factors, which we labelled Provision, Allocation and Choice, and we examined the relative importance of these factors. In this chapter we shall concentrate on the first of these, namely subject provision. We begin by examining the broad differences in subject provision at Inter. and Leaving Cert. levels between the different types of school. Then, in the bulk of the chapter, we develop a model to explain what factors lead to variations between schools in the kind of curriculum they teach. We shall attempt to discover why, for example, some schools have curricula rich in Science subjects while others concentrate on, say, Technical subjects. Similarly, we seek an explanation of the fact that some schools concentrate their teaching resources in one area of the curriculum while others spread their resources over a number of subject areas. In answering these questions we shall be chiefly concerned to assess the relative weight to be given to what we call external constraints — that is, factors outside the direct control of schools themselves — as against decisions and policies of school management (broadly defined) in the shaping of a school's curriculum.

Curricular Variation

In Tables 6.1 and 6.2, the schools in our sample have each been placed in one of five categories — boys', girls' or coeducational secondary schools; vocational schools (almost all coeducational), and community/comprehensive schools — again almost all coeducational. In Table 6.1 we see the percentage of schools in each of these categories offering certain Inter. Cert. subjects: in 6.2 the same is done for Leaving Cert. subjects. These figures may be compared with the percentages for all sample schools, given in the first column of each table. We used our sample figures rather than the available published data in the Department of Education's *Statistical Report* because the latter makes no distinction between the three types of secondary school (boys', girls' and coeducational). On the other hand, the number of schools of each type in Tables 6.1 and 6.2 is, in some cases, quite small. Thus, one should not attach

Table 6.1: *Percentage of Schools Offering Certain Inter. Cert. Subjects*

	Secondary Schools				Vocational Schools	Community/ Comprehensive Schools
	Total	*Boys'*	*Girls'*	*Coed*		
No. of Cases	93	20	20	16	25	12
Higher Maths	96	100	100	100	84	100
Science	99	100	100	100	96	100
Commerce	89	95	85	81	88	100
MD	59	50	0	63	96	92
Woodwork	55	25	0	69	96	92
Metalwork	37	0	0	13	84	92
French	97	100	100	94	92	100
German	19	15	50	6	0	33
Spanish	15	15	40	13	0	8
Home Economics	71	0	100	81	92	83
Art	70	50	90	75	52	100
Music	53	45	85	69	12	75

too much weight to small percentage differences in provision. Rather, we shall focus on the major differences between school types.*

What is perhaps most striking about the Inter. Cert. curricula of schools, as shown in Table 6.1, is the high degree of similarity between them. This stems, in large part, from the existence of a number of subjects which the Department of Education obliges schools to provide in the junior cycle. However, outside these subjects, there are some important differences between school types.

(i) In the provision of Technical subjects, the vocational and community/comprehensive schools have the highest levels of provision. There is some provision of these subjects in boys' and coed secondary schools, but they are absent from girls' secondary schools.

(ii) While French is found in almost all schools in our sample, it is clear from Table 6.1 that a second or even third language on the curriculum is likely only in girls' secondary schools and in some of the community/comprehensive schools.

(iii) Home Economics has a high level of provision in all school types except boys' secondary schools, where it is entirely absent. Art is represented on the curricula of quite a high percentage of all school types. Music

*Appendix Tables 6A.1 and 6A.2 contain details of subject provision in the three school types for boys and girls. However, these tables do not allow us to distinguish between school provision and school subject allocation policies.

Table 6.2: *Percentages of Schools Offering Certain Leaving Cert. Subjects*

	Secondary Schools					*Community/*
	Total	*Boys'*	*Girls'*	*Coed*	*Vocational Schools*	*Comprehensive Schools*
No. of Cases	90	20	20	17	23	10
Sciences:						
Higher Maths	77	100	85	76	39	100
Physics	64	90	60	65	35	90
Chemistry	62	90	90	53	9	90
Biology	81	75	100	100	96	90
Applied Maths	12	30	0	24	0	10
Physics and Chemistry	10	15	0	18	9	10
Commerce:						
Accounting	63	70	55	76	52	70
Business Organisation	72	75	80	76	57	80
Technical:						
TD	48	20	0	47	91	10
Building Construction	38	10	0	24	78	10
Engineering W-Shop	31	0	0	6	83	80
Languages:						
French	93	100	100	94	83	90
German	26	20	55	29	0	30
Spanish	21	15	55	12	4	20
Accomplishment:						
Home Economics (Gen)	44	0	65	41	61	60
Home Economics (S & S)	56	10	100	65	48	60
Art	59	60	75	59	35	80
Music	20	5	50	29	0	20
History	86	100	100	94	52	90
Geography	88	100	100	100	52	100

is somewhat less likely to be on a school's curriculum, and is unlikely to be found in vocational schools.

Overall, it is clear that the major curricular differences here lie between the vocational and the various secondary schools, and that the community/comprehensive schools have very broad curricula with above average levels of provision in virtually all areas.

Turning now to Leaving Cert. provision (Table 6.2), what is immediately striking is the much greater curricular variation between schools than was present at Inter. Cert. Although there are certain areas and subjects which display relatively little difference in provision levels between school types (for example, Biology, French and the Commerce subjects), there are certain areas in which major differences occur.

(i) The highest levels of Science subject provision are found in boys' secondary and community/comprehensive schools. Although almost all vocational schools teach Biology, they have the lowest overall level of Science provision.
(ii) As at Inter. Cert., the Technical subjects are most strongly represented in the vocational and community/comprehensive schools, and are absent from girls' secondary schools. Furthermore, provision levels in this area are rather higher in coeducational secondary than in boys' secondary schools.
(iii) As at Inter. Cert., the provision of a second or even a third Language is most common in girls' secondary schools.
(iv) Most schools, except boys' secondary schools, teach one or both of the Home Economics subjects. Provision of Art is roughly constant across the school types (with some tendency for it to be less common in vocational schools) while boys' schools and vocational schools have very low levels of Music provision.

Again, as we noted in discussing Inter. Cert. provision, the major differences lie between the three types of secondary and the vocational schools: the community/comprehensive schools have average or above average levels of provision of most subjects. It is important to bear in mind, however, that schools vary widely in respect of factors such as size (for example almost 40 per cent of vocational schools have less than 200 pupils while 90 per cent of community/comprehensive schools have over 300 pupils) which have an influence on the curriculum taught.

Of course, as we illustrated in the previous chapter, the presence of a subject on the curriculum does not ensure that all pupils will be given the opportunity of taking it; school allocation processes will intervene. In the case of some coeducational schools, there are *de facto* distinctions between the sexes in the subjects they are allowed to take at Inter. Cert., and the resulting sex specific patterns of take-up have consequences for Leaving Cert. subject take-up, as we showed in the previous chapter. Table 6.3 shows the percentages of coeducational schools making distinctions between the sexes in regard to the availability of different subjects. It can be seen that over three-quarters of vocational schools and almost two-thirds of community schools make some form of distinction on this basis. The difference between the vocational and community/comprehensive schools, on the one hand, and the secondary schools on the other, is statistically significant.

Table 6.3: *Percentage of Coeducational Schools Making Distinctions Between the Sexes in Subject Allocation*

		N
Secondary Coeducational	41	(17)
Vocational	78	(23)
Community/Comprehensive	67	(9)

In general, as we have seen, these formal distinctions are operative at the junior rather than the senior cycle, though they have consequences for the latter and ensure an almost equally rigid separation of the sexes in subjects taken. For the most part these distinctions involve girls being allocated to Accomplishment/Home Economics courses, while boys are allocated to Technical courses. A very clear example of these sex specific allocation policies can be found in the vocational sector (though sex-based allocation policies are also found in the secondary and community/comprehensive sectors, as Table 6.3 shows). According to the Department of Education *Statistical Report* 1979-80, there are 246 vocational schools (p.76); at Inter. Cert. level 219 vocational schools contain girls and 232 contain boys (pp. 41-2), implying that there are, in total, 208 coeducational, 11 girls' and 24 boys' vocational schools. There are, in all, 216 vocational schools offering Inter. Cert. Home Economics to girls. Assuming it is offered in all 11 girls' vocational schools, this leaves 205 coeducational or boys' schools in which it is taught, and yet it is offered to boys in only 46 of these schools. The clear conclusion is that, although boys in vocational schools are almost all in schools teaching Home Economics, it is very seldom made available to them. The opposite situation holds for Mechanical Drawing, which is taught in 230 vocational schools. Assuming it is taught in all boys' vocational schools, this leaves 206 coeducational or girls' vocational schools where it is taught. Yet, only 31 vocational schools offer Mechanical Drawing to girls. In Appendix 6A we present the national figures for all Inter. and Leaving Cert. subjects, showing sex differences in both provision and allocation. The picture these tables present is much as we might expect, with boys being better placed to take Scientific and Technical subjects, girls advantaged in the Modern Languages and the Arts and Home Economics subjects. Commerce subjects are roughly equally provided/allocated to both sexes, except for Economics, which favours boys.

The School as an Organisation

Having briefly examined the differences in rates of subject provision according to school sector, we shall now attempt to explain provision differences between individual schools. In this section we begin by setting out our conceptual framework.

The kinds of subjects that a school offers and the way it allocates these subjects to its pupils, can be seen as indicative of at least some of the objectives of the individual school's policymakers.[30] The Department of Education lays down certain regulations that bear directly on the type of curriculum taught at Leaving Cert. However, within these very broad constraints (and some others which we will later identify) Principals or school managers or Boards of Management — particularly those in secondary schools — have considerable discretion in developing a school's curriculum.

What we shall attempt to show in this section of the paper is the extent of this discretion and the way in which the decisions of school management, rather than external constraints, are responsible for curricular differences between schools. The framework we adopt in our study of the school broadly follows the organisational approach of Child (1972).

In the study of organisations, emphasis has frequently been placed on the role of environmental variables in determining organisational structure and on the role of both in determining organisational effectiveness or level of performance. The relative importance, in this respect, of these two sets of variables — environmental and structural — in determining effectiveness has been the subject of much debate, some researchers having found environmental variables to be of primary importance, others structural factors.

Child (1972) has presented a general critique of those approaches that view organisational structure as contingent upon what he calls "contextual" variables; that is situational factors that impose "certain, primarily economic" (1972, p. 2) constraints on structure. He discusses, as contextual variables, environment, technology and size. He argues that such approaches ignore the crucial role of "dominant coalitions" or decision-makers within organisations. Such power holders mediate in the relationship between contextual and structural factors; they interpret and define external constraints, rather than the constraints impinging directly on the organisation. Such constraints are not given, so much as recognised.

For example, many schools — particularly the private secondary schools — define their effective working environment (who are accepted as pupils,

[30]In the literature on organisational sociology, the distinction is usually drawn between goals as the officially stated rationalisation of what the organisation is trying to do, and objectives, that is, what it can be seen to be trying to achieve in its day-to-day activities. (Perrow 1961; see also Hall, 1972; pp. 79-103). Our concern is with the latter.

which social groups are chosen as the "market" etc.). They also determine their "teaching technology" — the kind of teachers employed, the categorisation of pupil "raw material" and how that "raw material" is handled; for example, whether or not classes are streamed and which classes are allowed to take which subjects.

These "decisions", however, may have been made a long time ago, the school organisation continuing in present channels with objectives and working practices which have remained unchanged, unchallenged and unproblematic; the current "power holders" merely seeing to it that the "machine" is effectively oiled and greased. The extent to which a school is so characterised in circumstances where the external environment, its own "market" and "educational technology" in general have changed considerably, indicates the dimensions of organisational adaptability and effectiveness.

Child's approach is thus valuable in so far as it draws our attention to the role of decision makers both within the structure of the organisation and in coping with external influences and identifying constraints. Child claims that the structure of any organisation, the formal social arrangements instituted — the division of labour, the allocation of work roles, and administrative mechanisms employed to direct, integrate and co-ordinate workers and work processes to achieve objectives, and the arrangements instituted to develop and maintain the commitment of workers to these objectives and to the organisation, as well as the processes of evaluation, feedback and sanctioning — are functions of strategic managerial choices, not of environmental or technological imperatives.

Aldrich and Pfeffer (1976) call this view of organisations "the resource-dependence model". This approach concedes that many courses of action may be compatible with organisational efficiency or survival, in contrast to a "natural selection" model which posits a deterministic relationship between environment and organisation. The resource-dependence approach thus focuses on the question of choice between alternative courses of action. In Aldrich and Pfeffer's (1976, p. 84) terms, it

> calls attention to the importance of environmental contingencies and constraints, at the same time leaving room for the operation of strategic choice on the part of organizational members.[31]

An approach such as this allows for the possibility that environmental effects

[31]As Wood (1979, 1980) has pointed out, however, this approach begs the question of how these decisions are made — in other words, the politics of decisionmaking within organisations. A further related weakness lies in the reliance of such studies on normative data (see, for example, Argyris, 1972, p. 2) rather than substantive.

may be more or less constraining, leaving varying degrees of freedom within which decisions about organisational structure, policies and goals can be made.

In Ireland there is, as we have seen in Chapter 4, what might be termed a loose articulation of the Department of Education/individual school link, in regard to school aims and their implementation. The Department sets rather broad parameters within which schools have considerable freedom to choose between alternative courses of action. A similar relationship is noted in the USA by Bidwell (1965, p. 1009-10) in his discussion of the school district/individual school relationship and by Meyer and Rowan (1978, p. 83). This loose articulation leads, in the Irish case, to some considerable autonomy in establishing specific objectives and in implementing them, for either the school or an intervening body that acts as an objective setting agency (for example, a religious order or a VEC).

This is not to argue, however, that the individual Principal or Manager of a school can add subjects almost at will. Our argument is that, to a large extent, the curriculum which a school possesses at any particular time must be regarded as the cumulation of decisions made by Principals, Managers or Boards of Management in the recent past, only some of which are determined by external constraints.

"School-effectiveness" Studies

Much of the analysis of schools and aspects of their organisation, as well as comparative studies of schools or school types, has measured "school outcomes" in terms of pupil performance in standardised tests (Coleman *et al.* 1966; Jencks *et al.*, 1972; Bidwell and Kasarda 1975) or in national exams (Rutter *et al.*, 1979;[32] Madaus, Airasian and Kelleghan 1980; Madaus, Kelleghan, Rakow and King 1979; Halsey, Heath and Ridge 1980; Kelleghan, Madaus and Rakow 1979). Our central interest, on the other hand, lies not so much in these kinds of measures as in explaining sex differences in curricular provision and in subject choice by pupils within the constraints of the school. Thus, for example, we shall be interested less in sex differences in subject performance and more in sex differences in subject take-up. Nevertheless, it is informative to examine the findings that have been arrived at in these earlier studies.

In their review of the literature on school effectiveness studies, Madaus, Airasian and Kelleghan (1980; ch 4) conclude that basic physical features of the school, such as characteristics of the teaching staff, time devoted to

[32]Rutter *et al.*, (1979; pp. 47-49) in fact use several measures of "outcome" in addition to examination results. These include attendance, level of delinquency and ex-pupils' employment one year after leaving school.

subjects, and level of physical facilities, have explained little of the variance between schools in student performance. They conclude that the ability level of the pupil intake and measures of process (such as clarity of teacher presentation, degree of parental support, pupils' attitudes to specific subjects) have shown themselves better able to explain this variance. As they note:

> What people do with their resources and facilities is likely to be more critical for student achievement than the mere presence of the resources and facilities (Madaus *et al.*, 1980, p. 103).

Again, the suggestion appears to be that, within broad constraints, management decisions about the deploying and utilisation of resources are crucial in determining school effectiveness.

Rutter *et al.* (1979) lend support to the findings of Madaus *et al.*. In this study, outcomes were measured in terms of attendance, pupil behaviour and delinquency as well as student performance. Neither pure physical factors (such as school size, age of buildings and so forth) nor "broad differences in administrative status or organisation" (Rutter *et al.*, 1979, p. 178) were found to relate to differences in outcome between schools. However, both school intake and social institutional characteristics of the school were found to be of importance. These latter included

> the degree of academic emphasis, teacher action in lessons, the availability of incentives and rewards, good conditions for pupils and the extent to which children were able to take responsibility (1979, p. 178).

And they note:

> All of these factors were open to modification by the staff, rather than fixed by external constraints (1979, p. 178).

Interestingly, however, Rutter *et al.*, also claim that the cumulative effect of these factors, being considerably greater than the sum of their individual effects, suggests that in combination they create "a particular ethos, or set of values, attitudes and behaviour . . . characteristic of the school as a whole" (1979, p. 179).

In addition to the findings of Rutter *et al.*, there is evidence from elsewhere that a variable one might call "school climate" or "ethos", defined much as Rutter *et al.*, defines it, is an important determinant of school effectiveness. For example, Smith (1976), (discussed in Madaus *et al.*, 1980) suggests that a climate characterised by a shared (between pupils, parents and staff) sense of purpose oriented towards specific, well defined school goals, that are approached in a direct, rather than an oblique, manner, is conducive to a high level of school effectiveness.

These studies, then, suggest that procedural variables (such as the use that is made of resources, rather than their simple presence) which are, by and large, under the control of the school management, and school ethos or climate, will be of more importance than external variables (with the exception of type of intake) and measures of school resources, in explaining "school effectiveness".[33] These findings guided us in our approach to this study and in the direction our analysis took.

School Objectives

As noted earlier, the school effectiveness studies primarily investigated school outcomes, in most cases as measured by exam results. In general, little attention was paid to the type of curriculum offered, and to the goals or objectives of school managements. Clearly, if these objectives differ widely, measuring one particular form of "effectiveness" may not be sensible. In this study our concern is with one particular type of school objective, namely the curricular priorities of school management, as these are expressed in terms of the provision and allocation of subjects. In other words, we shall examine, in an exploratory manner, how school managements implement their educational priorities in the type of curriculum they have developed and offer to their pupils.

The kinds of subjects that a school offers and the way these are made available to pupils, is one school management decision among many, and it may not be perceived as the most important of those decisions by a particular Principal or board. Nevertheless, such decisions and the importance attached to them, will have major consequences for the pupils of that school, as they enter the job market or seek third-level entry. This is not to denigrate other school objectives and functions, such as a more general socialisation of pupils, in the sense of inculcating a broad set of social values, knowledge and competence. However, schools are also "credentialising" agencies which allocate credentials to pupils on the basis of the type and level of examination passed, and these credentials are used by employers in choosing and allocating people to positions in the occupational structure (Kerckhoff *et al.*, 1982; Meyer, 1977). Previous studies of status attainment and school achievement have tended to concentrate on the number or level of formal qualifications their

[33]An exception is Bidwell and Kasarda's (1975) study of "School District Organisation and Student Achievement". Differences in student achievement between districts (rather than between individual schools) did seem to relate, for example, to fiscal resources. However, this effect was almost entirely indirect, being mediated via an improved teacher-pupil ratio (1976, p. 67). Interestingly, Rutter *et al.* (1979, pp. 103-104) found this latter variable to be not significantly related to outcome at a school level.

pupils have; our concern, however, is with the specific kind of qualifications they have, since access to third-level cources and to the higher levels of the job market tend to require not simply high levels of examination success but that this should be in certain specific areas. As we have seen, it is in the acquisition of these specific types of qualification — in the Sciences and the Technical subjects particularly — that girls seem to be at a disadvantage.

School Curricula

At the start of this chapter we set out our main aim of explaining variation in schools' subject provision, that is, in their curricula. In the light of the foregoing discussion, much of what follows will be concerned with the weight to be assigned, in explaining curricular differences, to the effects of school management decisions and policies relative to the effects of external constraints on curricular planning. The outline of the argument that we shall pursue for the remainder of this chapter is as follows. Initially, we shall define a set of distinct types of senior cycle curricula, each of which is shared by a number of schools in our sample. Schools will be grouped on this basis into what we term school clusters. We shall then investigate the degree to which the school clusters vary in their scores on a set of variables which can be held to represent the possible constraining effects of factors largely outside the control of school management, such as the location of the school, its age, its size and so forth. We shall see that there are, in fact, statistically significant differences between the clusters in their mean scores on almost all these exogenous variables, as we shall call them. This raises the question of the degree to which curricular variation between clusters is the simple consequence of between-cluster differences in these exogenous variables. We shall show that this is not, in fact, the case, and that, even allowing for these exogenous effects, there are still differences between clusters in curricular size and in what sorts of subjects are given priority in the curriculum.

Our argument will be, then, that these curricular variations arise largely through school management decisions and that the between-cluster variation in this respect is indicative of different managerial school objectives. We shall further support this argument in two ways. First, by showing that the grouping of schools according to similarities in their curricula produces groups of schools which also vary significantly across certain measures of "school ethos", such as the level of achievement ethos in the school. Such a correspondence would be expected if, as we claim, the nature of the curriculum and the ethos of the school are primarily the result of managerial decisions and reflect the objectives of school managements. Secondly, we shall show that these curricular groupings of schools also correspond, to a considerable extent, with certain structural groupings of schools — for example, vocational schools all appear to have a similar curriculum (they almost all fall into the same cluster) as do community schools (all but two of which fall into another cluster). Likewise, the schools run by any particular order are distributed across the clusters in ways which are non-random. This analysis of the correspondence between the clusters and the structure of the school system will also be used to determine whether the autonomy in curricular planning resides at the level of the individual school or at levels intermediate between the school and the Department of Education, such as VECs or religious orders.

Our overall intention then, is to show that the differences in provision between schools, as illustrated in Tables 6.1 and 6.2 (and particularly the differences between boys' and girls' schools) arise to a large extent out of decisions made by managements at the school or a higher level; these decisions are themselves a function of beliefs about what sorts of education are appropriate for the particular students in those schools.

The School Clusters

The first stage in our analysis of differences in the school curriculum involved a categorisation of schools.[34] Given 95 schools in our sample, we sought to find some means of reducing this number by grouping schools in terms of their basic curricular characteristics. Pre-existing groupings by sex or by sector (secondary, vocational, community) do not provide an adequate criterion for distinguishing schools' curricula; for example, not only is there considerable variation in curricula within, say, secondary schools, but some of these have a curriculum more like that of vocational schools than of secondary schools.

Initially, then, we gave each school a score on seven dimensions of the Leaving Cert. curriculum it offered. These were:

(1) the number of Science subjects taught;
(2) the number of Commerce subjects taught;

[34]The majority of the data relating to the schools in our sample was drawn from the Principal's questionnaire. The Career-Guidance teacher questionnaire was used primarily as a means of checking the consistency of responses on the Principal questionnaire. This latter was, on all occasions, administered as an interview, undertaken by one of the members of the ESRI research team; it varied in length from one-and-a-half to over three hours, and in some cases was administered in two separate sittings.

This questionnaire sought to tap specific factural information about the school such as its type, age, sex-mix and so on; information about its integration in broader structures, such as orders and VECs, the degree of autonomy of the Principal, school goals and means of achieving these, the organisation of the school — the distribution of responsibility and delegation of decisionmaking — the organisation of teaching — the streaming practices of the school and the bases on which subjects were allocated to pupils. A large amount of information was collected on the curriculum and the way in which it was organised, the extent to which the curriculum itself and the time-tabling of subjects had altered in the recent past and the ease with which future alterations might be made. There were also a number of questions relating to the parent/school relationship.

(3) the number of Technical subjects taught;
(4) the number of Modern Languages taught;
(5) the number of Arts subjects taught;
(6) the number of Home Economics subjects taught;
(7) the number of History and Geography subjects taught.

The contents of each of these groups is shown in Table 6.4. Three of these subject groups formed Guttman scales (in the order of subjects shown in Table 6.4, i.e., from the most to the least frequently occurring subject) and the coefficients of scalability and reproducibility are given in Table 6.4 also.[35]

Table 6.4: *Initial Grouping of Subjects*

Group	*Contents*	*Guttman coefficients* *Scalability*	*Reproducibility*
Science	Biology, Higher Maths, Chemistry, Physics, Applied Maths	.68	.92
Commerce	Business Organisation, Economics, Accounting	—	—
Technical	TD, Building Construction, Engineering Workshop	.85	.94
Modern Languages	French, Spanish, German, Italian	—	—
Arts	Art, Music	.86	.96
Home Economics	Home Economics (General) Home Economics (Social and Scientific)	—	—
History and Geography	History, Geography	—	—

[35]A Guttman scale is a means of combining several measured item indices into a single measure of some variable of interest. It has the property that the items are ordered, so that all those respondents replying in the affirmative to a high numbered item will also have responded positively to all lower numbered items. In the case of our scale measuring the number of Science subjects on the curriculum, the ordering of the five items included (Table 6.4) shows that, for example, schools which teach Physics, in general also teach all the preceding subjects (Biology, Higher Maths, Chemistry). So, the score on the scale not only indicates the number of sciences taught but which ones they are; thus, schools scoring 2 teach Biology and Higher Maths. Another way of looking at this is to say that schools do not teach Applied Maths unless they already teach the other four sciences. Being able to attach an ordering to the sciences is obviously useful in so far as it indicates that the growth of the science curriculum follows much the same pattern in all schools — first comes Biology, then Higher Maths, and so on. So, if a school teaching these two sciences wants to add a third, it will probably add Chemistry rather than Physics or Applied Maths. Clearly this criterion of ordering is very strong; the more items in the scale, the more likelihood there is of deviation from this criterion, i.e., that there will be schools teaching "non-permissible" combinations such as Biology and Physics. The extent to which the items in fact deviate from the scale ordering is reflected in the coefficient of Reproducibility which varies from 1 (a perfect scale) to zero. In the case of the three scales given in Table 6.4, this value is very close to 1, and we can have confidence that it accurately reflects the true situation.

Each school was then allocated into a particular school-cluster on the basis of these seven scores, using a Cluster Analysis programme.[36] The solution adopted was one which categorised the schools into seven clusters, one of which included only the five schools that offered no Leaving Cert. subjects. The distribution of school types and Leaving Cert. pupils according to the other six clusters is shown in Table 6.5.

Table 6.5: *Distribution of School Types and Leaving Cert. Pupils by Cluster (Percentages of Total in Parentheses) and Mean School Size in Each Cluster (Weighted Results)*

	School Type			*Pupil Sex*		
Cluster	*Boys'*	*Girls'*	*Coed.*	*Boys*	*Girls*	*Mean School Size*
1	4	14	4	462 (26.9)	1064 (53.9)	467.7
2	8	0	2*	558 (32.4)	1 (0.1)	521.6
3	4	6	6	119 (6.9)	488 (24.7)	295.3
4	0	0	22	187 (10.8)	210 (10.6)	249.2
5	2	0	10	218 (12.6)	191 (9.7)	565.8
6	5	0	3	177 (10.3)	21 (1.1)	306.0

$X^2 = 72.26$ ($p < .001$).
*One of these schools, although coeducational, had no girls at Leaving Cert. level.

Turning first to Table 6.5, it is clear that while girls' schools fall into only two clusters (1 and 3), boys' schools are spread more evenly. Coeducational schools were found overwhelmingly in cluster 4 — this includes almost all vocational schools — and cluster 5 — this is comprised mainly of community schools. Cluster 1 is made up of two Protestant coeducational schools and 20 schools run by Catholic religious orders, including six Mercy schools. This cluster contains the highest proportion of fee-charging schools. Cluster 3 contains a further five Mercy schools, as well as four independent Catholic schools and seven other schools run by religious orders; two of these are Christian Brothers' Schools (CBS). The bulk of the CBS, however, are found in clusters 2 and 6. In the former, as well as six CBS, there are two independent Catholic boys' schools and two other religous-run schools. In cluster 6 there are four CBS. It can be seen in Table 6.5 that these two clusters contain

[36]The programme used was CLUSTAN and the clustering method was Ward's Hierarchical. This is probably the best known method of clustering continuous data. It operates on the principle of combining previous clusters or elements in such a way as to minimise the resulting increase in the error sum of squares, measured by the sum of the squared distances from the mean or centroid of the cluster to its individual elements (see Everitt 1974, pp. 15-16 and Wishart 1975, p. 36). The choice of a final solution (i.e., number of clusters) is somewhat arbitrary, being based on a decision about whether or not this increase in the error sum of squares is acceptably small or not.

virtually no girls, and, subsequently, it will become apparent that schools of clusters 2 and 6 are alike in many respects, but vary according to their size. In summary, we can say that there is a vocational schools cluster (cluster 4) as well as a community schools cluster (5); thus, there is, as one might expect, a typical vocational school curriculum, and likewise there is a typical community school curriculum. There is not, however, a single typical secondary school curriculum. Putting aside the four secondary schools in cluster 4 and the four in cluster 5, we are left with 53 schools, spread over four typical curricula — clusters 1, 2, 3 and 6. As noted, girls' secondary schools are all in clusters 1 and 3, boys' mainly in 2 and 6, but with some in 1 and 3.

Table 6.6 shows the characteristics of the school clusters in terms of the seven groupings of subjects, as well as two further measures — these are the mean size of the Leaving Cert. curriculum in that cluster, and a measure of the extent to which the curriculum may be seen as general or specialised.[37]

As Table 6.6 shows, although the seven cluster solution (including the cluster containing five schools with no senior cycle) was the one chosen, we also examined the nine cluster solution which is important in that it subdivides the large first cluster in a significant manner. The subdivisions of cluster one are given at the foot of Table 6.6. The first subdivision (1a) distinguishes 12 schools from the remaining 10 in cluster 1. These are primarily girls' schools (nine girls' schools, two coeducational, one boys'), largely located in urban areas and serving a middle/upper-middle class clientele; indeed, several of them are fee-charging schools. Their curricula are at once quite broad (in that they score above the average for all subject areas except Technical and Commerce) but with particular strength in the Arts subjects. The second subcluster (1b) is made up of six mainly rural schools, of which five are girls' schools, one coeducational. None of these schools charge fees. They offer a relatively broad curriculum, but they are, on average, weaker than (1a) schools in Science, Arts and History and Geography, but rather stronger in Commerce and Home Economics. Finally, subcluster (1c) contains three large boys' schools and one coeducational school, which again, have primarily a

[37]This measure of specialisation of the curriculum was based on the degree to which in the case of a school's curriculum, the actual distribution of scores in the seven-subject groupings deviated from that which might be expected if the distribution were random, given the size of the curriculum and the maximum size of each of the seven-subject groups; that is

$$\sum_{i=1}^{7} \frac{(O_i - Ca_i/\Sigma_i a_i)^2}{\frac{Ca_i}{\Sigma_i a_i}}$$

where C is the actual size of the curriculum; O_i is the actual size of the subject group (i = 1 . . . 7); a_i is the maximum size of the subject group (i = 1 . . . 7). Thus, high scores indicate relatively more specialised curricula.

Table 6.6: *Curricular Characteristics of 6 School Clusters*

Cluster		*Home Economics*	*History Geography*	*Science*	*Arts*	*Technical*	*Commerce*	*Languages*	*Overall Size of Leaving Cert. Curriculum**	*Degree of Specialisation of Leaving Cert. Curriculum*
1	Mean	1.18	1.82	4.00	1.05	0.09	2.14	2.32	12.18	3.98
	S.D.	(0.80)	(0.39)	(0.69)	(0.79)	(0.29)	(0.83)	(0.57)	(1.65)	(1.22)
2	Mean	0.20	2.00	4.40	0.50	0.20	2.70	1.10	10.90	6.19
	S.D.	(0.42)	(0.00)	(0.52)	(0.53)	(0.42)	(0.48)	(0.32)	(1.45)	(1.81)
3	Mean	1.13	1.13	2.06	1.06	0.19	1.81	1.06	8.75	3.57
	S.D.	(0.81)	(0.34)	(0.77)	(0.68)	(0.40)	(0.83)	(0.25)	(1.57)	(1.61)
4	Mean	1.27	0.59	1.73	0.27	2.50	1.45	0.95	9.36	3.92
	S.D.	(0.55)	(0.50)	(0.88)	(0.46)	(0.60)	(0.86)	(0.38)	(2.26)	(2.09)
5	Mean	1.25	2.00	3.75	1.08	2.83	2.08	1.25	13.83	2.67
	S.D.	(0.75)	(0.00)	(0.75)	(0.67)	(0.39)	(0.90)	(0.45)	(2.44)	(1.48)
6	Mean	0.13	1.75	3.25	0.50	1.13	0.63	0.75	7.38	5.27
	S.D.	(0.35)	(0.46)	(0.71)	(0.53)	(0.99)	(0.52)	(0.46)	(2.20)	(1.45)
Overall	Mean	1.00	1.43	3.04	0.76	1.67	1.83	1.34	10.53	4.08
	S.D.	(0.78)	(0.67)	(1.28)	(0.71)	(1.27)	(0.94)	(0.71)		(1.88)
Subclusters of Cluster 1										
(1a)	Mean	1.25	2.00	4.00	1.50	0.00	1.67	2.17	12.58	3.80
	S.D.	(0.75)	(0.00)	(0.43)	(0.52)	(0.00)	(0.78)	(0.58)	(1.51)	(1.02)
(1b)	Mean	1.67	1.33	3.33	0.33	0.17	2.50	2.17	11.50	3.64
	S.D.	(0.41)	(0.52)	(0.52)	(0.52)	(0.41)	(0.55)	(0.41)	(1.05)	(1.27)
(1c)	Mean	0.25	2.00	5.00	0.75	0.25	3.00	3.00	14.25	5.05
	S.D.	(0.50)	(0.00)	(0.00)	(0.96)	(0.50)	(0.00)	(0.00)	(0.96)	(1.42)

*Excluded Irish, English and Lower Maths.

middle class intake. They are stronger than (1a) and (1b) in Science (all four schools teach all five of the subjects we classify as Science), Commerce (they all teach all three Commerce subjects) and Languages (they all teach three Languages), but weaker than (1a) in Arts and weakest of all in Home Economics. One might wonder how these four schools differ from the large boys' schools of cluster 2. Several dimensions can be identified. The curricula of the schools in cluster 2 tend towards specialisation in Science and/or Commerce subjects, whereas those in the third group of cluster 1 are broader and larger; they are equally well provided for in Commerce and better provided for in Science, but they have strengths elsewhere also. Their curricula are, in a word, more liberal. Furthermore, although both groups of schools have primarily a middle class intake, one's impression is that the intake of these four cluster 1 boys' schools is mainly drawn from the professional and large business middle class — or, as it were, the long-established middle class — whereas boys' schools in cluster 2 draw for their intake more on the urban middle to lower middle class and the rural middle class.

Returning to our comparison between the three subclusters of cluster 1, it is evident that (1c) schools have a greater depth of coverage in several subject areas than have (1a) or (1b) schools. If we examine the degree to which the curricula of these three subclusters is specialised we see that (1c) has both the largest and the most specialised curriculum. It is worth noting that clusters 2 and 6 (which contain the bulk of boys' secondary schools) contain schools which are, on average, also highly specialised; thus it appears that specialisation is a feature of boys' schools.

Although we considered it valuable to examine the three subclusters of cluster 1, particularly since they separated the curricular types of boys' and girls' schools within the cluster, the differences in curricula between the subclusters of cluster 1 are less important, overall, than the differences between the clusters themselves. Thus, for the rest of our analysis, we shall adopt the six-fold categorisation of schools on the basis of their Leaving Cert. curricula.

Although the clustering of schools was based on the composition of the curriculum, this was not independent of overall curriculum size: for example, only a relatively large school could score highly on more than, say, two groups of subjects. This can be seen if we contrast clusters 1 and 6 in Table 6.6. Although cluster 1 has a relatively unspecialised curriculum (its score in this respect is 3.98 compared with an average of 4.08; the lower the score the less specialised the curriculum), it nevertheless scores above the mean in all subject areas with the exception of the Technical Subjects. On the other hand, cluster 6 has a relatively specialised curriculum (5.27) but in fact scores above the mean only in two areas — History/Geography and Science. The contrast between the two lies in the difference in their overall size; cluster 1 has an above average number of Leaving Cert. subjects, while cluster 6 lies below the average.

If we examine the two dimensions of degree of specialisation and size of curriculum we can cross-classify the clusters into 4 further groups, as in Table 6.7. This shows that cluster 2 has a relatively large, specialised curriculum. Turning to Table 6.6 we see that it specialises in Science and Commerce (it has the highest scores of any cluster in these two areas), and all the schools in it offer both History and Geography. These schools are, as can be seen from Table 6.5, generally large boys' secondary schools (by Irish standards). They are on average weak in Modern Languages, Arts, Technical and Home Economics subjects.

Table 6.7: *Curricular Size and Specialisation according to Cluster*

Leaving Cert Curriculum: Size	*Degree of Specialisation*	*Cluster*
Above Average	Above Average	2
Above Average	Below Average	1, 5
Below Average	Above Average	6
Below Average	Below Average	3, 4

There are some similarities between cluster 2 and cluster 6, chiefly in their composition — both being largely made up of boys' secondary schools — and in their high degree of specialisation in Science subjects. Furthermore, of the 18 schools in clusters 2 and 6, 10 are run by the Christian Brothers. However, cluster 6 schools are marginally less well provided with History and Geography and rather more likely to have one or more Technical subjects, than are schools in cluster 2. In all other respects, however, their curricular provision is weak; this is inevitable given their size. Thus, although their mean score for specialisation is less than that for cluster 2, these schools, in fact, have the most restrictive curriculum.

In direct contrast are schools in clusters 1 and 5. These schools have unspecialised curricula but because their curricula are so large they can offer a number of subjects in each area; that is, their curricula are broad and deep. Particularly striking is cluster 5, (the community school cluster) the schools of which are, on average, strong in all subject departments.

Finally, clusters 3 and 4 contain schools with small unspecialised curricula. In particular, cluster 3 contains schools which are below average in all subject areas except Home Economics and Arts. These schools tend to have the same average number of pupils as those in cluster 6 but they teach slightly more subjects which are spread more thinly over a wider curricular range. This cluster contains a number of secondary coeducational schools that were formerly girls' schools. Cluster 4, made up of vocational schools, in the main, but with some secondary coeds, has the smallest number of pupils per school, and a curriculum size and degree of specialisation that are slightly below average. It is above average in Home Economics and Technical Subjects only and noticeably weak in Science subjects.

Briefly then, as a summary of this discussion and with regard to sex differences, we can note that girls in single sex schools are all in schools with unspecialised curricula. Thus, while for girls in cluster 1 the possibility of individual specialisation in one subject area is not precluded by the curriculum (since these schools have strengths in a number of subject areas), it is not necessary. For girls in cluster 3, specialisation is, on average, impossible. In contrast, pupils in cluster 6 (overwhelmingly boys) are given little choice but to specialise and likewise in cluster 2 the curriculum tends to this end. Boys in boys' schools, however, are spread across all the clusters except one, hence their education takes place in a wider range of curricular contexts than that of girls in general.

Curricular Priorities

Our aim in clustering the sample schools was not only to obtain a categorisation of schools more meaningful than, say, the readily available secondary/vocational/community distinction, but also to examine the curricular aims or priorities of the school decision makers which are implicit in these curricular arrangements. In other words, we sought to infer what kinds of pupils, with what kind and combination of qualifications, the schools sought to produce, through an examination of their curricula. Take cluster 2 for example; it is fairly clear from preceding tables that the products of these schools will, in general, have had the opportunity to become well-equipped in terms of Science and/or Commerce qualifications. These are highly instrumental qualifications, of value in the job market and in gaining access to third-level courses leading to prestigious or high income careers. The obverse of this is that, in all likelihood, such pupils will have few academic qualifications in the Arts, in Home Economics or in Technical Subjects. In contrast, one can make fewer assumptions about what the product of a cluster 1 school will emerge with in terms of qualifications. On the basis of the curriculum alone, it seems that pupils may either specialise or generalise and may choose over a wide set of options.

One problem with our investigation of the nature of schools' curricula thus far has been that our measures have not allowed for differences in the overall size of the curriculum. It is this which sets the constraints within which curricular priorities can be established and achieved. In this section, then, we focus on some of the determinants of the size of schools' Leaving Cert curriculum.

Clearly, the number of subjects taught will depend, to some degree, on the number of teachers in the school, and this will, in turn, depend upon the number of pupils, given the method of financing the employment of teachers. Indeed, this latter relationship is very strong, as can be seen from Table 6.8, where the correlation between the number of pupils and the number of teachers in a school is .95. In other words, the number of pupils almost wholly determines the number of teachers; the remaining variance can be attributed to differences in the pupil/teacher ratio in secondary, community and vocational schools and to the existence, in some secondary schools, of semi-retired religious or other non-quota teachers on whom they can call.

Table 6.8: *Correlations between Number of Leaving Cert. Subjects Taught, Number of Pupils and Number of Teachers (n=90)*

		1	2	3
1	Leaving Cert. subjects	—	—	—
2	Pupils	.60	—	—
3	Teachers	.61	.95	—

The relationship between, on the one hand, the number of pupils and of teachers, and, on the other, the number of Leaving Cert. subjects, is less strong; nevertheless there is a clear tendency for increases in pupil and teacher numbers to lead to a larger curriculum. This then raises the question of whether or not the differences in curricular size due to clusters are simply or partly due to differences in pupil and teacher numbers. We have seen (in Table 6.5) that the clusters do vary widely in pupil numbers; now we attempt to test the hypothesis that the relationship between cluster and curricular size is simply an artifact of the cluster/school size relationship. We carried out this test by first regressing curricular size on pupil numbers and on teacher numbers. The results of this are shown in column 1 of Table 6.9. As we might expect, given the high correlation between the two independent variables, neither of these appear as significant, though the overall equation is significant at $p \leq .05$ and, as we can see from the R^2 value, 38 per cent of the variance in curricular size is accounted for by these two variables. Column 2 of Table 6.9 shows the effect of adding variables representing the school clusters to the equation. The clusters are represented here by dummy variables, and thus one of the clusters is omitted and its coefficient is that given for the intercept.

Table 6.9: *Regressions of Leaving Cert. Curricular Size on Pupil and Teacher Numbers and on School Clusters*

Equation	(1)	(2)
Independent variables		
Pupils	0.004	0.003
Teachers	0.075	0.038
Cluster 1		2.553*
Cluster 2		1.113
Cluster 4		0.761
Cluster 5		3.697*
Cluster 6		−1.485
Intercept		7.321
R^2	.38*	.60*
R^2 (adjusted for degrees of freedom)	.36	.57

*significant at $p \leq .05$.

The omitted cluster is school cluster 3. This was chosen because it contains schools of all three types — boys', girls' and coeducational.

Equation (2) shows that the effects of pupil and teacher numbers are virtually wholly subsumed by the effect of school clusters. Furthermore, the increase in R^2 shows that not only are the clusters capturing the effect of pupil and teacher numbers, but they are introducing other effects which are to some extent, independent of this. Equation (2) may be interpreted as follows; holding the direct effects of pupil and teacher numbers constant cluster 3 schools have, on average, 7.3 subjects on their curriculum. The coefficients for the clusters may then be simply added to this number. So, clusters 1, 2, 4, and 5 schools all have larger curricula, on average, than cluster 3 schools while cluster 6 schools have smaller curricula. However, only in the cases of clusters 1 and 5 are these differences statistically significant.

If we take pupil and teacher numbers to be variables largely outside the control of school management, (that is, external or exogenous variables) the results of Table 6.9 show that differences in curricular size are, to some degree, the result of differences in these variables, and thus outside management control. However, we also noted the large increase in R^2 for the second equation, suggesting that these two exogenous variables do not entirely explain curricular size differences. Subsequently, therefore, we turned to other "exogenous" variables to see if differences in these between clusters helped to explain the differences in curricular size. We took five variables, in addition to pupil and teacher numbers, which could be seen as exogenous constraints on school management policy making. These are shown in Tables 6.10 and 6.11, in which, using analysis of variance and chi-squared, we examined the way these factors vary according to school cluster. The values listed under the clusters in Table 6.10 show the mean score for schools in that cluster on the dependent variable; thus, for example, on the Autonomy scale (variable 3) schools in cluster 2 score on average 0.60. In Table 6.11 the values given under cluster are the absolute number of schools in that cluster in a given region: thus there are 14 schools of cluster 1 in Leinster.

Table 6.10: *Bivariate F-ratios for Variables Representing Exogenous Factors Affecting School Decision Making, According to Cluster (n=90)*

Dependent Variables:	*School Cluster (means)*						*Overall mean*	*F-ratio*
	1	*2*	*3*	*4*	*5*	*6*		
1 No. of Pupils	467.7	521.6	295.3	249.2	565.8	306.0	388.3	9.93*
2 No. of Teachers	29.5	30.1	17.9	17.1	36.3	20.1	24.5	8.38*
3 Autonomy	0.64	0.60	0.75	0.47	0.38	0.53	0.57	6.49*
4 Median Social Class	2.73	2.5	3.25	4.41	3.75	3.88	3.44	7.21*
5 Age of School	52.3	78.0	64.4	37.3	19.2	63.8	50.22	3.72**
6 Own Resources of School	0.51	0.06	-0.01	-0.21	-0.31	-0.16	0.02	3.02*

* Significant at $p \leq .001$
** Significant at $p \leq .05$

Table 6.11: *Crosstabulation of Cluster by Region (n=90)*

	Cluster:					
Region:	*1*	*2*	*3*	*4*	*5*	*6*
Leinster	14	4	7	7	4	5
Munster	8	4	6	8	5	3
Ulster/Connaught	0	2	3	7	3	0

$\chi^2 = 17.1$ p=n.s.

Before discussing the results shown in these tables, let us turn to an examination of these variables. Number of pupils and of teachers, age (age of the school in years) and region are all self-explanatory. Autonomy is a six-item Guttman scale formed from questions that sought to determine whether particular decisions regarding school policy, expenditure and curriculum could be made within the school or would have to be referred to some external body such as a religious order, the VEC or the Department of Education. A high score indicates a high degree of autonomy.[38] Social class is the median social class, on a 6-level scale, of the present Inter. Cert. pupils in the school; this was aggregated from the individual pupil questionnaires and added to the data relating to the school. High scores on this scale indicate low social class. The Inter. Cert. pupils' scores (rather than the Leaving Cert. pupils') were used to construct this variable because it was felt that the latter would not be as good an indicator of the class composition of the school, because those pupils who are most likely to leave school before the Leaving Cert. tend to come mainly from working class origins. "Own resources" is a three item scale ($\alpha = \cdot 61$), based on (a) the number of non-quota (that is neither quota nor official ex-quota) teachers in the school, (b) the number of extra curricular subjects offered, and (c) the size of the school's fees. This variable sought to tap the level of resources available to school management over and above those sanctioned by the Department or the VEC. A high score indicates a high level of own resources.[39]

[38]The questionnaire items used in the construction of this scale are shown below. They were each scored 1 if the reply was "Make internally". 0 if it was "Refer". The order of the items (from most to least frequent) was 4, 1, 3, 2, 5, 6. Coefficient of Reproducibility = .92; coefficient of Scalability = .65.

Internal/External Decision-making

In the context of running the school, what kind of decisions are taken by you *within* the school, and what kind of decisions have to be referred to a higher authority? For example, if you were to add another subject to the curriculum — remaining within the teacher quota — would this decision be made in the school (internally) or would you have to refer it to higher authority?

	Make Internally	*Refer*
(1) Add another subject to the curriculum, remaining within teach quota	( )	( )
(2) Add another subject to the curriculum, involving employing teacher above the quota, and above your normal budget	( )	( )
(3) Ask parents to donate or increase donations to the school/or, if fee-paying, increase the fees	( )	( )
(4) Introduce new method of allocating pupils to classes — e.g., from mixed ability to streaming or vice versa	( )	( )
(5) Make a major alteration in school buildings, but within normal expenditure	( )	( )
(6) Major expenditure beyond budget (e.g., £10,000).	( )	( )

[39]These variables differ according to school in the degree to which they can be regarded as outside the control of the Principal or the school decision-makers. For example, it could be argued that social class is manipulable by the school management. However, while this may be the case in some schools, it cannot hold for all — vocational schools being the clearest example of schools which cannot select their intake.

Turning to the results of Table 6.10 we see, from the F-ratios, that there are significant differences between clusters in their scores on all six variables. As we might expect, the ordering of clusters in terms of pupil numbers coincides with that for teacher numbers, with cluster 5 (mainly community schools) being largest, cluster 4 (mainly vocational schools) smallest. In terms of the degree of autonomy Principals felt they had, cluster 3 Principals scored highest, cluster 5 Principals lowest. Cluster 4 pupils generally had the lowest median social class, while, somewhat surprisingly, cluster 2 (primarily larger boys' secondary schools) had the highest social class pupils.[40] These schools were also, on average, the oldest, while cluster 5 schools, unsurprisingly, were newest. The level of "own resources" was highest in cluster 1 schools. Clusters 4 and 5 had the lowest level of "own resources" so defined, perhaps reflecting the more direct control of these schools by, on the one hand, the VECs, on the other the Department of Education (which in turn is shown by their low scores on the autonomy variable). Lastly, the distribution of clusters by region (Table 6.11) fails to show any relationship between the two variables despite the absence of cluster 1 and 6 schools from Connaught/Ulster.[41]

[40]This finding is, however, in accordance with differences in the nature of the intake to these schools. Using a scale (INTAKE: $\alpha = .80$) built from three scores (a) the percentage of current first year pupils with literacy problems; (b) the percentage of current first year pupils with numeracy problems; (c) the percentage of current first year pupils coming from homes disrupted by poverty, alcoholism, desertion, etc. The mean values (of the standardised scale) according to cluster were

	1	2	3	4	5	6
Mean	−0.20	−0.69	−0.16	0.44	−0.21	0.26

These differences are significant at $p \leq .001$. Again cluster 2 is shown to have the lowest score and thus the lowest proportion of "problem" pupils, while cluster 4 has the highest. It is very difficult to avoid the conclusion that these findings are the result of, on the one hand, the inability of vocational schools to select their intake and, on the other, the effectiveness with which schools in cluster 2 accomplish this.

[41]Using the same set of variables as listed in Table 6.20 and re-coding REGION as two dummy variables (R1 and R2) contrasting, respectively, Munster and Connaught/Ulster with Leinster, we performed a discriminant analysis on the six clusters. This process produces a weighted combination of the independent variables that best discriminate between the weighted dependent variables (in this case the six school clusters). In this sense, a discriminant analysis can be seen as a form of canonical correlation. This process improves on the examination of the relationship of cluster to independent variables taken singly by taking into account the relationships between these variables. The results of the analysis are given below; number of teachers was not included in the final solution because the number of teachers is collinear with the number of pupils. One function of the five was significant.

Table 6.11a: *Results of Stepwise Discriminant Analysis Applied to Six School Clusters*

Significant Discriminant Function (standardised)		Cluster	Centroid
−0.931	No. of Pupils	1	−0.929
−0.098	Autonomy	2	−1.407
0.743	Social Class	3	0.325
0.053	Age	4	1.431
−0.077	Own Resources	5	−0.786
−0.259	Munster	6	0.906
−0.181	Ulster/Connaught		
Eigenvalue: 1.18:	Canonical Correlation: 0.74.		

Having identified these seven variables that represent exogenous constraints on the decision making scope of school Management and Principals, we can now test to see if the systematic differences in the scores of each cluster on these variables can be held to account for the differences in curricular size according to cluster.

Having recoded region into two dummy variables contrasting, respectively, Munster and Ulster/Connaught with Leinster, we entered our exogenous variables into the regression of curricular size, as shown in Column (1) of Table 6.12. However, we omitted total number of pupils from our regression in order to remove the multicollinearity between it and total number of teachers. It must be borne in mind, however, when interpreting the results, that the number of teachers is almost wholly dependent on the number of pupils.

If we compare Column (1) of Table 6.12 with Column (1) of Table 6.9 we see that the addition of the other exogenous variables increases the R^2 (adjusted) from .36 to .44. In particular it can be seen from Table 6.12 that the number of teachers has a clear positive influence on curricular size, but that social class and age also have significant effects: specifically younger

Table 6.12: *Regression of Leaving Cert. Curriculum Size on Exogenous Variables and School Clusters (n = 90)*

Equation:	(1)	(2)
No. of Teachers	0.140*	0.089*
Autonomy	–0.307	1.253
Own Resources	0.138	0.077
Social Class	–0.613*	–0.296
Munster	0.176	–0.297
Connaught/Ulster	1.836*	1.077
Age	–0.012*	0.001
Cluster 1		2.574*
2		1.014
4		1.290
5		4.105*
6		–0.882
Intercept	9.640	6.994
R^2	.48*	.65*
R^2 adjusted for degrees of freedom	.44	.60

* Significant at $p \leq .05$

schools tend to have larger curricula, even when other variables such as teacher numbers are taken into account. This is due, no doubt, to the large proportion of young schools which are community schools. Social class has an effect on curricular size also; given a higher median social class, the curriculum, all else being equal, will be larger. In Equation (1) of Table 6.12, the intercept gives a value for the effect on curricular size of being in Leinster; it can be seen that the coefficient for Munster (which should be added to that for Leinster) leads to no appreciable difference between them, but the Connaught/Ulster coefficient leads to a significantly larger curriculum in this region than in Leinster. Finally, the effect of increasing autonomy is to decrease curricular size, while the effect of increased resources is positive. Neither of these coefficients is significant however.

Although an investigation of the nature of the relationship between these variables and curricular size is of interest, our primary aim is to investigate whether or not the effect of school cluster on curricular size can be explained by those exogenous variables. So, Column (2) of Table 6.12 shows the regression of curricular size on these variables and on the clusters also. Again, cluster 3 is omitted, so in this case the intercept can be seen to report the coefficient attaching to cluster 3 schools in Leinster. Two things are of immediate interest in comparing Columns (1) and (2) of Table 6.12. First, the effect of adding the variables representing the clusters in Column (2) is to increase markedly the amount of variance explained. Secondly, this addition also has the effect of making all the exogenous variable coefficients (with the exception of teacher numbers) non-significant. These two findings suggest that, very largely, the effects of these exogenous variables are being captured by the clustering — as we should expect from the findings of Tables 6.10 and 6.11 — but that the clusters are more than simply "proxy" variables for the factors represented by these exogenous variables. The increase in the adjusted R^2 strongly supports the belief that the differences between clusters reflect variation in areas other than the degree to which school managements are restricted by school size, region and so forth. We suggest that these reflect, in part, different management policies and decisions.

Curricular Priorities

In our examination of curricular size according to cluster we have been looking at a very general school policy about how many subjects to offer, given external constraints. Now, however, we shall turn to a more particular question: given the size of the Leaving Cert. curriculum, what portions of it are given over to particular subject areas? In our earlier discussion of the school clusters we showed how they varied in their scores in seven subject areas; this, however, took no account of the limitations imposed by the size of curriculum. So, for example, a cluster made up primarily of large schools, such as clusters 1 and 5, could have above average scores in a number of subject areas, while in the smaller clusters these mean scores will either be moderately low in all areas (as with cluster 3) or high in one or two and low in the rest (as with cluster 6). In the following section we shall look at some determinants of school curricular strengths in the four areas of Science, Commerce, Technical and Modern Language subjects. Rather than giving each school an absolute score on these we shall give them a score for each area as a proportion of the total curriculum; thus we shall, for example, look at

$$\frac{\text{Number of Leaving Cert. Science Subjects}}{\text{Total number of Leaving Cert. Subjects}}$$

that is, the proportion of Science subjects at Leaving Cert. In the case of all four subject areas we shall approach the problem in the same way; that is, we will regress the proportion of subjects of a particular type on, first, the exogenous variables and then, secondly, on the exogenous variables plus the school cluster variables, and compare the results. These are shown in Tables 6.13 and 6.14.

Table 6.13: *Proportion of Leaving Cert. Science and Technical subjects regressed on Exogenous and School Cluster Variables (n = 90)*

	Leaving Cert. Science		*Leaving Cert. Technical*	
Equation	*(1)*	*(2)*	*(3)*	*(4)*
No. of Teachers	0.001	–0.000	–0.002*	0.000
Own resources	–0.013	–0.004	–0.005	0.004
Autonomy	–0.052	–0.0785*	–0.247*	–0.097*
Social class	–0.032*	–0.018*	0.039	0.017*
Munster	0.027	0.030	0.016	0.019
Connaught/Ulster	–0.054	–0.013	0.032	0.009
Age of school	0.001*	0.000	–0.001*	–0.001*
Cluster 1		0.075*		-0.023
2		0.141*		0.001
4		–0.054*		0.191*
5		0.023		0.122*
6		0.211*		0.129*
Intercept	0.368	0.339	0.204	0.061
R^2	.29	.72*	.57*	.80*
R^2 (adjusted)	.23	.67	.53	.77

* Significant at p≤.05

Table 6.14: *Proportion of Leaving Cert. Modern Languages and Commerce Subjects Regressed on Exogenous Variables and School Cluster Variables (n = 90)*

Equation	Leaving Cert. Modern Languages (1)	(2)	Leaving Cert. Commerce Subjects (3)	(4)
No. of Teachers	0.000	-0.000	0.001	0.001
Own resources	0.014	−0.001	−0.017	−0.018
Autonomy	0.036	−0.000	0.068	0.005
Social class	−0.007	−0.005	−0.012	−0.005
Munster	−0.015	−0.010	0.025	0.020
Connaught/Ulster	−0.034*	−0.018	0.042	0.031
Age of school	−0.000	0.000	0.000	−0.000
Cluster 1		0.061*		−0.028
2		−0.026		0.030
4		−0.014		−0.058*
5		−0.030		−0.081*
6		−0.032		−0.123*
Intercept	0.140	0.147	0.120	0.194
R^2	.23	.56*	.13	.35
R^2 (adjusted)	.16	.49	.05	.24

*Significant at $p \leqslant .05$

In interpreting these results, the most striking aspect of them is the increase in the amount of variance brought about by the addition of the cluster variables. Indeed, in all cases except that of Leaving Cert. Technical subjects, the equation omitting the cluster variables is not itself statistically significant, though some of the variables included are. This indicates that a high proportion of the exogenous variables have no explanatory power. As in our earlier discussion of curricular size, the increase in R^2 associated with the introduction of the cluster variables refutes the suggestion that clusters simply reflect different levels of external constraint, and, instead, suggests that clusters vary along particular dimensions of school policy. This can be seen clearly in the case of Modern Languages. In the second equation, only one variable (that representing cluster 1) is significant; none of the exogenous variables have coefficients that depart significantly from zero, and none of the other clusters' coefficients are significantly different from that for cluster 3 (the intercept).[42] In other words, the explained variance in the proportion of Modern Languages taught (R^2=.56) is due entirely to the effect of being in cluster 1, which is not

[42] In fact, as stated earlier, the intercept represents cluster 3 schools in Leinster. Since the effects of being in another province are given by a constant, we can ignore the regional effect in comparing only the coefficients for clusters with the intercept.

related to external constraints. Turning to the other three subject areas, rather than discussing the entire equation, we shall examine differences between clusters. So, in the case of the proportion of Leaving Cert. Science subjects we can explain 72 per cent of the between-school variance in this measure. In particular we note that cluster 5 does not differ significantly from cluster 3, and that cluster 4 is the weakest of all in this area. Cluster 1 is slightly, and significantly, stronger than cluster 3, but clusters 2 and 6 (predominantly boys' schools) have a particularly high proportion of Science on their curriculum.

Cluster 3 has a very small score on Technical subjects (0.061); three clusters differ from it significantly, all in the direction of an increased proportion of these subjects. These clusters are 4 and 5 (vocational and community schools) and, more surprisingly, cluster 6. Finally, in Commerce subjects, cluster 3 scores relatively highly, with only cluster 2 having a higher (but not significantly so) proportion of these subjects. All the other clusters have a smaller proportion of Commerce subjects (although the difference in the case of cluster 1 is not significant) with cluster 6 scoring particularly low.

These results are tabulated in Table 6.15. The score for cluster 3 here is simply the intercept of the regression equation, and the scores for each cluster are the intercept plus the regression coefficient for that cluster. By taking into account the effects of exogenous variables and by showing the proportion of the curriculum given over the specific subjects, Table 6.15 presents a clear picture of the curricular priorities of schools according to cluster.

Table 6.15: *Proportion of Science, Technical, Modern Language and Commerce subjects taught at Leaving Cert., Broken Down by School Cluster, and Controlling for Exogenous Variables (n = 90)*

	Cluster					
	1	2	3	4	5	6
Science	.414	.480	.339	.285	.362	.550
Technical	.038	.062	.061	.252	.183	.190
Languages	.208	.121	.147	.133	.117	.115
Commerce	.166	.224	.194	.136	.113	.071

If we turn to those two subject areas that show disproportionately low rates of take-up by girls (Science and Technical subjects) we see that, although Science subjects in all cases take up the largest share of the curriculum, girls are almost wholly absent from the two clusters (2 and 6) with the largest proportion of their curricula given over to the Sciences (see Table 6.5).

Furthermore of the clusters that contain schools showing any likelihood of teaching Technical subjects (clusters 4, 5, 6,), none of them contain any girls' schools, and, indeed, include only about 20 per cent of the female pupils in our sample.[43]

School Curriculum and School Cluster: a Summary

Initially we isolated six school clusters which varied according to curricular size and the make-up of the curriculum. We then showed that to argue that these differences according to cluster were simply the result of the effects of exogenous variables was inadequate, and that, although school clusters do capture the effect of exogenous variables, schools possess autonomy beyond this in regard to curricular decisions, and the exercise of this autonomy leads to a significant degree, to the observed differences in the strengths and weaknesses in the curricula associated with the clusters. The exogenous variables have no direct impact on curricular size[44] nor on the proportion of the curriculum given over to specific subject areas; their effect is indirect, mediated by the clusters, which do have direct effects on these two variables.

School Clusters and School Ethos

If this line of argument is correct, and the clusters do reflect the curricular objectives of the school, then we should expect that they would also reflect other differences between schools. In other words, the curricular objectives of the school are not, one presumes, determined in isolation from other school objectives and elements of the school organisation. In this section then we shall examine the variation between clusters in these respects.

It will be recalled that earlier in this chapter we discussed the major role of what has been called "school ethos" in determining school effectiveness. In order to measure aspects of school ethos we constructed scales which are described below and their construction is discussed in Appendix 6 B. The mean scores for schools within each cluster are shown in Table 6.16.

[43]In the analysis of curricular size and of the proportion of the curriculum devoted to, respectively, Science, Technical, Commerce and Modern Language subjects, we also tested for the effect of school sex-mix by entering two dummy variables indicating a girls' school and a coeducational school into the analysis after the school cluster variables. Our intention was to test whether, within each cluster, school sex-mix had any effect. In all cases except one, neither of these variables had statistically significant coefficients. The exception was in the analysis of the proportion of Commerce subjects; here girls' schools had a coefficient of −0.060, indicating that, controlling for the other variables, girls' schools have a very slightly — but nevertheless significant — smaller proportion of Commerce subjects in their Leaving Cert. curriculum.

[44]This is a slight over-simplification, for, as Table 6.13 shows, in the case of the proportion of Science and Technical Subjects, the degree of autonomy given to the Principal and the median Social Class both have significant effects independent of cluster.

Table 6.16: *Mean scores of each cluster on four school ethos variables, mean* IGPA *of Leaving Cert. class and Median* SOCLASS

	Overall Mean	*CLUSTER Means (as deviation from overall mean)* 1	2	3	4	5	6
ACHETHOS	2.94	0.10	0.37	−0.06	−0.13	−0.03	−0.01
SCHTEACH	2.09	0.02	−0.11	0.00	0.06	0.00	−0.13
IMPTCH	0.35	−0.08	−0.08	−0.01	0.13	0.03	−0.07
TEACHNEG	2.26	−0.06	−0.22	−0.02	0.15	0.04	−0.06
MEAN IGPA*	4.35	0.00	0.56	0.02	−0.17	−0.09	−0.15
SOCLASS**	3.44	−0.71	−0.94	−0.19	0.97	0.31	0.44

*See Chapter 2. The average score on IGPA was calculated for each school.
**The median social class of Inter. Cert. pupils in the school (low score = upper middle class, high score = lower working class).

(1) ACHETHOS measures the achievement ethos of the school, that is, the level of occupational and educational expectations held by pupils, parents and teachers; (1 = low achievement ethos; 4 = high).
(2) SCHTEACH measures the performance expectations and the support given to pupils by teachers relative to that of parents; (0 = low expectations; 4 = high).
(3) IMPTCH measures the importance of teachers in helping pupils choose subjects and jobs relative to parents and friends; (−1 = very unimportant; +2 = very important).
(4) TEACHNEG measures the extent to which teachers are less important than peers and constitute a negative reference group; (1= low importance of teachers; 4 = high).

All the variables listed in Table 6.16 differ significantly ($p < .05$) between the six clusters. Aside then from the specific nature of these differences, this result itself suggests that the clusters do reflect important distinctions between schools in terms of their objectives.

The achievement ethos of the school (ACHETHOS) is highly related to the median social class of the school (for all schools in the sample the correlation is −.67); high social class schools (i.e., those scoring low on SOCLASS) tend to have high achievement ethos. This is as we would expect, middle class parents, pupils and the teachers of middle class children having greater expectations than those of the working class. However, the relationship between performance (as measured by MEAN IGPA) and ACHETHOS is rather weaker (a correlation of .33). In other words, achievement ethos is more responsive to class than to performance.

The other three ethos variables — SCHTEACH, IMPTCH and TEACHNEG — are relative measures; that is, teacher importance, supportiveness and so on, are measured relative to that of parents and friends. This tends to introduce certain class effects, given that pupils from higher social class backgrounds have parents and friends with high aspirations for them. Schools in which such pupils predominate will tend to have low scores on these variables. This is the case, for example, in cluster 2. We saw earlier that this cluster had schools with, on average, the highest social class composition. It scores highest on achievement ethos (but also on MEAN IGPA) but very low on SCHTEACH, IMPTCH and TEACHNEG. This indicates that, on average, parents are more important, in these areas, than teachers. Conversely, the vocational school cluster 4, has the lowest median social class (and lowest MEAN IGPA) but the highest scores on these three variables. A plausible explanation of this is that the parents and peers of these pupils are of less absolute importance in educational decision making, and, therefore, teachers are of greater relative importance than they are in, say, cluster 2 schools.

However, these variables — SCHTEACH, IMPTCH and TEACHNEG — are not simply the result of the effect of social class, as we can see if we examine cluster 1 where, although the median social class is high, SCHTEACH is also quite high, indicating a high importance of teachers relative to parents and friends. Indeed, if we control for the effects of social class, we find that the ordering of the clusters in their scores on SCHTEACH and IMPTCH is virtually unchanged but that the differences between them are lessened. However, in the case of TEACHNEG, if we allow for the effect of class, then all the clusters except 2 and 6 have a mean score at or above the overall mean (that is, equal to or greater than 2.26). The same two clusters are the only ones scoring below the mean on SCHTEACH also. These results are shown in Table 6.17.

Table 6.17: *Mean Scores on Ethos Variables in Each Cluster, Controlling for the Effect of Social Class*

	Cluster Means (as deviation from overall mean)					
	1	2	3	4	5	6
SCHTEACH	0.03	−0.09	0.00	0.05	0.01	−0.13
IMPTCH	−0.05	−0.03	0.00	0.08	0.02	−0.08
TEACHNEG	0.00	−0.11	0.00	0.06	0.02	−0.07

It would seem then, that teachers—when compared to parents—are relatively less important in helping pupils decide on subjects, and are perceived as relatively less supportive in those boys' schools which teach highly instrumental, specialised curricula (clusters 2 and 6). These low scores may also reflect the relative saliency of pupil/teacher relationships to boys and girls, suggesting that these are of much less importance to boys in terms of their effects on performance and achievement than they are to girls. In vocational schools, however, teachers are perceived as particularly supportive and helpful. In community schools and cluster 3 schools teachers are of average importance. Finally, in cluster 1 schools, although teachers are not considered as important in helping in the choice-making processes, they are seen as quite supportive.

Autonomy for Whom? Schools and Intervening Agencies

Our discussion thus far of the relative importance of external constraints as against the school clusters has suggested that the particular type of curriculum a school has is not determined solely by these external constraints.[45] The question we now address is the following: to what extent is this degree of decision-making autonomy exercised by individual schools, and to what extent is it in fact a prerogative of an intervening agency such as a VEC or a religious order? One way of assessing this is by examining the degree to which the six school clusters accord with the distribution of schools according to sector. Thus, in Table 6.18 we show the percentage of schools in each cluster which fall into each of the following categories: Protestant and other independent;

Table 6.18: *Six School Clusters Broken Down According to Nature of their Immediate Higher Authority (n = 90)*

	School Cluster					
	1	2	3	4	5	6
Independent Schools:						
Protestant and other	2					1
Catholic lay and Diocesan		2	4	1		
Vocational Schools:				18	3	2
Community/Comprehensive schools:				1	8	1
Religious run schools:						
Mercy	6		5	1	1	
Christian Brothers		6	2			4
Presentation Sisters	2		1			
Presentation Brothers	2					
Holy Faith	2					
Other orders	8	2	4	1		
Total:	22	10	16	22	12	8

[45]The accuracy of this conclusion, of course, depends upon both the extent of error in our measures of external constraint and our having identified all the important constraints.

Catholic independent; vocational; community/comprehensive; Mercy; Christian Brothers; Presentation Sisters; Presentation Brothers; Holy Faith; other religious orders.

Some patterns are immediately evident from Table 6.18. For example, as we noted earlier, cluster 4 is almost entirely made up of vocational schools, cluster 5 of community schools, cluster 2 is very largely Christian Brothers' schools but with two schools of other orders and two Catholic independent schools. Cluster 6 contains a majority of Christian Brothers' schools also. Mercy convents, the most frequently occurring of the religious orders in the sample, are found predominantly in clusters 1 and 3.

What does Table 6.18 tell us about curricular policy making? The fact that almost all community schools are in a single cluster suggests that they are all, in curricular terms, setting out to achieve the same goal.

A re-examination of Table 6.6 (cluster 5 results) will bear this out. This is, of course, the result of a policy decision, not of the school Principals, but of the Department of Education: furthermore, we noted earlier that Principals of these cluster 5 schools consider themselves to have the lowest overall mean score on our AUTONOMY scale.

Vocational schools are almost equally heavily concentrated in cluster 4, except that three of them are, apparently, more like community schools, and two fall into cluster 6. However, unlike the community schools, the curriculum of the typical vocational school tends to score below the average in at least some respects; earlier we noted the relative weakness of cluster 4 schools in the Science subjects. Again, given the strong relationship between one particular cluster and the vocational schools, and bearing in mind that cluster 4 school Principals score only slightly above those of cluster 5 on the AUTONOMY scale, we must conclude that the curricular characteristics of these schools are determined, not by the individual schools, but rather by a general policy, that is shared by the different VECs, about the curricular goals of vocational schools — namely primarily to provide a Technical/practical sort of curriculum.[46]

Turning to the two largest religious orders in the sample, we see that Mercy schools are almost equally divided between clusters 1 and 3, and Christian Brothers' schools are split between clusters 2, 3 and 6. Examining the latter first: the two CBS schools in cluster 3 are extremely small rural schools, indeed their mean size (214.5 pupils) is less than the mean of any of the clusters (Table 6.5). The CBS schools in cluster 6 have a mean size of 308 pupils and

[46]Such a policy derives, of course, from the original aims laid down by the 1930 Vocational Education Act and by the Department of Education Guidelines for Vocational Schools (1931) and later in 1942 by the Department's Memorandum V.40 (see Coolahan 1981, pp. 96-99). These documents established the practical orientation of the vocational schools' curriculum, and also sought to establish the goals of vocational education.

those of cluster 2 have a mean size of 555.3 pupils. However, there is a danger of over-emphasising the differences between CBS schools in clusters 2 and 6. Broadly speaking, these two groups of CBS schools correspond to large urban or town schools against small, rural schools. However, if we re-examine our earlier discussion, we see that both clusters 2 and 6 share what we have elsewhere referred to as an "instrumental" orientation in their curriculum. Indeed, they are both highly specialised in curriculum (Table 6.6) and very strong in the Sciences (Table 6.15). The major distinction between them (aside from their size) is the specialisation of cluster 2 schools in Commerce and the relatively high proportion of Technical subjects in cluster 6 schools. In general, this would seem to point to a specific CBS type of curriculum — instrumental and specialised — albeit with some distinctions according to school size and location.

In the case of Mercy schools, the existence of a general "curricular principle" is less easy to establish. The Mercy schools are found in those clusters with the highest mean levels of autonomy for Principals: in addition, Mercy schools are organised on a diocesan rather than a national or provincial, basis.[47] If we examine the regression results (Tables 6.12 to 6.14), we see that, in terms of curricular size and the proportion of the curriculum given over to Science and Modern Languages, clusters 1 and 3 differ significantly even when exogenous variables are controlled for. The distinction between those Mercy schools falling into cluster 1 and those in cluster 3 is not related to school size, religious or urban-rural location. Unlike the two groups of Christian Brothers' schools, it is not really possible to distinguish a common curricular theme linking the two groups of Mercy schools.

Outside these two orders, it is not really possible — because the samples of each are so small — to make any comparable statements about the curricular policies of the other orders. However, we note that in the cases of the three other orders for whom we have more than one school in the sample, in every case both the schools of each fall into the same cluster.

Summary

The stipulations of the Department of Education regarding subjects that must be provided at Leaving Certificate level leave a great deal of scope for decisions about the constitution of the curriculum to be made either at the individual school level or at the level of an intervening agency. Outside these formal stipulations, however, there are also generally held views and aims regarding the function of the different types of school. Thus, the community schools and the vocational schools fall into well defined groups. While the

[47]This is not, however, the basis for the distribution of the Mercy schools in clusters 1 and 3.

community schools are more directly linked to the Department of Education, and their curricula are the product of a specific centralised policy, the vocational schools are directly under the control of intervening agencies — the VECs. However, the view of what a vocational school curriculum should comprise appears to be very generally held; thus, the role of the VEC in curricular planning seems to be clearcut. That is, it operates within a clear consensus of what a vocational school curriculum ought to include.

The two orders, of which our sample included a sufficiently large number of cases to enable us to make statements about their curricular objectives — the Christian Brothers and the Mercy Sisters — presented contrasting pictures. While the former seemed to share a common curricular theme across all their schools, around which there was some variation as a response, we believe, to the geographical location of the school (of which school size is probably a consequence), the Mercy schools fall into two distinct clusters, and this was not amenable to explanation on grounds of size, geographical and diocesan location, or sex-mix.[48] Taken together with the high score for Mercy schools on the AUTONOMY variable (a mean of 0.74), this suggests that Principals of these schools enjoy far more freedom in curricular planning than those of vocational, community or Christian Brothers' schools. Indeed, if we examine Table 6.19, we see that girls' schools in general enjoy greater autonomy than either boys' schools or coeducational schools, and that this is not solely the result of the high autonomy of girls' Mercy schools, since the other girls' schools (all of them run by religious orders) enjoy an almost equally high degree of autonomy.

Table 6.19: *Mean Values on* AUTONOMY *Variable of Schools Cross-classified by Sex-mix and Type (n = 90)*

	Sex-mix			
Type	*Boys*	*Girls*	*Coed.*	*Overall*
Independent:				
Protestant and other	—	—	.39	.39
Catholic	.78	—	.65	.70
Vocational	.25	—	.46	.44
Community	.38		.37	.37
Religious run:				
Mercy	—	.77	.69	.74
Christian Brothers	.63	—	—	.63
Other orders	.68	.71	.47	.65
Overall	.61	.73	.48	

Grand mean = 0.57.

[48] Of the Mercy schools in cluster 1, five were girls' schools, three coeducational. In cluster 3, one was a girls' school and two were coeducational.

The low score for coeducational schools is due to the low scores of the vocational and community sectors, which we have already discussed, and to the low scores of the "Other orders" and the Protestant and other schools. The low score of the latter is probably due to the high degree of importance and power accorded to the boards of management in these schools. However, these boards are not integrated at any higher level for the purpose of curricular planning. On the other hand, the independent Catholic schools, as we should expect, enjoy a comparatively high level of autonomy.

In discussing the question of Principals' autonomy in curricular decision-making, although the autonomy of community school Principals is very low, this is somewhat irrelevant. If we see the curricular make-up of any school as the result of decisions about the allocation of scarce resources (that is, a school can teach a limited number of subjects; how many of these should be in certain subject areas?) it is evident that resources have not been scarce in these schools; community schools have the largest, strongest curricula of any schools. In other words, the question of the allocation of scarce resources does not arise — in as acute a form — here as elsewhere.

We have claimed that vocational school curricula are, by and large, a response to generally held views of what the aims of these schools are, which are implemented by the VECs, and that Christian Brothers' schools have a broadly homogeneous curriculum, due less to individual Principals and more to the centralised structure of the order. On the other hand, girls' schools, and particularly Mercy-run schools, show high levels of Principal autonomy. This is not to say that their curricula will all be different — indeed the clustering process suggests that there are basically two types of girls' school curricula (clusters 1 and 3) — but that this is the result, not of any co-ordinating agency that is determining the make-up of the curriculum, but rather of generally accepted beliefs, held by Principals, about what girls' curricula should be like.

School Clusters and School Type

Finally, in this chapter we want to draw together our findings to show how girls', boys' and coeducational schools vary in regard to their curricula and school ethos.

The only new variable to appear in Table 6.20 is CHOICE, a measure of the average amount of subject choice at Inter. and Leaving Cert., reported by pupils; the higher the score, the greater the choice. This variable's construction is described in Appendix 6B.

If we first examine boys' secondary schools, we see that their characteristics are an amalgam of those reported for clusters 2 and 6; that is, these schools have highly specialised curricula (as do clusters 2 and 6) offering relatively little pupil choice of subjects, with a concentration on Science subjects and

Table 6.20: *School Characteristics According to School Type*

	School types (mean scores as deviations around the overall mean)					
	Overall Mean	*Boys'*	*Secondary Girls*	*Coed.*	*Vocational Schools*	*Community Compreh.*
Specialisation of Curriculum*	4.08	1.09	–0.31	–0.16	–0.08	–1.09
Size of Curriculum:	10.53	–0.48	0.67	0.12	–1.49	2.87
Proportion of Science:	0.29	0.10	–0.01	0.01	–0.09	0.01
Proportion of Commerce:	0.17	0.04	0.00	0.01	–0.04	–0.02
Proportion of Languages:	0.13	0.01	0.04	–0.01	–0.03	–0.05
Proportion of Technical:	0.12	–0.09	–0.12	–0.05	0.17	0.11
ACHETHOS	2.94	0.20	0.00	–0.02	–0.15	0.06
SCHTEACH+	2.09	–0.12	0.04	0.00	0.07	–0.01
TEACHNEG+	2.94	0.12	–0.02	–0.07	–0.06	0.06
CHOICE*	1.18	–0.08	0.34	0.13	–0.47	0.46
MEAN IGPA	4.35	0.43	–0.10	0.01	–0.28	0.00

* These figures control for curriculum size
\+ These figures control for social class

Commerce (the latter deriving mainly from cluster 2 schools). The high achievement ethos of boys' secondary schools is primarily due to the influence of cluster 2 schools, but both clusters 2 and 6 scored low on the measures of teacher/pupil relations (SCHTEACH and TEACHNEG) and so, accordingly, the means of these variables are low for all boys' secondary schools.

In many ways girls' secondary schools present almost the opposite picture. Although, on average, girls' schools offer more subjects than any other, except community schools, their curricula are markedly unspecialised, and contain an above-average proportion of languages only. Even then, as we have seen, this is due almost entirely to the girls' schools in cluster 1. Their achievement ethos is much lower than that found in boys' schools, but relations between pupils and teachers are perceived to be more positive. Wide choice of subjects is offered to pupils, as compared with most other school types, even when we control for the effect of curricular size (we do this because one would expect schools with large curricula to offer a wider choice). The contrast between boys' and girls' secondary schools in MEAN IGPA is interesting. One reason why it is so large a gap is that boys in secondary schools are, on entry to secondary school, a more highly selected group than girls, for the reason that more boys than girls attend vocational and community schools. Thus, we should expect boys in secondary schools to achieve more highly than secondary school girls. Furthermore, boys are more likely to drop out of secondary school than girls both before and after Inter. Cert. The net result of these trends is that Leaving Cert. boys constitute a more highly selected sample than do Leaving Cert. girls, and we should expect, as a consequence, their mean IGPA to be higher. This means, for example, that we cannot use our measure of mean IGPA to guage the quality of teaching or anything similar. However, it can be taken as indicative of a possibly crucial fact, which is that girls' schools are much better at retaining lower ability pupils up to Leaving Cert. Whereas low ability boys have only a small likelihood of acquiring the Leaving Certificate, low ability girls have a much greater likelihood. How this retention of girls, and, conversely, the loss of boys, is achieved, is not altogether clear. What is clear, however, is that girls' secondary schools, in their organisation and ethos, and in their interaction with pupils and parents, who possibly are operating in the light of their beliefs about job market opportunities, are far more successful at retaining, and generally securing, higher levels of qualifications for their low ability pupils than are boys' schools. On the other hand, boys, unlike girls, are susceptible to factors such as the availability of apprenticeships, that will tend to draw them out of formal education at an earlier age. Since these opportunities do not exist for girls, one would expect them to be less likely to want to leave school before the Leaving Cert.

There is no clear correspondence between any of the clusters and the coeducational secondary schools since they are spread across clusters 1, 3 and 6. On most of the variables listed in Table 6.20, they score at or about the mean. On the other hand, vocational schools and community schools correspond almost exactly with clusters 4 and 5 respectively. Any differences there are due to the presence of four non-vocational schools in cluster 4 and of four non-community schools in cluster 5, as well as to the presence of a few vocational schools in clusters 5 and 6 and one community school in each of clusters 4 and 6. These effects are minor, however, when set against the presence of 18 of our 23 vocational schools in cluster 4 and eight out of 10 community schools in cluster 5. Of the features associated with vocational schools (small curriculum, low degree of specialisation, concentration of the curriculum on Technical subjects, low concentration on Science, low ACHETHOS) only the very low level of choice calls for additional comment. As stated earlier, the figure given in Table 6.20 controls for the effect of curricular size, hence the small average curriculum of vocational schools cannot account for the low degree of choice offered. Rather, it seems to be a function of the sex-specific subject allocation policies followed in these schools, alluded to earlier, that is, that at Inter. Cert. especially, subjects are allocated not according to pupil choice but rather according to sex (and possibly perceived ability level also).

Finally, the picture we get of community schools from Table 6.20 is the same as that we have built up of cluster 5, i.e., large unspecialised curricula, with considerable choice afforded to pupils.

Conclusions and Summary of Findings

We have argued in this chapter that much of the variance between school curricula is attributable to management policies rather than external constraint. This argument has been set out in detail earlier in the chapter, so we will not repeat it here.

We have already seen (Table 6.5) that the distribution of schools according to their sex mix is not constant over all clusters. So, boys tend to be spread fairly evenly across the clusters; thus, the effects of being in a particular cluster will, taking the male sample as a whole, appear less than for girls. Girls' schools are, as we have noted, largely restricted to two clusters. Thus, the effect of being in those clusters will show itself in the total girls' sample in a manner which will not hold for boys. Put another way, taken across the sample as a whole, boys experience a greater variety of curricula than do girls. To give a concrete example, all girls in single sex schools are exposed to a curriculum weak in Technical subjects, and not particularly strongly orientated towards Science (though well provided for in Science in the case of cluster 1). Some boys, on the other hand, are in a similar position. Those in boys' schools in clusters 1, 2 and 3 are almost equally badly provided for in the Technical subjects; however, those in boys' schools in clusters 5 and 6 are relatively well provided for. Likewise, although some boys in single sex schools are subject to curricula that are not strongly Science-orientated, others (in clusters 2 and 6) are in schools that clearly put a heavy emphasis on Science.

The main findings of this chapter may be summarised as follows:

1. As one moves from Inter. to Leaving Certificate level, provision differences between school types (secondary, vocational and community/comprehensive) and between boys', girls' and coeducational schools, appear to widen.

2. The curricula of the 90 schools in our sample can be broadly divided into six basic types, one of which we could label a vocational school curriculum, another a community/comprehensive school curriculum. The remaining four types, which relate to secondary schools, reveal two basic types of boys' school curriculum (these tend to be very specialised, concentrating resources in a limited number of subject areas) and two types of girls' curriculum, one of

which comprises schools that are well provided with subjects in a range of areas, the other comprising schools with a very broad range of subjects but with very little depth of provision in any specific area. Neither girls' curricula appears to encourage subject specialisation (whereas the boys' curricula appear to make it almost mandatory) and in schools with the latter girls' curriculum, specialisation would be impossible. Rather, girls' education is more general and broadly based. We suggested that this distinction is related to the type of ethos informing the education of the sexes — a clearly instrumental job-orientated ethos in the case of boys, a non-instrumental less clearcut ethos in the case of girls.

3. In attempting to account for the variation among schools in curricular size and in the proportions of the curriculum given over to specific subject areas, we found that variables representing external constraints on the school, such as the number of teachers, the age of the school, its location, and so forth, account for only a part of this variation. We argued from this, and from the evidence of the clusters, that school management decisions are, and have been, crucial in shaping schools' curricula, particularly in the secondary sector.

4. In the case of vocational and community/comprehensive schools, we argued that the curricula of particular schools owe less to individual Principals, or even to VECs and CEOs, than to the centrally established objectives of vocational education and of the community/comprehensive schools.

5. In the case of secondary schools, we argued that there is a contrast between the Mercy schools and the CBS, in so far as individual Principals report having greater decision-making autonomy in the former, while the latter appear to have less variation in their curricula, and Principals report less autonomy. Our data did not allow us to make similar inferences for other orders. In general, Principals of girls' schools report the highest levels of autonomy, while Principals of vocational and community/comprehensive schools report the lowest levels.

6. In terms of provision differences at a school level, it is clearly the differences between girls' and boys' schools that are crucial, and, since the vast majority of single sex schools are secondary schools, this in fact means the differences between boys' and girls' secondary schools. In the final section of this chapter, we tried to draw together our earlier work to provide profiles of the typical or average boys' and girls' school. Roughly, the distinction took the following lines: boys' schools have a high achievement ethos, have very

specialised curricula with a clear instrumental bias (i.e., towards Science for example, rather than Arts) offering pupils relatively little choice of subjects, and are internally selective, in the sense that academically weak pupils are not retained. Against this, girls' schools have, on average, a modest level of achievement ethos, they have unspecialised liberal curricula and offer relatively wide scope for choice to pupils, while being less internally selective, that is, retaining more lower ability pupils. For example, Leaving Cert. pupils in girls' schools show eight times more variance in their mean IGPA (1.12 against 0.12) than do pupils in boys' schools. Finally, we noted in a previous section that Principals of girls' schools generally have much more autonomy in regard to decisions about the school curriculum and the organisation of the school, than do Principals of boys' schools. Such differences as we have isolated here are crucial in accounting for the discrepancies between the sexes in the rates of take-up of subjects, particularly the senior cycle Sciences.

In this chapter we have primarily been concerned with provision differences and in the next chapter we shall chart the development of the curricula of secondary schools between 1968 and 1978. However, we have also tried to demonstrate that curricular differences are related to other aspects of the school's organisation, particularly its "ethos", and in Chapter 9 we shall try to assess the impact of differences between schools in, for example, the level of achievement orientation or ethos, on the rates of subject take-up.

CHAPTER 7

Changes in School Curricula and Subject Take-up 1965–1978

In the previous chapter we sought to assign a relative weight to external constraints as against school management decisions in determining the curricular characteristics of schools. In this chapter we shall briefly discuss the factors influencing the development of secondary school curricula over the period 1965–78. In doing this we shall draw on our examination records for 125 secondary schools. Thus, the analysis will not correspond directly to that of Chapter 6, since we have no data on vocational or community schools. Furthermore, since our data come exclusively from examination records, the amount of information we possess about a school, its characteristics and those of its environment, is much less than in the sample of 95 schools used earlier in the analysis. Nevertheless, as we shall see, enough such information is available to show quite substantial differences between schools in subject provision levels and patterns both in the 1960s and 1970s, as well as in the extent of change in their curricula between 1965 and 1978.

The debate on curricular provision in Ireland has focussed almost exclusively on school size. As we have already seen many factors other than size — whether a single sex or coed school, the social class characteristic of the pupil body, and management decisions, for example — have substantial influences on the curriculum provided by a school. As we shall see in this chapter these essentially social or institutional factors have also had substantial influence on curricular change over the period 1965–1978.

The period 1965–78 was one of rapid expansion of the Irish educational system. The number of students in fulltime second-level education doubled, leading to a rapid growth in the size of second-level schools. One consequence of this expansion was the growth of school curricula. In the first section of the chapter we examine changes in the curricula of secondary schools between 1965 and 1978, as well as the relative influence of a few explanatory variables on difference in curricular size and type in both 1968 and 1978. In the second part of the chapter we analyse school changes over the decade 1968–78: what kind of school changed most and what kind changed least? In the final part of the chapter we describe the associated changes in the take-up levels of different subjects and subject combinations by boys and girls between 1965 and 1978.

Curricular Changes in Secondary Schools: 1965–1978

Given the rationalisation of second-level schools and the rapid increase in pupil numbers, actual secondary school size increased more rapidly than overall pupil numbers indicate, (Table 7.1). Average school size roughly doubled between 1965 and 1978: the most rapid increase being in the post-1967 period. The number of Leaving Cert. subjects taught did not increase as rapidly as did the number of pupils/teachers.[49] But over time the relationship between the two becomes more pronounced.

Table 7.1: *Average number of pupils and subjects per school; and correlation between size of school and curriculum 1965 to 1978 (Source: sample of secondary schools)*

Year	1965	1968	1972	1975	1978
No. of schools in sample†	105	111	119	121	125
Average No. of pupils per school	194	236	305	334	371
Average No. of Leaving Cert. subjects provided per school	8.2	8.6	10.2	11.3	11.4
Standard deviation	(3.0)	(3.1)	(2.6)	(2.3)	(2.8)
Correlation between					
Number of pupils in school and Number of Subjects	.49	.54	.62	.65	.71

†In the earlier years — particularly 1965 and 1968 — the sample is slightly biased towards larger schools — the smaller schools which closed or amalgamated being underrepresented.

In the mid-1960s very little (around 24 per cent) of the variation in curriculum size is explained by school size or pupil/teacher numbers. But by the late 1970s around half of the variance in subject numbers is so explained. In the post "Free Education" period the correspondence between pupil/teacher/subject numbers appears to have significantly increased: with around 95 per cent of schools in the "Free Scheme" in the 1970s teacher numbers appear to have become much more closely tied to pupil numbers — particularly given the decline in clerical teachers and in the significance of private

[49]An almost perfect correlation ($r = .95$) exists between number of teachers and number of pupils in the 1970s.

and religious contributions (Tussing, 1978). It also appears that much the same process has occurred in the provision of subjects — they have become much more closely tied to the provision of direct state supported teachers and facilities as time proceeded.

As schools increased in size their curricula expanded, and as a consequence, so did differences amongst pupils in the type and level of subjects being taken. Since the average number of subjects taken per pupil in the Leaving Cert. has remained relatively stable, at around 7.0, over the period, the choice of discretionary subjects has considerably widened. Almost all pupils do Irish, English and Maths. In the mid-1960s there was very little choice amongst the remaining subjects, the average school providing only five other subjects. But by the late 1970s the average pupil could choose four from amongst eight optional subjects being offered — excluding the obligatory subjects of Irish, English and Maths. So, if we examine changes over time in the distribution of pupils over the widening curriculum provided by schools, we can see a growing divergence amongst pupils in the discretionary subjects taken up (See Appendix 7, Table 7A.2). Much greater pupil/subject distinctions now exist, particularly given the much greater possibilities for specialisation in the different subject areas.

Seven categories of subjects were isolated in order to examine curricular specialisation in terms of both provision and take-up. These categories are:

Science Subjects	Commerce/Business Subjects
Language/Literature Subjects	Accomplishment Subjects
Technical Subjects	Social Subjects
General Subjects	

Details of the method of analysis of school curricula as well as of the subject categorisation are given in Appendix 7A.1.

The following table shows the growth in the relative importance of different subject specialities in schools. The number of Science subjects has more than doubled and the number of Commerce subjects taught has increased from being virtually absent to almost two subjects: the proportion of the total curriculum given over to both, increasing from about one-fifth to almost two-fifths of the curriculum offered by the average secondary school. The number of "Social" subjects (History and Geography), "Accomplishment" and Language subjects has remained relatively stable; their proportionate significance actually declining. The overall impression is of an increasing Scientific, Commerce speciality in schools, to rise to an equal level of specialisation with Languages, History/Geography and Accomplishment subjects in general. The number of subjects taught at a higher level also increased markedly over the period — particularly in the post-1972 period.

Table 7.2: *Changes in the average number of Leaving Cert. subjects taught per school between 1965 and 1978*

Type of subjects taught in the Average School	*Year*				
	1965	1968	1972	1975	1978
No. of Schools	105	111	119	121	125
Average no. of Pupils	194	236	305	334	371
Average no. of Leaving Cert. Subjects	8.2	8.6	10.2	11.3	11.4
Average no. of Honours Subjects	6.0	6.5	6.6	8.3	9.3
Average no. of Science Subjects	1.2	1.1	1.6	2.2	2.6
Average no. of Languages	1.2	1.4	1.9	1.8	1.5
Average no. of Commerce Subjects	0.3	0.4	1.1	1.6	1.7
Average no. of Accomplishment Subjects	0.9	1.0	1.1	1.2	1.3

There were very wide differences amongst schools, however, in the type of curriculum offered to pupils, the most obvious difference being between boys', girls' and coed schools.

The Curricula of Boys', Girls' and Coed Schools, 1968 and 1978

An examination of Table 7.3 shows clear curricular differences in our sample of single sex and coed secondary schools in 1968 and 1978, the period of most rapid growth. It is evident that the proportion of coed schools has increased since 1968. Nationally, there are proportionately more Protestant schools (19 out of 23), and lay Catholic schools (18 out of 31) which are coed. Coeducation is less popular among religious run Catholic schools (91 out of 475). And of these 91 coed schools only ten are run by male religious orders, the majority of Catholic coeducational schools being run by nuns. Most of these latter coed schools have been established in the past twenty years, particularly in rural areas, mainly through the introduction of boys into what were formerly girls' convent schools.

The growth in the size of schools is clearly evident from Table 7.3. Coeducational and girls' schools have, on average, about two and a half times as

Table 7.3: *Curricular characteristics of secondary school sample according to school type**, 1968 and 1978*

	1968			1978			*Rate of Change* 1968-1978 [N1978/N1968]		
	Boys' Schools	*Girls' Schools*	*Coed Schools*	*Boys' Schools*	*Girls' Schools*	*Coed Schools*	*Boys' Schools*	*Girls' Schools*	*Coed Schools*
No. of schools in sample	47	54	10	46	51	28	—	—	—
Average size of school	258	230	164	367	422	283	1.42	1.83	1.73
Average size of Leaving Cert. class	34	25	21*	57	64	44*	1.68	2.56	2.10
Average no. of subjects offered	8.4	9.0	7.3	11.2	11.9	11.0	1.33	1.32	1.51
Average no. of Honours subjects offered	6.4	6.9	5.2*	9.6	9.7	7.9*	1.50	1.41	1.52
Average no. of Science subjects offered	2.0	0.4	0.7*	3.1	2.1	2.4*	1.55	5.25	3.43
Average no. of Commerce subjects offered	0.4	0.4	0.3	1.9	1.5	1.5	4.75	3.75	5.00
Average no. of Languages offered	1.4	1.5	1.0	1.5	1.8	1.2*	1.07	1.20	1.20
Average no. of Accomplishment subjects offered	0.2	1.7	1.0*	0.5	2.1	1.4*	2.50	1.24	1.40

*Indicates a significant difference (at $p \leq .05$) between the three school types.

**Schools are categorised by the number of boys and girls in the Leaving Cert. classes in school. Boys' and girls' schools have only one sex in the school; coed schools are so defined if more than one boy and more than one girls are present in the Leaving Certificate class. It was felt that this more stringent definition of being "coeducational" was necessary to indicate schools where the senior cycle was genuinely coeducational.

many Leaving Cert. pupils in 1978 as in 1968, while boys' schools have about one and a half; the growth in boys' schools corresponding roughly to the growth in school numbers. As against this, while girls' schools show a disproportionate growth in the senior cycle, growth in the average number of subjects offered at Leaving Cert. shows no significant differences according to school type at either date, and the average increase of 33 per cent in this area has been roughly the same for both single sex schools, though coeducational schools have shown a significantly greater growth of 51 per cent. It would appear, therefore, that girls' schools have not used their resource growth to the same extent as boys' and coed schools in developing their curricula.

This curricular conservatism appears to be limited only to the general curricular areas, however: History, Geography, Home Economics, Art and Music. In Science, and to a limited extent Languages, girls' schools have been significantly more innovative than boys' schools, though less innovative than coed schools. As a result sex differences in Science provision have been considerably reduced over the decade. Even in Commerce subjects, where the rate of growth has been somewhat faster in boys' and coed schools, differences are minor in the late 1970s. What has been remarkable has been the overall growth in these subjects.

In both 1968 and 1978, the provision of Honours subjects, and of Science and Accomplishment subjects, shows significant variation across the three types of secondary schools. For Honours subjects the distinction lies between the single sex and the coeducational schools, the latter offering relatively fewer Honours subjects. This cannot be attributed to the smaller curricula of these schools (since the ratio of honours subjects to all subjects is lower in coed schools); rather it suggests that coeducational schools were teaching more subjects only at a pass or "common" level. The latter certainly occurs for 1978, since we saw in Chapter 6 (Table 6.2) that coeducational secondary schools were more likely to provide the Technical subjects (which are taught and examined at a common level) than were single sex secondary schools. As to the number of Science subjects, the distinction lies between boys' schools and the rest: in both 1968 and 1978 boys' schools are significantly better provided for in Science subjects, though this difference has been substantially reduced. From a situation where less than half of girls' schools offered any senior cycle Science subjects in the 1960s, the average school now offers more than two Science subjects, all schools offering at least one. In the case of the Accomplishment subjects the situation is reversed, with boys' schools in 1968 and 1978 having considerably poorer provision of these subjects than either coeducational schools or girls' schools. Over time, however, the provision of these subjects — particularly Art — in boys' schools has considerably increased with slightly over half of boys' schools offering some of these subjects.

The only area in which statistically discernible differences have developed over the period is in the Language subjects. Boys' schools remain virtually unchanged in the number of Languages they teach, whereas girls' schools and, to a lesser extent coeducational schools, show a slight increase. The particular languages taught in boys' schools have, of course, changed significantly with a substantial drop in the classical languages.

It is not, therefore, in the number of subjects provided, but in what subjects are offered that sex differences are important. Boys' and coed schools have significantly more Science and Technical subjects than girls' schools; and, if one takes into consideration the significantly smaller size of coed and boys' schools, significantly more Commerce subjects also. Girls' schools offer more Languages, Home Economics and Music options than coed or boys' schools. Given that girls' schools grew at a much faster rate and are, on average, bigger than boys' schools, these curricular differences are highly significant. In the last section of this chapter we will try to control for this differential increase in school size and examine the way in which such increases in opportunity were actually used in different school types.

Factors Influencing Curricular Size, and Composition in 1968 and 1978

In the previous chapter we attempted to account for the size of school curricula and their composition in terms of a number of variables, paying particular attention to school management decisions within boys', girls' and coeducational schools. Given the findings of our previous chapter regarding the significance of certain school characteristics in determining the curriculum, we would, therefore, expect that such school factors as school size or changes in school size, whether the school was in the "Free Scheme" or fee paying, whether rural or urban and whether, of course, it was a boys', girls' or coed school would all have significant influence on curricular provision.

Size of school, and changes in its size, is expected to be the main variable explaining the number of subjects taught. For every 19 fulltime registered pupils, secondary schools were entitled to an additional teacher paid for by the Department of Education. The number of pupils, therefore, determines the number of teachers, and the number of teachers should be highly predictive of the number of subjects available to be taught in school. An increasing number of teachers allows the school to add subjects to the curriculum. A stable teacher/pupil body gives very little leeway to a Principal to increase the school's subject range — unless there is a reservoir of underused subject qualifications and teacher hours amongst the teacher body; or unless older teachers are retiring and being replaced.

The rather naïve hypothesis is being proposed, therefore, that the larger the school the greater the subject range; and the greater the increase in pupil and teacher numbers between 1965 and 1978 the greater the addition to the number of subjects taught by the school.

But the latitude allowed to school managements by increasing pupil/teacher numbers may not be used. Given the obviously more instrumental attitude to education that is likely to be taken by boys' schools, for instance (given the traditionally greater saliency of labour market or career objectives in these schools), one would expect that boys' schools, as they increase in size, would feel under a greater pressure than girls' schools to increase the more instrumental subjects — Science, Technical and Commerce subjects. Whether and what kind of subjects are added, therefore, depends on the objectives of the school and the extent to which the school management authorities actually plan to reach these objectives. School managements which have an unselfconscious, taken for granted, view of their objectives, particularly where these have remained unquestioned for some time and with little pressure from parents or teachers, will obviously be in a different situation from other schools where this is not the case — where managements have changed, where the local economic or social environment has changed, or where the school changes from a single sex to a coed school, etc. Unfortunately we do not have many details of such school management characteristics. But we can contrast the behaviour of boys', girls' and coed schools; schools which remained fee paying when the "Free Scheme" was introduced in 1967; schools which changed from single sex to coed schools; schools of different sizes and different rates of growth; or schools run by different orders, etc. Given the major differences between orders in their objectives, their organisational structure, and the main social class towards which their efforts are being directed, one would expect significant differences between these religious orders. Some of the Catholic orders and the majority of the Protestant schools in our sample cater almost exclusively for the upper middle class. Given their social mobility functions and the much greater significance and saliency of educational expectations amongst both the parents and the pupils in these schools, they are likely to be more innovative in practice than other schools where school managements are under less "expectational pressure".

The cultural and socio-economic characteristics of the pupil body in the school have been shown to be the most important variables in educational achievement in almost all national and international studies (Coleman *et al.*, 1966; Jencks, 1972; Halsey *et al.*, 1980, Madaus and Kelleghan *et al.*, 1979); to the point indeed that Coleman *et al.*, concluded that schools themselves had no significant influence on educational achievement independent of familial and general social background characteristics. Later studies (Madaus *et al*, op. cit. and Rutter *et al.*, op. cit., 1979) however, clearly showed such a "school effect". Two indicators of the social class characteristics of the school are employed here: the median social class characteristics of the school as estimated from the responses of Inter. Cert. pupils in our national sample study of schools in 1981. There were only 57 secondary schools in that sample. However, since they were completely representative of the original Exam Study sample — every second school in the original list having been taken — we can validly generalise the resultant statistics to the total sample of schools. To check on this a second, but rather crude, index is employed: whether the school entered the Free Scheme in 1967 or not and remained in it or not; those few remaining fee-paying schools after 1967 being dominantly upper middle class in composition.

In the following, therefore, we examine the main factors influencing curricular size and composition in 1968 and 1978. The subsequent section examines the main factors influencing curricular change or growth between 1968 and 1978.

In this section we explore the relationship between five characteristics of schools — whether a boys' or girls' school, whether fee paying or not, median social class of the pupil body in the school, and the size of place in which the school is located — and the main curricular characteristics of the school in 1968 and 1978.

The size of the school — as we have already seen — is moderately to highly predictive of curricular size. In the present sample of secondary schools the correlation was .54 in 1968, .71 in 1978, i.e., explaining about a quarter of the variance in 1968 and around half in 1978. Thus, school size has become a much better predictor of curricular size over time. As one might expect, size is significantly correlated with the number of individual specialist subjects in 1968 and 1978: with Science subjects (.44 in 1968; .43 in 1978); with the number of Commerce subjects (.35 in 1968; .50 in 1978); with the number of Languages taught (.31 in 1968; .50 in 1978), and with the number of Accomplishment subjects (−.05 in 1968 and .35 in 1978).

Although there is a consistent tendency for girls' schools to show a lower overall curricular response to increases in school size, these differences are not statistically significant. Nevertheless, this response difference is so important in the type of subject added that for most of the following analysis boys' and girls' schools will be treated separately.

These school differences in responses are shown quite clearly in the following table where, as a preliminary to further analysis, we control for school size and examine the relationship between a set of school characteristics and the size and composition of their curricula in 1968 and 1978.

Table 7.4: *Parial Correlation (Pearsonian) Coefficients — Controlling for school size, between five school defining variables and seven curricular variables characterising schools. (N=112 schools in 1968 and 125 schools in 1978. Partial r² of .16 or greater are statistically significant at the .05 level)*

Dependent Variable	*Year*	*Boys' School**	*Girls' School**	*Fee Paying School*	*Size of Place**	*Median Social Class of Pupil Body**
1. No. of						
Subjects	1968	−.16	+.19	+.23	−.14	−.32
Provided	1978	−.09	−.06	+.13	+.25	−.29
2. No. of						
Honours						
Level	1968	−.10	+.18	.19	—	−.29
Subjects	1978	+.20	−.12	.17	+.08	−.43
3. No. of						
Science	1968	+.54	−.52	+.29	−.06	−.46
Subjects	1978	+.36	−.43	+.18	−.04	−.49
4. No. of						
Commerce	1968	−.10	.10	.06	.07	−.07
Subjects	1978	.19	−.28	−.14	.15	.01
5. No. of	1968	−.04	.09	.38	−.17	−.41
Languages	1978	−.08	.13	.43	−.06	−.40
6. No. of						
Accomplish-ment	1968	−.78	+.76	−.07	+.02	.13
Subjects	1978	−.70	+.59	.01	+.21	.16
7. No. of						
Technical	1968	—	—	—	—	—
Subjects	1978	.15	−.21	−.11	.11	.10
8. No. of						
General**	1968	−.63	.61	.08	.03	−.09
Subjects	1978	−.49	.31	−.15	.27	.12

*Variable Characteristics: (1) Boys', Girls' or Fee Paying Schools = 1, Else = o. (Dummy Variables). (2) Size of place has 6 values; Dublin = 1, to open county = 6; (3) Median social class of school pupils estimated from 1981 survey of Inter. Cert. pupils and, therefore, only estimated for half the sample (N = 57); 1 = Upper Middle Class; 2 = Lower Middle Class; 3 = Skilled Manual; 4 = Unskilled and Semi-Skilled Manual. The 1981 values are used for both years.

**General subjects = set of non-specialised subjects — minimising depth in most specialist areas.

Irrespective of size of school, boys' schools tended to have smaller curricula than others particularly in the 1960s. But what really distinguishes boys' from girls' schools is the composition not the size of the curriculum: being much stronger in Science, Commerce and, to a limited extent, Technical subjects

— usually Technical Drawing; the distinction in the latter subjects only becoming apparent in 1978. Girls' schools show a disproportionate investment in Accomplishment subjects, Languages and General subjects. They are particularly weak in Science subjects in both 1968 and 1978, and Commerce subjects by 1978. Interestingly, while girls' schools appear to have been significantly more academic than boys' (in the number of Honours level subjects offered) in the 1960s the opposite was the case in the 1970s. Of course, girls' schools increased very rapidly in size in the interim, while boys' schools captured relatively less of the growth in pupil numbers over that period and also showed a lower retention rate of boys moving from junior to senior cycle. As a result a much lower proportion of low ability boys now go on to do the Leaving Certificate in secondary schools than girls — and a relatively higher proportion of boys doing the Leaving Cert. in these schools go on to third level. Boys' schools, in general, therefore, have become much more academic than girls' schools and, as a consequence, tend to teach more Honours level subjects.

For schools of a given size coed schools had significantly larger curricula than either of the single sex schools in 1978, though not in 1968. Surprisingly, girls' schools had the larger curricula in the earlier period, but both single sex schools had become disadvantaged relative to coed schools in the 1970s. As we shall see later the increasing significance of coeducation within the secondary sector brings with it a more comprehensive type of curriculum than either of the single sex schools.

The influence of social class or of fee-paying schools on curricular characteristics is striking, even using the crude measures involved. Using 1981 measures for half the sample, the relationship between the social class clientele of a school (in 1981) and curricular size, Science and Languages specialisation is quite marked for 1978. The fact that the same relationship holds — though in a weaker form — for 1968 indicates substantial continuity in the curricular and/or social class characteristics of schools over that decade. And what is equally striking is that the middle class schools are strong over the academic subject areas — Science and Languages — and are particularly strong in the number of Honours level subjects offered. The only areas where working class (or small farm) schools are at an advantage are the Accomplishment and Technical subjects.

Size of place has only a minor relationship to curricular characteristics in either 1968 or 1978 — smaller places tending to have slightly larger curricula particularly in Accomplishment, Technical and General subjects, in the 1970s. But smaller rural communities tend also to have more coed schools so that the relationships here could be spurious. This will be examined later.

Examined from the perspective of curricular specialisation, therefore, it appears that Science and Commerce specialisation is more characteristic of boys' and coed schools — and particularly of middle class schools for Science. Languages, General subjects and particularly Accomplishment subjects are most characteristic of girls' schools, the language speciality being most marked in girls' middle class schools. So, to conclude, it would appear from this that small girls' schools catering mainly for pupils from working class or small farm origins tend now to have smaller curricula, to have least Science or Commerce subjects and to be particularly strong in Accomplishment and General subjects. At the other extreme it would appear from these results that upper middle class boys' schools — particularly those that are fee paying — are particularly strong in Science and teach many more of their subjects at an Honours level than other schools. In many respects, therefore, the size of school is rivalled in the significance of its impact on curricular characteristics by the predominant sex attending the school as well as by the predominant social class characteristics of the pupil body.

Because many of these variables are interrelated with each other we attempted through a multiple regression analysis to control for all the relevant variables simultaneously. And because some of the relationships varied by whether the school was a boys', girls', or coed school this information was run separately for each school type. Because of small sample sizes not many of the individual relationships retain statistical significance but the following results consistently hold. (See Appendix Tables 7A.3 to 7A.11).

(i) The size of school is of critical significance in 1968 and 1978 being of slightly more importance in boys' than in girls' or coed schools. Although not statistically significant in individual regression, fee-paying schools had consistently larger curricula than others. There is some evidence in addition that schools in Connaught and Ulster had consistently larger curricula than others — controlling for all other relevant variables. (See Appendix Tables 7A.3 and 7A.5).

(ii) Science Curricula: School size again is a critical factor in both periods — particularly in boys' schools. Fee-paying schools had larger Science curricula than others. And again schools in Connaught, Ulster, and in 1978 Munster also, had larger Science curricula than in Leinster — all other factors being controlled. (See Appendix Tables 7A.4 and 7A.6).

(iii) Commerce subjects become of relevance only in 1978. Here again size is of crucial importance. But whereas fee-paying schools were more likely to have generally larger and more Science oriented curricula than those in the "Free Scheme", here they are consistently less likely to stock up on Commerce subjects; whereas schools in Connaught and Ulster are far more likely — particularly girls' schools. (See Appendix Tables 7A.7 and 7A.9).

(iv) Number of Language Subjects: (Tables 7A.8 and 7A.10). Here again larger schools, and fee-paying schools, consistently teach a larger Language speciality than other schools. Those religious orders which have traditionally oriented their teaching towards the education of the less well off (Christian Brothers, Mercy and Presentation orders) are consistently less likely to emphasise Language teaching in both periods. And they are more likely, if a boys' school, to emphasise Science and Technical subjects; or Commerce subjects if a girls' school.

To conclude, therefore, the most important relationship is that between pupil numbers and curriculum size, though the relationship varies by type of school, girls' schools had more subjects than boys' in 1968 and 1978 (all other things held equal), but as school size increased the differences between the two school types decreased slightly at both times. This response to increasing size of school was greater in coed schools, however, in 1978 (and indeed in 1968 — though that is not significant). In comparing coed with girls' schools the smaller the school the greater the relative advantage of girls' schools here. But as school size increased these differences disappear.

If, however, we turn to Science subject provision in 1978, we find a rather different picture (Appendix Tables 7A.4 and 7A.6). Controlling for all other variables, among schools of all sizes boys' schools provided more Science subjects than girls', and, as school size increased, this difference widened. Boys' schools also provided more Science subjects than coeducational schools of all sizes, but, as school size increased, this difference narrowed. Lastly, while among smaller schools (under 200 pupils) girls' schools provided more Science subjects than coeducational schools, above this number the situation was reversed, and, as size increased, the differences in Science provision (favouring coeducational schools) widened. These patterns can be seen in Table 7.5 where, taking schools of 150, 200 and 400 pupils we have estimated

Table 7.5: *Average Number of Science Subjects Provided in Boys', Girls' and Coeducational Secondary Schools According to School Size, Controlling for other Variables, 1978. (Estimates made from Multiple Regression Equations)*

School Size Pupils	*Boys Schools* (1)	*Girls' Schools* (2)	*Coeducational Schools* (3)	(1)-(2)	(1)-(3)
150	1.84	0.45	0.22	1.39	1.62
200	2.09	0.55	0.57	1.54	1.52
400	3.09	0.95	1.97	2.14	1.12
Average (calculated from Table 7.3)	2.44	0.89	0.94	—	—

the number of Science subjects taught, excluding the effect of all variables (except size) which we have controlled for in our analysis. We see that boys' schools always had more Science than girls' or coeducational schools, but that the difference between boys' and girls' schools increased as size increased (as shown in Column 4 of Table 7.5) while that between boys' and coeducational schools decreased (Column 5) with growing size.

Comparing girls' and coeducational schools, we see that with 150 pupils, provision favours the former; at 200 pupils, provision levels are roughly equal, but at 400 pupils there is a marked difference in favour of coeducational schools. Girls' schools, therefore, are always at a significant disadvantage when compared to boys' schools but are almost at an equal disadvantage in relation to larger coed schools.

The schooling of boys and girls is, therefore, consistently biased by provision arrangements, showing very little change in these respects between 1968 and 1978. Social class, region and, to a limited extent, the particular educational mission of the religious order running the school, have also been shown to be important. Although size of school has been shown to be consistently the most important determinant of curricular size the actual nature of the curriculum taught by schools is equally, and in some respects more, responsive to the sex and social class characteristics of the pupil body.

Changes in School Curricula, 1968 to 1978

In the preceding section we examined the relationship between certain school defining characteristics and curricular characteristics in 1968 and 1978. In this section we examine changes in the curriculum in a sample of schools over that decade of rapid change between 1968 and 1978. Here again some of the same set of factors are expected to affect curricular change: the size of school, and increases in the size of school between 1968 and 1978. The larger the increase in size the larger the expected growth in the curriculum. School size also in 1968, as we have seen is moderately correlated with curriculum size in 1968; so that, in both cases, it is hypothesised that the larger the original size the smaller the growth in the curriculum: smaller schools and more limited curricula having much more leeway to make up. The social class characteristics of the school, and whether it remained outside the Free Scheme or not, is expected also to have a significant influence on curricular growth: the more middle class the school and the more demanding the parental clientele the more change one would expect in the curriculum. Equally one would expect that schools whose environment changes radically — for instance, by single sex schools opening their doors to pupils from the other sex — would be far more likely to innovate than schools whose situation has not changed in these, or other, respects. These are the main explanatory variables we will use in the analysis.

Table 7.6 shows some of the more important changes in the school curriculum between 1968 and 1978. This table is based only on those schools which were present in our sample at both dates and did not change from single sex to coed over the period.

Table 7.6: *Net Changes in Boys', Girls' and Coeducational Secondary Schools, 1968-78. For those schools which remained unchanged in sex of pupils between 1968 and 1978*

	Boys' Schools ('68)	*Girls' Schools* ('68)	*Coeducational Schools* ('68)
Average school size 1968:	271	242	177
Average increase in school size 1968-78	88.6 (33%)	172.9 (71%)	75.3 (43%)
Average increase in number of subjects	2.56	2.57	3.00
Average increase in Science subjects	1.24	1.60	1.60
Average increase in Commerce subjects	1.49	1.11	1.30
Average increase in Language subjects	0.05	0.15	−0.10
Average increase in Accomplishment subjects	0.37	0.28	0.20
Number of schools in sample	41	47	10

The only significant difference between the three school types is found in their increase in size: that for girls' schools far exceeding coeducational or boys' schools. While boys' and coed schools would, on average, have added the equivalent of four teachers, girls' schools would have added eight. The increases in the number of subjects, however, do not coincide with this; coeducational schools have experienced, on average, the largest net increase in the curricula, despite adding less than half as many pupils as girls' schools. And boys' schools have added as many subjects with only slightly more than half as many additions in pupils and teachers. As an initial conclusion then it would appear that girls' schools have been significantly less innovative than boys' or coed schools. In all three types of school, curricular additions have been predominantly in the Science and Commerce subject areas. In Science the most poorly provided for schools in 1968 (coeducational and girls' schools) added most subjects (see Table 7.3 also). The increase in the Accomplishment subjects can also be seen to follow a similar pattern, with boys' schools, which were most poorly provided for in 1968, showing the greatest relative increase. Finally, the small net change of Languages hides substantial gross changes, with the loss of Latin and Greek, etc., being substituted for by modern Continental languages. In summary then the greatest growth in curricular size, relative to growth in pupil numbers, occurs in coeducational schools. While girls' schools showed the greatest pupil growth, this growth was not, however, matched by an equivalent increase in the curriculum — they were, in fact, on average the least innovative in their curricula.

While it can be seen, in Table 7.6, that there was a general expansion of curricula over the 1968 to 1978 period, we are interested both in what factors account for this expansion and their differential effects on boys', girls' and coeducational schools. Initially we sought to explain the growth in Leaving Cert. curricular size over the 1968-78 period. Increase in pupil and teacher numbers should be highly predictive of curricular growth; although, as we have seen, the relationship between pupil numbers and the size of the curriculum is not straightforward. However, since there is a finite number of examination subjects a school may offer, the growth in curricula will, therefore, we expect, depend on how many subjects the school already has. For example, if in 1968 a school had a large curriculum, then the number of subjects it could add would be less than the number a school with a small curriculum could add, regardless of the increase in pupil numbers. Such an influence must be allowed for in any discussion of curricular expansion, thus our first two explanatory variables were the number of subjects taught in 1968 (the effect of which is expected to be negative) and the growth in numbers of pupils 1968 to 1978 (which we expected to have a positive effect). Because original school size is highly correlated with curricular size, ($r = .54$, Table 7.1), we would need to control for starting size in any analysis.

Beyond these three basic variables — original school size, original curricular size and growth in pupil numbers — we were also interested in examining the effects of region (indexed by the two variables Munster and Connaught/Ulster); of whether the school was in the Free Scheme or not; whether the school was Protestant; and finally, in the case of those schools that had become coeducational since 1968, the effect of this transition. Of course, whether a school was a boys', girls', or coeducational school (categorised according to their 1968 sex status) should be one of the most important factors in determining both the extent and the nature of curricular change between 1968 and 1978. However, before we proceed with a more complex analysis it is necessary to examine the independent and joint effects of our two main control variables: the starting size of school and the initial size of the curriculum. This is done in Table 7.7.

Table 7.7: *The simple, partial and joint effects of school size ('68) on curriculum growth (1968-1978). (simple and partial correlation coefficients and standardised regression coefficients) (n=111)*

	Net Growth in the Curriculum	*Net Growth in Science Subjects*	*Net Growth in Commerce Subjects*	*Net Growth in Language Subjects*	*Net Growth in Accomplishment Subjects*	*Net Growth in Technical Subjects*
Simple r with school size '68	−.02	−.01	.30*	.10	.12	−.28*
Simple r with curriculum size '68	−.60*	−.48*	−.16*	−.58*	−.41*	−.79*
Partial r with school size '68 controlling curriculum size '68	+.45*	.29*	.40*	.39*	.16*	−.22
Partial r with curriculum size controlling school size	−.70*	−.54*	−.31*	−.66*	−.43*	−.78*
Standardised multiple regression coefficients						
School size '68	.43*	.29*	.42*	.34*	.15	−.01
Curriculum size '68	−.83*	−.61*	−.31*	−.70*	−.42*	−.79*
R^2 =	.49	.29	.18	.44	.19	.63

*Significant at $p \leq .05$

Original ('68) school size has a quite unexpected relationship to curricular innovation: having almost no direct relationship but, when one controls for the effects of the original curriculum size, it has a quite marked positive influence on curricular growth, except for the Accomplishment and Technical subjects. Given equivalent curricula, the larger the original school size the greater the extent of change. The starting curriculum, therefore, acts as a classic suppressor variable, positively related to school size but negatively related to curricular growth. Contrariwise, controlling for school size also accentuates the relationship of original curricular size to curricular growth: those schools (of similar size) which started off with larger curricula were substantially less likely to innovate than those with initially smaller curricula. This latter relationship is as hypothesised; and a consequent narrowing of curricular differences amongst schools has obviously occurred over the past decade as smaller and poor curricular schools caught up with their better provided counterparts. The former relationship, however, does require some further explanation: the only reasonable one available is that the larger schools in 1968 were the older, more mature and more middle class schools with a much older teacher body. They would, therefore, have had many more teacher retirements and replacements than their smaller and generally "younger" counterparts, and on average also would have had a more demanding clientele. However, we do not have sufficient background information on them to fully explore the reasons involved for their significantly greater innovativeness. There is no doubt, however, that it occurred.

Given these quite marked relationships the simplest way to show the effects of other school variables on curricular innovativeness is to control jointly for both the effects of original school size and original curricular size and see if any of the other variables proposed have any additional effect; schools which grew rapidly in size as against those which stayed unchanged or declined; whether boys', girls' or coed schools; whether middle class fee-paying schools or not; whether the school had changed from single sex to coed in the interim; and region. We had hypothesised that boys' schools would be more innovative in Science and Technical subjects; that girls' schools would be significantly less innovative in these respects; that middle class and fee-paying schools would be more innovative than working class and small farm schools, etc. The results of this partial correlation analysis are shown in Table 7.8, and will be discussed in terms of changes in the main curricular areas.

First of all, overall curricular growth is very strongly and independently related to pupil growth over the period as one might expect. But besides this, only two of the other variables are important: schools which changed from single sex to coed and schools in the Connaught-Ulster areas have been significantly more innovative than others. The effects of "school sex" or of

Table 7.8: *Multiple Partial Correlation (Pearsonian) Coefficients, which Index the Relationships Between Certain School Defining Characteristics and Growth/Change in the School's Curriculum, Controlling for Both School Size and Curricular Size in 1968***

Dependent Variables	*Growth in the number of pupils in the school*	*Boys' School*	*Girls' School*	*Coed School*	*Change to coed School*	*Region*		*Feepaying Schools*
						Conn/Ulster	*Munster*	
(1) Growth in the Total Number of	.40*	−.05	.08	−.06	.21*	.19*	−.10	−.04
Subjects Provided	(.19)	(.08)	(−.08)	(.02)	(.26)	(.10)	(−.03)	(−.18)
(2) Growth in the Number of	.15*	.33*	−.30*	−.02	.18*	−.02	.07	.09
Science Subjects Provided	(.24)	(−.06)	(.05)	(.01)	(.20)	(.03)	(.04)	(−.08)
(3) Growth in the Number of	.17*	.08	−.11	.05	.02	+.31*	−.15	−.20*
Commerce Subjects Provided	(.12)	(.14)	(−.14)	(.01)	(−.04)	(.25)	(−.13)	(−.22)
(4) Growth in the Number of	.34*	−.01	.12	−.19*	.12	−.21*	.04	.27*
Languages Provided	(.28)	(.04)	(.01)	(−.06)	(.12)	(−.16)	(.05)	(−.07)
(5) Growth in the Number of Accomplishment Subjects	.15*	−.41*	.39*	−.02	.08	−15*	−.11	.01
Provided	(−.01)	(.13)	(−.10)	(−.05)	(.03)	(.10)	(−.06)	(.03)
(6) Growth in the Number of	−.05	.12	−.18*	.10	.00	.40*	−.13	−.12
Technical Subjects Provided	(−.01)	(.13)	(−.10)	(−.05)	(.03)	(.10)	(−.06)	(.03)

*Significant at $p \leq .05$.
**Simple correlation is given in parentheses.

social class — as indicated by whether the school remained fee-paying or not — are minimal. So, except for the greater innovativeness of the Connaught-Ulster schools, gross changes in the "environment" of schools — in size and composition — are the most important influences on curricular change. However, overall figures can hide very substantial changes within the curriculum — gross changes in the overall size of the curriculum can hide major shifts in the type and mix of subjects being taught. The table, therefore, also gives information on the effects of these school variables on growth in the Science, Commerce, Language, Accomplishment and Technical subjects within these schools.

Growth in numbers is not nearly as important as school sex in determining changes in the Science curriculum: boys' schools have been significantly more innovative than other schools, while girls' schools have been significantly *less* likely to add Science subjects than other schools. Their overall greater tendency to add Science subjects being a reflection only of their original starting position. When this is controlled for they are clearly shown to be far less likely to have added Science subjects than other schools. Besides these factors, schools which changed to coed over the decade were also more likely to add Science subjects.

The underlying logic of additions to the Commerce and Languages curriculum of schools appears to be somewhat different: school sex appears not to be important, whereas social class, region and growth in pupil numbers is. Fee-paying or upper middle class schools are less likely to innovate in the Commerce area, but far more likely to do so in Languages. Schools in Connaught-Ulster have behaved with a reverse logic — more likely to add Commerce and less likely to add Language subjects. And while growth in pupil numbers is very poorly correlated with Commerce subject provision it is more highly predictive of Language growth.

The Accomplishment subjects show a pattern of response to change which in many respects is opposite to that of Science subjects: boys' schools are far less likely, and girls' schools far more likely, to add Home Economics, Art or Music subjects than other schools, while schools in Connaught-Ulster are also more likely to add in this area. And interestingly, like Technical subjects, growth in pupil numbers is not significantly related to growth in this curricular area.

The only two variables retain relationships to Technical curricular growth — girls' schools are less likely than other schools to add these subjects: and schools in Connaught-Ulster are far more likely to add them.

Overall, therefore, girls' schools have added Home Economics, Art, and Music subjects and, to a limited extent, Languages, to a far greater extent than other schools. They have been particularly remiss in adding Science, Technical and — surprisingly — Commerce subjects. Boys' schools, on the other hand, have been disproportionately innovative in Science and, to a more limited extent, Technical subjects. And schools which changed to coed schools have a much more general pattern of curricular additions — as one might expect given that they are roughly equally split between what were originally boys' and girls' schools which opened their doors to pupils of the opposite sex. The Connaught-Ulster schools are particularly interesting: they are far more likely, of course, to have been coed in 1968 and also to have changed to coed than in other regions, and they are also disproportionately geared toward serving small farm communities and, therefore, non-fee paying. Perhaps because of these complex factors they have been more innovative than other schools — particularly in Commerce, Technical and Accomplishment subjects, although weak in Science and Languages. As coed rural schools catering mainly for children from the small farm class they have a less academic bias and are more comprehensive.

Provision and Take-up Changes

Obviously schools would not have added subjects if they did not intend their pupils to take them. The objective of provision increases must have been take-up increases. This has been an underlying assumption of the analysis up to this point. Clearly, this would occur where new subjects are being added to the curriculum. But since the absolute number of subjects taken per pupil has declined to less than 7.0 on average over the period covered, such increases in the take-up of "new" subjects can only occur if other subjects' rate of take-up declines. Our objective here is not to explore the nature of the relationship between provision and take-up of subjects — this is explored in Chapter 9. Rather our objective is to see whether these underlying assumptions have any validity. The following gives a view of the overall changes in take-up rates (Table 7.9 and Appendix Table 7A.13).

First (Appendix Table 7A.13) there has been a significant decline in the average number of subjects taken in the Leaving Cert. from 7.2 to 6.7. This appears to have coincided with the very rapid increase in the number doing the Leaving Cert. after 1968. This increase in numbers also coincided with a decided fall in the average number of Honours level subjects taken in the Leaving Cert., as well as the overall performance levels in the examination. Obviously the average level of performance of those going on from the Inter. Cert. to the Leaving Cert. declined as the proportion of the cohort going on increased. Besides these two trends, however, the main shifts have not been that obvious. Science specialisation has shown some increase after an initial decline. Clearly specialisation in Languages has declined. There has also been

Table 7.9: *Average No. of Subjects of Different Types Taken in Leaving Certificate in the Sample of Single Sex and Coed. Schools 1965-1978*

Subject	*School Type*	*Year* 1965	1968	1972	1975	1978
Average No. of Honours Subjects done in the Leaving Certificate	Boys:	3.66	3.76	2.83	3.27	3.44
	Girls	4.36	4.65	2.75	2.87	2.93
	Coed[1] Boys	3.81	4.13	2.76	3.30	3.24
	Coed[1] Girls	4.31	3.87	2.24	2.32	2.57
Average No. of Science[2] Subjects taken in the Leaving Certificate	Boys	1.53	1.32	1.12	1.27	1.36
	Girls	0.27	0.30	0.46	0.60	0.86
	Coed Boys	1.49	0.76	1.02	1.30	1.26
	Coed Girls	0.25	0.08	0.38	0.46	0.80
Average No. of Business Studies[4] Subjects taken in the Leaving Certificate	Boys	0.30	0.34	0.56	0.77	0.85
	Girls	0.16	0.20	0.40	0.58	0.61
	Coed Boys	0.08	0.22	0.48	0.72	0.81
	Coed Girls	0.15	0.26	0.63	0.86	0.68
Average No. of Accomplishment[5] Subjects taken in the Leaving Certificate	Boys	0.07	0.06	0.15	0.13	0.13
	Girls	1.23	1.31	0.83	0.84	0.71
	Coed Boys	0.06	0.43	0.15	0.16	0.18
	Coed Girls	1.35	1.33	0.85	0.84	0.71
Average No. of Language[3]/Literature Subjects taken in the Leaving Cert. (other than Irish or English)	Boys	1.18	1.10	1.05	0.87	0.82
	Girls	1.08	0.93	1.13	0.98	0.88
	Coed. Boys	1.06	0.93	0.85	0.59	0.59
	Coed. Girls	0.67	0.77	0.85	0.64	0.74
No. of Pupils in Each School Type	Boys	593	728	1,067	1,064	1,232
	Girls	561	643	974	1,308	1,654
	Coed Boys	67	91	167	271	328
	Coed Girls	55	112	240	272	351
No. of Schools		110	112	119	121	125

1. Coed schools are defined as those in which there are more than 5 pupils of each sex in the school.
2. "Science Subjects" = Physics, Chemistry, Physics/Chemistry, Biology, Honours Maths, Applied Maths, Agricultural Science.
3. Languages = (Languages other than Irish or English): Latin, French, German, Spanish, Italian, Greek, etc. All figures from non-aggregated (school) examination data file.
4. Business Studies/Economics Subjects — Business Organisation, Accountancy, Economics, Economic History.
5. Traditional Female Role and Accomplishment Subjects: Domestic Science General, and Social and Scientific; Art, Music.

a significant decline in the popularity of Home Economics and History and Geography options. However, since different sorts of changes took place in boys', coed and girls' schools they need to be examined separately, as in Table 7.9.

Although the average number of subjects taken per pupil in the Leaving Cert. has declined from 1965 to 1978, much more significant changes have taken place in the level and type of courses taken. On average boys in both single sex and coed schools have taken significantly more Honours subjects than girls in the 1970s, the reverse being generally the case in the 1960s. Boys, we should remember, however, are now much more selected than girls at Leaving Cert. level. In both kinds of schools these sex differences have widened since the early 1970s. This is a considerable change from the low participation days of the 1960s when an equal Honours differential existed in the opposite direction, with girls, in general, taking more Honours level courses than boys. Obviously, the disproportionately greater increase in the participation rate of girls in the senior cycle in the 1970s has resulted in a disproportionate fall in the average level of courses taken. From 1965 to 1978 (with some recovery from the early 1970s) the average number of Honours subjects taken by girls in the Leaving Cert. had declined by 1.40 and 1.30 subjects in single sex and coed schools, respectively. The equivalent decline in boys' schools was 0.33, and a decline of less than 0.10 in coed schools, combining the varying 1965 and 1968 figures. It appears, therefore, that the increasingly "overloaded" secondary schools coped with their rapidly increasing numbers in the post-1968 period by an expansion in Pass level courses (see Table 7.2), the increase in the provision of Honours level courses as well as the take-up of these courses occurring only after 1972.

The main changes, however, have not been in the level of subjects taken but in the type of subject and subject combinations; with growth in Science, Honours Maths, and Commerce subjects; and decline in Language and Literature subjects, as well as in the Accomplishment subjects.

The pattern of Science subject choices has shown a consistent increase from the late 1960s, although with a small decline in concentration for boys in the late 1960s and early 1970s. Girls, however, have shown a consistent and, in relative terms, a more rapidly increasing interest in Science subjects from the late 1960s. As a result, the percentage difference between boys and girls taking Honours Maths, for instance, declined from 33 to 18 percentage points from 1965 to 1978; in Physics from 30 to 25; in Chemistry from 42 to 24; and in the percentage doing two or more Science subjects from 52 to 25. Sex differences in these respects are, then, slowly declining. But, the rate of boys' take-up of some of these Science subjects is still three to four times that of girls. (See Appendix Table 7A.14).

Biology has shown an interesting pattern of rapidly increasing female participation, in keeping with findings from other countries. In coed schools, however, the subject has been equally popular with both boys and girls, where a large sex difference exists between the single sex schools. (See Appendix Table 7A.14).

Specialisation in the Language/Literature option has shown a consistent decline for both boys and girls in all school types. Only minor sex differences occur at any stage in this specialty. The proportions taking two or more Languages (excluding Irish and English) has declined from 25 to 30 per cent of students in the late 1960s to less than 12 per cent in 1978, with the decline in coed schools being slightly greater than in single sex schools (Appendix Table 7A.14). Although the sex differences within any year are minor the relative changes in take-up are interesting: while boys in coed schools declined markedly in Language take-up that of girls actually increased — though not consistently so over time. That increase, however, does not hold for girls in single sex schools whose Language rates have declined slightly but consistently over time.

Participation in Commerce subjects has increased markedly and consistently for both boys and girls in all school types over the whole period. And sex differences, although slightly in the boys' favour, have remained small and relatively stable over the period.

Sex differences in the traditional "Female Speciality" subjects have shown a consistent decline over time. There are two main reason for this: slightly increasing proportions of boys taking mainly Art and Music subjects, and decreasing proportions of girls taking Home Economics subjects. However, the sex differences here are still very wide although, like Science subjects, they have been considerably reduced.

In all of these comparisons between the sexes over the time period covered coeducation appears to have only a slight advantage over single sex schools. Indeed in some comparisons — the number of Honours subjects taken, for instance — sex differences are slightly greater in the coed than in the single sex school. However, in three of the four measures of specialisation used — Business Studies, Home Economics, Language/Literature — sex differences are slightly, though consistently, smaller in coeducational schools than in the single sex schools. In the Science/Honours Maths option, no consistent trend emerges. These conclusions, however, are not based on any statistical evaluation. A very detailed Analysis of Variance of the effects of sex, school type and year on the above subject take-up changes was carried out and is given in Appendix Tables 7A.15 to 7A.17. The main conclusions from this analysis are as follows.

Using sex, school type and time (changes from 1965 to 1978) as the independent variables predicting the number of Honours subjects and the number of Science subjects taken, the statistically and substantially significant results are as follows: (i) sex differences in the number of Honours subjects taken change from a position in the mid-60s where girls on average took more Honours than boys, to a situation in the late 1970s where the reverse is the case — no doubt reflecting the disproportionate growth in female participation levels. (ii) Pupils in single sex schools take more Honours and Science subjects than in coed schools. (iii) Change over time is curvilinear with the lowest averages for boys in number of Honours (N Hons) and number of Science subjects in the early 1970s, decreasing from 1965 and increasing again to 1978. For girls there is a consistent increase in the number of Science subjects over the whole period.

Complex two-way interactions occur between the three variables: (iv) Sex differences in the number of Honours subjects taken (N Hons) are less between single sex than within coed schools, although no such effect occurs for the number of Science subjects taken (N Science). (v) Sex differences in N Hons, N Science and N Commerce subjects declined over time, although as we have seen, in N Hons boys have come to out-perform girls in these respects.

At an aggregate level these results suggest a significant improvement in the take-up of Science and Commerce subjects by girls and a narrowing of the sex difference over the 1970s. Whether, however, this is a result of the curricular changes earlier outlined is not at all clear. We need to look at this relationship at an individual school and pupil level. This forms part of the remit of Chapter 9, which examines in detail the complex of factors which mediate between subject provision and subject take-up at the school and individual pupil level. However, these relationships do show at an aggregate level a close correspondence between such improvements in provision (Tables 7.2 and 7.3) and improvements in take-up (Table 7.9) of subjects.

Provision changes by schools have, therefore, been shown to be largely responsive to school organisation characteristics. And these provision changes by schools appear also to be reflected in pupils' choices of subject and subject combinations within schools. The relationship between school provision and pupil choice is explored in detail in Chapter 9. Before we examine that question in detail, we need to examine one other crucial aspect of schools' provision — that of the qualifications characteristic of their teaching staff, and of the effect of variation in such teacher qualifications, and subject provision and take-up rates.

Conclusions

1. A very significant increase in the size of schools occurred over the period 1965 to 1978. Schools on average doubled in size, but girls' and coed schools increased more than boys' schools.

2. Corresponding increases occurred in the number and range of subjects taught in schools; with girls' schools, however, not innovating at the same rate as boys'.

3. As a result mainly of the increase in the range of subjects taught in schools, a very substantial increase has also occurred in the extent of differences amongst pupils in the type and level of courses being taken. Subject specialisation by pupils has increased markedly also, although this is more marked for boys than girls.

4. Partly reflecting, no doubt, the rapidly increasing participation rate, the average number of Honours subjects taken in the Leaving Cert. declined substantially from 1968 to 1972, with some recovery after 1972. Distinctions between Pass and Honours pupils also appear to have increased significantly — particularly in girls' and coed schools.

5. Sex differences in subject provision and take-up have declined over the period. A very significant growth has occurred in Science and Commerce subjects for both sexes, and some associated decline in sex differences. A decline in the take-up of Home Economics subjects by girls, has been allied to a growth in the take-up of Biology and Art and Music by boys. Nevertheless, sex differences are still very substantial — particularly in Honours Maths. Specialisation in Science and Technical subjects, and even specialisation in Commerce subjects, is still dominantly male. There has been, however, a much greater decline in sex differentiation at the Inter. Cert. level than at the Leaving Cert.

6. Size of school has become a much more important factor in curricular provision over time. It explains much more of the variance in provision in the 1970s that it did in the 1960s. Even by 1978, however, it only explains around half of the variance in the number of senior cycle subjects provided by schools.

7. Despite the fact that girls' schools grew at a substantially faster rate than boys' schools over the period covered, their provision improvements were roughly equal. The correlation between school size and subject provision, in fact, is somewhat lower in girls' than in boys' schools in 1968 and 1978. General improvements in the curriculum appear to have been mainly dependent on original school size, original curricular deficits, and extent of growth in pupil/teacher numbers over the decade 1968 to 1978. However, since different kinds of schools expanded their curricula in different ways this overall size of

the curriculum is not a good measure of the extent and nature of curricular change involved.

8. Boys' schools disproportionately expanded Science and, to a more limited extent, Technical and Commerce subjects over the decade. Girls' schools disproportionately added the Accomplishment subjects and Languages and were significantly less likely to add Science, Technical or even Commerce subjects.

9. Besides sex, the social class clientele of the schools, whether it changed from a single sex to a coed school and whether it was in the western region or not have had significant influences on the nature of curricular provision of schools, but also on the nature of change. Middle class schools have tended to have larger curricula, more Honours level subjects, and more Science and Language subjects than others of similar size in 1968 and 1978, and Commerce subjects also in 1978. Single sex schools which changed to coed tended to grow at a faster pace and to add subjects relatively evenly over the curriculum. And schools in the western and northern region in the generally smaller farm areas, were also more innovative but tended to add subjects in a pattern almost directly opposite to that of the urban middle class schools — adding Commerce, Technical and Accomplishment subjects.

10. Changes in the take-up of subjects in the Leaving Certificate by both sexes have paralleled these curricular changes, but have also reflected the explosive growth in pupil numbers between 1969 and 1973, by showing a general decline in the average number of Honours and Science subjects taken in the examination up to 1972. By and large, however, there has been a significant growth in Science and Commerce take-up since the early 1970s — and a narrowing of the sex differences in Honours Maths and Science. Specialisation, in general, however, is not characteristic of girls' subject choices in the Leaving Cert. the only areas where this occurs being in Languages and Accomplishment subjects, and in both cases there has been a significant decline in these respects since the 1960s without any compensating growth of specialisation in other areas.

11. The detailed analysis of the relationship between provision and take-up of subjects is covered in Chapter 9. Before we proceed to this, however, we need to examine one crucial intervening factor — that of the qualifications of teachers.

CHAPTER 8

The Qualification of Teachers in Schools: The Impact on Subject Provision and Take-up

One of the most widely held beliefs about the reasons for the low take-up level of Honours Maths and Science subjects by girls is that their schools are very poorly provided for in teaching and lab resources in these subjects. This commonsense hypothesis is tested in this chapter: that low percentages of girls taking Science subjects or Hons. Maths are due to the poor provision of Maths and Science teacher resources in their schools. We first need to know, therefore, whether girls' schools are so disadvantaged; and secondly, whether that disadvantage, if present, is actually related to low levels of Hons. Maths and Science take-up by girls.

For this purpose a detailed study of the qualifications of fulltime teachers of specified subjects in the sampled schools was carried out, and the relationship between these teacher qualifications and pupil take-up levels in specific subjects was examined.

The Data

The support of the Department of Education enabled us to study in detail the qualifications of fulltime teachers in the sample of post-primary schools in which pupil interviews were held in 1981. The data were extracted from the "Timetable" records supplied to the Department each October by all registered secondary and community schools. These "timetables" give the day, time, class, subject, year and the identity of the allocated teacher to each class period. From this record we know for each subject/class/year what teacher is assigned and how much time is allocated to each subject. The basic degree qualifications of each of these teachers were then extracted from the separate Registration file. This provides information on the subjects in which teachers qualified in their basic degrees or teacher certificates. From this combined information it is possible to examine the degree qualifications of teachers of all registered subjects in the school. For most part-time teachers, however, such qualification data are not available. But, as we shall see, for the main subjects examined, this is not a serious problem.

For secondary schools, both the comprehensiveness and reliability of the data appear to be high for most schools. By checking the qualification and other information on teachers in the Department's files against returns by the Principal in our school interviews, we checked the completeness of records. In *40* of the *52* secondary schools surveyed, over 90 per cent of the teachers returned by the Principal as being employed in the school were traced and the qualifications and teaching responsibilities obtained from these records. For a further *seven* schools, less than 20 per cent of teachers' (qualification) data were missing. In one school, it proved impossible to get information on around half of all teachers, so it was dropped from the analysis. Overall, the full qualification and teaching characterisation of 85 per cent of the remaining teachers in secondary schools were successfully traced. For those teaching Maths and Science subjects, the information is even more complete (see Appendix Table 8.1).

The quality of data for vocational school teachers is better, though in community schools it is slightly worse than that available for secondary schools. In community schools the main reason for incompleteness was the difficulty in tracing the original registration records for many teachers who had transferred from vocational schools. For all schools, qualification data are not available for 15 per cent of all fulltime teachers — varying from 8 per cent of fulltime teachers in vocational schools to 23 per cent in community schools. However, for the main subjects which interest us — Maths, Science and Commerce — full registration data were available for over 87 per cent of all subject teachers.

Twelve per cent of all teachers in the sampled schools are part-time, concentrated mainly in vocational schools and convent secondary schools (see Appendix Table 8.2). Most part-time teachers, however, are in non-examination (Religion; Civics; Elocution; PE, etc.) or "cultural" subjects (Art, Music) in most schools. In many convent schools retired members are involved. Over all schools, however, the percentage of Science or Maths teachers who are part-time is less than 4 per cent.

Overall, therefore, the data appear comprehensive and reliable and should provide a reasonably accurate picture of the qualifications of teachers in the sampled schools.

The Results

(i) The Qualifications of Teachers

The table below lists the main characteristics of the teaching body in the

Table 8.1: *The qualifications of teachers in different school types*

	Boys' Secondary Schools	*Girls' Secondary Schools*	*Coed Secondary Schools*	*Vocational Schools*	*Community Schools*
1. Number of Schools in Sample	22	22	13	26	11
2. Total Number of Pupils	8,462	10,008	4,020	6,967	6,582
(Average school size)	(385)	(454)	(309)	(268)	(598)
3. Total Number of Fulltime Teachers	512	595	251	490	428
4. Percentage of Fulltime Teachers with Qualifications in Different Subjects					
(a) Maths* (i) Full Qualifications	22.5	15.5	13.5	19.4	22.6
(ii) Partial Qualifications	6.4	8.3	9.1	7.1	4.6
(b) English	31.5	31.3	28.8	21.0	24.7
(c) Irish	31.3	25.7	24.5	17.0	22.6
(d) Science Subjects	16.6	10.9	17.8	11.2	16.7
(e) Technical Subjects	0.7	0.0	1.9	15.9	7.3
(f) Languages+	27.0	24.8	20.2	11.9	20.4
(g) Accomplishment Subjects	0.5	13.1	8.2	9.3	7.0
(h) Commerce Subjects	19.9	16.7	17.3	18.8	14.0
(i) History	31.8	20.9	22.6	15.0	21.0
(j) Geography	14.2	16.9	12.5	11.9	11.6
(k) French	10.4	17.5	12.5	7.9	10.7

* Full Maths qualifications means possessing at least a primary degree in Maths, Applied Maths, Statistics, Maths-Physics. Partial Maths qualifications means possessing at least a primary degree in Physics, Mechanics, Computer Science, Engineering, Experimental Physics, Accountancy.

\+ Other than Irish and English.

actual sample of 94 schools used. In the three obligatory subjects of Irish, English and Maths, the relative qualifications profile of secondary and community schools is remarkably similar. In community, vocational and boys' secondary schools, the relative proportion of teachers with qualifications (including partial qualifications) in Maths is roughly equal to that in Irish and English — the other obligatory subjects. But in girls' and coed secondary schools, there is a clear and statisticaly significant weakness in the percentage of teachers qualified to teach Maths, and to a lesser extent, Science.

Vocational schools, in general, have the most individual teacher profile, with the highest proportion of teachers qualified in Technical subjects and, with one exception, in "Accomplishment" and Commerce subjects. Compared to secondary schools, and partly because of this Technical specialisation, a lower proportion of their teaching body is qualified in the Languages or in History or Geography.

Maths teaching, although obligatory, and almost as extensively taught as Irish and English, is not served by an equally qualified teaching body, except in the boys' secondary schools and in community schools. Adding those qualified in closely related disciplines — Physics, Computer Science, Engineering and Accountancy — however, does increase the "qualification level" of teachers in Maths and related Sciences, to a roughly equal level to that in English and Irish. But only about one-third of such partly qualified teachers actually teach Maths in the junior or senior cycle. Maths teaching, in general, therefore, is more poorly provided for than the other major subjects. In this respect, girls' and coed schools are most seriously disadvantaged. Only in boys' secondary and community schools does one find a distinct Maths teaching advantage; although vocational schools, also, are almost equally well provided for.

In general, the different educational charters of these school types are clearly reflected in the qualifications profiles of their teacher bodies, vocational school teachers showing expected strengths in the Technical, Commerce and Accomplishment subjects; community schools showing their more comprehensive mission, and greater size — being almost double the size of vocational schools; and secondary schools specialising in the more academic subjects: Languages, Sciences and History and Geography, etc. Since the appointments procedures of the three school types also vary widely, it should not be unexpected that the vocational and community schools should exhibit their characteristic teacher qualification profiles. The Department of Education not only sanctions the details of the posts to be filled in these schools but also the qualifications of the teachers subsequently appointed, whereas in the private secondary school such decisions are internal to the school. Given, therefore, that teachers in vocational and community schools are assessed and appointed to teach particular subjects, their characteristic teacher qualification profile was to be expected; one might also expect a much closer relationship between subject taught and teacher qualification in these schools. This is explored in Table 8.2.

Table 8.2: *The percentage of all teachers of maths, science, Irish, English and commerce who are qualified*

	Girls' Secondary Schools	*Boys' Secondary Schools*	*Coed Secondary Schools*	*Vocational Schools*	*Community Schools*
Junior Cycle			*Percentage Qualified in Subject*		
1. Of those teaching:					
(a) Irish	78	77	68	71	82
(b) English	80	72	73	64	78
(c) Maths, Fully qualified	53	59	46	70	82
(Partly qualified)	(14)	(6)	(11)	(4)	(1)
(d) Science*	93	85	86	93	100
(e) Commerce	92	81	90	93	91
Senior Cycle					
2. Of those Teaching Senior Cycle Maths, Percentage Fully Qualified	67	76	64	84	83
(including Partly Qualified Teachers)	(81)	(79)	(73)	(84)	(90)
3. Of those Teaching Senior Cycle Physics, Percentage Qualified	100	96	92	100	100
4. Of those Teaching Senior Cycle Chemistry, Percentage Qualified	95	97	100	N.A.	100

*Science qualifications includes qualifications in Chemistry, Botany, Biology, Physics, Zoology, Microbiology, Geology, Biochemistry, Physiology, Agricultural/Horticultural Science, Rural Science (Diploma).

And, except for the teaching of Irish and English in vocational schools, this tends to be the case: a slightly higher qualification profile of junior and senior cycle subject teachers does occur in community and vocational schools than in secondary schools, particularly girls' and coed secondary schools. It is in Maths teaching, however, that the most serious problem arises.

In fact, on average, only slightly more than half of Maths teaching in the junior cycle is done by fully qualified teachers — a significantly lower qualified teaching force than in Irish or English, Commerce, or Science. In fact junior cycle Science is almost always taught by fully qualified teachers in all school types. There are two exceptions to low Maths qualifications, however, community and vocational schools provide much better qualified teachers in Maths than secondary schools — reflecting, perhaps, their generally better provision of these teachers but also the more rigid rules of appointment. However, since this is not the case for the teaching of Irish and English in vocational schools, where the qualifications of the subject teachers are roughly equivalent to those in the smaller coed secondary schools — obviously rigid appointment procedures do not of themselves prevent non-qualified teachers from being used.

There is only very limited support, however, for the view that poorly qualified Maths teaching accounts for the poorer performance of girls at junior cycle. Indeed, if we add the percentage of Maths teachers with related (Science or Commerce) qualifications, girls' schools turn out to have roughly equivalent levels of "qualified" Maths teaching staff to boys' schools. However, it appears that these "partly qualified" teachers are being disproportionately used in girls' schools — around half of them are teaching Maths, roughly twice the proportion of other schools (Table 8.3). In other respects, however, in comparing girls' with boys' schools, the former appear to have a slightly higher proportion of qualified teachers in almost all subjects in the junior cycle; except in Maths where girls and coed schools are at some disadvantage.

Table 8.3: *The utilisation of fully and partly qualified maths teachers in the different schools*

	Girls' Secondary Schools	*Boys' Secondary Schools*	*Coed Secondary Schools*	*Vocational Schools*	*Community Schools*
			per cent		
Of those Teachers Fully Qualified in Maths: Percentage not Teaching Maths in Junior *or* Senior Cycle:	12	17	11	24	16
Of those Teachers Partly Qualified in Maths (Science/ Commerce): Percentage Teaching Maths in Junior or Senior Cycle:	49	26	32	13	20

It is in the coeducational secondary schools, however, that we find the most poorly qualified Maths teaching of all school types (Table 8.2). Indeed, across most subjects the level of qualifications of subject teachers in coed secondary schools appears to be the lowest. On the other hand, community schools are the best served across most subjects: their size, newness and design obviously reflected in their teaching body.

Of course, much of junior cycle Maths teaching can be done effectively by non-qualified teachers. Indeed, it may well be that a good teacher with a good Honours Maths Leaving Cert., or with Maths in the first year of a University degree course, can teach the elementary levels more effectively than a fully qualified but unsympathetic Maths specialist. Unfortunately we cannot test this possibility in this study.

More qualified teachers are used for Maths in the senior cycle, with over two-thirds of the Maths teaching done by fully qualified teachers and around 80 per cent by fully or partly qualified teachers. Boys' schools do have a clear advantage over girls' and coed secondary schools in terms of the percentage of Maths teachers who are fully qualified. The smaller rural coed schools are the most seriously disadvantaged in both senior and junior Maths teaching. The community and vocational schools have, however, the most qualified Maths teachers at both junior and senior cycle levels and are, in fact, least likely to use partly qualified teachers.

(ii) The Sex Ratio of Teachers in Different Schools

Post-primary teachers as a group are roughly balanced between men and women. However, the teaching body is very clearly sex segregated by kind of institution. Boys' schools and girls' schools have dominantly single sex teacher bodies, (see Table 8.4). Coed secondary and community schools are roughly evenly balanced, though within the coed secondary schools those which developed from the convent schools have a clear majority of female teachers while those developed from original boys' schools have a dominantly male teacher body. Vocational schools have a clear male majority.

The proportion of males in the profession increases in Maths and Science teaching even in girls' schools, but particularly in the community, vocational and convent coed schools — when expressed either as a proportion of the teaching body who have qualifications in Maths, or who are actually teaching junior cycle Maths/Science. For example, over two-thirds (67 per cent) of female teachers in girls' schools have no Maths or related Science or Commerce qualifications compared to half (51 per cent) of male teachers in girls' schools. Much the same pattern holds also in all other schools. Males are disproportionately qualified in Maths and Science, and they are correspondingly used in Maths teaching in all schools; although — with two exceptions — unqual-

Table 8.4: *Maths qualifications of fulltime male and female teachers in different schools types*

Number and Qualifications of Teachers in Schools	*Girls' Secondary Schools*	*Boys' Secondary Schools*	*Coed Secondary Schools*	*Community Schools*	*Vocational Schools*
Number of Male Teachers:	95	461	132	221	308
Number of Female Teachers:	500	51	119	207	182
(Percentage Male):	(16.0)	(90.0)	(52.6)	(51.6)	(62.9)
Percentage of Maths Teachers in Junior Cycle who are Male:	22.3	90.5	55.8	56.1	72.4
*Percentage of Male Junior Cycle Maths Teachers who have no Maths or Related Qualifications:	14.3	30.4	11.5	7.0	15.9
*Percentage of Female Junior Cycle Maths Teachers who Have no Maths or Related Qualifications:	18.9	0.0	20.0	16.7	3.7
Percentage of all Male Teachers who are Teaching Junior Cycle Maths:	30.5	22.8	22.0	20.8	23.1
Percentage of all Female Teachers who are Teaching Junior Cycle Maths:	20.2	21.6	19.3	17.4	14.8
*Percentage of Male Teachers with no Qualifications in Maths:	51.2	55.9	59.8	59.0	67.1
*Percentage of Male Teachers with Full Qualifications in Maths:	26.2	22.8	17.8	27.2	21.1
*Percentage of Female Teachers with no Qualifications in Maths:	67.2	65.9	65.3	66.5	60.1
*Percentage of Female Teachers with Full Qualifications in Maths:	13.5	19.5	8.9	17.4	16.8

*denominator = teachers for whom we have the necessary information on qualifications.

ified male teachers are less likely than female teachers to be used for teaching Maths. The opposite pattern is observable in boys' schools and vocational schools, where, if a female teacher is used for Maths, she is almost always qualified. It is as if teachers of a minority sex in a school need to be better qualified to be allowed to teach Maths.

Boys' schools, therefore, are not significantly advantaged in the qualifications of their Maths teachers — indeed the highest proportion of unqualified Maths teachers are used in boys' schools — a rather surprising finding given the higher level of performance of boys in Maths. Obviously, therefore, the relative advantages and disadvantages bestowed by the presence of qualified teacher resources in a school is not directly translated into actual teaching output. This is the question explored in depth in the next section.

(iii) The Relationship between Teacher Qualifications and Pupil-Subject Output

In Appendix Tables 8.3 and 8.4 we show the relationship between the percentage of boys and girls taking up Honours Maths and Science within a school, and the percentage of teachers who are qualified in Maths and Science subjects in the school.

The relative Maths qualifications of teachers within a school has *no* significant correlation with the proportion of pupils taking Hons. Maths at the junior or senior cycle level. Indeed a consistent, though statistically insignificant, negative correlation exists (see Appendix Table 8.3).

On the other hand, a very consistent, though small, positive correlation exists between the percentage of teachers qualified in Science and the percentage of pupils taking Hons. Maths at both the junior and senior cycle levels. It appears that the Science orientation of the curriculum and of the teaching body is a very consistent predictor of the percentage of students taking Hons. Maths. This is consistent with that of other findings which show a much clearer link between junior cycle Higher Maths choices/provision rates and senior cycle Science specialisation than with senior cycle Hons. Maths take-up rates. Where Hons. Maths is being encouraged in a school it appears, therefore, to be generally encouraged as part of a wider Maths/Science emphasis in the curriculum.

Whereas Honours and Pass science subjects can be taught at junior and even at senior cycle levels in the one class, this is not the case for Hons. Maths: separate Pass and Honours classes are usually provided. The Pass and Honours syllabi and the ability level differences between pupils taking each course appears to be generally greater for Maths than most other subjects. As a result — relative to most other subjects — where schools emphasise Honours Maths more generous teacher provision (and timetable) arrangements have to be made for it. As a result, given the overall shortage of qualified Maths teachers, the allocation of the qualified teachers has to be much more discriminating than in other subjects and, contrariwise, partly qualified teachers have to be drawn in to a much greater extent in schools where Hons. Maths teaching is more elaborated. Interestingly, it does not appear that the actual staffing policy of the school — in the proportion of qualified Maths teachers — actually reflects the curricular priorities being pursued in Maths; those schools with a higher proportion of qualified Maths teachers are not necessarily more likely to set up an Hons. Maths teaching speciality.

It may well be that the general scarcity of qualified Maths teachers is such that Hons. Maths teaching in most schools can only be expanded by separating the Pass and Hons. classes and allocating the qualified teachers to the Hons. Maths class, while other teachers — with Maths from the first year of their degree, for example — are allocated to the Pass classes.

Teaching specialisation in Commerce and in the Accomplishment subjects (Art, Music and Home Economics) is negatively correlated with Hons. Maths take-up, particularly in the senior cycle. Schools where those subjects are emphasised — or else where Languages are emphasised at the senior cycle for girls — are far less likely to encourage Hons. Maths take-up. Some curricular objectives appear, therefore, to be competing ones, while others appear to be mutually supportive. Hons. Maths and Science specialisation are clearly mutually accommodative. But Commerce, Accomplishment and, to some extent, Language specialisation appear to be competitive curricular orientations in girls' education.

Unlike Hons. Maths take-up, the relationship between teacher qualifications and take-up of Science is quite marked — particularly for girls at the senior cycle (see Appendix Table 8.4). Obviously, variations in teacher provision arrangement here are very clear. The effect of, what must be, conscious school provision policy is very marked indeed, particularly given the high negative relationships between Science take-up and teacher provision in the competing subject areas of Commerce and Accomplishment subjects. Clearly, school management decisions about staffing and provision of Science subjects has a very significant influence on take-up. These relationships are almost equally significant for boys and girls — particularly at the senior cycle level — but are more pronounced for girls in the junior cycle. As there is almost no variance in boys Inter. Cert. Science take-up — almost all boys take it — this different pattern of relationships between junior cycle Science take-up for girls and teacher provision factors is particularly important; as is also the very clear pattern of competition from well provided Language and Accomplishment subject provision. A pattern of Science *or* Commerce/Language/Accomplishment provision by school is present but not consistently so.

However, almost all of these independent variables are intricately related to each other so that we need to examine all their combined effects on Hons. Maths and Science take-up at the same time. Before we attempt this, however, the relationship amongst the 4 dependent variables needs to be considered. This is attempted in a schematic manner in the following 2 figures.

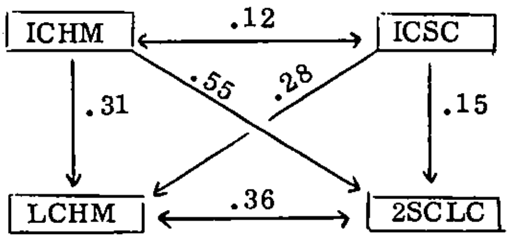


Figure 8.1: *Correlations between the percentage of girls within a school taking Higher Maths in the Inter. Cert. (ICHM), the percentage taking Science in the Inter. Cert. (ICSC), Hons. Maths in the Leaving Cert. (LCHM), and the percentage taking 2 or more Science subjects in the Leaving Cert. (2SCLC).*

In single sex and coed schools there is only a very moderate correlation between the proportion of girls taking Higher Maths for IC and Hons. Maths for LC, (r = .31), particularly given the very pronounced correlation between these 2 variables for boys (Fig. 8.2). There is, however, a much more pronounced correlation between IC Higher Maths and the percentage of girls taking two or more Science subjects for the LC (r = .55). There is an insignificant correlation with junior and senior cycle Science take-up in these schools. The extent of provision and take-up of Science at the IC by girls is *not* significantly related to the extent of provision/take-up of Science at the LC though such a relationship is present for Hons. Maths. The take-up of Higher Maths by girls at the IC, therefore, appears to be mainly a function of their schools' scientific specialisation in the senior cycle.

The structure for boys is somewhat different as we can see from the figure below.

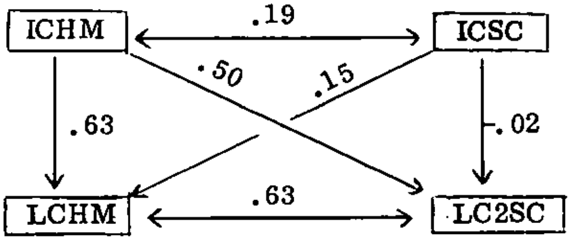


Figure 8.2: *The correlations between the percentage of boys who took: (a) Higher Maths in the Inter. Cert. (ICHM), (b) Science in the Inter. Cert. (ICSC), (c) Hons. Maths in the Leaving Cert. (LCHM), (d) 2 or more Science subjects in the Leaving Cert (LC2SC).*

The concentration on Higher Maths at the junior cycle is much more significantly related to Hons. Maths choice at the senior cycle, but almost equally related to senior cycle Science choices. Since almost all boys do IC Science, its take-up bears an even less significant relationship to subsequent choices than was the case for girls. But for both boys and girls the Science emphasis at the senior cycle appears to be the crucial variable one needs to pay attention to in understanding the overall Maths/Science policy of a school.

The relatively different meaning and significance of these junior/senior cycle subjects for boys and girls is clearly indicated in the following table where we examine them within the context of coeducational schools:

Table 8.5: *Inter-correlations amongst percentages of boys and girls in coed schools (N = 32) taking Hons. Maths and Science in the Inter. and Leaving Certificate Examinations*

Percentage of Boys and Girls taking:	*Percentage of Boys and Girls in Coed schools taking Hons. Maths and Science Subjects at both the Inter. and Leaving Certificate Levels* — *Inter. Certificate Higher Maths* Boys (1)	Girls (2)	*Inter. Certificate Science* Boys (3)	Girls (4)	*Leaving Cert. Hons. Maths* Boys (5)	Girls (6)	*Leaving Cert. 2+ Sciences* Boys (7)	Girls (8)
				per cent				
1. IC Boys Higher Maths	1.00							
2. IC Girls Higher Maths	.69*	1.00						
3. IC Boys Science	−.02	−.12	1.00					
4. IC Girls Science	.22	.04	.23	1.00				
5. LC Boys Hons. Maths	.61*	.48*	.06	.11	1.00			
6. LC Girls Hons. Maths	.40*	.44*	−.01	.18	.54*	1.00		
7. LC Boys 2 Science	.45*	.55*	−.04	−.04	.67*	.50*	1.00	
8. LC Girls 2 Science	.51*	.56*	−.04	.06	.59*	.57*	.76*	1.00

*$p \leq .05$, 2 tailed.
Source: Survey of Leaving Certificate Pupils, 1981.

First, the correlations between the frequency of take-up by boys and girls within the same coed schools: there is a high correlation between the percentages of boys and girls taking IC Higher Maths (.69), LC Hons. Maths (.59) and LC Science (.76); and a very low correlation between the proportion of both sexes taking IC Science (.23). Junior cycle Maths and senior cycle Science and Hons. Maths take-up rates seem jointly responsive; with almost no correlation between both sexes take-up rates in junior cycle Science. And whereas variation in IC Science take-up for either boys or girls is not related to LC Maths or Science specialisation, variation in the IC Maths rates is highly predictive of senior cycle Hons. Maths and Science specialisation. While the lack of correlation here is understandable for boys — there is no variance involved — why such a lack of correspondence exists for girls, however, is not at all clear-cut. There is considerable variation involved but that variation is not predictive. This lack of continuity in Science provision/take-up rates for girls in the junior and senior cycles clearly indicates different functions being served by Science provision/take-up rates in the junior and senior cycles in girls' education.

Obviously the same does not hold in Hons. Maths. It is the main discriminating variable in the junior cycle — priority attached to this by the school indicates a clear policy bias toward Science and Hons. Maths specialisation in the senior cycle. And, as we see in Appendix Table 8.3, such Hons. Maths provision/allocation biases are closely related to the provision of qualified Science teachers by the school: the take-up rates of Hons. Maths is consistently positively related to the provision of Science — not Maths. Quite obviously school curricular policy in senior cycle Science and in associated Science teacher provision is the critical variable.

(iv) Predicting Variations in Hons. Maths/Science Take-up Rates

Some of the relationships observed so far are partly explained by size of school. The larger the school size the lower the proportion of teachers qualified in Maths ($r = -.18$), and the higher the proportion qualified in Science subjects ($r = +.26$). Since Maths is an obligatory subject, like English and Irish, the smaller the school the more it dominates the curriculum. Since Science subjects are not obligatory the larger and more prosperous the school the greater the ability to concentrate on Science subjects, both in teachers' qualifications and in pupil allocations and pupil choices. The larger the school, therefore, the higher the proportion of pupils taking Hons. Maths (see first row of Table 8.6) but the lower the proportion of teachers qualified in Maths.

As we have seen also, it is not the mere presence of qualified Maths teachers in a school that determines the percentage of pupils so specialising, nor indeed the level of qualification of those teachers allocated to teach Maths. The highest correlations are between school variables like the predominant social class of the pupil intake ($r = -.50$ to $-.60$); whether the school is a secondary or vocational school; the curricular provision bias of the school (particularly schools with a rich Science curriculum); whether separate arrangements are made for teaching Hons. Maths; and the extent of school "encouragement" for taking it (Table 8.6). These are mainly variables referring to the types of curricular objectives pursued by the school, the social class composition of its pupil intake, and presumably the function played by the school in social mobility processes.

With larger schools, middle class pupils, streamed classes or with setting for Hons. Maths, and with a rich academic curriculum — particularly in Science, Commerce and Languages — Hons. Maths and senior cycle Science

Table 8.6: *The Correlations between Certain School Level Characteristics and the Maths/Science Specialisation of Pupils in Schools (Some Small Coed Schools are Excluded Here)*

Independent Variables Characterising each School	*Dependent Variables: Percentages of Boys and Girls within each School taking Hons. Maths and Science at IC and LC levels*							
	Boys in Boys' and Coed Schools (N = 63)*				*Girls in Girls' and Coed Schools* (N = 53)*			
	IC Higher Maths	*IC Science*	*LC Hons. Maths*	*Two LC Science Subjects*	*IC Higher Maths*	*IC Science*	*LC Hons. Maths*	*Two LC Science Subjects*
	per cent							
1. Number of full-time teachers:	.25	15	.41	.35	.17	.04	.27	.16
2. Number of part-time teachers:	—.30	.16	—.42	—.30	—.25	—.16	—.22	—.08
3. Extent of support for Hons. Maths teaching:[a]	.30	.02	.13	.14	.01	—.21	.01	—.18
4. Classes are streamed or not?[b]	—.14	—.14	.07	.16	.15	.11	.15	—.07
5. Median social class characteristics of school intake:[c]	—.58	—.09	—.53	—.50	—.55	—.01	—.07	—.65
6. Not in Free Scheme (1=not; 0=yes):	.40	.08	.31	.26	.22	.14	.12	.45
7. "Cluster 1 and 2" schools:[d]	.58	.26	.62	.66	.42	—.16	—.02	.54
8. Single Sex Secondary Schools:	.45	.13	.49	.33	.24	—.27	—.24	.30
9. Coed. Secondary Schools:	.14	—.25	.07	.26	.28	—.01	.23	.05
10. Comprehensive/Community Schools:	—.01	—.09	.06	.12	.09	.22	.57	.13
11. Vocational Schools	—.58	.03	—.54	—.39	—.49	.14	—.60	—.52

r>.25 is statistically significant at the .05 level.

[a] If separate Hons. Maths classes are provided — rather than being taught in a mixed syllabus class, a score of 1 is given; 0 = all other cases.

[b] If classes are streamed a score of 1 is given; 0 where mixed ability classes.

[c] Social class characteristics are given by pupils interviewed in the Inter. Certificate sample. The median social class (adjusted Hall—Jones scale) for school is computed: 1 = upper middle; 2 = lower middle; 3 = upper working class; 4 = lower working class.

[d] Schools where academic subject provision arrangements are maximised: Clusters 1 and 2: See Chapter 6.

*Schools which do not provide Hons. Maths and Science subjects are included in this analysis.

teaching and take-up are maximised. At the opposite pole, small girls' secondary or small vocational schools with a limited and undifferentiated curriculum — particularly one that emphasises Home Economics and Accomplishment subjects; and schools catering for lower middle class or working class pupils minimise Hons. Maths and Science specialisation in the senior cycle.

All of the school variables mentioned, however, are highly related to each other: school size, number of teachers, proportion of teachers qualified in Maths and Science, etc. In the following tables we summarise the main results of a multiple regression analysis which gives the relative influence of a series of school organisational and teacher qualification variables on the percentage of boys and girls taking Honours Maths and Science subjects in the Intermediate and Leaving Certificate examinations.

At the Inter. Cert. most of the variance in Higher Maths take-up for both sexes is explained by the social class characteristics of the pupil body and the associated curriculum type of schools attended (cluster 1 and 2 schools, see Chapter 6). Since a school's social class characteristics and school curricular characteristics (cluster 1 and 2) are highly correlated ($r = -.46$ for girls, and $r = -.56$ for boys) it is not possible to separate their effects satisfactorily.[50] Both are of crucial importance in the take-up of junior cycle Higher Maths, but can only be of importance for boys in senior cycle Hons. Maths take-up.

For girls also, the school's specific encouragement of Maths take-up is also independently important. There is, of course, much more variance in these respects in girls' schools. But size of school, and qualifications of teachers are not significant, once other variables are controlled for.

The independent effects of social class, however, disappear completely in the senior cycle for both sexes, and the effects of school management and school curricular factors became much more marked: the relative insignificance of social class being most marked in girls' education. For girls attending a coed secondary or community secondary or, to a less significant extent, cluster 1, schools bestow a substantial advantage in Hons. Maths take-up. Obviously school organisational factors — particularly coeducational schools which facilitate and encourage Hons. Maths take-up — are particularly advantageous to girls. Being in a single sex girls' school is negatively related to take-up, although not significantly so when other factors are controlled. Again school size and teacher qualifications retain no independent relationship once these school variables have been controlled for.

[50]The partial correlation between Cluster (1 + 2) and percentage pupils taking Higher Maths (IC) controlling for the effects of the wider social class of the school = .23 for girls and .37 for boys. The reverse partial correlation between median social class and Hons Maths (LC) = −.41 for girls and −.35 for boys, controlling for the effects of curricular type.

Table 8.7: *Weighted (standardised) regression coefficients (Beta Weights) from regression of eleven independent variables, characterising schools and teachers, on the percentage of pupils within schools taking Honours Mathematics in the Intermediate and Leaving Certificate examinations.† (Pearson r's are given in parentheses (r))*

Independent Variables: Characteristics of Schools/Teachers	*Percentage Pupils Doing Higher Maths in the Intermediate Certificate*				*Percentage Pupils Doing Hons. Maths in the Leaving Certificate*			
	Girls (N=52)		*Boys* (N=60)		*Girls* (N=51)		*Boys* (N=60)	
	(r)	*Beta Wt.*	*(r)*	*Beta Wt.*	*(r)*	*Beta Wt.*	*(r)*	*Beta Wt.*
Characteristics of Schools:								
1. Median Social Class of Pupil Body:	(—.52)	—.39*	(—.56)	—.34*	(—.11)	—	(—.53)	—
2. Cluster 1 and 2 Schools:	(.41)	.18	(.57)	.36*	(.00)	.17	(.62)	.36*
3. Separate Hons. Maths Classes Provided:**	(.41)	.34*	(.19)	—	(.27)	—	(.27)	—
4. (i) Single Sex Secondary School:	(.21)	—	(.43)	—	(—.24)	—	(.51)	.37*
(ii) Coed Secondary School:	(.26)	.16	(.13)	—	(.22)	.36*	(.00)	—
(iii) Comp./Community School:	(.10)	—	(.01)	—	(.57)	.68*	(.08)	—
5. Number of Teachers in School:	(.14)	—	(.25)	—	(.26)	—	(.43)	.36*
Characteristics of Teachers								
6. Percentage of Teachers								
(i) Qualified in Maths:	(—.15)	—	(.06)	—	(—.04)	—	(.00)	—
(ii) Qualified in Science:	(.28)	—	(.33)	—	(.32)	—	(.26)	—
(iii) Qualified in Languages:	(.25)	.16	(.19)	—	(—.22)	—	(.35)	—
(iv) Qualified in Accomplishment Subjects:	(.03)	—	(—.37)	—	(—.27)	—	(—.49)	—
R^2 =	.43		.39		.47		.56	
Average Dependent Variable	30.04		36.6		4.17		14.6	
Standard Deviation	20.13		22.6		6.20		15.5	

*Statistically significant, $P \leq .05$.
**This is a dummy variable — a score of 1 is given if separate + Honours Maths classes are provided, 0 if not.
†Schools which do not provide Hons. Maths are included in this analysis.

For boys, however, being in a single sex school has a distinct advantage, particularly where provision factors are particularly supportive (i.e., cluster 1 and 2 schools). And, in this case, size of school (number of teachers) also retains a distinct advantage. So, large middle class boys' secondary schools with good provision are the most advantaged schools with respect to boys take-up of Hons. Maths.

On this evidence it appears that girls at coed schools are at a distinct advantage, but that boys do better at single sex schools. In these limited respects these findings appear to contradict some recent British findings (Ormerod, 1975; Dept. of Education and Science, 1975) which show that, with equal provision, girls in single sex schools do better than in coed schools. This question will be explored in detail later. But we now need to examine the relative effects of these different school factors on Science take-up rates amongst girls and boys.

Science Take-up Rates

In the following table we give the results of a multiple regression analysis which indicates the relative influence of 11 independent school level variables on the per cent of pupils taking Science subjects at the Inter. and Leaving Cert. examinations. As we have already seen, the teaching of Science is much more determined by the Science qualifications of the teacher body than is that of Hons. Maths. Almost all boys do IC Science so that there is very little variance left to explain. What there is indicates that boys in cluster 1 and 2 type schools and not in coed schools or schools which emphasise Language teachings are more likely to take IC Science. For girls, however, specific school provision of Maths and Science teachers, particularly in some schools, is moderately correlated with take-up rates of Science in the junior cycle. This appears to be particularly characteristic of some community, vocational, and coed secondary schools which developed from original boys' schools in the 1960s. On the other hand, schools — particularly girls' schools — which emphasise Languages or Home Economics or other Accomplishment subjects minimise Science take-up rates. The effects of coeducation, therefore, appear to be positive for girls and negative for boys. The social class characteristics of the pupil body appear to have no influence on IC Science take-up for either sex. And the curricular and teaching qualification policy of the school becomes important — particularly for girls.

In the senior cycle the degree of specialisation by girls in Science subjects is highly related to a small number of school variables: (i) attendance at the small proportion of highly academically oriented secondary schools (cluster 1 or 2) or of the newer community schools with a rich academic curriculum; (ii) at schools which have proportionately more Science teachers; (iii) at

Table 8.8: *Weighted (standardised) regression coefficients from regression of 11 independent variables on the percentage of pupils in schools taking science at the inter. cert., and taking two or more science subjects at the leaving cert.*

Independent variables characterising schools and teachers	*Percentage of pupils doing Inter. Cert. Science*				*Percentage of pupils doing two or more Science subjects at Leaving Cert.*			
	Girls (N = 51)**		*Boys* (N = 60)**		*Girls* (N = 51)**		*Boys* (N = 60)**	
Characterising schools	(*r*)	*Beta wt*	(*r*)	*Beta wt*	(*r*)	*Beta wt*	(*r*)	*Beta wt*
(1) Median Social Class of Pupil Body:	(−.04)	—	(−.17)	—	(−.61)	−.42*	(−.49)	—
(2) Cluster 1 and 2 schools:	(−.18)	—	(.28)	.44*	(.52)	.40*	(.66)	.78*
(3) Separate Hons. Maths provided:	(.01)	—	(−.08)	—	(.28)	—	(.22)	—
(4) *Type of school:*								
(i) Single Sex Schools:	(−.30)	—	(.16)	—	(.27)	—	(.35)	—
(ii) Coed. Sex Schools:	(−.02)	—	(−.32)	−.40*	(.07)	—	(.19)	—
(iii) Comp/Comm. Schools:	(.22)	—	(−.10)	—	(.15)	.27*	(.13)	.36*
(5) No. of Teachers: (Size of School):	(−.02)	—	(.16)	—	(.22)	—	(.37)	—
Characterising teachers								
(6) Percentage of Teachers:								
(i) Qualified in Maths:	(.33)	.32*	(.11)	—	(−.25)	—	(.00)	—
(ii) Qualified in Science:	(.28)	.21	(.10)	—	(.41)	.17	(.44)	.24*
(iii) Qualified in Languages:	(−.33)	−.20	(−.06)	−.23*	(.18)	—	(.34)	—
(iv) Qualified in Accomplishment Subjects:	(−.31)	−.28*	(−.09)	—	(−.07)	—	(−.41)	—
R^2 =	.32		.27		.57		.54	
Average Percentage Taking Science	65.23		89.33		10.08		17.73	
Standard Deviation	28.12		16.83		11.93		19.86	

*Statistically significant at ≤ .05.

**Schools which do not provide Science subjects are included in this analysis.

schools which do not emphasise the competing Commerce teaching facilities, (see Appendix Table 8.4); and (iv) particularly at schools which recruit pupils coming from middle to upper middle class backgrounds. Social class and school curricular policy, therefore, becomes very important at the senior cycle level — although of no significance at the junior cycle. This pattern of relationships is similar to that influencing junior cycle Higher Maths provision and take up.

Although all of these school variables are intercorrelated they retain significant independent influences on Science take-up at the senior cycle. A significant proportion of girls' and coed schools which are not dominantly middle class have very rich Science curricula, having developed strong Science teaching faculties. Others appear to have specialised more strongly in Commerce options which, for girls' education only, appears to operate as a competing specialisation, rather in the same way as Language and Accomplishment subjects compete with IC Science. (See Appendix Table 8.4.)

In summary, therefore, the specialisation of girls in senior cycle Hons. Maths and Science appears to be largely a function of class background and the nature of the school attended: upper middle class schools, coeducational community (and to a limited extent, vocational and secondary) schools, and schools which have a specifically designed teacher and curricular (Scientific) specialisation. Coeducational schools appear to be particularly important in Hons. Maths. But other school policy differences — with a small number of girls' schools specialising in Science/Hons. Maths — indicates that a considerable degree of freedom did and does exist amongst girls' schools in these respects. Given the high proportion of school variance explained at the senior cycle level the results clearly indicate the overriding importance of school management policy in these respects — given the finding, particularly, that school size *per se* is not important in Science take-up and is only independently significant for boys' Hons. Maths take-up at the senior cycle.

In conclusion therefore, in nearly all these cases the influence of school policy becomes very marked — overriding variation in class origins or apparent ability levels in many cases. It is not the mere presence of qualified teachers in schools that is important, but the school's policy in employing these teachers towards the objectives it has set for itself, and the way it arranges its curriculum and teaching staff to achieve the objectives set. For instance, many boys' schools that stream their intake assign higher level Maths teachers and courses to the upper stream — with no choice given to the class. In even the most supportive girls' school Hons. Maths tends to be "set" for the upper classes — where they do stream. Higher ability girls are given a choice in the matter, boys are not.

Schools vary widely, therefore, in Maths and Science provision arrangements, in the organisational facilitation of Maths and Science take-up — i.e., arrangements which encourage or maximise take-up, or arrangements which minimise take-up. An illustration of the nature and extent of this variation is recorded in Table 8.9.

The examples given illustrate the way in which schools with similar resources, class backgrounds and overall academic standards can have very different priorities regarding the teaching of Hons. Maths and Science subjects. The overall academic standard (e.g., the percentage taking five or more higher level subjects) is not very different between schools A and B or between C and D. But schools A and C yield substantially higher levels of Science take-up rates and a somewhat higher level of Hons. Maths take-up at senior cycle. And despite the very high proportion of girls taking Inter. Cert. Higher Maths in school D, and higher than average in school B, it is not taught at senior cycle level in either school.

Schools E and F do not vary greatly in size or social class composition but vary substantially in Hons. Maths and Science take-up policy: School E being low in Higher Maths take-up in the Inter. Cert., and not providing it at all in the Leaving Cert. School F, on the other hand, has very high Hons. Maths take up levels for both sexes in both junior and senior cycles. Science take-up levels are equally discriminant — although basic Science take-up rates for girls in the senior cycle is limited to one subject, namely, Biology.

Schools G and H again illustrate contrasting priorities in terms of both provision and take-up, despite their working class characteristics. School G, in particular, reflects the general trend of the new community and comprehensive schools in maximising the teaching of Maths and Science and, except in the case of LC Science take-up, showing very similar patterns of Hons. Maths/Science take-up for boys and girls.

Schools, therefore, with roughly the same resources and teaching roughly similar pupils vary significantly in their curricular provision and teaching programmes, and equally significantly in the take-up of subjects and subject combinations. And those differences have significant impacts on life chances.

Conclusions

1. A detailed study was carried out of the qualifications of teachers in the national sample of schools in which interviews were held. Although full qualifications information was not available for 13 per cent of Maths and Science teachers in the sampled schools we were able to analyse in detail the relationship between teacher qualifications and pupil curricular choices.

Table 8.9: *Comparison of girls' rates of take-up of Maths and Science, and the associated levels of educational aspirations in pairs of schools matched in terms of the size and social class composition* (Figures for boys are given in parentheses)*

Main School Characteristics	*Small Lower Middle Class Girls' Schools*		*Large Middle Class Girls' Schools*		*Small Lower Middle Class Coed Schools*		*Large Working Class Community/Comprehensive Schools*	
	School A Urban Convent School in Free Scheme	*School B* Rural Convent School in Free Scheme	*School C* Large Town Convent School in Free Scheme	*School D* Small Town Convent School in Free Scheme	*School E* Small Town Convent Coed School in Free Scheme	*School F* Small Town Convent Coed School in Free Scheme	*School G* Rural Coed School in Free Scheme	*School H* Small Town Coed School in Free Scheme
	240 *pupils*	260 *pupils*	570 *pupils*	430 *pupils*	130 *Girls* 80 *Boys*	170 *Girls* 100 *Boys*	220 *Girls* 430 *Boys*	320 *Girls* 280 *Boys*
Leaving Cert. Provision								
Total Number	14	11	15	12	12	14	15	17
No. Science Subjects	3	2	3	2	2	2	3	2
Higher Level Maths?	Yes	No	Yes	No	No	Yes	Yes	Yes
Inter. Cert. Take-up								
% Taking Higher Maths	23%	36%	48%	71%	0.0 (13.0)	56.0 (47.0)	18% (31%)	38% (30%)
% Taking Science	46%	66%	82%	45%	62.0 (73.0)	44.0 (94.0)	100% (98%)	93% (96%)
Leaving Cert. Take-up								
% Taking 5+ Honours	43%	35%	36%	46%	42.9 (25.0)	23.1 (21.4)	33% (33%)	31% (11%)
% Taking Honours Maths	3%	0	7%	0	0.0 (0.0)	15.4 (21.4)	33% (29%)	17% (11%)
% Taking 2+ Science Subjects	26%	0	47%	11%	0.0 (0.0)	0.0 (35.7)	25% (48%)	0 (0)
Aspirations at Leaving Cert.								
% Aspiring to University	46%	11%	46%	44%	14.3 (0.0)	19.2 (42.9)	42% (52%)	20% (26%)
% Aspiring to Professional or Managerial Jobs	30%	9%	40%	18%	15.4 (12.5)	16.0 (30.8)	33% (62%)	26% (47%)

*Social Class of School is based on Median Social Class of Junior Cycle Pupils.

2. The teachers of Mathematics in schools appear to be the least qualified of all the main subject areas, particularly in girls' and coed secondary schools. The qualifications of teachers of Maths in the community and vocational schools, however, are much more satisfactory than in the secondary schools sector. However, there is no substantial difference between boys' and girls' secondary schools in the qualification levels of their Maths teachers. (See Tables 8.1 and 8.2), although these differences are statistically significant.

3. Indeed it appears that, given the general shortage of fully qualified Maths teachers, schools that teach a full Hons. Maths set of courses have to draw into the teaching programme a higher proportion of partly qualified Maths teachers than is normal: thus the higher the proportion of pupils taking Hons. Maths the lower the proportion of teachers of Maths who are qualified. This appears to be particularly the case in boys' schools.

4. There is, however, a positive correlation between the proportion of teachers qualified in Science and the proportion of pupils taking Hons. Maths and Science at both the junior and senior cycle level. This is particularly the case in girls' schools. Hons. Maths take-up, particularly in girls' schools appears to be mainly a function of the degree of Science specialisation at the senior cycle level. In these schools also it is negatively correlated with the teacher provision and pupil take-up rates of Commerce and Accomplishment subjects.

5. For different reasons in boys' and girls' schools, Inter. Cert. Science take-up levels within schools do not predict senior cycle take-up levels in Science or Hons. Maths. Almost all boys take junior cycle Science so it cannot act as a discriminator. On average, somewhat over half the girls take junior cycle Science, with very wide inter-school variations. But such school variations in the junior cycle are not related to equivalent variations in senior cycle Science specialisation. And the latter, having much more important long-term implications, is correlated with a different set of school characteristics.

6. Two main factors are important in accounting for variation in rates of Higher Maths (Inter. Cert.) and senior cycle Science take-up for girls; the social class characteristics of the school's intake and the curricular orientation of the school. In the case of senior cycle Science these two factors are highly intercorrelated, primarily because middle class schools tend to have curricula which are more highly developed in Science. The greater the middle class domination of the school and the greater the extent to which the school has designed "an appropriate curricular programme", (i.e., clusters 1 and 2

schools), the greater the proportion of pupils specialising in senior cycle Science. The effects of such school provision factors are, however, relatively independent of the social class characteristics of the school's intake. In other words, schools with apparently the same resource base can vary widely in Science/Hons. Maths provision arrangements and have correspondingly different impacts on take-up levels.

7. 'High provision' coeducational schools maximise the take-up rates for girls — particularly the newer community schools. Take-up rates for boys are maximised in high provision single sex schools. Size of school is not independently related to either Hons. Maths or Science take-up rates for girls — though it is for boys in Hons. maths take-up.

CHAPTER 9

Subject Choice and Pupil Characteristics

In the preceding chapters we have examined variations in subject provision by schools, the development of school curricula over the period 1968-78 and the level and effects of the qualifications of teachers within schools. In this chapter we shall first discuss variations between schools in the proportions of pupils taking certain Leaving Certificate subjects and the relationship between such take-up and variations in provision. But we will be mainly concerned with explaining one of the main factors influencing subject take-up by boys and girls; that is the "true rates of subject choice".

Take-up Rates According to School

In Chapter 5 we showed that the overall take-up rate for any Leaving Certificate subject in a particular school was the product of a set of different factors, which we labelled provision, allocation and choice. In that discussion we estimated the relative importance of each of these factors, and in Chapters 6 and 7 we dealt with some of the causes of differences in provision levels. Later in this chapter we shall turn to an analysis of what we call "true rates of subject choice", that is, what proportion of those who may choose a subject actually do so.

Initially, however, we shall be concerned with overall rates of take-up of subjects within schools. This is a relatively crude measure (the number of Leaving Certificate pupils taking a given subject divided by the total number of Leaving Certificate pupils) precisely because it is the overall result of provision, allocation and choice factors. However, viewed as a summary measure of the net effect of these factors at a school level it provides us with a revealing outcome measure of "school effects" in this case.

Our method of analysis was as follows. We attempted to account for the proportion of Leaving Cert. pupils in each school taking each of the four Leaving Cert. Science subjects (Higher Maths, Physics, Chemistry and Biology) using five explanatory variables. Four of these variables related to certain important features of the school; these were the median social class of the pupil body (SOCIAL CLASS); the proportion of the curriculum given over to science subjects; whether or not the school is coeducational (a dummy variable, COED, scoring one if the school is coeducational, zero otherwise); and the number of teachers in the school.

The number of teachers in the school provided us with a measure of school size; we included it in our analysis in order to see whether or not school size had an impact on the proportion taking a given subject. Social class was used to test the hypothesis that the class characteristics of the school would be related to take-up. It seemed likely, given that social class had a significant effect on the proportion of the curriculum devoted to science even when school cluster was controlled for (as we saw in our previous analysis) that it would also influence take-up. A further hypothesis was that the larger the proportion of the curriculum devoted to Science, the greater the proportion of pupils who would take a Science subject, since a Science-orientated curriculum could be seen as the result of school managements giving Science a high priority: in this case one would expect an associated encouragement of pupils to take Science subjects. This hypothesis was tested by the inclusion of a variable measuring the proportion of Leaving Certificate Science subjects on the curriculum. The variable COED was included, in order to determine what effects it would have on male and female subject take-up, if any, when the other factors are controlled for. We also included in our analysis a variable representing the average level of examination performance at the Inter Cert. (IGPA) of the Leaving Certificate sample in each school. We assumed that the proportions taking the Science subjects would be larger the higher the mean level of Inter. Certificate performance.

The results of these analyses are shown in Table 9.1 (Higher Maths and Physics) and 9.2 (Chemistry and Biology). Schools are included in a regression only if they offered the particular subject to the 1980-81 Leaving Cert. class and if at least one pupil was qualified to choose it.

The equations for Physics (for both sexes) and for Biology (boys) are not significant: in other words the set of variables used here do not provide a good explanation of the variation between schools in the proportions taking these subjects. There are, clearly, other factors operating here. Such a finding should not be entirely surprising, given that, as we noted earlier, take-up rates are the net result of the effect of several separate factors.[51]

Overall, we see that there is no significant effect of social class for either sex, when the other variables are controlled for. Likewise, with the exception of boys' Higher Maths take-up, the mean IGPA of the sample has no significant effect. On the other hand, in most of the equations (and all the girls') the proportion of the curriculum devoted to Science subjects has a very clear

[51]. The small number of observations in the Physics regression for girls would in any case, indicate that the results should be treated warily.

Table 9.1: *Proportion of Leaving Certificate Examination Pupils in Each School Taking Higher Maths and Physics Regressed on Five Explanatory Variables*

Equation	*Higher Maths* (1) Boys	(2) Girls	*Physics* (3) Boys	(4) Girls
Number of Teachers	0.003*	0.001*	−0.003	0.002
Social Class	0.003	0.004	0.017	0.020
Proportion of Science	0.645*	0.374*	0.050	0.823*
Mean IGPA	0.151*	0.018	0.094	−0.016
Coed School	−0.042	0.045*	0.012	−0.007
Intercept	−0.798	−0.219	−0.125	−0.238
R^2	.60 *	.43 *	.15	.48 *
R^2 (adjusted)	.55	.30	** .00	.26
N	44	28	30	18

*Significant at $p \leq .05$. **Schools which do not provide the subject in question are not included.

Table 9.2: *Proportion of Leaving Certificate Examination Pupils in Each School Taking Chemistry and Biology Regressed on Five Explanatory Variables*

Equation	*Chemistry* (5) Boys	(6) Girls	*Biology* (7) Boys	(8) Girls
Number of Teachers	−0.007*	−0.002	−0.002	−0.002
Social Class	−0.027	−0.006	−0.016	0.080
Proportion of Science	0.796	0.541*	0.033	1.321*
Mean IGPA	−0.021	−0.004	−0.153	0.216
Coed School	−0.018	−0.008	−0.079	0.234*
Intercept	0.388	0.066	1.214	−1.054
R^2	.48 *	.42 *	.06	.24 *
R^2 (adjusted)	.36	.30	− .00	.14
N	30	28	43	46

*Significant at $p \leq .05$.

effect, even controlling for these other factors. However, the proportion of the curriculum given over to Science is quite strongly related to both the school's median social class composition and the mean IGPA of the Leaving Cert. pupils, as Table 9.3 shows. In other words, schools with a high overall level of Inter. Cert. performance and those with a middle class, rather than working class intake, will tend to have a higher proportion of Science in the Leaving Cert. curriculum. For girls, this effect of social class is especially marked, since we saw, in Chapter 6, that the girls' schools best provided for in Science fall into the predominantly middle class cluster 1.

Table 9.3: *Correlations Between Mean IGPA, Median Social Class and the Proportion of the Leaving Cert. Curriculum Devoted to Science*

	IGPA	*Social Class*
Proportion of Science	.40	−.48

While being in a coeducational school has, apparently, no influence on boys' take-up once the other variables are controlled for, it has a clear effect on girls' rates in Biology and Higher Maths. That is, the positive effect of coeducation persists, even though we have allowed for differences in provision. We would, of course, expect more girls in coeducational schools to be taking Science subjects because such schools are likely to offer a larger number of Sciences than are girls' schools; however, even when we taken this into account, the positive effect of coeducation on girls' take-up remains.

The size of the school — as indexed by the number of teachers — does not have a significant effect on percentage take-up, except in Higher Maths and in Chemistry (boys only). In the case of Higher Maths, this effect may be due to the greater flexibility available in large schools with a large teaching body to offer separate Higher Maths classes. Finally, among boys, mean IGPA is positively related to the percentage taking Higher Maths. It may be that high performing schools containing boys channel pupils into Higher Maths to a greater extent than do high performing schools containing girls.

We can now draw the following conclusions from this analysis.[52] Firstly, coeducation has positive effects on female take-up of Biology and Higher Maths even when we control for provision. In other words, as well as conferring advantages on girls through being more likely to provide "boys'" subjects, coeducational schools have an additional positive effect on female take-up rates; that is, female take-up of Higher Maths and Biology would appear to be encouraged. Secondly, the level of provision of Leaving Cert. Science does appear to influence rates of take-up. Rather than this being a direct influence, however, we would hypothesise that schools which have a high proportion of Science in the curriculum are also schools which, in general, attach a high degree of importance to Science and encourage pupils towards Science subjects. The relationship between provision and take-up is not straightforward, as we have seen, and the results obtained here should not be viewed as indicating that an increase in Science subject provision in a school will automatically generate a substantial growth in Science take-up.

[52]. When interpreting these results, however, we must bear in mind that except for Biology, the proportion of girls taking any of these subjects is considerably smaller than the proportion of boys, as the figures given in Chapter 5 indicate.

Increases in Take-Up Rates, 1968-1978

In Chapter 7, we discussed some factors relating to changes in the curricula of a sample of 125 secondary schools between 1968 and 1978, and we found that, as well as being able to develop models that explained a reasonable amount of the variance in these changes, there were some important differences between boys', girls' and coeducational schools. Now we will examine the relationship between changes in provision levels and changes in take-up. For example, we should expect that the greater the increase in the number of Science subjects (indicating an increase in the resources devoted to Science), the greater the increase in the proportion of pupils who would take Science subjects. Table 9.4 supports this finding. There are strong positive correlations

Table 9.4: *Correlations Amongst Provision and Take-up Changes in Schools*

	Increase in number of Science subjects 1968-78	*Increase in number of Commerce subjects 1968-78*	*Increase in number of Language subjects 1968-78*	*Increase in number of Accomplishment subjects 1968-78*
Increase in the % of boys taking 2 or more Science subjects	+.64*	−.09	+.28*	−.00
Increase in the % of girls taking 2 or more Science subjects	+.43*	−.14	−.00	−.28*
Increase in the % of boys taking 2 or more Commerce subjects	−.17	+.57*	−.28*	−.19
Increase in the % of girls taking 2 or more Commerce subjects	+.05	+.54*	−.01	+.06
Increase in the % of boys taking 2 or more Languages	+.06	−.23*	+.28*	−.11
Increase in the % of girls taking 2 or more Languages	+.30*	+.16	+.57*	+.07
Increase in the % of boys taking Female Accomplishment subjects	+.08	−.04	+.11	+.06
Increase in the % of girls taking Female Accomplishment subjects	−.13	−.16	−.29*	+.37*

*Significant at $p \leq .05$.

between the increase in the number of Science subjects between 1968 and 1978 and the increase in the percentages of both sexes taking two or more Science subjects. However, Table 9.4 shows that there are similar relationships among Commerce provision and take-up and Language (including Latin, Greek, etc.) provision and take-up. The same holds among girls for the Accomplishment subjects (Art, Music, Home Economics). Most of the other correlations in Table 9.4 are not statistically significant, (indicating that provision changes tend to have discrete effects). In other words, changes of provision in one area (say, Commerce) do not, in general, affect take-up rates in another area (say, Science).

The exceptions here are the statistically significant positive correlations between the increase in Science provision and girls' Language take-up and the increase in Language provision and boys' Science take-up. Both of these are probably caused by the quite strong correlation between increases in Language subjects and increases in Science subjects. Of more substantial interest are the negative relationships between Languages and Commerce for boys (increased provision in either correlating negatively with changes in the take-up of the other) and between the Accomplishment subjects and Science for girls (an increase in the former correlating negatively with changes in the take-up of the other). These results suggest that, for boys, Languages and Commerce subjects are competitors, while for girls, increased Science provision acts in competition with the take-up of the female Accomplishment subjects.

While the correlations between curricular change in specific areas and rates of take-up are high, we are also interested to know what precise effect the one has on the other; in other words, given an increase of one Science subject, for example, what percentage increase in take-up did this lead to? These figures are given in Table 9.5 which reports linear regression coefficients for the increase (1968-78) in the percentages of each sex taking the given subjects regressed on the increase in the number of those subjects over the same period.

An unambiguous pattern emerges from Table 9.5. In Science and Commerce subjects, increasing provision has led to a greater addition to take-up for boys than girls, while the reverse is the case for the Language and Accomplishment subjects. In other words, boys have responded more to improvements in Science and Commerce provision, while girls have responded more to improvements in Language and Accomplishment provision.

Such a discrepant pattern between the sexes in their response to changes in provision may be due to the presence of a high achievement/instrumental ethos in boys' schools, which is absent from girls' schools. One might plausibly suggest (particularly in the light of some of our findings in Chapter 7) that in boys' schools provision changes in Science and Commerce resulted in large

Table 9.5: *Regression Coefficients Relating Changes in Take-up to Changes in Provision*

Increase in take-up (1968-78) in		*Increase (1968-78) in number of* *Science Subjects*	*Commerce Subjects*	*Language Subjects*	*Accomplishment Subjects*
(1) Percentage taking Two or More Science subjects	Boys	15.86	—	—	—
	Girls	4.00	—	—	—
(2) Percentage taking Two or More Commerce Subjects	Boys	—	12.43	—	—
	Girls	—	8.28	—	—
(3) Percentage taking Two or More Languages	Boys	—	—	10.29	—
	Girls	—	—	20.19	—
(4) Percentage taking Two or More Female Accomplishment Subjects	Boys	—	—	—	0.58
	Girls	—	—	—	20.17

increments to the take-up rate not only because such changes met the demands of male pupils, but because of a policy, associated with curricular changes, of encouragement or direction of pupils towards these subject areas as ones in which their prospects in third-level education or the labour market would be optimised.

True Rates of Subject Choice

Up to this point, we have been concerned with overall rates of subject take-up in schools. We have often stated, however, that these rates are the result of the operation of several factors; even if we restrict our analysis to schools that provide a particular subject, we find that take-up rates are still the product of, at least, school allocation policies and pupil choice. So, for example, the overall rate of take-up of, say, Physics in School A may be high because a large number of pupils are obliged to take it, while in school B it may be high because, although no one is obliged to take it, a large number of pupils choose to take Physics.

We saw earlier (in Chapter 5) that, in fact, at Leaving Cert., the question of subject choice is crucial in determining rates of subject take-up by the sexes. In particular, we noted that, for several subjects, sex differences in the true rate of subject choice (that is the proportion of those who, given the choice of a subject, choose to take it) were greater, in our sample as a whole, than were sex differences in subject provision or allocation. So, in this final section of the present chapter we shall move from the rate of subject take-up to the question of true rates of subject choice, and we shall analyse, not differences between schools in these rates, but differences between pupils. Our analysis will concern itself with isolating the pupil characteristics that best distinguish those who choose to take a particular subject from those who choose not to. In other words, we shall be testing those theories discussed earlier which claim that sex differences in educational choice and performance are related to a series of differences in the attitudinal and aspirational characteristics of boys and girls.

While our discussion earlier in this chapter was concerned with aggregate school rates, in the remainder of this chapter we shall be examining pupils as individuals. That is to say that we begin by isolating, for each of the same four subjects we earlier analysed — Higher Maths, Physics, Chemistry and Biology — those pupils who may, if they wish, take that subject; that is, those pupils falling into the categories we labelled G and H in Figure 5.1 and Table 5.6. This sub-sample is then divided into two groups — those who chose the subject and those who did not. Our analysis then attempts to determine what combination of a large set of variables best discriminates between these two groups. More particularly, we seek to answer these questions:

(1) Do the same set of variables operating in roughly the same manner (that is, with the same strength and same direction of effect) explain the differences between takers and non-takers (as we could call our groups) for both sexes?
(2) Can the differences in take-up rates between the sexes be accounted for solely on the basis of their different scores or these variables?

In order to try to answer these questions we used, in our initial analysis, six blocks of explanatory variables, as follows (these are shown in Table 9.6 and discussed more fully there):

I A measure of performance, IGPA (Inter. Cert. Grade Point Average): the pupil's mean score in the papers of the Inter. Cert. examination.

II Educational and job aspirations; these included variables representing the type of third-level course pupils wanted to pursue, if any; variables representing their level and type of occupational aspirations, and a variable measuring the highest level of qualification they hoped to receive as a result of their education.

III Variables measuring pupil's attitudes to the specific subject; these measured the degree to which they considered the subject is, or would be, useful, interesting and difficult. In addition, a variable measuring the extent of the pupil's preference for Literature/Language subjects over Maths/Science subjects (MATHLIT) was also included.

IV A set of social-psychological variables (these are discussed below).
V Variables measuring "significant other" influences on the pupil; these variables measured the pupil's perception of the educational and occupational ambitions and expectations held for him or her by parents, friends and teachers.
VI Measures of social position; specifically a measure of social class and measures of parental educational levels.

All the variables used in the analysis are shown in Table 9.6 and more fully described there.

Table 9.6: *Independent Variables Used in the Analysis of Choice in Leaving Cert. Subject Take-up*

Variable group	*Variable name*	*Description*
I	IGPA	Inter. Cert. Grade Point Average: a weighted mean of pupil's score in the Inter. Cert. examination.
II	CERT	Highest certificate pupil expects to receive as result of education (high score = higher level certificate).
	JOB1	Pupil's ideal job expectation classified according to Hall-Jones categories.
	JOB2	Pupil's ideal job expectation classified according to whether it falls into a male or female dominated occupational area (high score = male dominated).
	UNIVSCI	Dummy variable (1 = intends to pursue third-level pure Science or Maths course).
	TECHDIP	Dummy variable (1 = intends to pursue third-level applied Science or Technical course).
	COMMSOC	Dummy variable (1 = intends to pursue third-level Commerce or Social Science course).
	NURSING	Dummy variable (1 = intends to pursue training to be a nurse).
	TEACHING	Dummy variable (1 = intends to pursue training to be a teacher).
III	USE	Do you think (subject) is useful? (1 = yes; 0 = no).
	INTEREST	Do you think (subject) is interesting? (1 = yes; 0 = no).

Continued:

Table 9.6 *Continued*	DIFFICULTY	Do you think (subject) is difficult? (1 = yes; 0 = no).
	MATHLIT	Extent of preference for Language or Literature subjects over Mathematics or Science (high score = preference for former). (This scale is described in Chapter 2.)
IV	SCHOLAR	
	SOCIAL	
	EDIMAGE	See text (and Chapter 2.)
	HHTASK	
	TEACHVAL	
	SUBJEVAL	
	UTILVAL	
	WORK	"If you were working and married and had children, what would you do?" (Scores from 1 = would give up job and look after children full time; to 5 = would work as before and spouse would look after children full-time.)
V	LCEXPT	Teachers' expectations of performance in Leaving Cert. (pupil's own belief) (low score = high expectation).
	LCEXPF	Best friend's expectations of performance in Leaving Cert. (pupil's own belief) (low score = high expectations).
	SOI1	Significant other influences (parents and teachers) occupational aspirations for pupil (as perceived by pupil); Hall-Jones categories.
	SOI2	Significant other influences (parents' and teachers') occupational aspirations for pupil (as perceived by pupil) whether in female dominated occupation or not.
	PLCEXPS	Parents' Leaving Cert. expectations (pupil's perception) for pupil (low score = high expectations).
	PEDEXPS	Parents' overall educational expectations (pupil's perception) for pupil. (low score = high expectations).
	TEDEXPS	Teachers' overall educational expectations (pupil's perception) for pupil (low score = high expectations).
VI	SOCLASS	Social class of pupil (based on slightly amended Hall-Jones scale; high score = low social class).
	FATHED	Highest level of education achieved by father (high score = high level).
	MOTHED	Highest level of education achieved by mother (high score = high level).

The construction of the social psychological variables (IV) is discussed fully in Chapter 2.

A brief description of these scales is given below:

(a) Educational self-image (EDIMAGE): attitudes towards one's ability to achieve high standards in educational work relative to one's peers.
(b) (UTILVAL): the relevance or salience of utilitarian values (their usefulness to oneself in securing jobs, etc.) in choosing subjects.
(c) (SUBJEVAL): level of satisfaction with subjects chosen at Leaving Cert.
(d) (TEACHVAL): level of satisfaction with teachers' helpfulness in subject choice and the associated approachability and helpfulness of teachers.
(e) (SCHOLAR): level of perceived sanctioning for intellectual/scholarly reasons, in classroom.
(f) (SOCIAL): level of perceived sanctioning for social/behavioural reasons, in classroom.
(g) (HHTASK): extent to which pupil helps with household tasks at home.

Before proceeding with the analysis, we want to discuss the rationale behind the choice of these six blocks of variables. In Chapter 1 we discussed some of the hypotheses that have been advanced to account for sex differences in educational attainment and particularly for female under-achievement in Science. These hypotheses dealt with sex differences in socialisation and the differential effects of schooling practice. In our choice of explanatory variables, then, we tried to operationalise some of these hypotheses. For example, by including variables measuring pupils' attitudes towards specific subjects (block III) we were implicitly testing two hypotheses, the first of which is that girls will tend to have more negative attitudes towards Science subjects, in part at least because the image of science subjects and scientists is "masculine" and therefore both dissonant and problematic for girls' self-definition (e.g., Kelly, 1981, pp. 79-83; Smithers and Collings, 1981). The second hypothesis is that these attitudes will be important in determining whether or not a pupil chooses to take these Science subjects. For example, Ormerod (1981, p. 103) has suggested that the perceived difficulty of a Science subject is likely to prove far more of an obstacle to its take-up among girls than among boys.

If, as has been argued by many writers, girls and boys experience different patterns of socialisation, this ought to be evident in both the kinds of aspirations held for them by others (and the way in which they themselves perceive these) and in the level of aspirations they themselves hold. In the case of their perceptions of the aspirations held for them by others (variables in block V), it would be valuable to separate the within-school sources (teachers) from the extra-school sources (parents). Unfortunately, this was not possible to achieve satisfactorily because of the high correlation between the two in terms of both job and educational attainment expectations. Nevertheless, if there are sex differences in the perception of significant other influences, we should expect boys and girls to be differently distributed over these variables, and we should also expect that subject choice would be responsive to these variables, either directly, or more likely indirectly, through the effects that these have in forming the pupils' own ambitions (variables in block II).

The argument that schooling has differential effects on boys and girls (favouring boys, particularly in coeducational settings) is tested to some extent by the inclusion of certain social-psychological factors (block IV). Although we could not observe the effects of schooling directly, we hypothesised that these effects, if they were of sufficient importance, should be internalised by pupils and, therefore, amenable to measurement as social-psychological variables. Thus, for example, the influence of schooling ought to be partially captured by a measure of pupils' educational self-image (EDIMAGE) and by a variable such as SUBJEVAL, measuring the degree of satisfaction with subjects taken. The differential effects of pupil/teacher interaction, already alluded to in Chapter 1 (that teachers spend more time interacting with boys than girls, that boys and girls are sanctioned on different bases, and so on) are operationalised in the variables TEACHVAL, SCHOLAR and SOCIAL.

Bivariate Relationships

If we examine the variables in groups I to VI listed above, we find that, in all four of our subjects (Higher Maths, Physics, Chemistry and Biology), those pupils who choose to take the subject differ significantly in their scores on many of these variables, from those who choose not to take the subject. Using F-tests for the continuous variables and chi-squared for the dichotomies, we see, in Table 9.7, the significance of these differences. So, for example, in the case of Higher Maths, those who chose to do it had, on average, an IGPA of 5.73 against an average among those who chose not to take it of 4.80, a difference that is statistically significant at the .001 level. An example of a dichotomous, categorical variable is UNIVSCI (aspiration to third-level Science course). Here, the difference between Higher Maths takers and non-takers is again statistically significant ($p < .001$), and the mean values show that those who choose Higher Maths are more likely to aspire to a third-level pure Science or Maths course than those who do not. To give another example, the variable "Female" is a dichotomy scoring 1 if the pupil is a girl, 0 if a boy. So, for Higher Maths the mean score for takers is lower than that for non-takers (and this corresponds to a statistically significant different distribution

Table 9.7: *Bivariate Relationships Between Choice of Subject and Certain Explanatory Variables: Average Values of 14 Variables that are Hypothesised to Distinguish Between Takers and Non-takers of Subjects*

Subject and Mean Values	*Higher Maths*			*Physics*			*Chemistry*			*Biology*		
Variables	*Takers*	*Non-Takers*	$p\leq$	*Takers*	*Non-Takers*	$p\leq$	*Takers*	*Non-Takers*	$p\leq$	*Takers*	*Non-Takers*	$p\leq$
IGPA	5.73	4.80	.001	5.34	4.67	.001	5.38	4.53	.001	4.52	4.35	.001
CERT	3.76	3.16	.001	3.55	3.09	.001	3.57	2.99	.001	3.09	2.31	.001
JOB 1	1.62	2.80	.001	2.03	2.80	.001	2.05	2.95	.001	2.85	3.17	.001
JOB 2	1.86	1.59	.001	1.85	1.61	.001	1.73	1.47	.001	1.51	1.50	n.s.
MATHLIT	1.30	1.45	.001	1.29	1.52	.001	1.34	1.51	.001	1.49	1.52	.01
UNIVSCI	0.64	0.14	.001	0.52	0.13	.001	0.47	0.09	.001	0.17	0.12	.001
USE	0.96	0.90	.001	0.95	0.74	.001	*	*	*	0.93	0.86	.001
DIFFICULTY	0.77	0.58	.001	0.75	0.87	.001	*	*	*	0.52	0.67	.001
EDIMAGE	2.28	2.68	.001	2.42	2.70	.001	2.39	2.75	.001	2.72	2.76	n.s.
HHTASK	2.16	2.47	.001	2.23	2.44	.001	2.37	2.56	.001	2.61	2.62	.01
SOI 1	1.80	3.14	.001	2.25	3.20	.001	2.25	3.32	.001	3.19	3.49	.001
PLCEXPS	1.76	2.07	.001	1.88	2.10	.001	1.83	2.05	.001	2.03	2.07	n.s.
SOCLASS	2.93	3.39	.001	3.04	3.45	.001	2.93	3.72	.001	3.47	3.74	.001
FEMALE	0.12	0.41	.001	0.13	0.40	.001	0.36	0.57	.001	0.58	0.50	.001

Note: *These variables were absent from the analysis.

for boys and girls across takers and non-takers) indicating that being male makes one more likely to choose Higher Maths than being female does.

Table 9.7 does not show bivariate relationships with the true rate of subject choice for all the explanatory variables, but rather for those that we presumed would be most significant in discriminating between takers and non-takers. Comparing takers with non-takers across all four subjects, some clear patterns are evident. In all cases, takers tend to have a higher IGPA than non-takers and to have higher educational aspirations (CERT) and job ambitions (JOB 1). They are less likely to aspire to a female dominated occupation (JOB 2) except in the case of Biology, where the difference is insignificant, and they are more likely to aspire to a third-level pure Science course (UNIVSCI). They are less likely to prefer Language or Literature subjects to Science or Maths (MATHLIT) and consider the particular subject more useful and less difficult than do non-takers (except in the case of Higher Maths, where takers appear to consider it more difficult than do non-takers). Subject takers also have, on average, a higher educational self-image and are less likely to engage in household tasks than are non-takers, again with the exception of Biology where these relationships are, respectively, non-significant and reversed.

Occupational expectations of others (SOI 1) and parents' Leaving Cert. expectations are higher for takers than non-takers (except in the latter for Biology); takers tend also to come from higher social class origins.

Finally, gender itself is an important discriminating variable, with takers of Higher Maths, Physics and Chemistry more likely to be male, takers of Biology female. Indeed, it may well be the case that this particular relationship accounts for the absence or the reversal of relationships in Biology take-up which hold for the other three subjects. Furthermore, even if we confine ourselves to those variables which show relationships having the same direction across all four subjects, Biology is still distinctive in several respects. For example, in IGPA, JOB1, MATHLIT, UNIVSCI, SOI1 and SOCLASS, the scores for Biology takers are considerably lower than those for takers of the other three sciences; for IGPA the mean score for Biology takers is actually less than that of the non-takers of the other subjects. On those variables which, overall, distinguish science takers from non-takers, Biology takers, on average, score much lower than takers of the other sciences.

There are two obvious reasons for this. First, Biology is more widely available than the other sciences, as our earlier discussions of both provision and allocation indicated; it is taught in more schools and has fewer (or no) qualifying criteria, than the other sciences. Secondly, however, Biology is often chosen with different ends in mind (in terms of careers or subsequent education) than are the other sciences. For example, Physics, Chemistry and Higher Maths are generally taken by those aspiring to pure Science or applied Science courses at third-level, in other words those intending to specialise in Science. Against this, Biology is less of a specialist subject and more generally accessible, as its overall higher rate of take-up would indicate. Those who take Biology include not only those whose intention is a third-level Science course, but also pupils whose ambitions are much more diverse.

In summary then, there are considerable differences, over a range of variables, between pupils who choose and who choose not to take these subjects, despite the fact that they are all in a position to choose these subjects if they so wish.

Multivariate Analysis

The examination of these bivariate relationships is of considerable interest in so far as it allows us to construct profiles, defined in terms of the explanatory variables, of "typical" takers and non-takers of the subjects. However, there are also serious limitations to this exercise. These bivariate relationships may be misleading, because the association between, on the one hand, choosing or not choosing a subject, and on the other, any particular variable, may be spurious or illusory, in the sense that, if the effects of a third variable were taken into account, the association would weaken or disappear. For example, it is reasonable to suppose that the effects of social class on subject choice must be mediated through parental aspirations for educational and occupational achievement as well as through the pupils' own attitudes and aspirations, so that if the effects of the latter are controlled for, no relationship remains with social class. Equally, the level of occupational aspiration (JOB 1) is likely to be highly correlated with aspiring to take a University Science course.

To answer all queries of this kind that might be raised would require an analysis of considerable complexity. In this case we have sought that combination of explanatory variables which best predicts whether or not a pupil will choose the particular subject whose take-up we are analysing. We did this by performing a type of multivariate analysis known as a logistic regression or logit analysis.

The first stage in setting up a logit is to define two mutually exclusive outcome groups; in our case these two groups are those who choose to take a particular subject and those who choose not to take it, where that subject is available and the pupil is qualified to take it. In our case the former were given a score of 1 on our dependent variable, the latter a score of 0. The method then involves estimating the effects of the independent variables (those listed in Table 9.6) on the probability of a pupil's falling into group 1 (the choosers' group) rather than into 0. In other words, we estimate, for each independent variable, a coefficient which, indirectly, reflects that variable's effect on the probability of a pupil's choosing the subject, controlling for the effects of all other variables in the equation.[53] The method is like an ordinary multiple regression but with a dichotomous dependent variable. In so far as it takes into account the effect of the relationship between the independent variables, it is an improvement over the examination of simple bivariate relationships.

We carried out eight of these logit analyses, that is, one for each sex in each of the four Science subjects, Higher Maths, Physics, Chemistry and Biology. Before discussing the results of our multivariate analysis, let us first turn to an examination of the hypothesised relationships between the six groups of explanatory or independent variables (I to VI) listed above. We assumed that there would be a complex network of inter-relationships between them; these are shown in Figure 9.1. This set of relationships was not explicitly tested in our analyses; rather it served as a guide in formulating the analyses and interpreting the results.

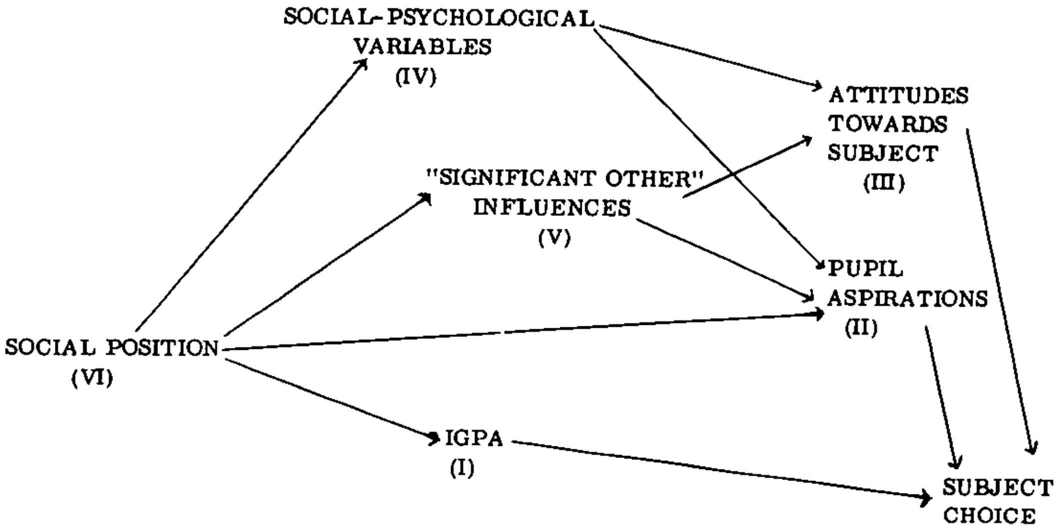


Figure 9.1: *Inter-relationships of the Explanatory Variables (Blocks I to VI) in Their Effect on Subject Choice for Each Sex*

[53]. The coefficients reported in the logit, however, have a rather complicated correspondence with the probability of choosing the subject. Letting P_c be the probability of choosing the subject and $\sum_i \beta_i x_i$ the logit equation, then

$$P_c = 1 - (1 + e^{\sum_i \beta_i x_i})^{-1}$$

and the probability of not choosing the subject is simply equal to $1 - P_c$.

Relationships Between the Independent Variables

As Figure 9.1 shows, we assumed that the various sets of independent variables would enjoy different degrees of salience or proximity to the actual process of subject choice, and their numbering reflects such a difference. Thus, pupil aspirations (variable block II) and attitudes towards the particular subject (block III) are of more direct saliency to choice than, for example, pupils' scores on the more general set of social-psychological variables (block IV) which are not oriented directly towards specific subjects. Similarly these social-psychological variables were considered more directly influential on choice making than the social position (block VI) variables. This is not to say that social class, for example, will have no effect on subject choice; rather, we are suggesting that its effect will be mediated by the variables in lower numbered blocks. In general, then, we are making some causal assumptions about the relationships between these variables and their effects on choice. The immediate determinants of choice are the low numbered blocks of variables. The higher numbered blocks have an influence on choice, but this is indirect, mediated in large part through the variables in the lower numbered blocks.

Logit Analysis: Results

There are 31 variables listed in Table 9.6. Clearly, to enter such a number into a regression would be both unwieldly and unlikely to produce any readily interpretable results. Consequently, we reduced the number of variables in the analysis according to a procedure used by Madaus *et al.* (1979, p. 213).[54] The result of this was that we retained a smaller set of independent variables for each analysis, consisting of the best predictors of the probability of choosing the subject from our six blocks of variables.

The results of the analyses are given in Tables 9.8 to 9.11.[55] We can use these to supply answers to the two questions we posed earlier in this chapter.

The first of these related to whether or not the same variables, operating in the same way, accounted for the distribution of takers and non-takers within each sex. A comparison of the boys' and girls' coefficients for each subject will show that, in general, the same variables are important for each sex in influencing the probability of a pupil choosing a subject. In Higher Maths and Chemistry, particularly, the correspondence of variables is quite close. In

[54]. The variables representing social class (SOCLASS) and also IGPA were retained by design throughout the analysis to act as control variables.

[55]. The R^2 values reported in Tables 9.8 and 9.11 derive from an ordinary multiple regression of the dichotomous dependent variable chose/did not choose the subject, on the same set of independent variables. It is thus only an approximate indicator of variance explained. The χ^2 statistic reports the result of a goodness-of-fit test of the null hypothesis that the parameter estimates do not differ significantly from zero. Since these statistics are all significant this hypothesis must be rejected.

Table 9.8: *Logit Coefficients for Choice of Higher Maths*

Boys			*Girls*		
Variable Group	*Variable*	*Coefficient*	*Variable Group*	*Variable*	*Coefficient*
I	IGPA	1.906	I	IGPA	1.110
II	UNIVSCI	1.527	II	UNIVSCI	2.278
	JOB 1	−0.322		TECHDIP	2.229
III	DIFFICULTY	2.448	III	DIFFICULTY	2.615
	MATHLIT	−2.825		MATHLIT	−2.721
IV	SUBJEVAL	0.893	IV	SUBJEVAL	0.653*
	EDIMAGE	0.316*	V	LCEXPT	−0.970
	WORK	0.266	VI	SOCLASS	0.095*
VI	SOCLASS	0.031*			
	INTERCEPT	−12.558		INTERCEPT	−7.226
	R^2	.50		R^2	.35
	χ^2 (9 d.f.)	439.01		χ^2 (8 d.f.)	109.60

*Indicates a t-ratio less than 2.0 (i.e., the coefficient is not statistically significant).

Table 9.9: *Logit Coefficients for Choice of Physics*

Boys			*Girls*		
Variable Group	*Variable*	*Coefficient*	*Variable Group*	*Variable*	*Coefficient*
I	IGPA	0.617	I	IGPA	0.612
II	UNIVSCI	1.413	II	UNIVSCI	1.054
	TECHDIP	1.106	III	INTEREST	2.188
III	INTEREST	1.516		MATHLIT	−2.273
	USE	0.894			
	MATHLIT	−1.620			
IV	EDIMAGE	−0.125			
	SOCIAL	−0.900			
	TEACHVAL	0.432			
	UTILVAL	−0.678			
V	LCEXPF	0.337			
VI	SOCLASS	−0.053*			
	INTERCEPT	−0.995		INTERCEPT	−3.557
	R^2	.38		R^2	.27
	χ^2 (12 d.f.)	352.74		χ^2 (4 d.f.)	88.95

*Indicates a t-ratio less than 2.0.

Table 9.10: *Logit Coefficients for Choice of Chemistry*

Boys			*Girls*		
Variable Group	*Variable*	*Coefficient*	*Variable Group*	*Variable*	*Coefficient*
I	IGPA	0.892	I	IGPA	0.928
II	UNIVSCI	0.904	II	UNIVSCI	1.453
	COMMSOC	−1.129		TECHDIP	1.685
	MATHLIT	−1.268		COMMSOC	−0.655*
IV	SOCIAL	−0.038*		MATHLIT	−1.374
	UTILVAL	−0.473	V	PEDEXPS	0.495
V	PEDEXPS	0.371*	VI	SOCLASS	−0.169
VI	SOCLASS	0.017*		FATHED	0.087
	INTERCEPT	−3.232		INTERCEPT	−5.270
	R^2	.30		R^2	.29
	χ^2 (8 d.f.)	310.49		χ^2 (8 d.f.)	268.66

*t-ratio < 2.0.

Table 9.11: *Logit Coefficients for Choice of Biology*

Boys			*Girls*		
Variable Group	*Variable*	*Coefficient*	*Variable Group*	*Variable*	*Coefficient*
I	IGPA	−0.203	I	IGPA	0.018*
	ICSCI	0.608*		ICSCI	1.876
II	COMMSOC	−0.452	II	CERT	0.085
III	INTEREST	1.116		NURSING	0.986
	DIFFICULTY	−0.372	III	DIFFICULTY	−0.644
	USE	0.416		INTEREST	0.922
IV	SUBJEVAL	−0.580	IV	UTILVAL	−0.408
V	LCEXPT	0.310		SOCIAL	−0.490
VI	SOCLASS	−0.016*		HHTASK	0.145*
				EDIMAGE	0.331
			V	LCEXPT	0.241*
				SOI 1	−0.235
				PEDEXPS	0.466
			VI	SOCLASS	−0.062*
	INTERCEPT	0.347		INTERCEPT	−1.336
	R^2	.10		R^2	.34
	X^2 (9 d.f.)	112.85		X^2 (14 d.f.)	393.87

*t-ratio < 2.0.

Higher Maths, the level of job aspired to (JOB 1) and sex-role expectations (WORK) are of importance for boys but not girls, while the reverse is true of teacher expectations (LCEXPT) and TECHDIP. This latter variable indicates that wanting to pursue a third-level applied science or technical course will increase a girl's probability of choosing Higher Maths, but will have no effect on a boy's. For neither boys nor girls is the effect of social class (SOCLASS) statistically significant. In the case of Chemistry, SOCLASS is significant for girls only; the higher the social class (bearing in mind that high social class scores low on SOCLASS) the greater the probability of choosing Chemistry. Again, TECHDIP is important for girls but not boys. Although SOCIAL (level of perceived sanctioning for social reasons) appears in the boys' list, it is not statistically significant. Likewise COMMSOC (aspirations to a third-level Commerce course) is not significant for girls but is for boys, having a negative effect on the probability of take-up.

Turning to Physics (Table 9.9), the variables that influence girls' probability of choosing the subject also appear in the boys' list, but the latter includes a number of additional variables. Thus, for girls, variables outside groups I, II and III do not have any influence additional to that of these groups, on the probability of choosing Physics.

If we compare the results for Biology (Table 9.11) with those for the other subjects, we see at once that they follow a different pattern. If we compare the boys' and girls' R^2 statistics, then it is clear that we have only poorly accounted for the probability of boys choosing Biology, but we have been more successful in relation to girls. Examining the IGPA coefficients, we discover that, whereas for the other three subjects, it had a positive effect (the higher the IGPA the greater the probability of choosing the subject), here IGPA is not significant for girls, and has a negative effect among boys; that is, controlling for the effects of the other variables in the boys' analysis, those with a lower IGPA have a higher probability of choosing Biology.

In this analysis we have also included a variable indicating whether or not the pupil took Science at Inter. Cert. (ICSCI; scores 1 if Science was taken, 0 otherwise). This was done because, as we noted in Chapter 5, we assumed that taking Inter. Cert. Science was not a school-imposed prerequisite for choosing Biology (whereas it was for the other senior cycle sciences) but that it would nevertheless have an effect on the probability of choice. The results in Table 9.11 show that it has a positive effect for girls — having taken Science at Inter. Cert. makes it more likely that a girl will choose Biology — but no effect among boys. This latter is probably due to the fact that there are very few boys in this subsample who have not taken Science at Inter. Cert. We also note that the variable MATHLIT measuring general preference for Science or Literature/Language subjects, does not appear among the variables predicting the probability of Biology take-up, whereas it is particularly important in regard to take-up of the other three sciences. Finally, NURSING (wanting to train to be a nurse) has, as we might expect, a strong positive influence on the probability of girls choosing Biology.

In all four analyses, and for both sexes, variables in blocks I, II and III are consistently important, and it appears that just those variables alone would predict the probabilities of subject choice almost as well as the complete equations given in Tables 9.8 to 9.11.[56] These three blocks of variables are IGPA (I), variables relating to aspirations and ambitions (II), and variables measuring attitudes towards the subjects (III). However, we note that in regard to block II (aspirations), the important variables relate not directly to level of job aspired to or even type of job, but to aspects of post-secondary training. In the case of Higher Maths, Physics and Chemistry these are third-level (University, NIHE, RTC, etc.) courses. From this we conclude that these subjects are far more likely to be chosen by those aspiring to third level. In the case of Biology the relevant post-secondary training is, as noted earlier, that for nursing.

In regard to the directionality of different variables' effects, these appear consistent across the sexes. Any variables with a statistically significant coefficient for girls has the same direction of effect for boys wherever it is statistically significant for boys. However, the sizes of the coefficients can vary quite widely. For example, in Higher Maths, the effect of MATHLIT (preference for Science or Language/Literature subjects) and DIFFICULTY (perceived difficulty of the subject) are almost the same for boys and girls, but those for IGPA and UNIVSCI (aspiration to a third-level Science course) differ widely. In summary then, in answer to our first question, we can say that although a number of variables are important in influencing the probability of choosing a subject, there is a core of variables that, particularly in Higher Maths, Physics and Chemistry, consistently appear to be crucial.

[56]. An approximate indication of this is to compare the R^2 values for the full regressions with those for the regressions including only variables of blocks I, II and III. These are shown in Table 11a. In all cases the differences are slight.

Table 11a: *R^2 for Full and Truncated Logit Equations*

	Boys		*Girls*	
	Full	*Truncated*	*Full*	*Truncated*
Higher Maths	.30	.28	.35	.32
Physics	.38	.35	.28	.27
Chemistry	.30	.29	.29	.27
Biology	.10	.08	.34	.31

These are IGPA, attitudes towards the subject, and whether or not the pupil aspires to certain types of third-level courses. The effects of these variables are consistent in direction, but the size of their effect may vary according to sex.

The second question we set ourselves to answer was whether or not the observed sex differences in true rates of subject choice were due to differences between the sexes in their distribution over those variables that appear important in determining whether an individual pupil chooses to take or not take the subject. In other words, we have seen that IGPA, attitudes to the subject, and aspirations to certain third-level courses are crucial in determining the probability of a pupil's choosing a specific subject. We now ask if it is the case that, for example, fewer girls than boys choose Higher Maths because girls have a lower IGPA, have less favourable attitudes towards Higher Maths, and are less likely to aspire to third-level science courses, or are the sex differences primarily due to other factors?

It is clearly the case that the two sexes are differently distributed across these crucial variables. Table 9.12 for example, shows the mean scores for boys and girls who are given the choice of taking Higher Maths and Chemistry, on some of those variables which appear to be important in determining individual choice for both sexes.

Table 9.12: *Mean Values of Four Variables for Those Pupils Who May Choose Higher Maths and Chemistry.*

Higher Maths			*Chemistry*		
Variable	*Boys' Mean*	*Girls' Mean*	*Variable*	*Boys' Mean*	*Girls' Mean*
IGPA	5.18	5.05	IGPA	4.86	4.73
UNIVSCI	0.38	0.18	UNIVSCI	0.30	0.11
DIFFICULTY	0.65	0.64	COMMSOC	0.20	0.10
MATHLIT	1.38	1.44	MATHLIT	1.43	1.48

We see in Table 9.12 that for MATHLIT, which is negatively related to the probability of choosing either Higher Maths or Chemistry, the girls' mean score exceeds boys', i.e., they have less favourable attitudes towards Maths and Science. On the other hand, in the remaining variables, which are positively related to choosing the subject, boys score more highly than girls. The exception is COMMSOC (aspirations to third-level Commerce or Social Science course); this is related negatively to choice of the subject, but boys score higher than girls.

It is the case then, that overall, girls' scores on the variables which are strongly related to an increasing probability of a subject take-up, are such as to make them less likely to take the subject than boys. What we want to know, however, is how much of the sex difference in take-up such variations account for.

We can answer this question by adopting a technique used by Walsh and Whelan (1976). In our case this involves estimating for each sex the mean probability of taking a subject, by multiplying the logit coefficients for each variable by the mean score on that variable of each sex. So, for example, in the case of Higher Maths, the mean IGPA of those girls given the option of the subject was 5.05 (from Table 9.12); we multiply this by 1.11, which, as Table 9.8 shows, is the coefficient for girls' IGPA. We do the same for the following variables — UNIVSCI, TECHDIP and so on, and by summing these multiples, we obtain the estimated probability for girls of choosing Higher Maths. The full set of means for both sexes is given in Appendix 9A. If we do the same for boys, the sex difference in mean probability will be, for any subject:

Sex difference = (Boys' Coefficients × Boys' Means) − (Girls' Coefficients × Girls' Means) (1)

If we then substitute the boys' means into the girls' equation and take the difference between this and the girls' own score (that is, girls' coefficients × girls' means) this will be that part of the sex difference due to the different mean scores of boys and girls on the variables involved, that is,

Effect of different means = (Girls' Coefficients × Boys' Means) − (Girls' Coefficients × Girls' Means) (2)

The remaining difference (i.e., (1) − (2)) will be due to sex differences in the coefficients of the variables in the analysis. The two parts of the overall sex difference can be expressed as percentages of the overall sex difference, as in Table 9.13.

Table 9.13: *Partition of Sex Differences in Probabilities of Subject Choice (as Percentages)*

	Due to Different Variable Means	*Due to Different Variable Coefficients*
Higher Maths	12	88
Physics	15	85
Chemistry	62	38
Biology	27	73

In the case of Biology, girls' probability exceeds that of boys; thus, the boys' "disadvantage" is not due chiefly to their different distribution across the crucial variables. In the other three subjects, where the boys' probability exceeds that of girls, the major cause of this is not differences in mean values, (except in the case of Chemistry), but, rather, sex differences in the coefficients attached to the variables.

In terms of the method used, the variation arising from the different effects of the variables involved (since any variables that do not appear in the equation for one sex but do for the other can be regarded as having, in the former instance, a coefficient of zero) in the logits (including the differences in intercept) shows the sex difference in the probability of choosing the subject between a boy and girl (who were both offered the subject) who had identical scores on all the variables which our analyses suggest are important in determining this probability. In other words, a girl and a boy, each of whom may choose, say, Physics, could have identical IGPA, identical aspirations to third-level, identical attitudes to the subject, identical educational self-image, come from the same class, and so on, and the girl would still be far less likely to choose Physics than the boy. If we control for the different distributions of the sexes across the independent variables, then, except in Chemistry, the sex difference in the probability of choosing the subject will decrease only slightly (in fact by the percentage given in column one of Table 9.13).

Different factors affect each sex's probability of choosing a subject in different ways. If we examine the Higher Maths results, for example, the coefficient for the variable WORK (measuring attitudes to combining work and child rearing) is of crucial importance for boys. This may not be immediately evident, but in fact, if we omit this variable from our calculation of the mean probability of choosing Higher Maths, this mean probability would be considerably reduced. For girls, on the other hand, WORK is of no importance; rather, LCEXPT (teachers' Leaving Cert. expectations of the pupil) is of major importance in reducing the probability of choosing Higher Maths. So, for girls, their perception of the expectations of their Leaving Certificate performance held by teachers (and also parents, since their perceived expectations are very highly correlated with those of teachers) are important in regard to whether or not they choose to do Higher Maths, whereas for boys this is unimportant. This is despite the fact that, of those who may choose Higher Maths, girls score more favourably on LCEXPT. LCEXPT may be important for girls, but not for boys, for the following reason. Since Higher Maths is considered a difficult subject, it may be that girls, because they have a lower perception of their own abilities (as we saw in earlier chapters), require high levels of teacher support and encouragement before they will attempt it. For boys, their perception of future sex roles, as captured by WORK, is important. Boys who perceive their sex roles in a more traditional light will be more likely to choose Higher Maths. For girls, on the other hand, their perception of future sex roles are of no direct consequence in this respect. This may occur, however, because for girls, holding non-traditional expectations of the working/child rearing relationship may be strongly related to some of the other important variables in the equations, such as UNIVSCI (aspirations to third-level Science course). In other words, the effect of WORK on girls' subject choice may be mediated through more specific educational ambitions.

Turning to Physics, the major cause of the sex difference is the difference in intercepts of the boys' and girls' equations. If the boys' intercept replaced the girls' in the girls' equation, then the girls' probability would come to exceed the boys'. The intercept value represents the effects of sex, net of differences in both mean values and logit coefficients. It may, therefore, represent either discrimination against girls by schools or teachers (direct or indirect) or some other area of sex difference not directly accounted for in our model.

Finally, in Biology, the effects of IGPA and ICSCI (having taken Inter. Cert. Science) are of major importance. Whereas IGPA is of no importance in determining the girls' probability (the coefficient is not statistically significant) increasing IGPA markedly reduces the boys' probability. Conversely, having done Inter. Cert. Science is unimportant for boys, but has a strong positive effect among girls. Another variable which is unimportant for girls but not for boys is SUBJEVAL. It appears that boys who take Biology tend to be dissatisfied with their choice of Leaving Cert. subjects.

At this point, it may be useful to summarise our findings thus far. Our analyses have sought to discover what combinations of those variables listed in Table 9.6 best predict the probabilities of taking Higher Maths, Physics, Chemistry and Biology, among those boys and girls who are given the option of taking these subjects. We found that these variables showed some consistency across the subjects and the two sexes; in particular, IGPA, and those variables that indexed pupils' attitudes towards the subject and the kind of third-level course they aspired to, were consistently important and acted in a consistent direction. Biology was, to a degree, an exception to this. Not only is girls' true rate of choice higher than that of boys, but different factors are important for the two sexes in determining the probability of choice, and in some cases (as with the effect of IGPA on the boys' probability) the direction of effect of variables is the reverse of what it is for the other subjects.

We then noted that, for those variables that occur consistently in our logit equations, boys and girls are distributed differently across them, girls tending to score lower on those variables relating positively to choice of the subject. We then assessed the mean probability of choice for each sex in each subject and asked to what extent the sex differences in those probabilities were due to this different distribution of the sexes across common independent variables. We found that, except for Chemistry, this did not account for much of the sex difference, the bulk of which must, therefore, be due to the different effects on boys and girls of the independent variables. So, we gave the example of Higher Maths, where LCEXPT (teachers' Leaving Cert. expectations) has very strong effects on the girls' probability of choice, but none on the boys'.

A crucial question raised by such a finding is the following: why do the various variables used in these analyses have different effects on each sex? Put another way, why, for example, is the return to Inter. Cert. performance in terms of an increase in the probability of choosing Higher Maths, greater for boys than girls? In fact, this is, in cross-national comparisons, a common finding. For example, Kelly (1981, p. 38), writing of sex differences in Science achievement, notes that "boys' achievement was more highly correlated with attitudes than was girls', and boys achieved better in science than did girls with equally favourable attitudes".

One possible explanation for our finding of a greater return (in terms of the probability of choosing the Sciences) to boys than girls of scores on the independent variables in our analysis, is that girls' adult roles are, in general, viewed as less certain than those of boys. This has effects both on the pupil and on the way in which girls and boys are dealt with by teachers and the kinds of roles schools see themselves as playing. In particular, girls' labour market participation is probably seen as more equivocal than boys'. Thus, girls themselves may be less likely to extract the full labour market returns from their current position and achievements. This need not be a direct effect (as might be the case, for example, when a professionally qualified woman did not participate in the labour market); rather, it may be indirect, such that girls, even though aspiring to certain jobs and having achieved certain levels of educational performance, still do not translate these into subject choices that maximise their labour market potential. Secondly, given the equivocal nature of female labour market plans (or even given simply an assumption of it on the part of the school), schools may not push girls towards subjects presumed to be both demanding and yielding a high return in the labour market, and may actually discourage them.

In Chemistry, however, the strengths of the factors influencing whether pupils choose to take or not to take the subject, appear to be very similar for both boys and girls. In this sense it may represent a mid-way point between Biology, which is dominated by girls, and Physics and Higher Maths, dominated by boys. Some consideration of the nature of the subject would tend to support this view, in that Chemistry, while more abstract than Biology, is certainly not as abstract as Physics or Higher Maths, and like Biology (though less markedly) deals with tangible and immediately concrete matters to a greater extent than do Physics or Maths.

To conclude this section of the chapter, we shall discuss what sorts of features are characteristic of girls who choose Higher Maths, Physics and Chemistry (i.e., the subjects in which girls are under-represented). As we have already noted, a number of variables will be found to be common to all three subjects. So, for example, those girls choosing Higher Maths will, in contrast to those who choose not to take it, have, on average, higher IGPAs, have aspirations either to a third-level pure or applied Science or Technical course, they will, in general, prefer Maths/Science type subjects over Language/Literature subjects, and they will perceive their teachers and parents as having high expectations of their Leaving Cert. performance. In the case of Chemistry, those girls choosing this subject will have an almost identical profile, except that for most of the variables, the coefficients are smaller. This implies that the influence of, say, wanting to do a third-level Science course, on the probability of choosing Chemistry is much less than on the probability of choosing Higher Maths. Nevertheless, it is in these same respects — IGPA, third-level Science course aspiration, perception of parents' educational expectations, and a preference for Maths/Science subjects — that takers and non-takers may be distinguished. In the case of Chemistry, however, social class also has direct effects; girls from the higher social classes tending to be more likely to choose the subject. Finally, in Physics, as Table 9.9 shows, four factors are important; girls choosing Physics will on average tend to have high IGPA (but not as high as those choosing Higher Maths), will aspire to third-level Science courses, will have a high degree of interest in the subject and will prefer Maths/Science subjects.

School Effects on the Probability of Subject Choice

We have identified a number of variables associated with individual female pupils that influence the probability that they will choose Higher Maths, Physics and Chemistry. We will now conclude this analysis with an investigation of the extent to which schools might be held to influence these variables. We shall look at how, if at all, aspects of schools themselves are associated with systematic variations in girls' scores on these crucial variables; are there, for example, schools where girls score particularly highly on UNIVSCI or LCEXPT, and where, therefore, we might expect high rates of take-up, of say, Higher Maths? If this is the case it will show that schools do have an influence on the true rate of subject choice.

In the analysis we chose to examine three variables which appear to be important in determining the probability of a girl choosing one of the science subjects: these are whether or not she aspired to a third-level Science or Maths course (UNIVSCI), the extent of her preference for Language/Literature subjects over Science (MATHLIT) and the perceived level of teachers' Leaving Cert. expectation of her (LCEXPT). The features of the schools which we hypothesised would affect these variables are those we previously discussed as ethos variables. In this case we used four such variables; these were the median social class of the pupils (SOCLASS) — this was included as a control variable — the level of achievement ethos in the school (ACHETHOS) — which we hypothesised, would influence a variable such as UNIVSCI — and two measures of pupil/teacher relationships, SCHTEACH (measuring teacher supportiveness) and TEACHNEG (the extent to which teachers constitute a negative reference group). The former measures the performance expectations and support given to pupils by teachers relative to that given by parents, and the latter measures the extent to which teachers, relative to peers, constitute a negative reference group. These variables are likely to have a substantial effect on measures such as LCEXPT.

In the analysis we first entered the variables IGPA and SOCLASS (measuring the pupil's IGPA and individual social class) in order to control for these variables, (as our primary interest is in the effects of variables that index features of the school rather than of individuals) since it is highly likely that IGPA and SOCLASS will have a considerable influence on our three dependent variables — UNIVSCI, MATHLIT and LCEXPT.[57] A final point is that we carried out the analysis for girls only, and we used three subsamples of girls, namely, those who were given the option of choosing (1) Higher Maths, (2) Physics, and (3) Chemistry — in other words, the same female samples involved in the preceding logit analyses of the probability of choosing the subjects.

The results of the analyses are shown in Tables 9.14, 9.15 and 9.16. These tables give the results of the regression analyses for each of our three dependent variables in each of our three subsamples. We note initially that the pupil's IGPA is uniformly significant in predicting each of these variables for all three samples: a high IGPA leads to the perception of a higher level of teacher Leaving Cert. expectations (since LCEXPT scores high for low expectations) a lower level of preference for Language/Literature subjects and a greater likelihood of aspiring to a university science course.[58] Against this we see that, controlling for all the other variables in the analysis, the pupil's social class is

57. We also included in the initial analysis the variables representing the school clusters and a dummy variable indicating whether the school was coeducational or not. Entered into the analysis after the ethos variables, none of them had significant coefficients and they were omitted from the final analysis.

58. Since UNIVSCI, the dependent variable in this analysis is dichotomous, we should have used a logit procedure had we wished to obtain fully accurate parameter estimates. Our interest, however, was in the direction of the effects of our independent variables and whether or not they were statistically significant, for which an Ordinary Least Squares analysis is adequate.

Table 9.14: *Regression Analysis of Effects of Certain School Level Variables on LCEXPT; Girls Only*

	Subsample		
	1. Those who May Choose Higher Maths	*2. Those who May Choose Physics*	*3. Those who May Choose Chemistry*
Independent Variables			
Pupil's social class	–0.004	–0.023	–0.013
IGPA	–0.298*	–0.268*	–0.226*
School social class	–0.031	0.025	–0.009
ACHETHOS	0.733*	0.817*	0.424
SCHTEACH	–2.012*	–1.746*	–1.367*
TEACHNEG	0.301	0.198	–0.197
INTERCEPT	5.130	4.280	5.422
R^2	.20*	.14*	.12*
R^2 adjusted	.18	.12	.11
N	273	301	712

*Significant at $p \leq .05$.

Table 9.15: *Regression Analysis of Effects of Certain School Level Variables on MATHLIT; Girls Only*

	Subsample		
	1. Those who May Choose Higher Maths	*2. Those who May Choose Physics*	*3. Those who May Choose Chemistry*
Independent Variables			
Pupil's social class	0.006	0.006	0.002
IGPA	–0.109*	–0.119*	–0.787*
School social class	–0.012	–0.094*	–0.002
ACHETHOS	0.186	–0.010	0.201
SCHTEACH	–0.282	–0.061	–0.210
TEACHNEG	–0.046	0.555*	0.094
INTERCEPT	2.149	1.284	1.489
R^2	.11*	.13*	.06*
R^2 (adjusted)	.09	.11	.05
N	273	301	712

*Significant at $p \leq .05$.

Table 9.16: *Regression Analysis of the Effects of Certain School Level Variables on UNIVSCI; Girls Only*

	Subsample 1. *Those who May Choose Higher Maths*	2. *Those who May Choose Physics*	3. *Those who May Choose Chemistry*
Independent Variables			
Pupil's social class	–0.008	–0.011	–0.008
IGPA	0.134*	0.143*	0.095*
School social class	0.008	0.035	–0.013
ACHETHOS	0.211	0.205	0.203
SCHTEACH	0.691*	0.766*	0.136
TEACHNEG	0.060	–0.322	0.070
INTERCEPT	–2.699	–2.109	–1.283
R^2	.11*	.19*	.10*
R^2 (adjusted)	.09	.17	.09
N	273	301	712

*Significant at $p \leq .05$

not significant in any of the analyses. If social class has an effect on these dependent variables — which its simple correlation would suggest is the case — it must be mediated through the other independent variables.

Our central concern, however, is with the influence of the school variables ACHETHOS, SCHTEACH and TEACHNEG. The fact that the equations of Tables 9.14 to 9.16 are generally relatively poor predictors of the dependent variables, indicates at once that the effects of these variables will at best be modest and examination of these equations suggests that this is indeed the case. However, these variables do show statistically significant effects, in particular, SCHTEACH shows clear effects on LCEXPT and UNIVSCI. SCHTEACH measures the influence of teachers. We saw earlier that its value depends, to some extent, on the social class of the school; however, if we control for this (by including school social class in the analysis) we see that in those schools where teachers are perceived as supportive, girls will perceive teachers as holding a higher set of Leaving Cert. expectations for them, and girls will also be more likely to aspire to a third-level Science course. The school's achievement ethos level (ACHETHOS) is related to LCEXPT. However, in this case girls in schools with a high acievement ethos will perceive their teachers as holding lower Leaving Cert. performance expectations for them. Beyond these two variables, however, there is no other discernible pattern of school effects, and indeed, in explaining MATHLIT, our school level variables perform very poorly.

Three points can be made in summary. As regards the dependent variables of this analysis, a considerable amount of variance remains unexplained by our independent variables. That is, most of what accounts for, say, a girl's score on LCEXPT, is not captured by our analysis. The kinds of aspirations held by both sexes and the beliefs they have about their future adult roles are widely shared by parents, friends and the community at large. Thus, if schools are to try to influence pupil choices it may be that, if they try to do this alone, they will find themselves operating against these widely held assumptions. Thus, it seems likely that any successful attempts by schools to influence pupil choice into non-traditional directions will have to involve, and require the support of, parents. Secondly, there is evidence for the effects of schools on LCEXPT and UNIVSCI, even though these effects are relatively weak. Thirdly, it is of interest that SCHTEACH should be so important since it suggests that girls are more responsive than boys to the type of relationship they have with their teachers, to the point that this can clearly influence their future aspirations and ambitions.

Conclusions and Summary of Findings

1. In the first part of this chapter we examined variables influencing the proportion of pupils taking certain Science subjects at Leaving Certificate. These subjects were Higher Maths, Physics, Chemistry and Biology. We found that the percentage take-up of these subjects was related to the proportion of the curriculum devoted to Science which, we hypothesised, reflected the importance accorded to Science by the school. Furthermore, for girls, whether the school was single sex or coeducational was also important in influencing the proportionate take-up of Biology and Higher Maths.

2. Subsequently we analysed the relationship between changes in Science take-up rates and changes in Science provision between 1968 and 1978 among our samples of secondary schools. Here we found that, in Science and Commerce subjects at Leaving Certificate, the increased take-up associated with increased provision was much greater among boys than among girls (Table 9.5). Conversely, in the Language and Accomplishment subjects, the increased take-up associated with increased provision was much greater among girls.

3. In investigating hypotheses about variables that influence whether or not a pupil, when given the choice of a particular Leaving Cert. Science subject, actually chooses it, we noted that a large number of variables were related at the bivariate level to the probability of choosing the subject. However, the relationship between these variables and the probability of choosing Biology was different from the relationship between these variables and the choice of Higher Maths, Physics or Chemistry.

4. Our analysis then sought to discover what combination of variables best

predicts the probabilities of taking Higher Maths, Physics, Chemistry and Biology for each sex, among those pupils given the option of taking these subjects. We found that these variables showed some consistency across the subjects and the two sexes; in particular, IGPA and those variables indexing pupils' attitudes towards the subject and the kind of third-level course aspired to by the pupil are consistently important and act in a consistent direction. Biology was something of an exception to this; not only is the rate of choice here higher among girls than boys but different factors are important for the two sexes in determining the probability of choosing the subject, and in some cases the direction of the effect of a variable (whether it is positively or negatively related to choosing the subject) is the reverse of what it is for other subjects.

5. We noted that for those variables that occur consistently in our logit equations as having an influence on pupil choice, boys and girls are distributed differently across them, girls tending to score lower on those variables relating positively to choice of the subject. However, we found that this difference in distributions only accounted for a small amount of the sex difference in the probability of choosing one of the Leaving Cert. Science subjects we analysed (except for Chemistry, where it accounted for a considerable proportion of the sex difference). Rather, the sex difference in the probability of choice was mainly due to the different effects on boys and girls of the variables in the analysis.

6. Finally, we examined the influence that schools have on those variables that are, in turn, important determinants of choice among girls. We found that the ethos of the school has a clear statistically significant effect on these variables, but this effect is modest. This suggests that schools can influence pupils' choices but only to a limited extent, and that any intervention programmes aimed at influencing pupil choices would have to be more broadly based, involving parents. However, such intervention would not necessarily seek *per se* to alter aspirations to adult sex roles, but rather, those aspirations that unnecessarily reduce girls' level and type of career aspirations, no matter how they might be combined with adult familial roles.

In Chapter 5 we pointed out that, in order to increase girls' rates of take-up of the Leaving Certificate subjects we analysed there, increased provision, taken alone, would have little effect. In this chapter we have presented some evidence to support that contention; particularly we might point to Table 9.5 which shows that, for each Leaving Certificate Science subject added in a secondary school between 1968 and 1978 only an additional four per cent of girls (compared with 15 per cent of boys) took two or more Science subjects at this level. In Chapter 5 we also argued that girls' true rates of subject choice would have to increase if their overall rate of take-up was to grow. In the analysis of this chapter we have isolated what factors contribute to forming the true rate of choice and we have indicated that the strength of these factors among pupils varies according to features of the school ethos. The inescapable conclusion is that schools can influence pupils' choices but the extent to which they can do this acting alone is probably limited.

CHAPTER 10

Summary of Findings

Introduction

In this chapter we have three main objectives. The first is to summarise those findings of previous chapters which bear on the central aim of this research, namely to describe and explain differences between both schools and pupils in the extent of sex differences in subject provision, allocation and choice, particularly in Maths and Science subjects. Our second objective is to provide an indication of the relative importance of different policy-relevant variables in their effects on such sex differences. A third objective is to summarise our findings on the role of the Guidance Counsellors in schools.

In the model underlying our analysis the take-up rate of subjects in schools can be viewed as the product of both school and individual pupil factors. As we have seen (a) a school may not provide a particular subject or (b), even if provided, the school may exclude certain categories of pupils — on the basis of sex or ability, for instance — from taking that subject. However, (c), even given equal levels of subject provision and allocation, male and female pupils may differ systematically from each other in their choice of subjects.

In summarising our results, therefore, we must keep in mind that we are operating at two different levels of analysis:

(i) At the school level, where we examine differences between schools in their individual subject and total curricular provision, as well as in school rules which discriminate amongst their pupil categories in terms of the level and type of subject allocated;

(ii) At the individual pupil level where we describe and attempt to explain differences between boys and girls, as well as amongst boys and amongst girls, in their subject choices amongst the alternatives available. At the school level we are concerned with the factors which predict why different categories of schools provide different types of subjects or curricula. At an individual pupil level we are concerned primarily with the internalised ("personality") consequences of differential sex role socialisation processes for individual boys and girls.

The Context of Sex Differentiation

Before we review our research conclusions in detail, we need to place the extent and implications of the sex differences in subject take-up in second-level schools in the context of the overall educational and labour market inequalities of men and women; otherwise we may misinterpret their meaning and significance.

Girls are more likely than boys to complete second-level education. Girls' participation levels in the senior cycle of post-primary schools are substantially higher than those of boys (Chapter 3) and are also greater than most other EEC countries — only Belgium, The Netherlands and France having higher rates. (Eurostat, *Social Indicators of the EEC*, 1960-1975, pp. 231-232; Eurostat, *Education and Training*, Statistical Bulletin, Oct. '82). Early school leaving is much more characteristic of boys than girls; by age 16, for instance in 1980/81, 43 per cent of boys compared with only 23 per cent of girls had already left school.

A high proportion of boys, however, drop out early from second-level schooling to enter apprenticeships, while almost no girls enter apprenticeship training or take up skilled manual or craft occupations. In the school year 1980/81, for instance, of 1,137 male school leavers sampled 22 per cent went into apprenticeships or related AnCO training courses; while only three per cent of 1,062 female school leavers did so. (NMS School Leavers' Survey, 1981. See Appendix Table 10.1). Of male school leavers who left before or at Inter. Cert. level 30 per cent entered such apprenticeship or related training compared to less than 8 per cent of females.

Moreover, although more females complete second level substantially fewer go on to third level, and of those who do, fewer enter applied professional/technical scientific courses in the Universities or RTCs. Girls, on the other hand, are more likely to enter Arts, Commerce, Nursing and Teacher training and other related semi-professional occupational training courses.

Even with the same educational qualifications in Maths and Science, girls are far less likely than boys to take applied Science or Engineering courses in Universities or RTCs. With more than 5 honours in the LC, 53 per cent of boys and 43 per cent of girls went on to University in 1980/81, and with less than 3 honours, nine per cent of boys but only one per cent of girls did so. Girls with more than three honours are far more likely to enter teacher-training or nursing (see Appendix Table 10.2). Equally discrepant patterns exist for those with different Science qualifications in the Leaving Cert. Over half of the boys with two or more Science subjects went on to do Applied Science or Engineering Courses in third level compared to less than one in four girls with equivalent qualifications. (See Appendix Table 10.3). Such girls are disproportionately concentrated in teacher-training, nursing or even Arts or Commerce courses at third level.

In other words, even if girls take the same second-level courses as boys and achieve the same level of honours in the Leaving Certificate they do not then go on to take the same kind of third-level courses or enter the same kind of jobs as boys. Sex differentiated values and expectations even appear to extend to such third-level choices.

The results of our pupil interviews (Chapter 2) show that, compared to boys, girls have more negative attitudes towards Maths/Science subjects, have lower educational self-images, are less competitive in class, but feel more rewarded for academic success and feel less sanctioned for misbehaviour — given the former differences the latter feelings of reward must be due to different reasons for girls and boys. Also, while girls' sex-role attitudes are more egalitarian than boys', they are nevertheless far more involved in household task performance than boys are. Whether these differences in values and attitudes explain differences in subject take-up at post-primary level was examined in Chapter 9 and will be summarised later.

So although girls are less likely to drop out of school — leaving without any educational certificate — and are, as a consequence, on average, more employable than boys; and although they are less likely to enter low paying unskilled or semi-skilled manual or service employment, their employment opportunities are nevertheless so concentrated in a relatively narrow range of female dominated lower non-manual or white-collar occupations that their labour market opportunities are extremely limited (see Chapter 3). Roughly two out of three working women are in occupations which are dominantly female in composition (Appendix Tables 10.5 and 10.6). This high degree of sex segregation of the labour market exists as part of a more widespread social and cultural system which clearly differentiates men's from women's roles in adult life. This sex role differentiation extends back to the early learning and socialisation experiences of male and female infants and it is also clearly represented in the cultural assumptions shared by the main educational institutions in their provision and allocation of subjects. In this system of interrelated influences it is not easy, therefore, to isolate any discrete set of factors which on their own could be changed to substantially reduce sex inequalities in take-up of subjects in the junior and senior cycles of post-primary schools.

But if this system of sex roles is so deeply institutionalised, why should we worry about its current functioning? There are several reasons why our highly differentiated sex role system should be a cause for concern. As we saw in Chapter 3, in terms of the attitudes of older married women and the actual practice of younger married women the traditional division of labour between the "male provider" and female "housewife" role has become somewhat less accepted in practice. Secondly, there are serious elements of inequality in the sex-role system which become more difficult to accommodate as society becomes increasingly more industrialised and urbanised.

Thirdly, in women's accommodation to an essentially servicing role in family, communal and economic life, certain psychical costs are involved — their general undervaluing of their own abilities, and a significant educational and occupational under achievement, relative to men — which have increasingly become less balanced by alternative rewards from other sources. Or, to put it another way, those educational, occupational, and general social achievements that are most socially rewarded in our society are those in which women have significantly under-achieved; while those roles in which they do achieve—in family, communal and general caring roles — are ones which have become increasingly less socially rewarded.

But finally, much more obvious and pragmatic reasons exist why we should worry about the continuation of earlier relationships between the education, employment, and marriage patterns of women:

(i) Women have become increasingly concentrated in a limited number of occupations. In 1979 — about 60 per cent of working women were employed in general clerical jobs — in mainly clerical-administrative jobs in commerce, insurance and finance; and in professional/technical occupations such as nursing, teaching and pharmacy (see Appendix Tables 10.4 to 10.6). Continuous expansion in these clerical and semi-professional "female" occupations persisted up to 1979 (Appendix Table 10.4). Contrariwise there has been a substantial relative decline in service, some manufacturing but, particularly, in agricultural occupations (Appendix Table 10.4). And, as we pointed out in Chapter 3, the level and type of education provided for girls from the early 1960s to the early 1980s, in fact, was far more adaptive to these labour market changes than was the general education provided for boys.

But the advent of microelectronics is likely to have a substantial impact on office employment — both in terms of a decline in the demand for ordinary clerical labour and through a shift in the type of technical and analytical skills required in future office employment (see Appendix 10.A). Many studies of the impact of office technology on large corporate employers of clerical labour in banking, insurance, and the public service, for example, not only estimate substantial declines of employment over the 1980s, (see Science Policy Research Unit 1982; Bird, 1980), but also indicate a shift in the balance of office/administration employment towards more technical-analytical skills (see Appendix 10.A).

(ii) Over the coming decade cut backs in public expenditure and a relative stabilisation in the number of primary school pupils (White Paper, 1980) are likely to significantly *reduce* the demand for primary and second-level teachers, and the position of nurses and related occupations, is equally pessimistic.

(iii) The retention of younger married women in the labour force grew rapidly over the 1970s. As we indicated in Chapter 3, there are a series of underlying economic, social and cultural reasons for this trend. It is likely to continue. As a result, the number of job vacancies produced by such withdrawal from the labour force on marriage is likely to decrease further.

(iv) Significant changes are occurring in the family life cycle which have reduced substantially the age of completion of childbearing and early child rearing for married women (See Chapter 3; and Rottman and Hannan, 1981 p. 107; Walsh, 1980). The age at which the typical married woman completed childbearing was estimated at 34.5 in 1971 (Brahimi, 1978). Fertility is estimated to have declined significantly since then with median age of marriage remaining static (Walsh, 1980). As a result, some educational preparation for a post-childrearing stage — which in most other, though more industrialised, countries involves a return to the labour force — would be most advisable. Given the likely trends in clerical employment, education and training in conventional office skills or related types of employment, would quickly become redundant for older married women wishing to return to work.

Summary of Main Findings: Provision, Allocation, Choice

1. *The "Take-Up" of Subjects by Girls and Boys*

Throughout our discussion of take-up we have emphasised the point that the overall take-up of a subject is the net result of the effects of at least three variables: Provision, Allocation and Choice. Thus, not only may rates of take-up vary according to sex and school type, but so may the relative importance of these three factors in contributing to this rate. The take-up of Leaving, Intermediate and Group Certificate subjects was analysed using various data sets, examining take-up rates at the national level, the school level, and school sector level (secondary, vocational, community/comprehensive):

(a) Historical changes in national rates of subject take-up by each sex over the recent past were examined in detail in Chapter 4;

(b) current sex differences in take-up at a national level were described in detail according to school type, in Chapter 5;

(c) variations in the rate of take-up of specific Leaving Cert. Science and Honours Maths subjects were examined at an individual school level in Chapters 7, 8 and 9.

In examining contemporary levels of subject take-up in both the junior and senior cycles, we have seen that there are considerable differences in these levels between subjects, between schools and between the sexes. Indeed, we have seen that not only do particular subjects show sex differences in their rates of take-up, but also that these sex differences may vary, depending on what type of school one is analysing. Broadly one can distinguish between two types of subject displaying sex biases in rates of take-up. On the one hand are those subjects which are always biased in take-up in favour of one sex, regardless of school type. The amount of sex bias in the take-up of these subjects may vary depending on whether we are examining rates of take-up in secondary vocational or community/comprehensive schools, but the direction of their bias is always constant. Stated in the order of this "male bias"; the Technical subjects, Hons. Maths, Applied Maths, Inter. Cert. Science and Leaving Cert. Physics are all "male" subjects; and Home Economics, Music, Art, and German are consistent "female" subjects. All of these subjects showing a consistent "sex bias" do so either because of a consistency across school types in their provision/allocation biases, or individual pupils have such consistent biases in their choices that they override any contrary provision arrangements. Despite this overall consistency, however, there is wide variation from individual school to individual school in the provision and allocation arrangements for these subjects to girls and boys, as well as apparent school influence on pupil choices, with some schools, as a result, showing minimal sex differences in take-up even in the most "sex typed" subjects.

On the other hand are those subjects such as Inter. Cert. Commerce and the Leaving Cert. Commerce subjects — Accounting, Economics and Business Organisation — which, although showing sex bias in their rates of take-up, display a different direction to this bias, depending on school type. Thus, as we noted in Chapter 5, these Commerce subjects tend to be associated with girls in vocational schools but with boys in secondary schools. This bias in vocational schools is due in large part to the specific allocation policies pursued in these schools, where Commerce and the Commerce subjects are often timetabled as an implicit "girls'" alternative to the "boys'" Technical subjects. The conclusion that we drew from these findings in Chapter 5 was that schools can be seen to influence the rates of take-up of subjects; indeed, in the case of subjects like Commerce which fail to show a consistent pattern of sex bias, it appears to be primarily school factors rather than pupil choice, that determine the extent of this bias. Elsewhere, however, the relative importance of these three factors is less obvious, and most of our subsequent research involved gauging this importance.

A further aspect of take-up differences, however, should be mentioned here: that is, as a cohort of pupils passes through the post-primary system, sex differences in subject take-up become more marked. For example, Table 10.1

Table 10.1: *Percentage of Inter. Cert. Survey Respondents Taking Certain Subjects in their 1st, 2nd and Inter. Cert. years in Single Sex and Coed Schools*

	1st year				*2nd year*				*3rd year*			
	Boys in Boys' Schools	*Girls in Girls' Schools*	*Boys in Coed Schools*	*Girls in Coed Schools*	*Boys in Boys' Schools*	*Girls in Girls' Schools*	*Boys in Coed Schools*	*Girls in Coed Schools*	*Boys in Boys' Schools*	*Girls in Girls' Schools*	*Boys in Coed Schools*	*Girls in Coed Schools*
Maths	99.6	99.5	99.7	99.6	O 44.0* H 55.2*	O 64.4 H 34.9	O 60.5 H 36.6	O 66.9 H 32.3	O 45.6 H 53.6	O 71.6 H 27.7	O 65.1 H 32.0	O 68.8 H 30.4
Science	97.9	68.9	94.6	79.5	97.4	57.1	89.1	72.9	96.2	54.2	84.5	70.8
Commerce	66.3	60.3	40.4	66.5	62.7	55.0	33.5	62.4	57.8	53.5	32.7	58.8
Home Econ.	3.1	71.5	9.6	81.8	0.6	58.8	1.8	76.3	0.2	56.3	0.2	72.8
Mech. Draw.	28.4	1.4	57.5	9.3	23.1	0.1	56.0	1.2	22.9	0.1	54.7	0.9
Woodwork	16.0	0.5	64.9	7.1	11.5	0.1	53.9	0.9	10.9	0.0	50.7	0.6
Metalwork	3.5	0.9	39.9	5.2	2.0	0.1	34.0	0.8	1.9	0.1	33.0	1.4

*O = Ordinary Level; H = Higher Level.

shows, that, among our Inter. Cert. sample, sex differences in the percentages of boys and girls taking the subjects listed increased in both single sex and coeducational schools, as they moved from first through to third year (although it is interesting to note that, while this trend occurred in Commerce, the direction of the sex bias was towards boys in single sex schools and towards girls in coed schools). And in the most sex-typed subjects — Technical subjects and Home Economics — although a small proportion (less than 10 per cent) of boys and girls took the subjects in first year, they had dropped them by second year.

In the move from junior to senior cycle, this widening of sex differences continues. For example, Table 10.2 shows that of those who obtained a C or better in Inter. Cert. Higher Maths, a very much lower percentage of girls than of boys in our Leaving Cert. sample, went on to take Leaving Cert. Higher Maths. These sex differences, however, are less pronounced in coed than between single sex schools.

Table 10.2: *Percentage of Male and Female Leaving Cert. Respondents who Obtained C+ in Inter. Cert. Higher Maths, Who were Currently doing Honours Maths for the Leaving Cert., in Single Sex and Coed Schools*

	% of respondents who got grade C+ in IC Higher Maths	*% of those with C+ in IC Higher Maths now taking Leaving Cert. Honours Maths*
Boys	38.5	61.9
Girls	16.5	13.6
Coed Boys	19.8	52.1
Coed Girls	15.3	31.4

In Table 10.3 we see much the same pattern is evident in the Leaving Cert. Sciences. Taking only those pupils who obtained a C or better at Inter. Cert. Science, a much higher percentage of boys than of girls went on to take Leaving Cert. Physics and Leaving Cert. Chemistry. Again, single sex schools show the greatest overall sex difference, with coed schools showing only a small difference in Chemistry. In Biology, coed schools again show less sex difference but this time the subject is taken by a higher percentage of girls than of boys.

Table 10.3: *Percentage of Male and Female Leaving Cert. Respondents with C+ in Inter. Cert. Science who were Currently Taking Physics, Chemistry and Biology for Leaving Cert. in Single Sex and Coed Schools*

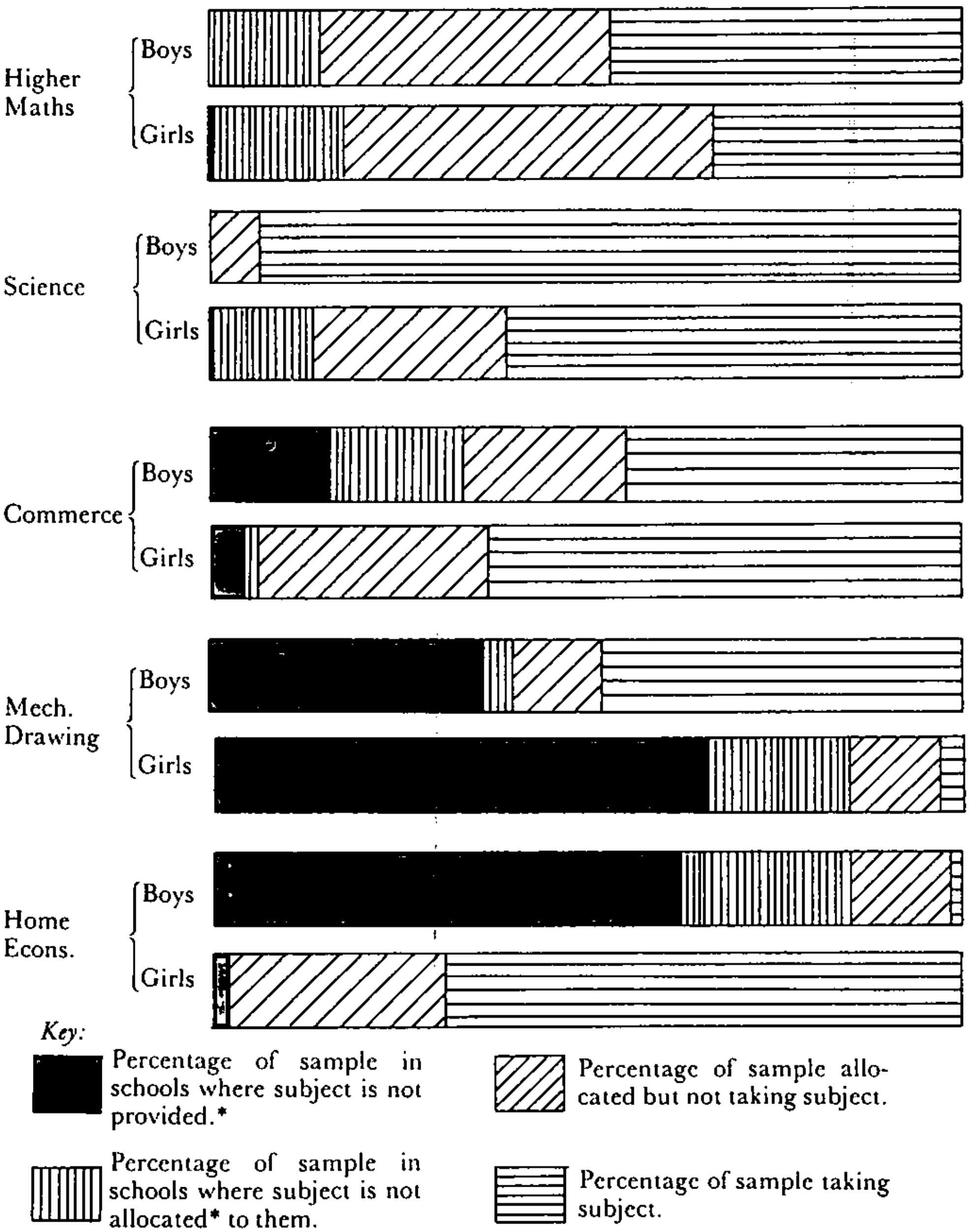
	C+ in IC Science (% of Total)	*% of Those with C+ now Taking Physics*	*% of Those with C+ now Taking Chem.*	*% of Those with C+ now Taking Biology*
Boys	68.8	43.4	46.9	40.2
Girls	38.8	7.8	32.0	85.5
Coed Boys	56.9	29.6	29.9	49.4
Coed Girls	45.7	6.3	22.4	82.7

Perhaps the major finding to emerge from our analysis of the effects of Provision, Allocation and Choice in determining sex differences in the rates of subject take-up was that, for most of the subjects analysed, although sex differences in Provision and Allocation were often great they tended to be less pronounced than sex differences in the true rates of pupil choice. Furthermore, for individual subjects the importance of these factors could vary widely, so that in some subjects such as Leaving Cert. Biology, Provision factors play only a minor role, whereas in, for example, Leaving Cert. Technical Drawing, provision is of major importance. Figure 10.1 shows, graphically, the relative importance of each of these factors for each sex in determining the overall take-up of six Leaving Certificate and five Inter Cert. subjects among our sample. It also permits a ready comparison between the sexes of the effects of these factors.

In the following sections we shall return to our model of Provision, Allocation and Choice to summarise, in each area, those findings which are of chief importance in relation to policies that might be pursued to attain greater sex equality in subject take-up.

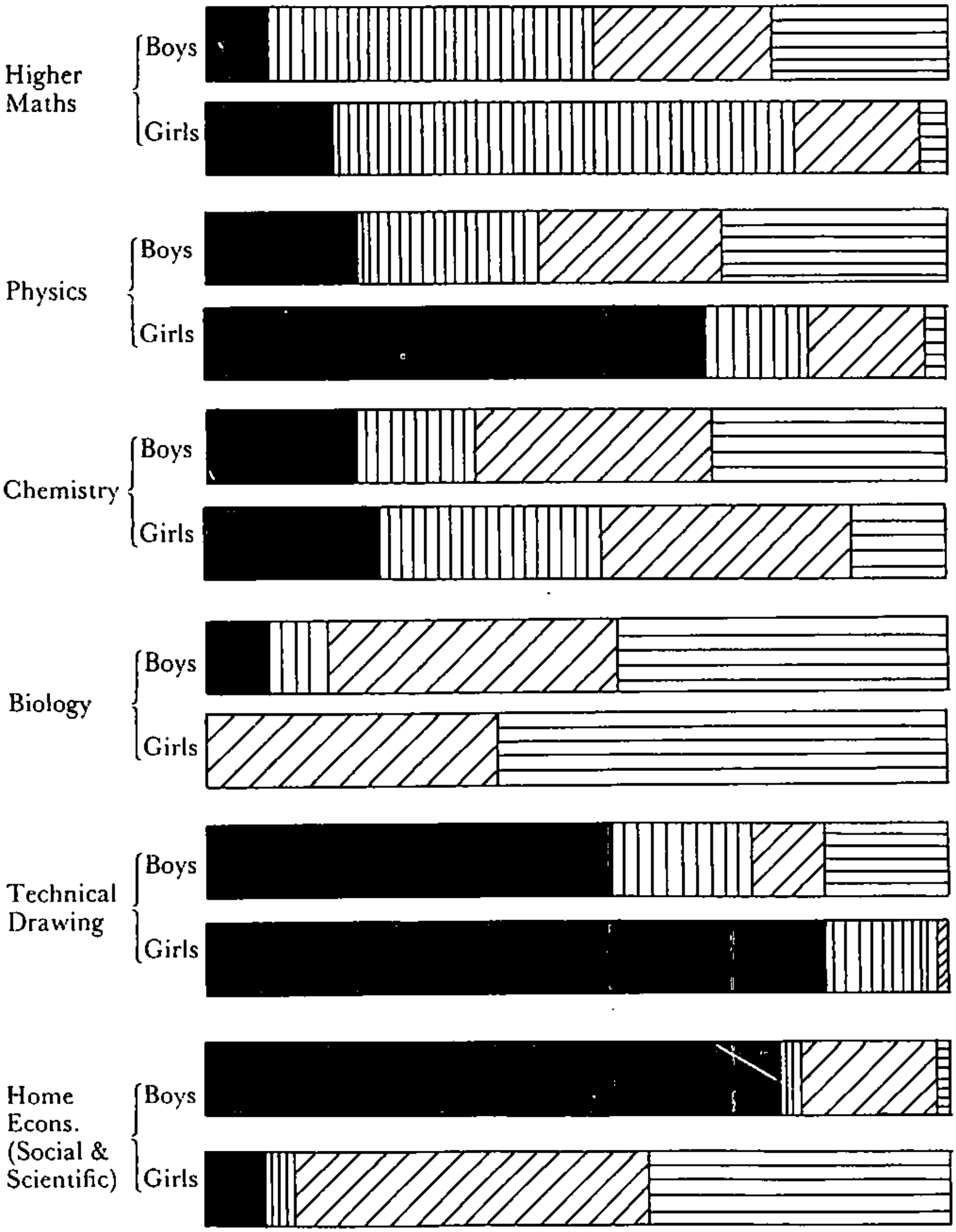
Figure 10.1: *Bar charts showing overall rates of provision, allocation and choice among both sexes for five Inter and six Leaving Certificate subjects*

Inter. Cert. Subjects: (percentages based on Inter. Cert. Sample):



*Provision and Allocation as defined in Chapter 5.

Leaving Cert. Subjects: (percentages based on Leaving Cert. Sample):



Note: Allocation here includes cases where the pupil does not meet the qualifying criteria for taking the subject.

2. *Provision*

In Chapter 6 we dealt with some of the variations in the school provision of subjects. The junior cycle curricula of schools show less variation than the senior cycle; at the former level there is a core of subjects common to most schools, including Science, Commerce, History/Geography, French; but there are then other subjects such as Home Economics, Technical subjects, Art and Music, whose occurrence in the curriculum is much less common across schools, and which lead to variation between schools and school types.

Our analysis, in Chapter 6, concerned itself chiefly with the senior cycle where greater variation is present. Here we found that quite wide variations in curricular provision between schools could be explained only moderately by variables such as school size, location, age, composition of intake, and so forth. We did find, however, that there were six basic curricular types within our sample of post-primary schools: one which was associated with vocational schools, another with community/comprehensive schools, and the remaining four with secondary schools, two (clusters 2 and 6) being made up primarily of boys' schools, and two (clusters 1 and 3) being largely girls' schools. We suggested then that these clusters reflect not only differences in the environmental constraints on schools (that is, those factors largely outside the control of school management) but also differences in the policies pursued by school decision makers. For example, the fact that there is a particular curriculum associated with vocational schools which is distinct from other types of school curricula, indicates substantial agreement across the VECs regarding the kind of subjects that vocational schools should offer. The curriculum of a particular vocational school will thus differ from that offered by a secondary, or a comprehensive, school even if, in terms of their intake, size, location, age, and so on, the two schools are similar. Vocational and community/comprehensive schools each have clearly distinct curricula; however, this is not true of secondary schools as a category.

We argued that curricular variations are due largely to policy decisions and we attempted to locate the level at which these decisions are made. In the case of vocational and community/comprehensive schools decisions about the curriculum appear to be the product of a general consensus within these respective sectors regarding the goals of vocational and community/comprehensive schools and what curricula are appropriate to achieve them. On the other hand, while there are a number of independent schools whose curricula are clearly the product of decisions taken by the local Principal/Manager, the religious orders appear to play a variable role in determining the curricula of the individual schools under their control. For example, in Christian Brothers' schools there is a common curricular principle; they have what we described as instrumental curricula: highly specialised, in

Science, Commerce, or, in Technical subjects, with relatively little choice offered to pupils. On the other hand, in the largest female order — the Mercy — there is less evidence of centralised planning of curricular goals, and the Principals of these schools report very high levels of autonomy in decision making.

In examining school provision differences between boys' and girls' secondary schools, we noted that for girls' schools Principals in general have, in their own view, high levels of autonomy relative to that enjoyed by the Principals of boys' or even coeducational secondary schools. The senior cycle curricula of boys' schools are more specialised and narrower than those of girls, which tend to be broader, less specialised, and to afford a wider range of subject choice, even when we allow for differences in school size. Such differences are reflected at other levels in our model of provision, allocation and choice, as we shall see. In general, however, we can say that boys' education is more heavily guided — in terms of choices that pupils are allowed to make — than is girls', to whom much more freedom of choice is offered.

Taking the two most distinct and most usual school types for our purposes — boys' secondary and girls' secondary schools — they have distinct curricula, distinct organisational characteristics and a distinct ethos. Boys' schools tend to be smaller; highly specialised in Science, Hons. Maths and Commerce subjects; have a high achievement ethos shared by parents and teachers, but where teachers are, in general, relatively less important than parents. Girls' schools, on the other hand, have much less specialised or broader curricula, with less Science and Commerce but more Languages and Accomplishment subjects. They have generally lower levels of achievement ethos but have teachers who are relatively more important than in boys' schools in affecting pupils' choices and aspirations.

Provision differences between secondary schools — both in the size of the curriculum and in the provision of Science subjects — are closely related to size of school, as one would expect. But in neither case does school size explain more than half the variance in overall provision levels, less than one-third in the case of Science subjects. Besides size the main social class characteristic of the school's pupil intake; whether the school was a boys', girls' or coed school; as well as the religious order running the school, had independent influences on curricular size and direction. But even taking all these environmental and formal organisational characteristics into consideration it became quite clear that a lot of freedom still existed for individual Principals, or decision-making coalitions within schools, to determine their curricular priorities — particularly in schools where pupil (and teacher) numbers were increasing rapidly. It is clear from our results that some schools used these expanding opportunities innovatively and consciously, while others failed to capitalise on such resource additions. So that in the expansion of pupil/teacher numbers over the decade from 1968 to 1978, although certain circumstantial factors (original size of school, correcting original deficits in the curriculum, changes from single sex to coed schools, the demanding attentions of a middle class clientele, etc.) had significant influences in curricular expansion or development, somewhat over half of the variance remains unexplained. We have proposed that much of this residual is explainable as the result of individual school innovativeness in decision making.

Similarly the encouragement of Science specialisation by pupils, implicit in increased provision by schools over the 1968-78 decade, is clearly realised in boys' schools, but is not to the same extent in girls' schools. And it is also clear that in girls' schools contrary curricular objectives have greater consequences on take-up rates of Science and Hons. Maths: expansion in Commerce and Accomplishment subjects particularly has negative effects on Science specialisation by girls.

3. *Allocation*

At the senior cycle, the most important aspect of school allocation policies concerns the academic prerequisites, as we termed them, that schools establish for those pupils wishing to choose particular subjects. We showed in Chapter 5 that, although these prerequisites for subjects such as Physics, Higher Maths, Chemistry, and so on, show little difference between boys' and girls' schools, in general a higher proportion of girls than of boys, who might otherwise be in a position to choose these subjects, is lost through this aspect of allocation. This is largely because of the higher proportion of girls who have not sat for the required Inter. Cert. subject. This is most marked in the case of the technical subjects where, because girls are not allocated to Inter. Cert. TD, Woodwork and Metalwork, they cannot meet the prerequisites for the senior cycle equivalents of these subjects. Thus, junior cycle allocation has clear effects on senior cycle options. A less extreme case is Science in the junior cycle, where 80 per cent of boys, but only 20 per cent of girls, are obliged to take the subject; no boys but 13 per cent of girls are not allowed to take the subject, and the remainder of each sex (20 per cent of boys, 66 per cent of girls) are given the option. The basis for this differential allocation is that low ability girls in single sex schools are not given the opportunity to do Science, whereas low ability boys in single sex schools are. Even among high ability girls, Science is often an option, as opposed to boys (often of all ability levels) among whom it is obligatory.

Indeed, allocation practices are of greater consequence at the junior than the senior cycles in determining rates of take-up, but, because these junior cycle subjects are often prerequisites of certain senior cycle subjects, these allocation differences at junior cycle have consequences that extend beyond Inter. Cert. In Chapter 5 we analysed allocation differences in five Inter. Cert. subjects, and we found major allocation differences in four of them; we have already mentioned Science and MD, but allocation differences are also found in Home Economics and Commerce. Home Economics is often allocated to girls in coeducational schools but not to boys; while in Commerce, there are two sources of sex difference. On the one hand, in vocational and community/ comprehensive schools, Commerce is often either allocated or placed as an alternative in a set of options, to the Technical subjects; while, on the other hand, in boys' schools, Commerce may be allocated according to ability (which less commonly occurs in girls' schools) such that low and moderate ability boys are offered or allocated the subject, while high ability boys are not.

In general, if we examine allocation policies at junior cycle level, we see that boys are more likely to be required to take subjects as part of the core than are girls, a greater proportion of whom are allowed to choose their subjects as part of an option package. We have already given the example of Science, but, if one examines Table 5.14 it can be seen that, of Science, Commerce, Home Economics and Mech. Drawing (MD). in all but Home Economics a greater percentage of boys than girls are obliged to take the subject.

4. *Choice*

We defined our notion of a true rate of choice in Chapter 5, where we also showed that the sex differences in choice, at least for the seven Leaving Cert. subjects we analysed, were greater than the sex differences in provision or allocation. However, Table 5.11 shows that in subjects such as Technical Drawing choice is a minor factor (compared with the other two) in determining the overall rates of take-up for either sex, while in History and Biology true rates of subject choice are roughly equal between the sexes (the sex difference here is greater than for provision or allocation simply because in these latter two there are virtually no sex differences).

In the junior cycle, choice is less important, especially for boys, and allocation differences and provision factors (in Home Economics and Mechanical Drawing (MD) among the subjects we analysed) are correspondingly of greater weight. However, as Table 5.17 shows, rates of choice are sex biased, particularly in Home Economics and MD.

In Chapter 9 we dealt with true rates of choice at some length, in examining factors influencing the choice of Higher Maths, Physics, Chemistry and Biology. These subjects were chosen because, as we showed in Chapter 5, the true rate of choice is both important in determining the rate of take-up of each sex, and is itself markedly sex biased in Higher Maths, Physics and Chemistry.

Biology was included as a subject in which, in contrast to the others, girls' take-up is proportionately higher than boys'.

Analysing what factors influenced those who chose or did not choose each of these subjects, when offered the opportunity, we found three factors to be common to both boys and girls. These were their level of examination performance in the Inter. Cert. (IGPA), their aspirations (particularly whether or not they aspired to a third-level Science course) and their attitudes towards the particular subject and to Maths and Science in general. Beyond this, however, we found that these variables had differing effects on each sex, and that certain additional variables influenced one sex but not another. An example of the latter was the clear effect that the level of pupils' perception of teacher expectations had on the girls' probability of choosing Higher Maths. This variable had no effect among boys (Chapter 9). Despite the significant sex differences in other values and attitudes described in Chapter 2, these variables added little to the explanation of differences between takers and non-takers of senior cycle Science subjects once the above variables had been controlled for.

The crucial question from the point of view of the research pursued here related to whether or not schools could influence these true rates of choice, since much of our earlier discussion (for example, in Chapter 5, and the discussion of the relationship between curricular change in the Science subjects and changes in the take-up of these subjects, in Chapter 9) indicated that any increase in the rate of take-up of these subjects among girls would depend very heavily on an increase in the girls' true rate of subject choice. In the concluding part of Chapter 9 we demonstrated that schools (specifically, aspects of schools' ethos) could influence those variables which, in turn, influence the probability of a girl choosing a particular Leaving Cert. Science subject, but this school effect was, though statistically significant, quite moderate. It was particularly clear that teachers' expectations/support was an important independent influence on girls' choice of Science subjects — and that such "teacher effects" were mediated by schools.

Since the level of performance of pupils is also influenced by such school organisation factors (Madaus, Kellaghan *et alia,* 1979, Rutter *et alia,* 1979); and individual performance levels are closely related to pupil choice (Chapter 9) it is clear that schools as corporate units can have independent though, it appears, moderate influences on subject choice patterns.

It is clear also from many intervention programmes carried out in the US and Britain that the subject attitudes and aspirations of pupils and teachers are open to intervention. Some of these studies will be reviewed in the final chapter where we will examine some strategies of intervention which might be put into practice were one to attempt to change subject choice patterns — the crucial variable, as we have shown, which affects differential subject take-up rates. Before we do that, however, we need to review the role of the Career Guidance Counsellors in schools — a role which one might expect to be closely related to subject choices.

5. The Role of the Career Guidance Counsellor

In this section of the paper we shall turn our attention to the role of the Career Guidance Counsellor in influencing both pupil choice and the organisation of the curriculum; in other words, the packaging of options, the allocation of pupils to classes and their choice of subjects. We use three sources of data here: first, the results of the interviews we carried out with Guidance Counsellors; second, those parts of the interviews with Principals which related to the Guidance Counsellor's role; thirdly, the responses of the Leaving Cert. pupils to their interviews.

Of our sample of 95 post-primary schools, 68 had one or more Guidance Counsellors. Three of these 68 schools had more than one Counsellor. Of the 68 Guidance Counsellors interviewed 45 were ex-quota.

As Appendix Table 10.7 shows, only about an eighth of guidance teachers were entirely exempted from class teaching; the great majority teaching between one and ten hours per week. They spend relatively little time on administrative work, almost a half spending none. But almost 3 out of 4 spend more than ten hours per week on guidance duties. Those who spend least time on guidance tend to be ex-quota. Appendix Table 10.8 shows that in those schools in which some selection of students for entry takes place, over half of Guidance Counsellors are not involved at all, though 40 per cent have an important role in this respect. This division between those heavily involved and those not involved may depend upon such factors as whether or not a remedial teacher is present to whom this duty may be transferred. Much the same may account for the distribution of responses to the question dealing with involvement in the allocation of pupils to first year classes. Here again there is a bunching of responses at both ends of the distribution. Involvement in allocation at higher levels is, as Appendix Table 10.8 shows, much less.

There is little evidence of any high degree of involvement of Guidance Counsellors in planning the structure of classes at any level — that is, in deciding on the number and structure (whether streamed or banded, etc.) of classes. The majority (between a half and three-quarters) have no involvement or only a minor involvement, while around one-third claim a greater degree of involvement than this, as Appendix Table 10.9 shows.

If we turn now to the involvement of Guidance Counsellors in subject allocation and choice we see from Appendix Tables 10.10 to 10.11 that they play almost no role in timetabling and a large proportion have no involvement in setting up the option packages in the school; although at Leaving Certificate just under half have a significant involvement though they are not the main person involved.

It is in helping pupils to choose subjects that the guidance teachers have high levels of involvement, although this is very marked only at the Leaving Cert. level. A surprisingly high percentage of Guidance Counsellors claim to have no involvement in subject choice at first year and Inter. Cert. level (Appendix Table 10.13) but over 80 per cent are highly involved at senior cycle level. But in the choice of jobs and careers (Appendix Table 10.14) the Guidance Counsellor appears to be the main person involved at all levels — indeed in some schools Guidance Counsellors appear to organise what almost amounts to a placement service for school leavers.

Another aspect of the Guidance Counsellor's role which is very important is that of personal counselling. Between 70 and 80 per cent claim either significant or main involvement in personal counselling (Appendix Table 10.18): much more important than the junior cycle advisory role or that in any of the pupil or subject selection and allocation decisions within the school; and almost as important as that of the senior cycle subject advisory functions. It is substantially less important, however, than the involvement with occupational choice at all levels.

The picture that we build up from these tables of the Guidance Counsellor's own perception of his/her job shows a high degree of involvement in personal counselling (at all levels in the school) and in helping pupils choose jobs regardless of when they leave school. Involvement in helping in subject choice is relatively low until senior cycle, and involvement in option packaging and determining what subjects are offered, and in the selection of pupils for entry and the allocation of pupils to classes, is modest. In timetabling and the design of classes, Career Guidance Counsellors generally play little part. Although there is clearly a considerable amount of variation between schools, the role of the Guidance Counsellors seems to allow relatively little involvement in policy decisions or in planning, but rather more involvement in the practicalities of job selection by pupils and personal counselling. Asked which classes in the school obtained most help, 73 per cent of Guidance Counsellors said either the fifth or sixth year classes or both.

According to the interviews with Career Guidance Counsellors they spend, on average, 15 hours each week on guidance, 1.6 hours on administration and 7 hours on teaching. There is a good deal of variation, however, in the number of hours available to Guidance Counsellors for the different types of work. Appendix Table 10.19 [59] examines the effect of the number of hours available

[59]Variables measuring degree of involvement in decision making, subject choice, job choice, personal counselling and pastoral care — while not strictly interval scales — are correlated with number of hours on guidance, etc., as a means of summarising the trends present.

for each task on the degree of involvement of the Guidance Counsellor with subject and job choice and personal counselling as well as in decision making in the school.

Turning first to involvement in school decision making, this seems to be a function of the Guidance Counsellor's duties as a teacher and to a lesser extent as an administrator — rather than being linked to the role of counselling *per se*. Thus, the greater the teaching responsibilities of the Counsellor the greater the involvement in decisions made by the school. The negative correlations between number of hours spent on guidance and involvement in school curricular or allocational decision making (although only the correlation with involvement in decisions to change admission policy is significant) very clearly indicates that the roles are not seen as complementary: the negative correlation being due to the fact that both variables are related to the extent of teaching duties within the school — greater involvement in teaching corresponds with less involvement in counselling and more involvement in school decision making.

We can see from Appendix Table 10.13 that the Guidance Counsellor is highly involved in helping pupils to choose subjects at Leaving Cert. level and it is at this level also that teaching responsibilities most reduce the Guidance Counsellor's involvement. On the other hand, while the Counsellor tends to be the main person involved in helping pupils decide on jobs or careers at all levels (Appendix Table 10.14) only involvement at Leaving Cert. level is reduced by high teaching responsibilities. Thus, the extra time available to Guidance Counsellors with few teaching responsibilities seems to be used to help pupils choose subjects and decide on careers at the Leaving Cert. level. As teaching hours go up, therefore, involvement in subject and job counselling goes down at Leaving Cert. level. Personal counselling, as we can see in Appendix Table 10.18 is another significant responsibility of most Guidance Counsellors. In this instance, however, involvement is reduced at all levels as the burden of teaching duties on the Counsellor increases. In schools which have a pastoral care programme, the Guidance Counsellors' involvement seems to be related to administrative rather than guidance or teaching duties.[60]

In summary, the Guidance Counsellor with low teaching or administrative responsibilities tends not to be very involved in school decision-making but tends to have a greater than average involvement in helping pupils to choose subjects and decide on careers at Leaving Cert. level and a greater than average involvement in personal counselling at all levels. Any discussion of the "effectiveness" of Guidance Counselling must take into account the fact

[60]While longitudinal data would be necessary to assert with certainty that, e.g., the Guidance Counsellor would be more involved in personal counselling if the teaching duties were lighter, the present cross-sectional data do suggest that this might be the case.

that few Counsellors are totally free of teaching or administrative responsibilities and that these latter can curtail both the time available for, and the degree of involvement in, work considered the main function of the Guidance Counsellor.

If we now turn to the Principal's views of the Career Guidance Counsellor's role, these concur largely with the Guidance Counsellor's own perceptions. For example, in only nine per cent of schools with Guidance Counsellors was the latter the main person who decided on timetabling. In helping pupils decide on Inter. Cert. subjects, the Guidance Counsellor had an important role in 54 per cent of schools where this was relevant, in 13 per cent of cases being the only teacher so involved. At the senior cycle, however, the Guidance Counsellor was important in subject choice in 90 per cent of schools, being the only teacher involved in 26 per cent of schools. Finally, in occupational choice, the Guidance Counsellor appears in almost all cases to be the crucial figure.

Finally, we turn to pupils' perceptions of the importance of the Guidance Counsellor in helping them to decide on jobs and careers: these results are shown in Appendix Tables 10.15 to 10.17 and refer only to those schools where a Guidance Counsellor is present and where the question is relevant (for example, we exclude from Table 10.15 those schools which offer no subject choice at Inter. Cert.). We must also note that these are the perceptions of Leaving Cert. pupils. We have already seen that Guidance Counsellors' efforts are concentrated on such pupils.

At Inter. Cert., in helping pupils decide on subjects, the Guidance Counsellor is relatively unimportant; being perceived by both sexes as less important than ordinary teachers in the school or than friends, and substantially less important than parents, particularly mothers (see Appendix Table 10.15). Only the school Principal was clearly perceived as being of less importance. Such a finding would not surprise us, given that we have already seen that Career Guidance Counsellors themselves allocate more of their time to the senior cycle, and consider themselves to play a greater role in pupils' decisions at senior level than earlier in the school.

At senior cycle the Career Guidance Counsellor is perceived as the most important figure within the school in helping pupils choose subjects, although for girls the ordinary subject teachers are almost as important (Appendix Table 10.16). For both sexes, however, parents are the most important figures, with the mother, on average, of more importance than the father.

It is, however, in the area of job selection and decision making that the importance of career guidance comes to exceed markedly that of the other teachers (Appendix Table 10.17). Almost half of the pupils claim to have discussed jobs with the Guidance Counsellor "quite a lot". Even here, however, the Guidance Counsellor is of rather less importance in this respect than parents or friends; the latter being particularly important among girls. Of course, such figures reveal nothing of the quality of information given to pupils by these different contacts; it is reasonable to suppose that, in the area of job selection, Guidance Counsellors are much better informed than parents or friends. In all the three areas dealt with in Appendix Tables 10.15 to 10.17 girls perceive all significant others as more important than do boys.

In summary then, we may point initially to the quite wide variance that exists in the role of the Guidance Counsellor. For example, while in most schools Guidance Counsellors play a minor part in school management decisions, there are notable exceptions. Such variation appears to be related more closely to their teaching and administrative roles within the school and to characteristics of the school's own organisation; for example, some schools may give greater management responsibility to staff than others. Thus, we should emphasise that the picture of the Guidance Counsellor's role which we present here is an average around which considerable variation occurs.

In general (and all our data sources agree on this) there are three main areas in which Guidance Counsellors operate: personal counselling; helping pupils choose jobs or careers; and helping with subject choice in the senior cycle. They appear to play only minor roles, if any, in the broader policy decisions of the school — relating to option packaging, timetabling and so forth. Similarly they do not appear to be very involved in subject choice at the junior cycle levels.

CHAPTER 11

Policy Implications

Introduction

Our main objective in this report was to describe the nature and extent of sex differences in curricular provision and subject choice in Irish post-primary schools and to identify the main influences affecting this. We were not asked to evaluate alternative programmes of intervention to change that situation, although we were requested to isolate where and how the most useful and effective interventions might be made to that end. Although this is, therefore, primarily a research report the policy recommendations presented in this chapter follow from, or are based upon, our main research findings. As such they are an outline of policies rather than a set of specific policy blueprints which have been fully evaluated and costed.

Our aim in this chapter, therefore, is first to briefly summarise those areas of schooling practice where interventions might be made if we wished to significantly increase the proportion of girls taking Higher Maths, Science and Technical subjects at the junior and senior cycle levels and the proportion of boys taking subjects like Home Economics, Art and Music. Our second aim is to suggest what kinds of interventions would be most effective in reducing the sex differences in the take-up of these subjects. In some cases, before one could come to clear-cut recommendations, a further stage in policy development is required: the institution of pilot programmes of intervention to evaluate which of a series of possible interventions would be most effective.

In our analysis, for practical reasons, we accepted as given the current subject boundaries and syllabi. However, it is clear that altering the syllabus of a subject can have substantial effects on sex differences in take-up; as the mid-1960s change from Drawing to Mechanical Drawing and Art, or the dropping of Elementary Mathematics, clearly demonstrated (see Chapter 4). Hence, sex equality in education may require syllabus revision in order to rid subjects of those areas that, while not of crucial importance in strict syllabus terms, serve to demarcate the subject as a "boy's" or "girl's" subject. For example, it may only be via syllabus revision that some form of core junior cycle programme could come about, which would allow all pupils access to the central areas of Language and Literature, Cultural, Technical, Scientific, Mathematical and General "life skills" (Home Economics) knowledge. The main syllabus problems arise in a few sex stereotyped subjects: Technical subjects, Hons. Maths, Physics, Home Economics and so on. No published work exists in Ireland on syllabus bias, on textbook bias, or on examination bias in any of these subjects. But their structure and content is unlikely to be any different to the situation in the US, France, the UK, and Scandinavia where many studies have shown significant sex bias in these subject areas (see review in Chapter 1.) This area, in our view, requires urgent attention by the Curriculum and Examinations Board envisaged by the Minister, and by the syllabus review committees.

Besides the content of subjects, the *boundaries* of subjects are equally important — particularly applied subjects, like Home Economics or Technical subjects, which are not based on unitary disciplines at third level. "Handcrafts", "Homecrafts", aesthetic and general "living skills" subjects appear now to contain many elements which maximise their traditional sex role associations. Need this be so? Some of the associated content of these subjects deserves close attention. At present in Metalwork or Woodwork classes, for instance, where heavy materials have to be manipulated by pupils, many teachers see them as too onerous for girls. This requirement may not be at all essential to modern Woodworking, Metalwork or applied Engineering work outside the classroom (see Council of Europe, 1982; Byrne, 1978 (b)). For the purpose of this research, these questions were regarded as beyond our brief. There appear, however, to be some inbuilt elements of sex role stereotyping in the Technical and Home Economics (Inter. Cert. and General) courses that require attention. However, for our purposes we focus on sex differences in the provision of subjects, in the allocation of subjects, and in the choice of subjects, as these are currently defined.

The Objectives of Policy

These policy proposals are being made within the context of government commitments to equal opportunity between the sexes made in the *White Paper on Educational Development* (1980), the commitments to the Council of Europe proposals (in 1979), and explicitly contained in the resolution of the EEC Council of Ministers of Education (in 1976) which committed all EEC governments to equality of opportunity in all forms of education. The *White Paper* (1980) recognised the need to ensure that: "equal opportunities for education and training and, hence, career choice are available for girls". . . particularly . . . "opportunities to follow approved courses in Mathematics and related subjects which are of growing importance in a technological society" (Ibid. para. 7.21).

The objective being proposed above is that of equality of access to subject areas. Of course, such equality in formal access to non-traditional, sex-typed subjects is an essential prerequisite for reducing inequalities; but unless it is accompanied by changes in the attitudes, expectations and supportive behaviour of teachers, parents, peers and the pupils themselves, only minor changes in the take-up of non-traditional subjects — like Technical subjects by girls, or Home Economics by boys — will occur (see Chapters 5 and 9).

In other words formal access to subjects needs to be accompanied by a strongly supportive school environment if girls or boys are to make such non-traditional choices and perform to their capacities in subjects that have become largely sex stereotyped. If the ultimate objective of policy, therefore, is to effect a significant reduction of inequality in the take-up of these subjects by boys and girls, then some crucial supportive changes are also necessary in the way individual subjects are provided and allocated, changes in the relationship between teachers and pupils, and changes in the self attitudes and aspirations of pupils themselves — particularly of girls' attitudes to Maths and Science and Technical subjects and in their own level of academic self confidence.

This view of curricular innovation at a school level may suggest that such organisational and attitudinal change can only come about under the guidance of outside "experts". However, there are a small number of schools within our sample, as well as schools known to us outside the sample, which show quite high levels of non-traditional subject choices — and examination performance — by girls. Such a situation has often been brought about by innovative and committed school management and teachers, in some cases acting on their own and without such "expert" help, in other cases with help and advice from the curricular development centres. Furthermore, some "mixed" vocational schools have moved away from operating in a coinstitutional tradition and have become genuine coeducational schools. In many of these schools it appears that significant increases in non-traditional subject choices have taken place.

In this study we take it, therefore, that the objective of policy is to reduce gender inequalities in the take-up rates of certain subjects, in addition to instituting formal equality of opportunity to take these subjects. It is, therefore, not only a policy of reducing inequalities of provision of subjects to boys and girls but also one of diffusing or spreading out those effective schooling or organisational changes from those innovative schools which have succeeded in significantly reducing these inequalities, through the most effective means possible. This policy raises two questions:

1. Is there evidence that such reductions in inequality would be to girls' benefit or, conversely, that girls are handicapped by their low levels of Maths, Science and Technical subjects take-up at present? And, is there evidence also that boys are handicapped by their low take-up of such subjects as Home Economics?

2. Is there evidence that schools can achieve increases in take-up; that is, can schools go beyond formal equalisation of provision and allocation to achieve some greater equality of take-up?

In regard to the latter there is clear evidence that schools not only can do so but have actually done so. This question, however, will be dealt with in more detail later. In regard to the former, we note that the difference in subject take-up by the sexes relates to much broader differences in the type of education they receive. It is particularly true of secondary schools that, especially in the senior cycle, girls' education is, on average, general — giving more subject choice and discouraging subject specialisation; whereas boys' education is more narrow, specialised, with little choice, and with a much more pronounced bias towards subjects with (assumed) utility in the labour market.

It is clear from our discussion in Chapters 3 and 10 that traditionally girls' education was closely linked to a very specific and very segregated labour market role, but also more broadly to a set of adult family, spousal, childrearing and more general social and cultural roles which had become very specialised in the overall division of labour in our society. Indeed, as our society became more industrialised and urbanised the extent of this sex based division of labour increased: the distinction between the "husband-provider" economic role, and the "wife-mother" role widened, although the level of emotional bonding between the spouses may have significantly increased and the level of experienced inequality in family power and decision making declined, (Goode, 1963; Hannan and Katsiaouni, 1977).

It is clear also from our analysis that sex differentiation in our educational system is very deeply institutionalised: in the ideological and cultural presumptions underlying the provision of subjects and the design of curricula by the different school owning authorities, in the expectations of parents and teachers, and in the self definitions and educational attitudes and expectations of the students themselves. However, if this system of conventional sex roles is so deeply institutionalised — so widely taken for granted and so deeply internalised within our personalities — why should we worry? Particularly given that girls in our second-level system have significantly higher participation rates than boys — and have suffered lower unemployment rates on leaving school.

In the last chapter, as well as in Chapter 3, we have indicated, however, that even accepting the legitimacy of the conventional division of labour between the sexes, there are serious pragmatic grounds for worry about the continued viability of that pattern and about the type of very general second-level education being received currently by girls, which places many of them at a serious life-long disadvantage in the labour market and in the relationship between work and family roles. We, therefore, have put forward an urgent case for intervention to change existing patterns of provision, allocation and choice of subjects at second-level for girls. This case rests primarily on the following considerations: (i) The degree of sex segregation, if not sex discrimination, in the labour market restricts women's medium and long-term earning capacity and promotion opportunities. In so far as the very general second-level education received by girls is presumed to fit them for these restricted positions in the labour market, it seriously disadvantages them in competing more widely for positions in that market and in adjusting to changes in it. (ii) The likely depressing effects of the "microelectronics revolution" on office employment in the 1980s, combined with declining demand for teachers and nurses — the most popular female professions — require a shift in curricular emphasis in so far as the traditional one was based on the assumption that demand in these occupational outlets would remain strong. (iii) The rapidly increasing participation of younger married women in the labour force now means that women's role in the labour market is playing a more significant part in their adult life. It also means, of course, that fewer positions in the labour market are being released by the early retirement of younger married women. Up to 90 per cent of Leaving Certificate girls interviewed aspired to wife-mother roles in adult life, but half aspired to combining the maternal role with part-time working. And it is significant that such variations in career-marriage aspirations are not important discriminators in girls' subject choices (Chapter 9). Those with traditional marriage/work expectations are not any more or less likely to choose these non-traditional subjects. (iv) Declining fertility within marriage and much earlier completion of the childbearing period, combined with the increasing span of post-childrearing life, has to be adjusted to by older married women who — surveys indicate — would like to return to the labour force. But they would be at a considerable disadvantage in doing so given their current educational and training patterns and likely labour market changes.

On all of these grounds, therefore, we have argued that the presumptions on which, within very many schools teaching girls, current school curricular provision, current subject allocation policies and the associated set of expectations held by school authorities and teachers are organised, require serious revaluation and change. In particular girls' educational self attitudes and their attitudes towards certain crucial subjects need to be changed to fit them more adequately to the challenges of modern life.

Boys' education on the other hand — and particularly that of boys in single sex secondary schools — has a highly instrumental, achievement-directed orientation with an emphasis on individualistic and competitive achievement. Attention to the practicalities of domestic life, to interpersonal relationships and to what Tornes (1982) calls the "rationality of caring" is generally lacking. Given the trends towards less traditional sex-role expectations on the part of girls of equivalent status (Table 3.16) and the fact that the more high achieving boys tend to have the most traditional sex role and familial expectations (Chapter 9), these deficiencies and the more narrow and more technical educational patterns for boys may cause problems for them in building and maintaining happy and satisfying spousal and parental roles and relationships. The general taken-for-granted, male expectation that the female would do most of the adaptation to changing work and familial roles is unlikely to be as often realised in the future as in the past, for many of the reasons given above. Change in male education to meet these changing demands of work-family-parental roles appears to us to be as important as that of female adaptation.

The kinds and seriousness of the various disadvantages suffered by boys and girls depend crucially on social class (see Chapter 3). Working class male pupils suffer disproportionately from very early drop-out from post-primary school, the consequence of which is their very high rate of unemployment. Without the necessary certification they are in a very poor position to enter any of the skilled trade apprenticeships. And boys' post-primary education is far more likely than girls, to "shed" both working class and academically poorer pupils at an earlier age. Working class girls are far less likely than working class boys to drop out early from the system, but those who do are similarly disadvantaged in terms of high unemployment. Working class girls who achieve higher levels of education, however, are likely to find themselves competing, at some disadvantage, with girls from middle class backgrounds for places in a restricted range of occupations. These middle class girls themselves are most seriously disadvantaged, not in their level of education, but in its type, and in their consequent bunching in a set of intermediate non-manual and lower professional positions in the labour market; their occupational horizons being significantly constricted. Obviously, priorities in intervention must take account of these different social class positions.

The policy recommendations proposed to correct these deficiencies are being advanced at a time of severe financial stringency. Many of the most important recommendations, however, require little or no increased expenditure from public funds. They are more concerned with changes in the management and maximisation of the resources already in the system, being suggestions for the assignment of new or alternative tasks or roles to currently existing bodies, or changes in the rules of resource allocation. However, some policy changes do require some funding, but we would argue that even at the present time it would be necessary to start with some such allocations. A lot of work, however, can be done at relatively little expense.

The adoption of specific policies — or the establishment of priorities amongst competing policies — is ultimately a political decision. Our objective in the following is to present a number of policy interventions which would, in our view — and given the results of our research — be effective in reducing sex inequalities in second-level schooling. We would hope that in this, and in previous chapters, sufficient information and analysis is provided for policy-makers to ensure that whatever choices are made they will be based on an accurate and well informed understanding of the existing situation.

These policy recommendations are being made at a number of levels: at a national curricular policy level; at an individual school management level; at a pupil-teacher interaction level, and at an individual pupil, or category of pupil, level. If our objective is to increase the proportion of girls taking Technical subjects, Honours Maths or Science subjects, for instance, and the proportion of boys taking "living skills" and aesthetic subjects, the following policy interventions appear to us to be the most effective ways of doing so.

National Policy

(i) *School Curricular Policy*

There is no effective corporate influence on the curricular policy of secondary schools which operates at a national level, except the minimal obligatory curriculum which is laid down by the Department of Education in its *Rules and Programmes*.

As we have seen, the different curricular management practices of schools have resulted in considerable inequalities in both the size of curricula and the depth of subject specialisation provided by schools (see Chapters 6, 7, 8). And such subject provision differences are closely related to the educational outcomes of their pupils (Chapter 9). These curricular differences are most marked amongst secondary schools. Community school and vocational school Principals have less autonomy in deciding the curriculum of their schools which show substantially less variation in the type of curriculum outcomes involved (Tables 6.9 to 6.12). Even controlling for size of school and associated resource implications, substantial differences in school curricular outcomes still occur (see Chapters 6 and 7).

Given the importance of such school provision and allocation factors for pupils' life chances, the extent of public expenditure on education, the relative isolation of school Principals (particularly secondary school Principals) from each other and from any central curricular advisory body, it would appear essential to develop some central curricular monitoring and advisory service for school decisionmakers. Indeed, unless some such service is set up it is very difficult to see how effective curricular developments can be successfully diffused from curricular development centres or from the minority of innovative schools.

The functions of such a body would be to:

1. Monitor the curricular, subject allocation, and teacher (qualification), appointment policies of individual schools. This is largely carried out at the moment for community and vocational schools by VECs and the relevant sections of the Department of Education. However, outside the minimal curricular requirements; it is not carried out for secondary schools. But through the submission of timetables to the Department of Education, through the registration records of teachers and through examination records, etc., very detailed information is available for each school on these issues. Some of those records are used by the inspectorate in their consultation with schools. If the current records were computerised and fully analysed, it would provide vital monitoring information on individual schools to any national curricular body.

2. Act as a curricular promotion and advisory body to individual schools' decisionmakers, using the detailed national and individual school curricular information available; but also have some power to insist upon a minimal set of curricular provisions by individual schools.

3. Link with the teacher and resource allocation sections of the Department so that those sections of the Department act in unison in their relationship with individual schools, particularly in the areas of the curricula offered by schools and the qualifications of additional teachers, etc.

Such tasks could be carried out by allocating new functions to existing sections within the Department of Education. Alternatively a new section might be established to consolidate those sections already dealing with post-primary schools. To be effective at a school level, however, such a body would need the full support of the school teaching bodies — particularly the secondary schools; and in reducing inter-school inequalities in these respects, such a body would require a very close working relationship with school authorities and teaching bodies as well as the relevant sections of the Department.

The Minister for Education proposes to set up a national Curriculum and Examinations Board which would be widely representative of all second-level teaching interests, and would have overseeing functions for the development and balance of the second-level curriculum and co-ordinate the work of the syllabus committees; as well as having responsibility for the modernisation and diversification of the public examinations (speech by the Minister at the Association of Secondary Teachers, Ireland (ASTI) Conference, Blarney, April 5th, 1983). If widely representative and accepted, such a body would have the necessary legitimacy to influence the sort of "within school" decisions that need to be made. And to be effective in the delivery of the curriculum at the individual school or a teacher-pupil level, such a body would need these kinds of powers in any case. What we would suggest, therefore, is that the proposed Curriculum and Examinations Board be given the responsibility for reducing inter-school inequalities in the curriculum and in influencing schools in their subject allocation policies so as to minimise sex differentiation.

Whether this function is carried out by such a Board or by a section within the Department, or by some other mechanism, it is difficult to see how else inter-school inequalities in the delivery of the curriculum — particularly in secondary schools — can be dealt with effectively.

At the moment we would not envisage that additional teacher resources would be allocated to those schools which have unsatisfactory curricula, except in a very limited set of circumstances to be mentioned later; and particularly where these teaching resources had significantly expanded in the 1970s. However, we would envisage substantial improvement in management advisory services to schools — so as to maximise the use of resources already allocated; to encourage co-operation amongst neighbouring schools; and to give guidance in the correction of weaknesses within the curricula of schools through specific recruitment and replacement policies.

At the moment Department of Education inspectors appear to have a minimal function in such curricular developments at an individual school level; indeed, although we had no detailed information on the subject, the ordinary school role of the inspectorate appears to have declined substantially in recent years. Linking a changed inspectorate role — towards greater involvement in school curricular and overall school policy — to that of the Curricular Board as above would substantially improve this situation. Again this proposal, we feel, would be highly cost effective in the long run; but to be effective such a real change would require significant increases in the currently depleted numbers of inspectors.

To be effective, such policy-making bodies would need very detailed information on individual schools' curricular provision and practice. Much of this required information is already available, as we have seen, in the Department's files. These records are, however, very widely dispersed in different sections of the Department of Education and almost none of them is computerised. Consolidated into a central computerised file, and using a standardised analysis framework for each school, this information could provide vital indices of curricular provision, teaching resources and subject/teacher allocation practices, as well as pupil take-up rates, etc., for each school in the system. This would be invaluable information for individual schools as well as for national curricular planning, particularly as trends could be quickly and comprehensively picked up. Given that many of the Department's routine administrative records, etc., are being computerised in any case, we are suggesting that this computerisation be done in ways that allow extraction of these records in a form that is suitable for both school level and national level analysis and not exclusively for administrative purposes.

(ii) *School Size*

Thirty per cent of boys', 15 per cent of girls' and 40 per cent of coed secondary schools have under 250 pupils; over one-fifth of boys' and coed secondary schools have under 200 pupils. Since 42 per cent of vocational schools — catering mainly for boys — have under 200 pupils, boys are in fact more seriously disadvantaged by size-of-school problems than girls. These small schools with less than 10 teachers, on average, can teach only a necessarily restricted curriculum. Although the number of teachers is only partially predictive of the range of the curriculum, small school size is, nevertheless, an inescapable constraint on the curriculum — particularly limiting the extent to which the school can provide specialised packages of subjects — Science, Commerce, Languages, etc.

These small schools are not generally consequences of location in sparsely populated areas. In fact less than one-third of non-urban secondary and vocational schools — outside the five county boroughs — appear to be in single school catchment areas (*White Paper*, para. 1.12). Most appear to be present in catchment areas where one or more secondary schools and a vocational school are competing with each other for pupils. While a clear case can be made for additional aid to isolated small schools located in sparsely populated areas, one cannot justify any extra allocation of resources in cases where small size is mainly a consequence of the existence of two or three competing institutions in a small catchment area. Either amalgamation or co-operation appear to be the best options in these cases. Some successful examples of such co-operation exist — as in Rathmore, Co. Kerry; or Ballinamore, Co. Leitrim; but these are very few, and there have been many failures. In the interest of equality of opportunity, the promotion of such co-operation or amalgamation would be a task suitable for the Curriculum Board or a reconstituted Development Unit within the Department. In the case of small isolated schools, where no possibility of solving problems by co-operation or amalgamation with other schools from the immediate area exist, there would appear to be an unanswerable case for additional resources.

(iii) *School Management*

In our research we have paid particular attention to school management factors. Although "external constraints" — those over which management has no control — are important determinants of the overall size of the curriculum, as well as the level of specialised subject provision, there is considerable management autonomy in determining the curriculum, the categorisation of pupils, the allocation of subjects and levels to different categories of pupils, and the nature and effectiveness of timetabling. This is particularly true of secondary schools (see Chapters 6—8). Some schools, for instance, have obviously designed their curricula and organised their teaching to maximise Science and Maths take-up by girls, while other schools — with roughly the same resources — remained with their very general and unspecialised curriculum (see Chapter 6). Nor is the teacher employment policy of schools necessarily predictive of curricular specialisation. In Maths, for instance, pupil specialisation depends mainly on *how* Maths teachers are used, not on their mere presence in a school (Chapter 8).

Given the significance of such school organisation factors, and the wide variation that is found, there would appear to be a strong case for comprehensive management training courses for school Principals and other teachers intimately concerned with managing the schooling process. The complexity and the importance of the management tasks involved are so great that, given the evidence of significant differences in school effectiveness (Madaus and Kelleghan *et alia*, 1979; Rutter *et alia*, 1979), it would appear essential to set up management training courses that are geared towards maximising effectiveness, and that incorporate the most up-to-date information from research studies. In regard to reducing the levels of sex differentiation in both single sex and coed schools, school managements play a vital role in the way physical and teaching resources are allocated and managed. The *White Paper* (para. 11.6) recognises this need but, from all the indications available, the issue would need to be treated with greater seriousness and urgency.

Despite substantial curricular changes in the 1970s a rather high proportion of girls' schools continue to teach a broad but shallow curriculum; and even within that curriculum, do not encourage specialisation in Science, Maths or even Commerce subjects. The comparison of clusters 3 and 6 (Table 6.6) is particularly relevant in these respects — both are small schools having around 300 pupils and with relatively small curricula. But whereas cluster 3 (mainly girls') schools provide a broad but shallow curriculum, cluster 6 (mainly boys') schools teach a narrower but highly specialised one. However, even where a much more generous Science/Commerce/Language specialisation is provided, as in cluster 1 schools, girls are far less likely than boys in the same kinds of schools to take up specialist options. However, they are far more likely to do so than are girls in other schools.

Given these differences in curricular policy, any school curricular development, therefore, must include a major school management advisory role — on how to effect a change in a school's ability to mobilise its resources so as to increase the take-up of currently unpopular subjects by girls and boys. This would help to spread the adoption of those curricular and resource mobilisation policies that a small minority of innovative schools are now successfully carrying out. We are not, therefore, advocating a policy of providing additional curricular resources, as such, where deficits exist — except in the small number of cases mentioned — but, given our results, of improving the use of resources already there or changing the criteria by which additional resources are allocated.

(iv) *Maths Teaching*

Maths teaching, though an obligatory subject in second-level schools, has a much less qualified teaching body than Irish or English — the other obligatory subjects. This is particularly so in girls' schools where only 16 per cent of teachers have Maths qualifications compared to 31 per cent with qualifications in English (Table 8.1). As a result, a much higher proportion of teachers qualified in Science and Commerce in girls' schools are involved in Maths teaching, thus, not only providing a less qualified Maths teaching body but also depleting the extent of their involvement on their own major subject (Table 8.2). This weak position of Maths teaching has not changed very much from the mid-1960s (*Investment in Education*, 1966, para. 10.14ff.). Given the importance of Higher Maths — particularly in the junior cycle — for senior cycle Science and Honours Maths specialisation, some means of improving the situation in girls' and coed schools — the most seriously deficient schools — appears necessary. We do not have sufficient information from this investigation to specify which policies would be most effective: release for teachers with Maths in the first year of their degree course so as to complete the B.A. or B.Sc. Maths course; inservice training courses; the use of part-time teachers, etc. Some effective action to improve the situation is certainly required.

(v) *Allocation Rules and Practices*

In many of those coed schools which teach Home Economics and Technical subjects the former is frequently assigned to girls, the latter to boys. In most mixed vocational schools (14 out of 23) surveyed, explicit exclusionary rules existed which allocated both Technical subjects to boys and Home Economics/Commerce subjects to girls. The position in community schools (4 out of 9) and coed secondary schools (7 out of 17) surveyed was slightly better —

although these differences were not statistically significant*. However, up to a quarter of vocational schools sampled and over a third of community and coed secondary schools did not discriminate between the sexes in this way — they were genuine coeducational schools. But even in these coeducational schools, where no such explicit rules exist, the usual practice is to timetable Technical subjects against Home Economics, Art, Music; or in vocational schools, commerce subjects. In fact, in almost all the coeducational schools — whether vocational, secondary or community — in which such subjects are taught, such direct timetable clashes occurred. And it is clear from our work on choice that such practices significantly reduce the probability of girls taking up Technical or even Science subjects, even where they may feel inclined to do so. Such timetabling practices, combined with other aspects of the "hidden curriculum" — the informal expectations and sanctions of teachers and peers, etc. — are likely, as in Britain (where formal exclusionary rules have been made illegal) to remain as important constraints on take-up.

Whether as explicit exclusionary rules, as explicit timetabling arrangements or as implicit assumptions about the appropriate subjects for boys and girls, it is obvious that such sex differentiation is widely present within the total system of coinstitutional and coeducational schools. But it is particularly important in vocational and community schools where Technical and Home Economics/Commerce options are present. The five groups of subjects, for instance, from which pupils must choose in the Group Certificate — Commerce (2), Domestic Science, Manual, Rural Science — to be eligible for an award of the Group Certificate, tend to formally reinforce sex boundaries in subject take-up, by making it unrewarding and difficult to cross subject category lines.

What we recommend, therefore, is that such exclusionary rules should be disallowed and that timetabling practices be changed to encourage rather than discourage non-traditional options: by leaving subject choices open initially and subsequently timetabling to maximise "unpopular" choices; by being supportive of "unpopular" choices; by leaving options open as late as possible in the junior cycle, etc. A number of schools that have been successful in encouraging "sex-inappropriate" choices, for instance, teach all subjects to all pupils in the first year and choices are made only after pupils have had experience of subjects and are supported and encouraged by the schools in making non-traditional choices.

In Higher Maths (Inter. Cert.) sex differences in school take-up rates are significantly greater than differences in the provision of the subject by schools. The greater take-up by boys is due partly to their greater selection, a higher

*The distinction here is made between schools which make *both* distinctions. Previous measures indicate schools which *either* exclude girls from Technical *or* boys from Home Economics, etc., subjects.

proportion of lower ability boys having dropped out by the Inter. Cert. Overall, boys appear to have less freedom than girls to opt out of Higher Maths. For example, greater streaming is present in boys' schools and in many cases upper streams are assigned higher level Maths rather than being given any choice in the matter.[61] Even in equally streamed girls' schools more flexibility is afforded to pupils in taking or not taking Higher level Maths. Given that girls have, on average, less positive attitudes than boys to Maths — even at the higher levels of performance — they need much more support than boys in staying at the higher level. They appear to receive less support. A much more supportive attitude is, therefore, required for girls taking Higher Maths — and particularly so in the transition from junior to senior cycle where so many girls drop out, even when their Inter. Cert. marks were very high. Again, changes in teaching practice seem vitally important here.

(vi) *Junior Cycle Science*

Science provision and allocation show a significant sex difference. Almost all boys are offered the subject and the great majority is given no choice in the matter — it is mandatory for 80 per cent of boys, but for only 20 per cent of girls. Furthermore, around one in seven of all girls is not offered Science, primarily because they are in the lower ability stream in large schools. And where it is offered as an option it is very frequently offered against popular girls' subjects like Home Economics, Commerce or Languages at a very early stage in the junior cycle. In other words not only are boys obliged to take Science but girls, if they want to take it, are in many cases asked to choose it in preference to subjects that are far more popular; and they are often asked to do so at the start of the first year.

Not being allowed to take junior cycle Science or not being encouraged to take it at such an early stage (age 12 or 13) pre-empts later educational and occupational options, reinforces a stereotyped image of females as having difficulty in understanding elementary scientific and technical processes and, therefore, increases their dependence on males in understanding and manip-

[61]Table 11.1: *The Proportion of Different Schools that Stream their Classes and Allocate Different Subjects to Different Streams*

Proportion of Schools that:	*Boys' Secondary School*	*Girls' Secondary School*	*Coed Secondary*	*Vocational School*	*Community School*
(i) Stream or Band	.71	.46	.59	.52	.44 ($p \leq .05$)
(ii) Allocate different subjects to different streams (if present)	.82	.70	.78	.92	.75 (p. = n.s.)

ulating everyday scientific and technical processes in the home, office or workplace.

A number of policy options exist: (i) A Science course could be made part of the core curriculum in the junior cycle in all schools. It would seem highly desirable that all pupils should take courses in introductory Science. But if the course was confined to the currently recognised Science A and E syllabi it might create serious problems for low ability pupils. (ii) Syllabus change, designed particularly to suit low ability pupils, and to emphasise the usefulness and attractiveness of Science for female roles. (iii) If not in the core, it would seem highly desirable that Science choices be postponed as late as possible in the junior cycle; and timetabling and other allocational discouragements to the choice of junior cycle Science in girls' schools, or for girls in coed schools, should be removed; and a policy of encouragement of Science take-up by girls at the junior cycle be instituted. (iv) The possibility of commencing courses at senior cycle level based on the foundation of courses other than Inter. Cert. Science should be explored. The inclusion of a wider Science basis to Home Economics, for instance, might be an option. This type of approach was to be facilitated according to the *White Paper*, ". . .with a view to reducing the need for pupils to make subject choices at too early an age" (para. 6.14). As the most serious loss here appears to occur in junior cycle Science and Technical subjects for girls, such a syllabus change approach might be more fruitful than simply requiring everyone to take particular junior cycle Science, Technical or Commerce courses.

(vii) *"Skills for Living" Courses*

The equivalent deficit subject in boys' education is in Home Economics. Here a very high proportion of boys is excluded because of provision: only 1 boy in 7 is in a school where he is free to take the subject. Almost no single sex boys' school offers the subject — in contrast to an almost universal coverage in girls' schools. And in coinstitutional or coed schools, most boys are formally excluded or informally discouraged from taking the subject. Junior cycle Home Economics is the most highly sex typed of all subjects at the junior cycle. For instance, needlework and dressmaking are linked with homecrafts rather than tailoring. The introduction of the newer senior cycle Social and Scientific course is much more "neutral" in these respects though also much less skill based. Although less than 10 per cent of coed secondary schools provide the subject to boys and only a minority of the coed community and vocational schools, it has proved a much more popular option for boys in these schools.

The situation is most serious in boys' schools where there is a virtual absence of Home Economics or "living skills" courses, or indeed any serious curricular questioning of the traditionally segregated husband-provider role. In most of the middle class boys' schools there is a very strong instrumental orientation in the curriculum and a high achievement ethos. Perhaps partly as a result, it is in boys' middle class schools where the most traditional sex role expectations are found — particularly amongst the high achieving pupils. Having regard to the likely spousal, parental and household roles that men and women will play as adults, particularly given the shift that has occurred in the familial and work role expectations of similar status girls, the process of negotiating and constructing a happy and satisfying familial life will not be helped by such a traditional socialisation of boys for their future domestic and familial responsibilities.

The *White Paper* (para. 6.14) suggests that the introduction of short curricular modules might be considered to help balance the highly pressurised curriculum provided in high achieving schools. Although the *White Paper* is more concerned with aesthetic subjects, the deficit is even more marked in the areas of living and social skills.

Some experimental courses in the USA (Safilios-Rothschild, 1981) and Scandinavia (Tornes, 1982), particularly short courses on "Skills for Living", have proved successful with boys. However, some curriculum development and evaluated pilot studies are needed in this area before likely successful programmes could be recommended. To develop successful courses for boys based on the "rationality of caring" (Tornes, 1982) or on very practical "skills for living" courses, discussed by Safilios-Rothschild (1979, 1982) would need considerable development work.

(viii) *The Significance of Teacher Expectations*

The finding that teachers' expectations and support for girls' unconventional choices were independently influential in subject choice making constitutes an important policy finding. Combined with other findings on the effects of schools it indicates that intervention can be effectively made at a school level.

One of the assumptions made in this study is that the indirect influence of teachers' attitudes and expectations is adequately reflected in pupils' own self images, expectations and attitudes, and can be adequately measured in pupils' perceptions of these effects. However, since such "hidden curricular" effects can be important constraints on choice or performance without pupils necessarily internalising their effects, or can be such important reinforcements of traditional expectations and behaviour or supports for non-traditional behaviour, intervention at the level of the school and the teacher appears necessary. Many of the intervention programmes being put into operation abroad (see a description of the British Girls Into Science and Technology (GIST) project by Smail *et al.*, (1982), and of American interventions by

Safilios-Rothschild (1981 and 1979)) are aimed directly at reducing sex role stereotyping expectations and behaviour by teachers. Most of these interventions, however, are aimed at influencing teacher behaviour in coed schools. Since the majority of girls are in single sex schools in Ireland, and since the cultural and institutional context of girls' schooling is considerably different, equivalent interventions here would require careful design, piloting and testing before they could be generally applied. We, therefore, strongly advocate the funding of such a pilot intervention programme for this purpose.

(ix) *Guidance Counsellors*

The expansion of Guidance Counselling services in schools from the 1960s onwards has ensured that currently over 400 second-level schools and around two-thirds of their pupils have their services (*Whilte Paper,* op. cit., 7.17); although recent changes in funding may lead to some regression in these respects. The growth in the complexity of, and the rapid change in, occupation and career opportunities has heightened the need for services to help pupils make satisfactory subject career choices. While we did not carry out a complete study of the role of Guidance Counsellors in our sample schools we found that their role in career and subject choice guidance is mainly concentrated at the senior cycle level, particularly for those pupils who do the Leaving Certificate. They are much less involved in junior cycle choices. They are not involved to any great extent in curricular decision-making at a school level; and they are only minimally involved in timetabling or in setting up or changing the core and optional subject alternatives. They are highly involved in student assessment and in the initial allocation of pupils to streams/bands, etc. though not in the policy decisions that lead to banding/streaming, etc. As a result, most Guidance Counsellors work within pupil categorisation and subject provision/allocation parameters set by school decision-makers, as well as within the constraints posed by choices taken by pupils and parents at the junior cycle stage.

Given the effects of such curricular and pupil/subject allocation policies at a school level and the follow-on effects of very early choices, particularly in girls' schools, if the Guidance Counsellor's role continues to be concentrated on senior cycle individual pupil counselling, it cannot have much effect on reducing sex differentiated curricula and pupil choices. The Guidance Counsellor role does provide, however, an entrée to required areas of policy change within schools. To be effective in these respects, Guidance Counsellors would need to devote much more time to junior cycle pupils and their subject choices as well as become more involved in school curricular subject allocation and timetabling policies. Most Guidance Counsellors do not have that kind of influence within schools, except where they have acquired it through long experience as teachers within the school. It is not treated as part of the Guidance Counsellor's role *per se*. Any substantial change in role towards such school curricular functions and towards greater involvement in junior cycle choices would divert considerable time away from senior cycle choices and their personal counselling role. Without further study of the consequences of any such shift in roles — particularly when a decline in the amount of time allocated to it is likely to occur as their teaching duties increase — we can only raise the problems associated with the current position.

(x) *Timetabling*

This appears to be a serious management problem in many schools. It takes up a lot of management time and often with results that do not maximise the full use of the subject/teacher/classroom/laboratory resources of the school. With larger schools, conflicting demands, diverse resources but very restricted time constraints, it is an extremely difficult and time-consuming exercise. Given the importance of timetabling and option packaging to maximise pupil choice and the use of school resources, much more attention needs to be focused on it. It is our impression that schools would welcome information, guidance and advice or consultancy services in this area. In addition, it is an area that lends itself to operations research procedures and it seems likely that standard computer timetabling programs could be developed for use on school computers. The development of such sophisticated approaches to timetabling could also be designed to help school management form a clearer specification of priorities regarding curricular objectives at a school level.

(xi) *Coeducation*

Most recent British research work in this area indicates considerable disquiet about the "polarisation effects" of coeducational schools on the attitudes, aspirations, subject choices and examination performance of boys and girls (Dale, 1974; Dept. of Education and Science, 1975, Ormerod, 1981). Our results do not support these conclusions. In fact girls in coeducational schools in Ireland appear to be at somewhat of an advantage compared with British girls in those respects.

However, there are so many different types of coeducational or coinstitutional schools in Ireland — vocational, community and coed secondary schools — that it is very difficult to make comparisons with single sex schools. Most secondary coed schools are smaller than single sex schools. They are highly diverse in size and social composition. They include, for example, the urban Protestant upper middle class secondary schools and small rural convent schools. But coinstitutional or coed schools also include the small vocational schools which cater mainly for pupils from small farm or working class families, and the large new coed and, surprisingly, coinstitutional community schools.

Most of the coed secondary schools, in fact, arose from amalgamations of small single sex schools, or from single sex schools which took in pupils from the opposite sex. In many cases, therefore, the original single sex traditions of the school remain very strong, particularly if they are associated with an unbalanced sex ratio in the coed pupil population. The newer community schools are more likely to have balanced sex ratios, as well as a more balanced social composition, and — if designed from the "green field" stage — to be specifically designed as coed schools. Nevertheless, many of the older ones appear to operate with rigid sex biased subject allocation rules also — i.e., as coinstitutional schools. Given this diversity of types of coed schools, it is very difficult to come to any definite conclusions about their effects.

Nevertheless, there is a high degree of sex bias in the allocation of Technical and Home Economics subjects in most of these schools. These explicit sex biases in subject allocation have been specifically barred in many European countries. In England and Wales the first few years of second-level education incorporate a common core of Science, Technical and Domestic Science subjects which are taught to most pupils irrespective of sex (Kelly, 1982; Ormerod, 1981). In fact, girls' attitudes towards Science and Technical subjects appear to worsen over that compulsory period (Ormerod, 1982); and sex differences in the take-up of the main sex typed subjects at both O and A levels — the Physical Sciences, Technical subjects, Home Economics — are almost as marked as in the Inter. or Leaving Cert. (see Equal Opportunities Commission (EOC), Research Bulletin No. 6, 1982). Consequently, the exclusion of these allocation rules on their own, without other associated changes, as we have pointed out, would have very little impact on sex "inappropriate" subject choices.

In so far as we could control for all of these relevant variables that distinguish single sex from coed schools, however, it appears that Irish girls attending coed schools are at some limited advantage in regard to Maths and Science take-up rates, compared with girls in single sex schools. Boys in coed schools, although they show no significant improvement in the take-up of non-traditional subjects, do exhibit less traditional sex role attitudes and expectations than their peers in single sex schools. In contrast to these latter findings, the most recent British findings (Ormerod, 1981, Dept. of Education and Science, 1975), show clear evidence of sex role polarisation in their coed schools, with girls doing significantly better in single sex schools. In interpreting these discrepant results it should be kept in mind that our coed schools are the exception, where theirs are the norm; and that most of our coed schools have only recently been established and may not as yet have had enough time to have acquired those routine, taken-for-granted, working procedures that characterise long established organisations and that would tend towards using ascriptive characteristics, like sex, to allocate roles. As we do not have sufficient information on the actual work practices and behaviour within these recently established coed schools we can only sound a cautionary note, particularly given the clarity of these research results from Britain.

(xii) *The Information Needs of Schools*

There is an urgent need to assemble, publish and disseminate to second-level schools basic information on the labour market, and on the relationship between the type and level of education achieved by girls and boys and position achieved in the labour market or at third-level. At the moment three regular sources of such information are assembled annually: the National Manpower *School Leavers Survey*, the AnCO statistics on apprenticeships and training, and the Central Applications Office data on third-level Higher Education Authority (HEA) institutes. All of these agencies have available such information by sex, educational level and type of education received. The National Manpower Service publishes detailed annual data by level of education, sex, and by type of occupation achieved by young people one year after leaving post-primary school. For school curricular and pupil advisory purposes, more information on the relationship between subjects taken and at what levels taken in the various public examinations and subsequent job type or third-level course taken would be of great benefit.

Currently AnCO do not provide apprenticeship or training data by sex, educational level or type of course taken in second-level education. We strongly recommend that such data be made available on an annual basis. It would provide invaluable data for school planners and Guidance Counsellors, and help monitor trends in the extent to which apprenticeships or related training courses are taken up by girls.

Similar data from the HEA and the National Council for Educational Awards (NCEA) on Regional Technical Colleges, on the relationship between type and level of second-level educational achievement and third-level course entry, would also be of great use to school planners and Guidance Counsellors.

Given that all this information is regularly collected and that most of it is computerised and readily accessible, the further work of analysing it and publishing it with the other data already published on an annual basis, would be more than amply repaid in the wealth of information it would provide for school decisionmakers. It would also provide a means of monitoring trends and isolating bottlenecks, or over-subscribed queues, in the labour market or third-level education.

(xiii) *Pupil Choices/Attitudes*

The importance of sex differences in true rates of choice is shown by our analysis in Chapter 9. The factors influencing whether or not a pupil who was qualified to choose Higher Maths, Physics or Chemistry did so, appeared to depend on four things: first, the pupil's Inter. Cert. examination performance; secondly, her or his attitudes towards the subject; thirdly, ambitions and aspirations towards further educational and occupational goals; and, finally, for girls, the expectations of their teachers. Sex differences in the true rates of choice could be partly attributed to differences between boys and girls in these respects; but was mainly due to their differential effects on boys and girls.

This finding raises a number of policy dilemmas. A significant reduction in the inequality of take-up as between the sexes depends mainly upon a diminution of the sex differences in "true" rates of subject choice. How this might be done constitutes our main problem. True rates of subject choice are, to a large extent, a function of pupil ambitions, aspirations and attitudes: because girls have more negative attitudes than boys towards Science subjects and because they do not want to go on to third-level Science or Engineering courses, they do not choose Science subjects at Leaving Cert. And these ambitions and attitudes, are themselves a function of a wider set of influences operating on pupils (see Figure 9.1).

As we have seen, however, schools do intervene to change or influence these attitudes, and schools also vary significantly in the relative influence of their teachers on pupils (Chapters 6 and 9). As a result, it should be possible to build on the experience of those schools that have been successful, as well as on the experience of intervention programmes abroad, to design and implement effective programmes of intervention to improve girls' attitudes towards Science-Maths and to widen their career options.

However, the school itself is only one source of influence on pupils' attitudes. Such attitudes are, to a large extent, the product of a set of "taken for granted" assumptions about girls' abilities and what subjects and adult labour market roles are appropriate for them. Such assumptions are widely held by peers and parents as well as, in many cases, teachers. Thus, intervention programmes within schools, if they are not to find themselves operating in direct opposition to such beliefs, must seek some degree of parental involvement.

A number of such intervention programmes operate in Britain and the United States (see review by Kelly, 1980; Safilios-Rothschild, 1982): the use of "Remedial Maths" classes and "Maths Anxiety" clinics (Tobias, 1978); the design of curricula and courses to help pupils lacking confidence to an understanding of basic concepts in Maths, Science and Technical subjects; the use of "work clinics" for pupils with problems in understanding Science lessons; in-school workshops with teachers which create awareness of sex role stereotyping processes by teachers and pupils (Guttentag and Bray, 1976; Kelly, 1981, 1982); strategic timetabling, early career advice and counselling; the incorporation of the Career Guidance Counsellor, not only at an early stage in the process of choice by pupils, but having a more significant input into the whole curricular decision-making process; the creation of awareness of, and encouraging identity with, high achieving female role models with non-traditional occupational roles — like plumber, painter, engineer, architect etc. See Appendix 11.1 for details of some of these interventions.

As these reports of intervention strategies show, change is possible even within the short period for which most of the projects were in progress. Underlying the slightly differing aims and strategies some common findings emerge. The first is the fact that legislation prohibiting sex discrimination, such as Title IX in the USA or EOC in Britain, is not enough. Even when equalisation of formal provision occurs, reduction in the level of inequality in take-up rates is small. The attitudes and behaviour of pupils, teachers and administrators must also be changed. Secondly, the support of teachers is vital to the success of the intervention. Time spent in raising their awareness of the subtly different ways they treat boys and girls and of the differential expectations thus conveyed, is well spent. In single sex schools where comparison with the opposite sex is less immediately salient, sex-typed expectations may be just as prevalent even if less obvious. While most teachers professionally espouse an egalitarian ideology they may unconsciously hold sex-stereotyped attitudes about the capabilities and careers of their pupils. Indeed, most research done abroad on this topic suggests the need for intervention at this level if successful changes are to be brought about.

What we would suggest, therefore, is a series of intervention programmes along the above lines; more particularly along the lines of the GIST (Girls into Science and Technology) programme at Manchester. Such intervention programmes would need to be substantially redesigned to suit Irish conditions: the fact that most of our schools are single-sex and rather small by international standards is particularly relevant. Before generalising to the mass of schools therefore, a number of pilot intervention programmes would be required. These are relatively inexpensive[62] projects and should fully repay the limited investment required.

(xiv) *Research Needs*

Finally we conclude with an appeal for much more research on many of the topics touched on in this report, but which we could not cover in sufficient

[62]The GIST (Manchester) project for instance, is a 4-year project staffed by one full-time officer (schools liaison), two part-time action researchers, a part-time secretary and relatively modest field costs and overheads. It is jointly funded by the British SSRC and EOC (see *Girls into Science and Technology*, Report from project team, 9A Didsbury Park, Manchester).

depth: the process of schooling management; the in-school effects of coeducation; the "hidden curriculum"; the operation of the female labour market — particularly the position of new female entrants and their adaptability to changing (office) technology — as well as the subject and curriculum requirements for successful adaptation to changing demands of the labour market; adjustment to early marriage and childrearing roles — the extent of "role overload" on working mothers and the extent to which young husbands adjust to changing role expectations and actual family role demands; sex role stereotyping in textbooks, etc.; the extent, effects and implications of increasing "credentialism" within conventional office and service employment on the life chances and education of working class girls; the very deprived position of working class boys who drop out of school at a very early stage and have very limited labour market prospects, etc. The list of useful research on such policy-relevant topics is almost endless. With the cutbacks in the funding of the social sciences by the National Board for Science and Technology, there is urgent need for some annual social science research funding which would allow many of these topics to be tackled; Ireland being one of the few European countries without any Social Science Research Council.

(xv) *Data Bank*

As an aid to the promotion of such research most of the data collected in this research project will be put into a data bank at the Institute — with all the confidential and identifying data removed. Access to it will be made available, at cost of extraction, to research scholars who satisfy the Institute and, in the case of the examination data, the Department of Education, of their bona fides.

Summary of Policy Recommendations

1. *Syllabus Review:* Review of sex role stereotyping in textbooks, course outlines and examination formats, etc. Review of the syllabi of the main homecraft and handicraft subjects, as well as the boundaries between the subjects, with a view to minimising sex stereotyped teaching or learning programmes.

2. *Girls and Science:* Institution of programmes which would lead to increased provision, change in subject allocation practices and encouragement of increased take-up of Science by girls in the junior cycle programme. Where feasible, Science should be made part of the core curriculum at least for first year. Where taught as an option, choice between Science and other subjects

should be postponed to as late a stage as possible. Timetabling should encourage, not discourage, Science take-up. Full advice on the implications of not choosing Science should be made available to pupils. For low ability pupils changes in the Science syllabus may be necessary.

Senior cycle Science choices — particularly of Physics and Chemistry — are even more sex typed. The main variables involved are attitudinal — those of girls' attitudes towards the subjects and their capability of handling them, as well as their relationship to post-school choices. But teacher support for such choices is also crucial. We suggest intervention programmes to help change these attitudes. The encouragement of junior cycle Higher Maths also is important in this respect.

3. *School Curricular and Management Policy:* (i) The establishment of a national curricular review body which would have sufficient acceptance, influence and expertise to monitor, evaluate and effectively influence curricular changes at an individual school level. It is suggested that this function be given to the proposed Curriculum and Examinations Board. (ii) Changes in the role and the resources of the inspectorate so that they can play a more active and effective advisory and monitoring role in both curricular and general schooling management policy at the individual school level. (iii) Review of the special curricular needs of isolated small schools, and changes in teacher allocation policy so that a school's curricular needs becomes a more important resource allocation principle. (iv) Establish and publish a minimum standard of subject offerings by schools to both boys and girls which all pupils have a right to expect. (v) The institution of school management training courses which would be particularly geared towards effective school management processes. (vi) The establishment of an advisory system to improve timetabling and associated resource management processes within schools so as to maximise resource use and pupil choice. (vii) The publication of curricular offerings by school catchment area.

4. *Subject Allocation Rules:* The elimination of sex biased subject allocation rules in coed schools which distinguish between boys and girls in the allocation of Technical, Home Economics, and Commerce subjects and the development of timetabling and option packaging procedures which encourage non-traditional choices. For historical reasons the majority of vocational schools are coinstitutional rather than strictly coeducational, so that the existence of these rules is not primarily an indication of current discretionary prejudgements of Principals or teachers but rests on the consequences of much earlier decisions, taken usually when these schools were being set up. We are, therefore,

recommending change towards a genuine coeducational school where all subjects are offered to both girls and boys and cross-sex subject choices are encouraged not discouraged.

5. *Maths Teaching:* We need to correct the clear deficit in the qualification of Maths teachers in girls' and coed secondary schools particularly.

6. The development of "living skills" courses for boys, particularly in single sex schools.

7. Review of the roles of Guidance Counsellors, towards their increased participation in curricular and subject/pupil allocation decision-making within schools, and their greater involvement in junior cycle subject choices by pupils.

8. *Publication of Departmental Statistics:* The examination results for the Group Certificate examination should be published by sex of pupil. And the current excellent statistical series dealing with subject availability, and take-up, and Inter. and Leaving Cert. examination results, should be continued, with all results shown for girls and boys separately.

9. *Publication of AnCO Statistics on Apprenticeship Training:* These data should be made available by sex of trainee or apprentice, and the examination and subject qualification of entrants to these courses published. This would be invaluable information for schools. More extended analysis of the NMS *School Leavers' Surveys* and of HEA statistics is also advised.

10. *Pilot Intervention Projects:* Pilot intervention projects should be established to help change schooling and teaching policy and pupil attitudes at three levels:

(a) At a school management level to help design and effect changes in curricular, pupil/subject allocation, and timetabling and resource mobilisation processes; so as to reduce the level of inequality in curricular provision/allocation, and in pupil choice and performance.

(b) Institution of intervention programmes in schools which would be concerned with changing differential teacher expectations for boys and girls, given the significance of such differential performance expectation for girls' non-traditional choices.

(c) Establishment of intervention programmes to help improve girls' educational self confidence, their attitudes towards Maths and Science subjects, and their aspirations towards and expectations about the labour market; and the relationship of these expectations to subject choice and performance.

11. The need for curricular innovation being proposed here comes at a time when not only are real resources for education declining but also in a decade when pupil numbers are increasing at a fraction of the rate they did in the 1970s — pupil numbers in second-level education increased by 50 per cent in the 1970s but are projected to increase only by 10 per cent in the 1980s — (*White Paper,* Table 1). Therefore, methods other than getting new posts or replacing retiring teachers will have to be used to the maximum to achieve curricular change, i.e.:

(a) Greater flexibility in the possibility of transfer of teachers between schools so that, where subject qualification mismatches exist, some reduction in inequalities of provision can be achieved by permitting or encouraging such transfers. Significant changes in and revision of agreements on seniority rules would be required here, however.
(b) Greater sharing of specialist teachers between schools.
(c) Amalgamations of smaller single sex schools to form coeducational schools.
(d) In-service training courses, and grants for full-time retraining of teachers for subjects that need to be strengthened.

APPENDIX 1

Questionnaires

A copy of the Leaving Cert. Pupils Schedule is included in this Appendix Copies of the Inter. Cert. Pupils, Principal and Guidance Teacher Schedules may be had on request from the authors at The Economic and Social Research Institute.

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ECONOMIC AND SOCIAL RESEARCH INSTITUTE

CURRICULUM DIFFERENCES PROJECT

LEAVING CERT SCHEDULE

CARD 1

Student Code No. [| | |] 1-4

Pupil's Questionnaire - 1

5-6

INTERVIEWER [|] Date ____________

7-9

SCHOOL [| |]

10

CLASS [ ]

11

GRADE [ ]

SCHOOL TYPE: Boys .... 1 Girls .... 2 Coed.... 3 Coinstit. 4 12

The purpose of this questionnaire is to get your views about the different subjects you are taking, about education, about your future work and your future adult life generally. The information provided will be of great value in assessing the suitability of current educational programmes and in developing ways to help people like you with their educational and job-seeking problems. The answers which you give will be treated with the strictest confidence and will be used for research purposes only. The research workers are the only people who will ever see your questionnaire. Your name is needed for sampling purposes only and will never be published in any connection. We are interviewing over 4,000 students in 100 schools in Ireland in the study and the answers will be combined to form a general picture of their views.

Most of the questions can be answered by circling the appropriate number like this;

Are you at school? Yes...... 1 No........ 2

or by writing a number in a box like this

"What age are you?" [1 | 5] years

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CARD 1

1. Name________________________ 13-14

2. What age were you on your last birthday? [|]

3. What was the name and address of the last primary school which you attended. [ ] 15

Name________________ Address ______________________________

____

4. How far away was it from this school? (Circle the number beside the answer which is true in in your case)

Within 3 miles of this school 1 16

Between 3 and 10 miles away 2

Elsewhere in Ireland 3

In another country 4

5. Have you attended any other post-primary school (circle the appropriate number) 17

Yes .... 1 No 2

6. (a) Are you : 18

a boarder 1

a day pupil 2

(b) Are you:

a boy 1 19

a girl 2

7. (a) How many older sisters and brothers have you? [|] 20-21

(b) How many younger sisters and brothers have you? [|] 22-23

8. IF YOU HAVE NO OLDER SISTERS, GO ON TO Q. 9

(a) How many older sisters have you? [|] 24-25

(b) Do you have any older sister who is married and working outside the home? 26

Yes .... 1 No 2

9. How many years did you spend between entering post-primary school and taking the Inter Cert exam? [ ] 27

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CARD 1

10. Going back to the first 2 years you spent in post-primary school, what subjects did you take in that year, (Please circle the number corresponding to each subject you took)

Subjects taken in First year
[Please circle)]

Irish .... 1 — 28
English................ 1 — 29
Maths................. 1 — 30
History................ 1 — 31
Geography............. 1 — 32
French................ 1 — 33
Science A or E......... 1 — 34
Commerce .... 1 — 35
Art .... 1 — 36
Home Economics ...... 1 — 37
Mechanical Drawing..... 1 — 38
Woodwork............. 1 — 39
Metalwork .... 1 — 40
Music................. 1 — 41
Latin or Greek......... 1 — 42
Hebrew............... 1 — 43
German............... 1 — 44
Spanish............... 1 — 45
Other (1) (specify)______________ 1 — 46
Other (specify)______________ 1 — 47

Subjects taken in Second year.
[Please circle)]

Irish (Pass)............. 1 — 48
(Hons)............. 2
(Common Level).... 1
English (Pass)........... 1 — 49
(Hons)........... 2
(Common Level)... 3
Maths (Pass)............ 1 — 50
(Hons)........... 2
(Common Level)... 3
History................. 1 — 51
Geography.............. 1 — 52
French................. 1 — 53
Science A or E.......... 1 — 54
Commerce.............. 1 — 55
Art.................... 1 — 56
Home Economics........ 1 — 57
Mechanical Drawing..... 1 — 58
Woodwork.............. 1 — 59
Metalwork .... 1 — 60
Music................. 1 — 61
Latin or Greek.......... 1 — 62
Hebrew................ 1 — 63
German................ 1 — 64
Spanish................ 1 — 65
Other (1) (specify)______________ 1 — 66
Other (2) (specify)______________ 1 — 67

11. Which of these subjects were you best at?

1. (Best)____________________ 68-69
2. (2nd Best)________________ 70-71

12. Which of these subjects were you worst at?

1. (Worst)__________________ 72-73
2. (Next worst)______________ 74-75

13. At the time when you were choosing your Inter. Cert. Subjects, did you have a choice of taking any other subjects, other than those you did take? (Please circle the number beside the statement that is most true in your case).

No, there were no other subjects that I could have taken 1
Yes, there was one other subject that I could have taken 2
Yes, there were 2 other subjects that I could have taken 3
Yes, there were 3 or more other subjects I could have taken 4

76
77-79 = blank
80 = 1

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CARD 2
DUP 1-4

14. Looking back now at the other subjects which were taught in the school when you were choosing your Inter Cert subjects, are there any, which you now think you should have taken?

Yes .... 1 No .... 2 — 5

IF YES, which ones?

1. ________________ 6 - 7

2. ________________ 8 - 9

15. Are there any other subjects which you now wish you had taken for the Inter Cert but could not because they were not taught in your school at that time?

Yes .... 1 No .... 2 — 10

IF YES, which ones?

1. ________________ 11-12

2. ________________ 13-14

16. When you were deciding on your Inter Cert. subjects, how important were each of the following people to you in helping you to make up your mind? (Circle one number on each line)

	Very Important	Somewhat Important	Not Important	There is no such person, or this person is dead or absent	
My Father	1	2	3	4	15
My Mother	1	2	3	4	16
The School Principal	1	2	3	4	17
A particular teacher in Primary School	1	2	3	4	18
The Career Guidance teacher	1	2	3	4	19
A particular teacher(s) in Secondary School	1	2	3	4	20
My friend(s)	1	2	3	4	21

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CARD 2

17. What subjects did you take for the Intermediate Certificate? And what grade did you get in each subject in the Inter Cert? Place a tick (✓) after those of the following subjects which you took, and fill in the grade received in the accompanying box ☐

Subject		Please tick (✓) if did subject	Grade received in Inter Cert	
Irish - lower course	(1)	....	☐	22
" - higher course	(2)	....	☐	23
English - lower course	(1)	....	☐	24
" - higher course	(2)	....	☐	25
Maths - lower course	(1)	....	☐	26
" - higher course	(2)	....	☐	27
History	(1)	....	☐	28
Geography	(1)	....	☐	29
French	(1)	....	☐	30
Science A or E	(1)	....	☐	31
Commerce	(1)	....	☐	32
Art	(1)	....	☐	33
Home Economics	(1)	....	☐	34
Mechanical Draw.	(1)	....	☐	35
Woodwork	(1)	....	☐	36
Metalwork	(1)	....	☐	37
Music	(1)	....	☐	38
Latin or Greek	(1)	....	☐	39
Hebrew	(1)	....	☐	40
German	(1)	....	☐	41
Spanish	(1)	....	☐	42
Other 1_____	(1)	....	☐	43
Other 2_____	(1)	....	☐	44
Other 3_____	(1)	....	☐	45

18. In your Inter Cert. class, how would you have placed yourself? (Indicate the statement which, in your opinion, best described your position in that class by circling the number after it).

Near the top of the class 1

Well above average but not at the top 2

Just a little above average for the class .... 3 — 46

Just at the average for the class 4

Just a little below average for the class 5

A good bit below average for the class 6

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CARD 2

19. What subjects are you now taking at school? (Please circle the appropriate number below - indicating also whether you are taking the Ordinary (pass) or Higher (honours) level; if you haven't fully decided on Pass or Honours, circle the level you will be most likely to take.)

	Pass	Hons	
Irish	1	2	47
English	1	2	48
Maths	1	2	49
Geography	1	2	50
History	1	2	51
French	1	2	52
Physics	1	2	53
Chemistry	1	2	54
Biology	1	2	55
Physics and Chemistry (combined)	1	2	56
Applied Maths	1	2	57
Mechanics	1	2	58
Economics	1	2	.59
Business Organ.	1	2	60
Accountancy	1	2	61
Econ. History	1	2	62
Art	1	2	63
Music and Musicianship: A or B:	1	2	64
Home Econ. (Soc. & Scientific)	1	2	65
Home Econ. (General)	1	2	66
Technical Drawing	2		67
Engineering Workship	2		68
Building Construction	2		69
Latin or Greek	1	2	70
Hebrew	1	2	71
Spanish	1	2	72
German	1	2	73
Italian	1	2	74
Agric. Science	1	2	75
Agric. Econ.	1	2	76
Other 1 ________	1	2	77
Other 2 ________	1	2	78

79 = Blank
80 = 2

FOR OFFICE USE ONLY

CARD 3

DUP 1-4

20. For each of the following 7 subjects state, by circling the appropriate number, whether you think the subject is: (i) Useful or not, (ii) Interesting or not, and (iii) Difficult or not. There are no right or wrong answers. It is what you think about the subjects that is important. (Please respond whether you are taking these subjects or not.)

	(i) This subject is Useful		(ii) This subject is Interesting		(iii) This subject is Difficult		
	Yes	No	Yes	No	Yes	No	
Maths.	1	2	1	2	1	2	5-7
Irish	1	2	1	2	1	2	8-10
History	1	2	1	2	1	2	11-13
French	1	2	1	2	1	2	14-16
Physics	1	2	1	2	1	2	17-19
Biology	1	2	1	2	1	2	20-22
Home Economics	1	2	1	2	1	2	23-25

21. Thinking back to the time when you came back to school after the Inter Cert. were there any other subjects you could have taken other than those you actually took? (Please circle the number beside the answer that is most true in your case).

No, there was no other subject I could have taken 1
Yes, 1 other subject I could have taken 2
Yes, 2 other subjects I could have taken 3
Yes, 3 or more other subjects I could have taken 4

26

22. At that time, was there any other subject taught in the school, which you would have liked to take? (that is, apart from the ones you did take.)

Yes ....1 No......... 2 ——> Q. 23 27

IF YES: (i) which ones?

(Other subjects I would have liked to take)

1 ________ 28-29

2 ________ 30-31

TAKING THE FIRST SUBJECT MENTIONED:

Was this subject offered to your class?

Yes 1
No 2

32

IF YES: Why did you not take it? (Please indicate whether 'Yes' or 'No' for each of the following reasons by circling the appropriate number)

(i) I had to choose between it and another subject which I preferred to take at that time .... Yes .. 1 No ... 2 33

(ii) I could have taken it, but I would have had too many subjects Yes .. 1 No ... 2 34

(iii) I would have preferred to take it, rather than another subject, but there weren't enough places in the class .... Yes .. 1 No... 2 35

(iv) I was told I couldn't take it, for other reasons .... Yes .. 1 No ... 2 36

FOR OFFICE USE ONLY

CARD 3

23 (a) At that time were there any subjects not taught in the school which you would have liked to take?

Yes 1   No .... 2 ——> next question   37

IF YES: (a) Which ones?

1 ________________________   38-39

2 ________________________   40-41

(b) At that time were there any subjects which you would have liked to take at honours level but could not, because they were only taught at pass level in the school?

Yes 1   No 2   42

IF YES: Which ones?

1 ________________________   43-44

2 ________________________   45-46

24. Of the subjects you are now taking were there any that you would have preferred not to take at that time?

Yes 1   No 2   47

IF YES: Which ones?

1 ________________________   48-49

2 ________________________   50-51

TAKING THE FIRST SUBJECT MENTIONED

Why then did you take it (circle one number)

(i) Because I was told by the school to do it - I had no choice 1

(ii) I had a choice but I liked the other subject options even less 2

(iii) I had to take it because there were other subjects linked to it that I wanted to take 3   52

(iv) Other - please explain ________________________ 4

____

____

FOR OFFICE USE ONLY

CARD 3

25. Looking back now at the other subjects which were taught in the school at the time when you were choosing your Leaving certificate subjects, are there any of those subjects which you now think you should have taken?

(a) Yes 1   No 2   53

IF YES, which ones?

1 ______________________________   54-55

2 ______________________________   56-57

(b) Taking the first subject you mentioned, what was your main reason for not taking it at the time? (Please chose whichever of the following 6 reasons is the most important in your case by circling the appropriate number. If you circle No. 6 ("other reason"), please explain what this reason is).

Because you didn't think it would be useful, at the time, although you could have taken it 1

Because although you could have taken it, you thought it would be too difficult 2

Because although you could have taken it, you thought it would be too boring or not stimulating enough 3   58

Because you hadn't taken it, or a subject linked with it, up to Inter Cert level 4

Because you weren't given the option of taking it, for some other reason, although you wanted to 5

Other reason (please give details) ______________________________

______________________________ 6

(c) And why do you now think that you should have taken the subject? (Please indicate below what your main reason is)

Because without it, I will not be able to take up a particular job I would really like to get 1

Because without it, I will not be able to do a particular course (e.g. at Technical College, or University) which I would really like to do after leaving school 2   59

Because I think I would like it better than some other subject which I am now taking 3

Other reason (please give details) ______________________________

______________________________ 4

FOR OFFICE USE ONLY

CARD 3

26. How strongly do you agree or disagree with each of the following statements. There are no right or wrong answers - this is just a way of getting your opinions. (Please circle the appropriate number).

	Strongly Agree	Agree	Disagree	Strongly Disagree	
1. I prefer to do subjects that involve a lot of reading:	1	2	3	4	60
2. I like to be ahead of others in my class	1	2	3	4	61
3. I prefer to do subjects in which I have to work out problems as in Maths or Science	1	2	3	4	62
4. I prefer subjects that deal with abstract ideas to subjects that deal with people or everyday life.	1	2	3	4	63
5. I usually give in when people disagree strongly with me	1	2	3	4	64
6. I always try to answer questions in class	1	2	3	4	65
7. I have more confidence dealing with a subject like English than with any Science subject.	1	2	3	4	66
8. I don't like competing against others in class	1	2	3	4	67
9. I have taken some of my subjects because of the teacher, rather than anything to do with the subjects	1	2	3	4	68
10. I get a greater sense of satisfaction out of appreciating a piece of poetry or prose than out of solving a difficult maths problem	1	2	3	4	69
11. I don't like people who always want to stand out in class	1	2	3	4	70
12. Science and Maths subjects are just too difficult for a lot of students to master:	1	2	3	4	71

72-79 = Blank

80 = 3

27. At the time when you were choosing your Leaving Certificate subjects how important were each of the following people to you in helping you to make up your mind. (Circle the one number on each line).

CARD 4
Dup 1-4

Person	Very important	Somewhat important	Not important	There is no such person, or he/she is dead or absent	
1. Your father	1	2	3	4	5
2. Your mother	1	2	3	4	6
3. A particular teacher or teachers in school	1	2	3	4	7
4. The school Principal	1	2	3	4	8
5. The career guidance teacher	1	2	3	4	9
6. Your friend(s)	1	2	3	4	10
7. Your older brother	1	2	3	4	11
8. Your older sister	1	2	3	4	12

FOR OFFICE USE ONLY

CARD 4

28. Here is a list of reasons which people could give for choosing their subjects. How important were each of the following reasons in your case? (Circle one number on each line).

I picked my subjects because	Very important reason	Reason of some importance	Not an important reason	
1. They were the most useful	1	2	3	13
2. It is easier to get a good job if you do well in these subjects	1	2	3	14
3. They would help me get on with people	1	2	3	15
4. I knew I could do well in them in the exams	1	2	3	16
5. I could learn things I would need to know when I leave school, to help me get on in life	1	2	3	17
6. I would need them to get into futher training or further education	1	2	3	18
7. I needed them to get into an apprenticeship	1	2	3	19

29. How strongly do you agree or disagree with each of the following statements? There is no right or wrong answer - we would just like your opinion on each statement. (Circle one number on each line).

	Strongly Agree	Agree	Disagree	Strongly disagree	
1. Most of the subjects I have chosen turned out to be interesting	1	2	3	4	20
2. Most teachers help you to decide what subjects to take	1	2	3	4	21
3. I didn't know what I was letting myself in for with some of the subjects I chose	1	2	3	4	22
4. Most teachers are too busy when you ask them for advice	1	2	3	4	23
5. I wish I had been given more help in choosing my subjects	1	2	3	4	24
6. I seem to be getting on well with the subjects I have chosen	1	2	3	4	25
7. Teachers are always ready to help you with advice on what you should do	1	2	3	4	26
8. If I could choose again I would choose different subjects	1	2	3	4	27
9. Most teachers are hard to talk to	1	2	3	4	28
10. I think that the subjects that I have chosen will help me later on	1	2	3	4	29

FOR OFFICE USE ONLY

CARD 4

30. Over the last two weeks that you have been in school, about how many hours did you spend on studying or homework on each night from Monday to Friday. (Circle one of the code numbers).

Less than 1 hour	1	30
Between 1 and 2 hours	2	
Between 2 and 3 hours	3	
Between 3 and 4 hours	4	
More than 4 hours	5	
No time	6	

31. What 2 subjects take up most of your homework or study time?

1_____________________ 31-32

2_____________________ 33-34

32. Over the last two weeks that you have spent in school how often did you prepare things - like essays or projects - including Science and Maths projects - for class?

Almost every day	1	
About once every two days	2	35
About 3/4 times	3	
About once/twice	4	
Almost never	5	

33. How is most of your homework checked? (Circle one number only)

It is collected and given back with comments and/or corrections	1	
It is collected and given back without comments or corrections	2	36
Pupils check their own homework in class	3	
Its not usually checked	4	
Other (give details) ________________________	5	

34. Over the last three weeks that you have spent in class, how often;

(Circle one number on each line)

How often?	Very Often	Often	A few times	Never	
1. Have you been told that your work is good?	1	2	3	4	37
2. Have you been blamed because your work is untidy?	1	2	3	4	38
3. Have you been asked questions in class?	1	2	3	4	39
4. Have you been blamed for misbehaving?	1	2	3	4	40
5. Have you been praised because your written work is tidy and done on time?	1	2	3	4	41
6. Have you felt very stimulated and interested	1	2	3	4	42
7. Have you been told that your work is poor?	1	2	3	4	43
8. Have you been unable to express fully what you mean?	1	2	3	4	44

FOR OFFICE USE ONLY

CARD 4

35. How would you place yourself in your present class? (Indicate the statement which, in your opinion, best describes your position, by circling the number beside it.)

Near the top of the class	1	
Well above average but not at the top	2	
Just a little above average for the class	3	45
Just at the average for the class	4	
Just a little below average for the class	5	
A good bit below average for the class	6	

36. How strongly would you agree or disagree with each of the following statements about yourself? (Circle one number on each line)

	Strongly agree	Agree moderately	Moderately disagree	Strongly disagree	
1. I'm hardly ever able to do what my teachers expect me to do	1	2	3	4	46
2. In my lessons I usually do more than the teachers expect of me	1	2	3	4	47
3. I usually find it difficult to concentrate on what I read	1	2	3	4	48
4. I could do much better at my lessons if I really wanted to	1	2	3	4	49
5. I'm usually well ahead of the class in my work	1	2	3	4	50
6. I feel that I really can master any subject I set my mind to	1	2	3	4	51
7. I usually have to give up on difficult problems in mathematics	1	2	3	4	52
8. Most people can learn to master even the most difficult subjects if they really want to	1	2	3	4	53
9. I feel that I will never really be able to understand maths	1	2	3	4	54
10. I become very discouraged if it takes me a long time and a lot of hard work to really understand something	1	2	3	4	55

FOR OFFIC USE ONLY

CARD 4

37. What is the highest certificate you expect to get as a result of your education?

Inter Cert 1

Leaving Cert .... 2 . 56

Technical (or Agric.) College Cert. or diploma .. 3

Nursing or related type of diploma 4

University or equivalent (e. g. NIHE) degree 5

Other - specify 6

If you intend to go on for further education after your Leaving Cert., state precisely the course you intend to take or, if you are not exactly sure, the course which you would prefer to take. State also the place at which you intend to pursue this course.

(i) Exact Course you intend to pursue? : (e. g. : Laboratory Technician, A Nursing Diploma, a Chemical Engineering Degree etc.) ________________________ 57-58

____

(ii) How sure are you of your choice at this stage?

Very sure 1

Sure 2

Somewhat unsure 3 59

Very unsure 4

(iii) And where exactly do you intend to pursue this course?

At a University 1

Teacher Training College 2 60

At a Regional Technical College . 3

At a College of Technology 4

At a NIHE 5

At a Training Hospital 6

Other ____________________ 7

38. What, in your opinion is the highest certificate which your father expects you to get as a result of your education? (If your father is dead or absent leave this question blank).

Inter Cert 1

Leaving Cert 2

Technical College Certificate or diploma 3 61

Nursing or related type of diploma 4

University degree 5

Other - specify 6

39. What, in your opinion, is the highest certificate which your mother expects you to get as a result of your education? (If your mother is dead or absent leave this question blank).

Inter Cert 1

Leaving Cert 2

Technical College Certificate or diploma 3 62

Nursing or related type of diploma 4

University degree 5

Other - specify 6

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CARD 4

40. What, in your opinion, is the highest certificate which your teachers expect you to get as a result of your education?

Inter Cert	1	63
Leaving Cert	2	
Technical College Certificate or diploma	3	
Nursing or related type of diploma	4	
University or equivalent degree	5	
Other - specify	6	

41. What, in your opinion, is the highest certificate which your best friend will get as a result of his/her education?

Group Cert	1	64
Inter Cert	2	
Leaving Cert	3	
Technical College Certificate or diploma	4	
Nursing or related type of diploma	5	
University degree	6	

42. How well do your parents, your teachers, your best friend expect you to perform in the Leaving Certificate? How do you expect to do, yourself?

(Please answer about each person, circling one number on each line)

	Very well	Well	Not too badly	Badly	I have no such relative or he/she is dead or absent	
1. Your mother	1	2	3	4	5	65
2. Your father	1	2	3	4	5	66
3. Your teachers	1	2	3	4	5	67
4. Your best friend	1	2	3	4	5	68
5. And yourself	1	2	3	4		69

43. LOOKING TO THE FUTURE, WHEN YOU FINALLY FINISH YOUR EDUCATION, WE WOULD LIKE TO KNOW ABOUT THE KIND OF WORK YOU HAVE BEEN CONSIDERING (PLEASE DESCRIBE THESE JOBS AS FULLY AS POSSIBLE).

(a) If you had your choice, what job would you really like to get? ______________

____ 70-72

(b) What is the first job you think you will actually get ______________

____ 73-75

(c) How sure are you of your choice at this stage?

Very sure	1	76
Sure	2	
Unsure	3	
Very unsure	4	

77-79 = Blank
80 = 4

FOR OFFICE USE ONLY

CARD 5

Dup 1-4

44. How fully, if ever, have you discussed your plans or prospects about jobs with each of the following? (Circle one number on each line).

	Quite a lot	Vaguely	Never	I have no such relative/teacher or he/she is dead or absent	
1. Your father	1	2	3	4	5
2. Your mother	1	2	3	4	6
3. A particular teacher or teachers in school	1	2	3	4	7
4. The principal	1	2	3	4	8
5. The career guidance teacher	1	2	3	4	9
6. Your friends	1	2	3	4	10
7. Older brother	1	2	3	4	11
8. Older sister	1	2	3	4	12

45. (a) What job, in your opinion, does your father expect you to go into?

_______________ 13-15

(b) What job, in your opinion, does you mother expect you to go into?

_______________ 16-18

(c) What job, in your opinion, do your teachers expect you to go into?

_______________ 19-21

46. NOW WE WOULD LIKE TO ASK SOME QUESTIONS ABOUT EDUCATION, WORK AND MARRIAGE.

(a) Do you think that girls should have a different education from boys?

Yes .... 1 No .... 2 — 22

What is your reason for this? _______________

_______________ 23-24

(b) Do you think that girls should have different careers from boys?

Yes .... 1 No .... 2 — 25

What is your reason for this? _______________

_______________ 26-27

47. Ideally, at what age would you like to get married?

(Circle the appropriate number)

between 18 and 20 1

21 - 23 2

24 - 26 3

27 - 29 4

30 or over 5

don't want to marry 6

28

FOR OFFICE USE ONLY

CARD 5

48. Supposing it is 6 or 7 years in the future. Imagine that you have just got married to somebody who has just as good a job as you have, but lives about 120 miles away from you. Either you or your spouse (i.e. your wife if you are a boy, your husband if you are a girl) will have to give up the job and move house to be with each other. Which of the following outcomes would be most likely to occur in your case, do you think? (Circle one number on each line).

	Likely Outcomes				
	(i)	(ii)	(iii)	(iv)	
	Its very likely this would happen	Its likely	Its unlikely this would happen	Its very unlikely	
1. My spouse would move to where I was living and try to find a new job there.	1	2	3	4	29
2. I would move to where my spouse was living and look for a new job	1	2	3	4	30

49. Supposing that you were much older and were working and married, and then you had children, what do you think you would do in these circumstances? And what would your mother and father expect? Please indicate which of the following 5 outcomes you think would be most likely to occur in your case? (Circle the number indicating the answer that is most true in your case).

	(i)	(ii)	(iii)	(iv)	(v)	
	You would give up your job to mind your children on a fulltime basis.	You would combine part-time work with minding the children while your spouse continued to work full time.	You would both continue to work full time as before and you would pay someone else to look after the children	Both you and your spouse would work part-time and share in minding the children	You would work full-time as before while your spouse would mind the children full-time	
What would you be most likely to do?	1	2	3	4	5	31
What would your mother expect?	1	2	3	4	5	32
What would your father expect?	1	2	3	4	5	33
What do you think your spouse would expect?	1	2	3	4	5	34

FOR OFFICE USE ONLY

CARD 5

50. NOW WE WOULD LIKE TO ASK YOU ABOUT WHAT YOU DO IN YOUR SPARE TIME. Outside school hours and not as part of any classroom subject, about how many times in the past month did you take part in any of the following activities: and (ii) were these activities organised by the school or not? (Please circle the number corresponding to what is most true in your case).

	(i) How often have you taken part in these activities in the last month?				(ii) Was this Activity organised by the school or not?		
	Never	Once or twice	3 or 4 times	5 or more times	YES	NO	
1. Music or singing or choir	1	2	3	4	1	2	35, 36
2. Debates or Plays	1	2	3	4	1	2	37, 38
3. Dances/Discos	1	2	3	4	1	2	39, 40
4. Team games (like football, or hockey etc.)	1	2	3	4	1	2	41, 42
5. Games like tennis or badminton or table-tennis	1	2	3	4	1	2	43, 44
6. Watch matches	1	2	3	4	1	2	45, 46
7. See a film	1	2	3	4	1	2	47, 48
8. Hikes or long walks etc.	1	2	3	4	1	2	49, 50

51. Do you have a job outside school hours? 51

Yes .... 1 No 2

IF YES, What do you do? ______________________ 52-54

How many hours per week do you work on this job? ____________________ 55-56

52. In the past month, how many times have you been out on a date? (Circle the appropriate number).

Not at all 1

Once or twice 2 57

Three or four times 3

More than four times 4

53. IF A GIRL: Do you have a regular boyfriend? Yes ...... 1 No 2 58

IF A BOY: Do you have a regular girlfriend? Yes ...... 1 No 2 59

IF YES: About how many times have you gone out together in the past month? (Circle the appropriate number)

Once or twice 1

Three or four times 2 60

More than four times 3

54. Indicate which of the following statements tells where your best friend is - by circling <u>one</u> of the numbers below

In your class 1
In another class in the school 2 61
In another school 3
Has left school 4

55. In the last two weeks how often have you done any of the following jobs at home? (If you are a boarder focus on the work you do at home during the holidays). (Circle one number on each line).

	Never	Once or twice	three to 5 times	6 to 10 times	more than 10 times or every day	
1. Made your bed	1	2	3	4	5	62
2. Made any beds other than your own	1	2	3	4	5	63
3. Swept the floor or used the vacuum cleaner	1	2	3	4	5	64
4. Set the table for meals	1	2	3	4	5	65
5. Cleaned the windows	1	2	3	4	5	66
6. Did the dishes	1	2	3	4	5	67
7. Brought in fuel for the fire	1	2	3	4	5	68
8. Prepared the dinner or tea	1	2	3	4	5	69
9. Did the ironing	1	2	3	4	5	70
10. Looking after the younger children	1	2	3	4	5	71

FINALLY, WE WOULD LIKE TO ASK YOU A FEW QUESTIONS ABOUT YOUR PARENTS. THIS INFORMATION IS NEEDED FOR SAMPLING PURPOSES - LIKE ALL OTHER DATA YOU HAVE GIVEN IT WILL BE TREATED AS STRICTLY CONFIDENTIAL.

56. What did your father's education consist of? Answer to the best of your knowledge by circling the appropriate number.

Primary education 1
Some vocational school education 2
Completed vocational school education 3 72
One or two years of secondary school education 4
Three or four years of secondary school education 5
Finished secondary school education 6
Some university education 7
University degree 8

57. What did your mother's education consist of? (Answer to the best of your knowledge, by circling the appropriate number).

Primary education 1
Some vocational school education 2
Completed vocational school education 3
One or two years of secondary school education ... 4
Three or four years of secondary school education ..5
Finished secondary school education 6
Some university education 7
University degree 8

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58. (a) What is your father's principal occupation? (If he is retired or if he is dead, state what his occupation was). Please state the title of his job and the kind of work he does, not just the name of the place he works in.

Job Title ____________________________ 74-76

Kind of work ____________________________

(b) If your father is a farmer - what size of farm has he? _________ statute acres. How much of this land is arable? ____________

(c) If your father is an employer, how many people does he employ? ______________

59. (a) Does your mother have a paid job, outside the home?

Yes 1   No 2   77

(b) IF YES, does she work part time .... 1 or full-time 2

(c) What kind of work does she do? ________________________________

____ 78-79

(d) What is her exact job title? ________________________________

(e) If she is a farmer, what size of farm has she? __________ statute acres
How much of this land is arable? ____________ acres

(f) If she is an employer, how many people does she employ full-time? ________ 80 = 5

Thank you very much for your cooperation. We would like to stress, once again, that the information which you have given us is completely confidential and will be used for research purposes only. Your answers will not be revealed to anyone.

We only need your name for sampling purposes - it will be changed into a code number for the analysis. Your answers will be combined with those of the other students being interviewed (there are more than 4,000), to give an overall picture of the views of second-level pupils about what they are doing now and are likely to do in the future.

APPENDIX 2: *Appendix to Chapter 2*

Appendix Table 2.1: *Comparison of Percentages of Examinees in Sample and Population Who took Various Subjects in the 1978 Leaving Certificate and Group Certificate Examinations*

Subject	*1978 Published LC Results % Total LC Candidates taking Subjects*		*Percentage of Sampled LC Candidates in Sampled Schools taking Subjects*	*Group Certificate 1978* *Subject*	*Total pop. of Examinees*	*Sample in Vocational Schools*
Irish	Pass:	66%	69%	Irish	75%	63%
	Hons:	26%	25%	English	89%	77%
English	Pass:	53%	51%	Maths	83%	70%
	Hons:	49%	48%	History	55%	41%
Maths	Pass:	83%	85%	Geography	57%	43%
	Hons:	11%	12%	Science	42%	32%
Physics	Pass:	5%	5%			
	Hons:	8%	11%	Woodwork	48%	46%
Chemistry	Pass:	7%	4%	Metalwork	35%	38%
	Hons:	12%	18%	Mech. Draw.	50%	46%
Biology	Pass:	23%	21%	Typewriting (general)	13%	14%
	Hons:	25%	32%			
				Shorthand (general)	11%	11%

APPENDIX 2.2: *Attitudinal Scale Construction*

These 12 scales were constructed from pupil responses in the following manner.

(i) *Attitude towards Maths/Science subjects* ("MATHLIT")

Responses to the following eight items were used in this scale. The scored responses were aggregated in the following manner to give a scale which ranged in total value from 8 to 16. Only between 1 to 3 per cent of items were not responded to. To control for non-response the total score was divided by the number responded to by each pupil giving the final score with values ranging from 1.00 (preference for Maths/Science) to 2.00 (preference for Language/Literature). The overall reliability was very high: Cronbach's Alpha = .77.

Item		*Response/Score*	
1. (C306)*	"Maths is interesting"	Yes = 1;	No = 2
2. (C307)	"Maths is difficult"	No = 1;	Yes = 2
3. (C362)	"I prefer subjects in which I have to work out problems as in Maths or Science. . ."	Strongly Agree or Agree = 1	Disagree or Strongly Disagree = 2
4. (C366)	"I have more confidence dealing with a subject like English than with any Science subject"	Strongly Disagree or Disagree = 1	Agree or Strongly Agree = 2
5. (C369)	"I get a greater sense of satisfaction out of appreciating a piece of poetry or prose than out of solving a difficult problem in Mathematics"	Strongly Disagree or Disagree = 1	Agree or Strongly Agree = 2
6. (C371)	"Science and Maths subjects are just too difficult for a lot of students to master"	Strongly Disagree or Disagree = 1	Agree or Strongly Agree = 2
7. (C452)	"I usually have to give up on difficult problems in Mathematics"	Strongly Disagree or Disagree = 1	Agree or Strongly Agree = 2
8. (C454)	"I feel that I will never really be able to understand Maths"	Strongly Disagree or Disagree = 1	Agree or Strongly Agree = 2

*C306, C307, etc., refer to the column numbers used for coding the responses from the questionnaires.

(ii) *Educational Self-image* ("EDIMAGE")

This is a five-item scale with an Alpha of .73. It indexes the pupil's image of his or her own educational ability relative to that of peers. The items below were aggregated for each pupil and divided by the number of valid responses. Thus the values of the scale range from 1 (very high educational self-image) to 4 (low educational self-image).

Item	*Response/Score*			
	Top/Well Above Average	A little Above Average	Average	Below Average
1. (C445) "How would you place yourself in your present class?	1	2	3	4
2. (C246) "How would you have placed yourself in your Inter. Cert. class?	1	2	3	4
	Strongly Agree	Agree	Disagree	Strongly Disagree
3. (C446) "I'm hardly ever able to do what my teachers expect of me".	4	3	2	1
4. (C450) "I'm usually well ahead of others in my class".	1	2	3	4
	Very Well	Well	Not too badly	badly
5. (C469) "How well do you expect to do in the Leaving Certificate?"	1	2	3	4

(iii) *Perceived level of reward or praise from teachers* ("POSCLASS")

This is a five-item scale which measures a pupil's level of interaction with, as well as receipt of, rewards from teachers in class — mainly though not exclusively for educational achievement. The scores of the 5 items below were aggregated for each pupil and divided by the number of items responded to. The final scale has values ranging from 1.0 (high level of interaction/praise) to 4.0 (low level). The scale is relatively highly reliable with an Alpha of .63.

Item	*Response/Score*			
	Strongly Agree	Agree	Disagree	Strongly Disagree
(C365) I always try to answer questions in class	1	2	3	4
Over the last three weeks in class how often:	Very Often	Often	A few times	Never
(C437) Have you been told that your work is good?	1	2	3	4
(C439) Have you been asked questions in class?	1	2	3	4
(C441) Have you been praised because your written work is tidy and done on time?	1	2	3	4
(C442) Have you felt very stimulated and interested?	1	2	3	4

(iv) *Pupils' perception of level of sanctioning (correction) — mainly for poor presentation and classroom misbehaviour* ("NEGCLASS")

This is a three-item Likert scale of moderate reliability (Alpha = .54). The final scores range from 1 (high level of correction) to 4 (low level of correction by teacher) when the aggregated scores were divided by the number of items responded to.

Item Over the last three weeks in class how often	*Response/Score* Very Often	Often	A few times	Never
(C438) Have you been blamed because your work is untidy?	1	2	3	4
(C440) Have you been blamed for misbehaving?	1	2	3	4
(C443) Have you been told that your work is poor?	1	2	3	4

N

(v) *Perceived level of sanctioning (positive or negative) for scholastic reasons* ("SCHOLAR")

This five-item scale has three items in common with "POSCLASS". Instead of measuring positive teacher rewards however, it is designed to tap the level of pupil-teacher interaction concerned with school and class work. This may take the form of praise, correction, or level of pupil-teacher classroom interaction. Despite some evidence from the literature and pretest results, however (see Chapter 1), its reliability is somewhat lower than that of "POSCLASS", with an Alpha of .51.

Item Over the last three weeks in class how often	*Response/Score* Very Often	Often	A few Times	Never
1. (C437) Have you been told that your work is good?	1	2	3	4
2. (C439) Have you been asked questions in class?	1	2	3	4
3. (C442) Have you felt very stimulated and interested?	1	2	3	4
4. (C443) Have you been told that your work is poor?	4	3	2	1
5. (C444) Have you been unable to express fully what you mean?	4	3	2	1

The final scores range in value from 1.0 (a high degree of scholastic-oriented interaction) to 4.0 (low degree).

(vi) *Pupils' perception of level of sanctioning for social or behavioural reasons* ("SOCIAL")

This scale is similar to both 'POSCLASS' and 'NEGCLASS'. It taps both classroom praise and correction related to social, presentational or behavioural reasons rather than for purely scholastic or intellectual reasons. It has three items and the final score ranges from 1.0 (a high degree of such sanctioning) to 4.0 (low degree). Its reliability is only moderate, however, with an Alpha of .49.

Item Over the last three weeks in class how often	*Response/Score* Very Often	Often	A few Times	Never
1. (C438) Have you been blamed because your work is untidy?	1	2	3	4
2. (C440) Have you been blamed for misbehaving?	1	2	3	4
3. (C441) Have you been praised because your written work is tidy and done on time?	4	3	2	1

(vii) *Pupils' competitiveness and attitude towards competitiveness* ("COMPETE")

This scale has three items which were aggregated for each pupil and the scores divided by the number of items responded to. It has an Alpha of .41 and is thus not very reliable. The final scores range from 1.0 (low competitiveness) to 4.0 (highly competitive).

Item	*Response/Score* Strongly Agree	Agree	Disagree	Strongly Disagree
1. (C361) I like to be ahead of others in my class	4	3	2	1
2. (C367) I don't like competing with others in my class	1	2	3	4
3. (C370) I don't like people who always want to stand out in class	1	2	3	4

(viii) *Satisfaction with Subjects chosen* ("SUBJEVAL")

This is a five item scale with an Alpha of .70. The following items were aggregated and divided by the number of valid responses for each pupil. The values of the scale thus vary from 1.0 (low evaluation of subjects chosen) to 4.0 (high evaluation of subjects chosen).

Item	*Response/Score*			
	Strongly Agree	Agree	Disagree	Strongly Disagree
1. (C420) Most of the subjects I have chosen turned out to be interesting	4	3	2	1
2. (C422) I didn't know what I was letting myself in for with some of the subjects I chose	1	2	3	4
3. (C425) I seem to be getting on well with the subjects I have chosen	4	3	2	1
4. (C427) If I could choose again I would choose different subjects	1	2	3	4
5. (C429) I think that the subjects I have chosen will help me later on	4	3	2	1

(ix) *Satisfaction with teachers' helpfulness* ("TEACHVAL")

This five-item Likert scale had an Alpha of .69. The items below were aggregated for each pupil and divided by the number of items responded to, giving a scale with values from 1.0 (low level of satisfaction) to 4.0 (highly satisfied with teacher helpfulness).

Item	*Response/Score*			
	Strongly Agree	Agree	Disagree	Strongly Disagree
1. (C421) Most teachers help you to decide which subjects to take.	4	3	2	1
2. (C423) Most teachers are too busy when you ask them for advice.	1	2	3	4
3. (C424) I wish I had been given more help in choosing my subjects.	1	2	3	4
4. (C426) Teachers are always ready to help you with advice on what you should do.	4	3	2	1
5. (C428) Most teachers are hard to talk to.	1	2	3	4

(x) *Importance of utilitarian values in subject choice* ("UTILVAL")

This four-item scale is moderately reliable with an Alpha of .50. The final score ranges from 1.0 (usefulness of subject was important in deciding to choose it) to 3.0 (usefulness of subject was not an important factor).

Item	*Response/Score*		
I picked my subjects because:	Very important reason	Reason of some importance	Not an important reason
(C413) They were the most useful	1	2	3
(C414) It is easier to get a good job if you do well in these subjects	1	2	3
(C418) I would need them to get into further training or further education	1	2	3
(C419) I needed them to get into an apprenticeship.	1	2	3

(xi) *Expectations of pupils in relation to combining work and childrearing roles* ("SEXROLE")

This scale contains two items and is highly reliable with an Alpha of .71. The final score ranges from 1.0 ("Traditional" attitudes) to 5.0 ("Modern" attitudes). The scoring given below is that used for female respondents. The scoring was reversed for male respondents. In addition, for male respondents scores 2 and 3 below (on responses (b) and (c)) were reversed since (b) involves more of a role-change for the male than (c) does.

"Supposing that you were much older and were working and married and then you had children, what do you think you would do in these circumstances?"

	Response/Score				
	(a)	(b)	(c)	(d)	(e)
item	You would give up your job to mind your children on a full-time basis.	You would combine part-time work with minding the children while your spouse continued to work full-time.	You would both continue to work full-time as before and you would pay someone else to look after the children.	Both you and your spouse would work part-time and share in minding the children.	You would work full-time as before while your spouse would mind the children full-time.
1. (C531) What would you be most likely to do?	1	2	3	4	5
2. (C534) What do you think your spouse would expect?	1	2	3	4	5

(xii) *Participation in household tasks scale:* ("HH TASK")

This is a 10-item Likert scale constructed from the total responses for the 10 items given below.

Question 55: "In the last two weeks how often have you done any of the following jobs at home?" (Circle the most correct number)

Item In the past two weeks how often have you	*Response/Score* Never	Once or twice	Three to five times	Six to ten times	More than ten times
1. (C562) Made your own bed?	1	2	3	4	5
2. (C563) Made any beds other than your own?	1	2	3	4	5
3. (C564) Swept the floor or used the vacuum cleaner?	1	2	3	4	5
4. (C565) Set the table for meals?	1	2	3	4	5
5. (C566) Cleaned the windows?	1	2	3	4	5
6. (C567) Cleaned the dishes?	1	2	3	4	5
7. (C568) Brought in fuel for the fire?	1	2	3	4	5
8. (C569) Prepared the dinner or tea?	1	2	3	4	5
9. (C570) Done the ironing?	1	2	3	4	5
10. (C571) Looked after younger children?	1	2	3	4	5

The scores were summed for each pupil and divided by the number of responses. A highly reliable scale (Alpha = .83) which ranged in value from 1.0 (very low participation) to 5.0 (very high participation).

APPENDIX 3: *Appendix to Chapter 3*

Appendix Table 3.1: *Ratio of Male to Female First Year Students and Graduate and Postgraduate Numbers in the Different University Faculties in 1976/77. Number of Males per Single Female*

Faculty	*1st year Entrants* 1976	*Undergraduate Degrees* 1976	*Postgraduate Degrees* 1976
Arts and Soc. Sc.	.617	.575	1.436
Econs./Soc. Studies/Commerce	2.645	3.645	14.500
Law	2.370	2.338	2.000
Engineering/Architecture	15.122	16.190	43.000
Medicine/Dentistry	1.371	1.886	6.500
Vet./Ag. Sc./Dairy Sc.	6.929	18.750	26.000
Total	1.341	1.324	2.018

Source: Relevant HEA reports.

Appendix Table 3.2: *Percentages of Boys and Girls (in 1981 NMS School Leavers Survey) from 5 Social Class of Origin Categories who (a) completed their education before the Inter. or Group Cert. Level and (b) Completed Leaving Cert.*

"Dropout" and "Completion" Rates in Second Level	*Social Class Origin of Pupils** *Upper Middle Class* 1		*Farmers and 'Middle' Class* 2		*Lower Middle* Class* 3		*Upper Working Class* 4		*Lower Working Class* 5		*Total*	
	M %	F %	M %	F %	M %	F %	M %	F %	M %	F %	M %	F %
Percentage who completed their education *before* the Inter. Cert.	3.9	0.0	16.4	5.0	17.1	5.1	27.4	12.6	45.1	27.7	24.2	11.1
Percentage who completed the Leaving Cert.	85.7	96.1	60.4	83.6	57.4	76.3	38.9	57.4	25.8	45.5	49.8	70.0
Total Nos.	77	76	359	383	216	186	226	183	244	213	1,122	1,041

Source: Special tabulation from NMS *School Leavers Survey* 1981. The coding of father's occupation is as previously indicated except that three distinctions are made amongst those of non-manual categories — farmers being assigned to the middle category.

APPENDIX 4: *Appendix to Chapter 4*

Appendix Table 4.1: *Number of Second-level Centres Outside Cities Classified by Type of Facility*

Year	*Comm. and Comp.*	*Sec. & Voc. Boys & Girls*	*Sec. only Boys & Girls*	*Sec. for Girls & Voc.*	*Sec. for Boys & Voc.*	*Voc. only*	*Sec. for Girls only*	*Sec. for Boys only*	*Total*
1961/62	—	118	41	28	4	81	45	7	324
1978/79	29	128	55	4	1	70	10	4	301

"1.13 The following changes have taken place:

(a) Community and comprehensive schools have been introduced.
(b) A number of convent schools in centres which had only one secondary school have become co-educational. This also applies, but to a much lesser extent, to boys' schools in similar circumstances.
(c) A limited number of centres offering minimal second-level facilities are no longer in operation.
(d) In addition, a number of schools, both secondary and vocational, have widened the range of subjects taught.

This comparison thus provides a measure of the effect of the introduction of the free education/free transport scheme and of subsequent efforts to rationalise the second-level structure."

Source: White Paper on Educational Development, 1980.

APPENDIX 6: *Appendix to Chapter 6*

APPENDIX 6A

The following tables, which are derived from the Department of Education's *Statistical Report* 1980-81 show the percentage of Secondary, Vocational and Community schools offering subjects to each sex. These tables then show the effects of both Provision and Allocation, since, from these tables we can calculate, for example, the percentage of secondary schools not offering Home Economics to boys. However, among these schools, we cannot distinguish those coeducational and boys' schools where it is not taught at all from those coeducational schools in which, although taught, the subject is not offered to boys.

Appendix Table 6A.1: *Percentage of Secondary, Vocational and Community/Comprehensive Schools Offering Various Subjects to Boys and Girls in the Junior Cycle in 1980-81*

Subject	Secondary		Vocational		Community and Comprehensive	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
			per cent			
Irish (H.C.)	93.8	93.1	55.9	56.4	84.0	82.0
Irish (L.C.)	81.6	81.7	80.8	78.4	78.0	76.0
Irish (C.C.)	11.1	14.7	31.0	31.2	30.0	30.0
English (H.C.)	95.7	93.1	61.6	60.6	84.0	82.0
English (L.C.)	76.4	72.7	79.9	78.4	84.0	82.0
English (C.C.)	10.8	14.7	30.6	31.2	28.0	28.0
Mathematics (H.C.)	95.4	94.0	55.0	50.9	76.0	74.0
Mathematics (L.C.)	83.9	84.1	82.5	79.8	84.0	82.0
Mathematics (C.C.)	11.8	15.9	28.4	28.9	32.0	30.0
History & Geography	100.0	100.0	91.3	93.6	96.0	96.0
Latin	41.0	25.8	—	—	22.0	18.0
Greek	1.6	0.6	—	—	—	—
Hebrew	0.3	0.3	—	—	—	—
French	99.0	99.4	79.9	83.5	90.0	88.0
German	18.4	37.5	2.6	1.8	28.0	28.0
Spanish	14.1	22.8	2.6	2.3	18.0	14.0
Italian	1.3	3.0	—	—	—	—
Science A	95.4	90.7	55.5	50.0	78.0	74.0
Science E	3.0	3.6	53.3	53.2	24.0	18.0
Science (Common Course)	3.6	5.7	7.4	6.0	18.0	20.0
Home Economics	11.1	94.6	23.1	94.5	32.0	92.0
Music & Musicianship A/B	40.0	65.2	10.0	10.6	52.0	60.0
Art	68.5	89.8	54.1	53.7	84.0	88.0
Woodwork	50.5	4.5	99.1	17.4	92.0	32.0
Metalwork	8.5	0.9	86.9	8.3	88.0	22.0
Mechanical Drawing	60.0	9.6	99.1	24.8	100.0	62.0
Commerce	89.8	87.7	38.9	94.5	92.0	94.0
Total No. Schools	305	333	229	218	50	50

Source: Department of Education Statistical Report, 1980-81, pp. 45-46.

Note: Ten schools (six Secondary and four Vocational) in four centres are operating a system of common enrolment. These were treated as four Community schools for the purpose of this table.

Appendix Table 6A.2: *Percentage of Secondary, Vocational and Community/Comprehensive Schools Offering Various Subjects to Boys and Girls in the Senior Cycle 1980-81*

	Secondary		*Vocational*		*Community/ Comprehensive*	
Subject	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
			per cent			
Irish (H.C.)	87.8	86.5	58.5	59.5	86.4	86.0
Irish (L.C.)	82.6	79.8	85.0	85.3	81.8	81.4
Irish (C.C.)	7.3	11.9	16.5	17.4	13.6	14.0
English (H.C.)	90.4	89.6	64.5	63.7	84.1	83.7
English (L.C.)	80.4	77.1	86.5	86.3	81.8	81.4
English (C.C.)	7.4	13.8	15.5	16.3	20.5	20.9
Latin	28.3	19.3	—	—	20.5	11.6
Greek	1.6	0.6	—	—	—	—
Hebrew	0.3	0.3	—	—	—	—
French	92.9	97.6	61.5	81.6	93.2	95.3
German	16.7	33.9	2.0	0.5	31.8	37.2
Italian	1.6	4.3	—	0.5	—	—
Spanish	14.5	28.4	2.5	4.2	20.5	20.9
History	93.6	94.8	47.5	53.7	90.9	93.0
Geography	94.9	96.6	58.5	58.9	90.9	88.4
Mathematics (H.C.)	80.7	66.7	31.5	23.2	75.0	74.4
Mathematics (L.C.)	88.1	90.8	89.5	90.5	81.8	79.1
Mathematics (C.C.)	5.8	8.9	14.0	14.2	13.6	14.0
Applied Mathematics	20.3	3.4	3.0	—	15.9	9.3
Physics	73.3	45.6	30.5	15.8	68.2	62.8
Chemistry	80.7	78.6	21.5	13.7	68.2	67.4
Physics & Chemistry	12.5	11.3	14.0	10.0	20.5	20.9
Agricultural Science	13.5	4.0	19.0	11.1	22.7	14.0
Biology	86.2	97.6	85.5	92.6	95.5	97.7
Agricultural Economics	2.3	0.6	4.5	3.2	2.3	2.3
Engineering Workshop	5.1	—	81.0	1.6	70.5	9.3
Technical Drawing	39.5	2.4	96.5	6.8	97.7	30.2
Building Construction	14.1	0.3	75.5	4.2	88.6	7.0
Mechanics	0.3	—	1.5	1.1	4.5	—
Home Economics (Social & Scientific)	11.6	78.0	5.5	50.0	25.0	74.4
Home Economics (General)	3.2	54.7	3.0	56.3	11.4	58.1
Accounting	69.1	70.0	25.0	61.6	72.7	76.7
Business Organisation	65.9	73.7	36.5	58.9	79.5	79.1
Economics	64.0	48.3	27.0	33.7	68.2	62.8
Economic History	10.9	6.4	1.5	1.6	4.5	4.7
Art (incl. crafts)	55.9	84.4	35.5	41.1	77.3	81.4
Music & Musicianship	14.8	47.1	3.0	3.7	22.7	37.2
Total number of schools	311	327	200	190	44	43

Source: Department of Education Statistical Report, 1980-81, pp. 47-48.

Note: Ten schools (six Secondary and four Vocational) in four centres are operating a system of common enrolment. These were treated as four Community schools for the purpose of this table.

APPENDIX 6 B

School Ethos Scales

These scales are derived from school averages of Leaving Cert. pupils' evaluations of the school curriculum, of teacher-pupil interaction and teacher supportiveness, of pupils', parents' and teachers' levels of aspiration and performance expectations, of teachers' classroom supportiveness and of the relative importance and salience of teachers' versus parents' and peers' levels of expectation for pupils' performance.

Starting off as individual pupil attitudinal scales (see Chapter 2) or as individual responses to questions in the Leaving Cert. pupil interviews, those responses are aggregated (summed) for all relevant Leaving Cert. pupils within each school. So, for each of the schools which had Leaving Cert. classes we get an average school score on each of the variables involved. These average scores were factor analysed — using Principal Factor with iteration, and Varimax Rotation. These procedures yielded *six* discernible "school ethos" scales, which indicate clearly the organisational climate or ethos of the school concerned, the first four of which were employed in the analysis.

Scale 1: Achievement Ethos (ACHETHOS)

This indicates the overall achievement ethos of schools. A high score indicates schools whose pupils have high levels of educational self image, high levels of individual competitive achievement goals, high levels of educational and occupational aspiration and performance expectations, and associated with these aggregate pupil attitudes/aspirations are high levels of teacher and parental performance expectations and aspirations. In other words, these are schools where parents, teachers and pupils have consistently high supportive aspirations and expectations for pupils' educational progress. At the other extreme are schools which have the opposite characteristics.

Appendix 6B.1: *The Mean and Standard Deviation of Items in the Achievement Ethos Scale* ACHETHOS *and Intercorrelations of the Items*

	Grand Mean of schools	Standard Deviation of schools	Intercorrelation Matrix 1	2	3	4	5	6	7	8
1. Mean educational self image in schools	2.62	.23	1.00	.70	.45	.55	.47	.35	.44	.33
2. Mean class competitiveness scores	2.33	.21		1.00	.49	.52	.51	.47	.33	.38
3. Mean pupil level of educational aspiration	2.87	.40			1.00	.89	.89	.85	.43	.41
4. Mean teachers' level of educational aspiration	2.72	.36				1.00	.89	.74	.47	.34
5. Mean parental level of educational aspiration	2.72	.36					1.00	.78	.38	.40
6. Mean pupil level of occupational aspiration	2.92	.36						1.00	.36	.46
7. Mean pupil level of Leaving Cert. Exam. performance	2.59	.20							1.00	.58
8. Average extent to which teachers' Leaving Cert. expectations exceed pupil's own expectations	4.86	.20								1.00

An 8-item school Likert scale was constructed using these 8 school item scores giving an overall mean score of 23.6 and a standard deviation of 1.84. The overall reliability of the scale is very high: Alpha = .90.

Scale 2: School Teaching (Quality) Intensity (SCHTEACH)

This is a 7-item Likert scale which indicates the comparative teaching intensity of schools. A high score indicates schools in which pupils have, on average, high intensity of positive rewards for classwork and performance; in which teachers give more homework, are more likely to correct the homework, are generally highly supportive of pupils, and in which pupils themselves are moderately to highly satisfied with subject choices and provisions.

Appendix Table 6B.2: *The Mean and Standard Deviation of Items in the Teaching Intensity Scale* (SCHTEACH) *and Intercorrelations of the Items*

	Grand Mean of school scores	*Standard Dev. of school scores*	*Intercorrelations* 1	2	3	4	5	6	7
1. School mean of positive classroom interaction scale	2.40	.15	1.00						
2. School mean of pupils' satisfaction with teachers' help and supportiveness	2.65	.19	.36	1.00					
3. School mean value of pupils' satisfaction with subjects taken	2.90	.16	.56	.37	1.00				
4. Mean value for school of no. of times per week homework is given and corrected	2.57	.40	.27	.15	.23	1.00			
5. Mean school value of pupils' satisfaction with subjects given by school	1.60	.18	.25	.36	.35	.36	1.00		
6. Mean level of teachers' expectations of pupils' Leaving Cert. performance	2.73	.19	.26	.42	.17	.16	.25	1.00	
7. Mean diff. in LC expectations between teachers and parents	.19	.21	.23	.34	.05	.07	.14	.62	1.00

A seven-item school level Likert scale was constructed with an overall mean score of 14.66 and a standard deviation of 0.91. The overall reliability of the scale was moderately high: Alpha = .67.

Scale 3: Relative Importance of Teacher in Subject/Career Choices (IMPTCH)

This 3-item scale is constructed exactly as for that measuring the relative influence of the school guidance counsellor; a school's pupils' average assessment of the importance of teachers versus parents and peers in the subject/career choices. The overall scale has very high reliability (Alpha = .88). It has a mean value of 1.05 and a standard deviation of .66.

Appendix Table 6B.3: *The Mean and Standard Deviation of Items in the "Relative Importance of Teachers" Scale* (IMPTCH) *and Intercorrelations of the Items*

	Grand mean of individual school means	Standard deviation of school means	Intercorrelations 1	2	3
1. Average pupil assessment at school level, of teachers' importance in subject and career choices	1.77	.22	1.00		
2. Mean (school) difference scores in importance of teachers versus parents in advising one in subject and career choices	−.45	.24	.79	1.00	
3. Mean school difference scores in relative importance of teachers versus friends in advising on subject and career choices	−.27	.27	.73	.62	1.00

Scale 4: Teachers as a negative Reference Group (TEACHNEG)

A low score here indicates schools where teachers' level of negative sanctioning is high, where the level of expectation for pupils' achievement is low and where the relative importance of friends in educational and occupational choices is high: schools with little aspirational influence flowing from teachers — low performance and achievement expectations and high negative sanctioning; but where the pupil peer group is relatively important. But associated with both of these are low parental expectations. The composite scale has a relatively high reliability of Alpha = .76.

Appendix Table 6B.4: *The Mean and Standard Deviation of the Items in the* "TEACHNEG" *Scale and Intercorrelations of the Items*

	Grand mean of school average	*Standard Deviation*	*Intercorrelations* 1	2	3	4
1. School means of "NEGCLASS" scale: level of teachers' negative sanctioning in classroom	3.55	.13	1.00			
2. School means for perceived teachers' level of occupational aspiration for pupils	1.81	.50	.33	1.00		
3. School means for perceived parental level of occupational aspiration for pupils	1.79	.50	.31	.92	1.00	
4. School means for scale of importance of friends in subject/career choice	2.05	.18	.37	.42	.39	1.00

Scale 5: Relative Importance of Career Guidance Counsellor in Pupils' Subject and Occupational Choices (IMPCGT)

This is a 3-item scale constructed of school means based on pupils' assessment of the guidance counsellor's relative importance in subject and career choices. The relative importance is based on comparisons with parental and peer influences. The overall reliability of the scale is very high: Alpha = .89.

Appendix Table 6B.5: *The Means and Standard Deviation of Items in the "Relative Importance of Guidance Counsellor" Scale* (IMPCGT) *and Intercorrelations of the Items*

	Grand mean of school scores	*Standard Deviation of school (mean) scores*	*Intercorrelations* 1	2	3
1. Mean pupil assessment of importance of guidance counsellor in subject and career choices	1.94	.41	1.00		
2. Mean difference scores in pupils' assessment of importance of guidance teachers versus parents in subject/career choices	−.27	.39	.68	1.00	
3. Mean difference scores in pupils' assessment of importance of guidance teachers versus friends	−.09	.39	.69	.84	1.00

Scale 6: Amount of Subject Choice (CHOICE)

This scale measures the average amount of choice of Inter. and Leaving Cert. subjects as perceived by the pupils. A high score for a school indicates that, on average, the pupils felt that they had a good deal of choice whilst a low score indicates little or no choice of subjects. Table 6B.6 shows the items that were used in the scale and the response scoring at individual pupil level.

Appendix Table 6B.6: *Items in* "CHOICE" *scale — response scoring*

	No	*Yes: One other subject*	*Response* *Yes: Two other subjects*	*Yes: Three or more others*
			Score	
1. At the time when you were choosing Inter. Cert. subjects, did you have a choice of taking any other subjects?	0	1	2	3
2. Thinking back to the time when you came back to school after the Inter. Cert. were there any other subjects you could have taken other than those you actually took?	0	1	2	3

Scores on the two items were summed and divided by 2. Thus 'CHOICE' is a two-item Likert scale with scores ranging from 0 to 3. The Grand Mean at school level is 1.18 with a standard deviation of 0.57.

APPENDIX 7: *Appendix to Chapter 7*

APPENDIX 7A.1: *A School Level Curricular Analysis*

A number of methods of categorising and analysing subject packaging within schools — curricular provision — and the kind of linked choices made by students within the curriculum offered were attempted. Essentially, we were interested in two curricular processes:

1. The process of segregation of pupils by virtue of their distribution over the curriculum provided by the school; as well as by the extent to which they are separated by the school into Pass and Honours streams, etc. This is partly dependent on the size of the curriculum — if the number of subjects provided is barely above the number taken by pupils, there cannot obviously be much segregation.
2. The nature of the partitioning or subject packaging done by schools, or the associated process of take-up of subjects by pupils within the subject allocation policy of the school. This can reflect the provision biases of the school by maximising, for instance, the provision of a number of Science, or Commerce or Languages while minimising other options. It can also reflect a timetabling policy which encourages specialisation in one or two of the above areas of subject provision or through a process of encouraging pupils to take up more than one subject in these specialist areas.

The nature and degree of packaging of subjects — either as sets of subjects which go together or as optional alternatives — by the school, is partly dependent on the number of subjects available in the school, as well as the curricular management policy of the school, etc. The number of degrees of freedom in curricular choice available to the students, therefore, depends on the total unconstricted degrees of freedom within the curriculum, but also on the number of constraints introduced by school management, etc. The nature and reasons for the latter constraints vary very widely.

As a preliminary to the analysis of the nature and extent of subject linkages or sets of subjects taken by students in the 1978 LC results, a cluster analysis (McQuitty, 1961) was carried out on the matrix of linked proportionate Leaving Certificate subject choices made by students within a sample of schools: the proportion of students taking subject A who took subject B, C, D, etc., as well as the reciprocal proportion taking B, C, D, etc., who took A. This is taken as crudely equivalent to a matrix of regression coefficients of A on B and B on A.

This analysis yielded an almost consistently repeated set of findings from school to school: the first dimension usually extracted referred to the distinction between Pass and Honours students or students taking a linked set of generally Pass subjects, and students taking a linked set of generally Honours subjects.

Even when this distinction is very sharp, however, some anomalies exist with some Honours level subjects. A subject like Business Organisation or Spanish, for instance, does not appear to discriminate between Pass and Honours students or subject groups.

In most of the smaller schools only two clear clusters (Pass/Honours) emerged with individual Scientific/Technical or Commercial subjects attached to a rather general Honours or Pass cluster of subjects. The larger schools usually generate a number of clearly discriminable clusters such as specialist Scientific (Physics/Chemistry), Business Studies (Business Organisation/Accountancy, Economics, etc.) clusters emerging. In many schools Business Studies subjects appear to be consistently taught as a set of Pass subjects. And in many girls' schools Home Economics subjects are equally and similarly discriminatory. Scientific subjects, on the other hand, only appear to occur consistently as a linked set at an Honours Level in boys' schools.

Considerable variation exists amongst schools in the clarity or distinctiveness of the clusters. In some schools, for instance, there is very wide variation in choice of subject options and even variation in level of subject choice (Pass or Honours). In other schools the Pass/Honours distinction and the consistency or tightness of subject packages appears quite high. In the following table we reproduce the cluster characteristics of four schools, which illustrate some of the above distinctions.

Appendix Table 7A.1: *Characteristics of Subject Packages Taken by Students in the LC 1978*

	*Boys' School***								Girls' School**					
	Cluster 1		*Cluster* 2		*Cluster* 3		*Cluster* 4		*Cluster* 1		*Cluster* 2		*Cluster* 3	
Large,	Eng	P*	Eng	H	Mat	H	Acc	P	Irs	P	Eng	H	Eng	P
well	Irs	P	Irs	H	Phy	H	or		Eng	P	Irs	H	Irs	P
endowed	Mat	P	Fre	H	Che	H	Acc	H	Mat	P	Fre	H	Mat	P
School	Geo	P	or		Eng	H*	Bor	H	HEs	H	Bio	H	Acc	P
	His	P	Fre	P	Geo	H	Eng	H	or		Che	H	His	P
			Che	H	Fre	H	Fre	H	HEs	P	Acc	H		
			Geo	H	Bio	H	Irs	P						
			His	H			Mat	P						
			Cluster 1				*Cluster 2*		*Cluster 1*				*Cluster 2*	
Small,			Irs	P			Irs	H	Mat	P			Irs	H
Rural or			Eng	P			Eng	H	Irs	P			Eng	H
"Poorer"			Mat	P			Fre	H	Eng	P			Fre	H
School			Geo	P			Bio	H	Geo	P			His	H
			Bor	P			Geo	H	Bor	P			Bio	H
			Ecs	P			Mat	P	Hes	P			Bor	H

*The first 3 letters refer to the subject name. They are self explanatory. The capital P or H refers to level, Pass or Honours.

**Of 52 girls' schools only 21 taught both Physics and Chemistry. This was true, however, of 37/46 boys' and 15/29 coed. schools; 10 girls', 1 boys' and 3 coed schools did not teach either subject.

Girls' schools rarely yield a specific Scientific/Technical specialty, whereas it very frequently occurs in larger boys' schools. On the other hand, a Language/Literature specialty is much more likely in girls' schools. The general impression is of a much more generalised curriculum being provided in girls' schools, therefore, with individual Science subjects being taken with Language and Commerce options. In large boys' schools Honours Maths and Honours Physics and Chemistry very frequently occur together. Besides the obvious fact, therefore, that the Honours Maths and Science subjects are individually less popular in girls' schools, the overall school context in boys' schools is far more likely to accentuate or emphasise such a specialisation.

Finally, a point about Home Economics: very rarely does one find it as a member of an Honours cluster in girls' schools. Whether at Pass or Honours level, it is usually found as a member of the Pass cluster. Differences between Pass and Honours Business Organisation also, although somewhat more pronounced than that of Home Economics, are much less discriminating than other subjects like Accountancy, Economics or most Scientific/Technical or Language/Literature subjects.

Measures used in Analysis of Curriculum

A set of summarising measures was devised for each school to try and index most of the dimensions of interest isolated in the above cluster analysis:

1. *Measure of the overall degrees of freedom* within the curriculum offered: the extent to which students use — or are allowed to use — the full range of courses offered by the school. The measure indicates the degree of dispersion or scatter of pupils over the range of subjects offered or the degree of concentration on particular subjects within the curriculum.

Two measures were devised for this purpose: (i) "VARPROP" a measure of the extent of variance or unevenness of distribution across the various subjects provided by the school. This is the equivalent of the coefficient of variation, but is based on the distribution of percentages of relevant pupils across the total range of subjects offered by the school. It is the standard deviation of proportions divided by the average proportion $(= s/\bar{p})$. This measure however, is highly sensitive to the number of subjects taught. The larger the number the necessarily smaller is the average proportion (the denominator) and therefore, the larger is the resultant coefficient. The measure ranges from 0 (min.) to 1.0 (max.).

(ii) A direct measure of concentration which is directly sensitive to the number of subjects is "CONC", a measure devised by Ray and Singer (1973)

$$= \sqrt{\frac{\Sigma p_i^2 - 1/N}{1 - 1/N}}$$

when N = number of subjects provided; p_i=proportion of total subject choices in subject i. If p^2 is large — which can only occur if the distribution is highly concentrated — CONC approaches 1.0.

Although it clearly has serious deficiencies "VARPROP" turned out to be the more useful measure. Its values and relationship to the size of school curriculum is given below.

Appendix Table 7.A.2: *Correlation between Number of Pupils and Number of Subjects, and Level of Concentration in those Subjects*

Year	1965	1968	1972	1975	1978
(i) Average no. of pupils per school	194	236	305	334	371
(ii) Average number of Leaving Cert. subjects provided by school	8.2	8.6	10.2	11.3	11.4
(iii) "VARPROP", Grand Mean:	.35	.44	.51	.59	.62
Correlation between					
(iv) VARPROP and number of pupils	.30	.44	.41	.43	.59
(v) VARPROP and number of subjects	.64	.63	.63	.60	.73

Clearly, differentiation in subject take-up has markedly increased over time. In the beginning of the 1960s students were largely concentrated on a very limited number of subjects and were necessarily almost evenly spread over the range of subjects. As schools increased in size and in number of subjects provided, students started to discriminate more widely amongst these options; and correspondingly greater differences emerged in the mixture of subjects taken, with greater differences emerging between popular (and easy) and less popular and more difficult options. The measure used shows very clear and consistent increases in levels of dispersion or concentration as schools increased in size and complexity from 1965 to 1978. This increase was relatively evenly shared by both single sex and coed schools and is mainly a function of the size of the curriculum as the correlations at the end of Appendix Table 7A.2 show.

2. *Measures of the distinction between Pass and Honours students:* There was wide variation between schools in the extent to which Pass and Honours students were differentiated.

Two overall measures were devised here to measure that variation: (i) coefficient of variation in the number of pupils taking 0 to 8 Honours subjects; (ii) the number of "modes" or the number of "changes in direction" in the distribution of pupils over 0 to 8 Honours subjects.

3. *Measures of specialisation:* Seven categories of subjects were isolated in order to examine differences in the type of subjects provided by schools and taken up by pupils at senior cycle. Thus, the analysis can be conducted at both the school and pupil levels. At the school level it was assumed that if at least three of the pupils in each school sample (or six pupils in all in the school) took a subject, that the school provided it. The number of subjects in each category provided by the school was used to examine concentration in the subject areas. At the pupil level specialisation in a particular area of the curriculum was said to occur if the pupil took a certain number of subjects (usually 2 or more) in that area. The following are the categories of subjects which were isolated:

(i) Science subjects: Honours Maths, Physics, Chemistry, Physics/Chemistry (joint), Biology, Applied Maths, Agricultural Science. (Honours Maths was included here as it was highly correlated with choice of Physics and Chemistry.) Pupils taking 2 or more of these subjects were regarded as specialising in science.

(ii) Commerce/Business subjects: Business Organisation, Accountancy, Economics, Economic History, Agricultural Economics. Pupils taking at least two of these subjects were regarded as specialising in this area.

(iii) Accomplishment subjects: this category includes the subjects which are cultural or "social" in content, i.e., Home Economics (General), Home Economics (Social and Scientific), Art, Music. In some of the analysis, Biology has also been included in this category. Take-up of 2 or more of these subjects is regarded as specialising in Accomplishment subjects.

(iv) Language/Literature subjects: French, German, Spanish, Italian, Greek, Latin, Hebrew. Irish and English are not included in this category since most pupils are obliged to take them. Again, specialisation in Language/Literature subjects consists in take-up of at least 2 of the above subjects.

(v) Technical subjects: Technical Drawing, Building Construction, Engineering Workshop, Mechanics. Take-up of 2 or more of these subjects was regarded as specialisation in Technical subjects.

(vi) "Social" Studies: History and Geography pupils taking both were regarded as specialising in "social" studies.

(vii) General Subjects: This category was included in response to a consistent finding from our preliminary analysis, i.e., a high proportion of girls in smaller schools choose to take a "general curricular package" of subjects at senior cycle. Take-up of at least 3 of the following subjects constitutes a "general subjects" specialisation: History; Geography; Biology; Home Economics (General) *or* Home Economics (Social and Scientific), Business Organisation *or* Accountancy and French *or* Spanish. At the school level, provision of a large number of subjects in this category indicates a failure to provide enough subjects in any of the other categories to allow specialisation by pupils.

Appendix Table 7A.3: *Number of Leaving Cert. Subjects provided, 1968, in Boys' and Girls' Secondary Schools** Regressed on Eight Independent Variables*

Independent Variables	*School Type* *Boys' Schools*	*Girls' Schools*
	B	B
Number of Pupils	0.011*	0.009*
Munster	1.221	−0.232
Connaught/Ulster	0.957	−0.079
Fee Paying	1.523	2.020
Non-Catholic++	−2.950	4.831*
CBS	−0.182	+
Mercy	+	−1.188
Presentation	+	−1.216
Intercept	3.444	5.435
R^2	.47	.49
R^2 (adjusted)	.39	.41
N of cases	47	54

*Significant at $p < .05$.

+ Variables omitted from the equation.

++ Non-denominational schools are included in this category.

**In our 1968 sample, there were too few coed schools (N = 10) to justify multiple regression.

Appendix Table 7A.4: *Number of Science Subjects provided in 1968, in Boys' and Girls' Secondary Schools, Regressed on Eight Independent Variables*

School Characteristics	*Boys' Schools***	*Girls' Schools***
	B	B
Number of Pupils	0.006*	0.001
Munster	0.683	−0.074
Connaught/Ulster	0.199	−0.096
Fee Paying Schools	0.695	0.253
Non-Catholic	−0.390	5.138*
CBS	0.321	+
Mercy	+	−0.070
Presentation	+	−0.328
Intercept	−0.792	−0.005
R^2	.54	.74
R^2 (adjusted)	.47	.70
N of cases	47	54

*Significant at $p < .05$.
+ Variables omitted from the equation.
**In our 1968 sample, there were too few coed schools (N = 10) to justify multiple regression analysis.

Appendix Table 7A.5: *Number of Leaving Cert. Subjects provided in Secondary Schools, 1978, Regressed on Eight Independent Variables*

School Type	*Boys' Schools*	*Girls' Schools*	*Coed Schools*
	B	B	B
Number of Pupils	0.013*	0.010*	0.018*
Munster	0.425	0.282	1.169
Connaught/Ulster	4.218*	1.344	0.900
Fee Paying	1.424	0.435	−0.040
Non-Catholic	−0.623	0.855	.0.395
CBS	−0.211	+	+
Mercy	+	−0.404	−0.565
Presentation	+	−0.282	−1.523
Intercept	4.392	7.205	5.548
R^2	.69	.46	.69
R^2 (adjusted)	.64	.38	.58
N of cases	46	51	28

*Significant at $p < .05$.
+ Variables omitted from the equation.

Appendix Table 7A.6: *Number of Science Subjects provided for Leaving Cert. in Secondary Schools, 1978, Regressed on Eight Independent Variables***

School Type	*Boys' Schools*	*Girls' Schools*	*Coeducational Schools*
	B	B	B
Number of Pupils	0.005*	0.002*	0.008*
Munster	0.438	0.202	1.986*
Connaught/Ulster	1.085*	0.092	0.369
Fee Paying Schools	0.259	0.828	−2.062
Non-Catholic Schools	1.356	0.993	3.350*
CBS Schools	0.108	+	+
Mercy Schools	+	−0.046	0.130
Presentation Schools	+	−0.082	−1.056
Intercept	0.573	0.152	1.286
R^2	.56	.20	.57
R^2 (adjusted)	.50	.07	.42
N of cases	46	51	28

*Significant at $p < .05$.

+ Variables omitted from the equation.

** These regression equations are not the same as those used for Table 7.5, Chapter 7. The definition of school sex — boys', girls' or coed — is based here on sex-mix at Leaving Cert. level. In Table 7.5 it is based on school sex-mix so that some schools are differently defined. The equations used for Table 7.5 can be obtained on request from the authors.

Appendix Table 7A.7: *Number of Commerce Subjects Provided for Leaving Cert. in Secondary Schools, 1968, Regressed on Eight Independent Variables*

School Characteristics	*Boys' Schools***	*Girls' Schools***
	B	B
Number of Pupils	0.001	0.002*
Munster	−0.141	−0.111
Connaught/Ulster	0.208	0.060
Fee Paying Schools	0.347	0.400
Non-Catholic	−0.560	−1.061*
CBS	0.142	+
Mercy	+	0.139
Presentation	+	0.156
Intercept	−0.237	−0.467
R^2	.26	.22
R^2 (adjusted)	.15	.10
N of Cases	47	54

*Significant at $p < .05$.

+ Variables omitted from the equation.

**In our 1968 sample, there were too few coed schools (N = 10) to justify multiple regression analysis.

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Appendix Table 7A.8: *Number of Language Subjects Provided for Leaving Cert. in Secondary Schools, 1968, Regressed on Eight Independent Variables Characterising Schools*

School Type	*Boys' Schools***	*Girls' Schools***
	B	B
Number of Pupils	0.003*	0.002
Munster	−0.011	0.319
Connaught/Ulster	0.138	−0.184
Fee Paying Schools	0.604*	1.138*
Non-Catholic	−1.205*	0.812
CBS	−0.634*	+
Mercy	+	−0.876*
Presentation	+	−0.862*
Intercept	0.406	0.258
R^2	.58	.47
R^2 (adjusted)	.51	.39
N of Cases	47	54

*Significant at $p < .05$.
+ Variables omitted from the equation.
**In our 1968 sample, there were too few coed schools to permit multiple regression analysis.

Appendix Table 7A.9: *Number of Commerce Subjects Provided for Leaving Cert. in Secondary Schools, 1978, Regressed on Eight Independent Variables Characterising Schools*

School Characteristics	*Boys' Schools*	*Girls' Schools*	*Coeducational Schools*
	B	B	B
Number of Pupils	0.003*	0.003*	0.005*
Munster	−0.291	−0.165	−0.598
Connaught/Ulster	0.935	1.465*	0.119
Fee Paying Schools	−0.013	−0.018	−1.004
Non-Catholic Schools	−1.127	−1.557	0.321
CBS Schools	−0.156	+	+
Mercy Schools	+	−0.040	−0.705
Presentation Schools	+	0.733*	−0.471
Intercept	0.790	0.277	1.585
R^2	.53	.50	.48
R^2 (adjusted)	.46	.41	.30
N of cases	46	51	28

*Significant at $p < .05$.
+ Variables omitted from the equation.

Appendix Table 7A.10: *Number of Language Subjects Provided for Leaving Cert. in Secondary Schools, 1978, Regressed on Eight Independent Variables Characterising Schools*

School Characteristics	*Boys' Schools*	*Girls' Schools*	*Coeducational Schools*
	B	B	B
Number of Pupils	0.003*	0.002*	0.002*
Munster	0.425*	0.291	0.388
Connaught/Ulster	0.423	−0.213	−0.048
Fee Paying Schools	0.789*	0.473	0.885*
Non-Catholic	−0.283	1.333	−0.476
CBS	−0.254	+	+
Mercy	+	−0.663*	−0.225
Presentation	+	−0.693*	−0.511
Intercept	−0.608	0.539	−0.407
R^2	.61	.47	.42
R^2 (adjusted)	.55	.39	.22
N of cases	46	51	28

*Significant at $p < .05$.
+ Variables omitted from the equation.

Appendix Table 7A.11: *Increase in the Number of Commerce Subjects Offered at Leaving Cert. in Secondary Schools between 1968 and 1978, Regressed on Seven Factors Characterising Schools*

School Characteristics	*Boys' Schools***	*Girls' Schools***
	B	B
Number of Pupils 1968	0.003*	0.003*
Number of Commerce Subjects 1968	−0.803*	−0.602*
Growth in numbers 1968-78	0.003*	0.001
Munster	−0.208	−0.178
Connaught/Ulster	0.993	0.864*
Free Scheme	−0.128	−0.691
Changed to Coed	−0.435	0.079
Intercept	0.812	1.286
R^2	.38	.36
R^2 (adjusted)	.27	.27
N of Cases	46	55

*Significant at $p < .05$.
**The number of schools which were coed in 1968 is too small (N = 10) to justify multiple regression analysis.

Appendix Table 7A.12: *Increase in the Number of Language Subjects Offered at Leaving Cert. in Secondary Schools between 1968 and 1978, Regressed on Seven Explanatory Variables*

School Characteristics	*Boys' Schools***	*Girls' Schools***
	B	B
Number of Pupils 1968	0.002*	0.003*
Number of language subjects 1968	−0.533*	−0.696*
Growth in numbers 1968-78	0.003*	0.001
Munster	0.324*	−0.008
Connaught/Ulster	0.200	−0.380
Free Scheme	0.555*	0.468
Changed to coed	0.487*	0.093
Intercept	−0.749	−0.250
R^2	.58	.62
R^2 (adjusted)	.50	.56
N of cases	46	55

*Significant at $p \leq .05$.

**The number of schools which were coed in 1968 (N = 10) is too small to permit multiple regression analysis.

Appendix Table 7A.13: *Average per Pupil Take-up of Different Subjects in the Leaving Certificate in the Years Between 1965 and 1978.*

	1965	1968	1972	1975	1978
	Average	Average	Average	Average	Average
Average per pupil					
Average no. subjects taken in LC	7.2	6.9	6.68	6.76	6.70
(s)*	(.88)	(.89)	(.82)	(.89)	(.96)
Average no. Hons. subjects taken in LC	4.0	4.1	2.7	3.0	3.1
(s)	(2.3)	(2.0)	(2.2)	(2.2)	(2.3)
Average no. of Science subjects taken	1.0	0.8	0.8	0.9	1.1
(s)	(1.2)	(1.1)	(1.0)	(1.0)	(1.0)
Average no. of Commerce subjects taken in LC	0.2	0.3	0.5	0.7	0.7
(s)	(.4)	(.4)	(.7)	(.8)	(.8)
Average no. of Languages in LC	1.1	1.0	1.1	0.9	0.8
(s)	(.8)	(.8)	(.8)	(.7)	(.6)
Average no. of FMSP subjects in LC (excluding Biology)	0.6	0.7	0.5	0.5	0.5
(s)	(.8)	(.9)	(.7)	(.7)	(.6)
Number of schools in sample	105	112	119	121	125
Number of LC pupils in sample	1,276	1,574	2,448	2,915	3,565

*s = standard deviation.

Appendix Table 7A.14: *Percentage of Boys and Girls in Sampled Single Sex and Coed Schools Taking Science Subjects and Two or More Languages or Commerce Subjects in the Leaving Certificate, 1965 to 1978*

	School Type and Sex	1978	1975	*Year* 1972	1968	1965
Doing Chemistry in L.C.	Boys'	37.7%	41.8%	45.9%	44.0%	47.4%
	Girls'	14.0%	9.3%	10.0%	8.1%	5.2%
	Coed.:					
	Boys	21.7%	28.0%	24.0%	13.2%	25.4%
	Girls	10.0%	8.8%	6.3%	4.5%	7.3%
Doing Biology in L.C.	Boys'	33.8%	27.8%	9.4%	2.9%	8.6%
	Girls'	60.5%	42.8%	28.9%	13.5%	6.8%
	Coed.:					
	Boys	51.2%	45.4%	26.4%	5.5%	7.5%
	Girls	58.4%	29.8%	22.5%	0.0%	9.1%
Doing Hons. Maths in L.C.	Boys'	24.2%	23.8%	21.1%	31.2%	38.1%
	Girls'	6.2%	3.7%	3.4%	2.2%	5.4%
	Coed.:					
	Boys	18.0%	17.3%	14.4%	19.8%	23.9%
	Girls	5.1%	2.9%	2.5%	2.7%	0.0
Doing Physics	Boys'	29.6%	22.8%	22.3%	32.0%	33.7%
	Girls'	4.7%	3.6%	1.5%	1.4%	3.4%
	Coed.:					
	Boys	23.6%	19.9%	19.8%	29.7%	35.8%
	Girls	4.6%	3.3%	1.7%	0.0%	0.0
Doing 2 Modern Languages in L.C.	Boys'	3.6%	19.6%	27.1%	25.0%	24.6%
	Girls'	10.8%	20.9%	31.8%	29.1%	28.2%
	Coed.:					
	Boys	2.4%	7.8%	18.0%	23.1%	34.3%
	Girls	5.4%	6.2%	23.3%	8.0%	5.5%
Doing 2 or more Science Subjects	Boys'	39.9%	34.1%	28.4%	51.4%	62.3%
	Girls'	15.1%	10.2%	8.6%	7.9%	9.5%
	Coed.:	10.2%	22.7%	12.8%	14.3%	41.8%
Doing 3 + Science Subjects	Boys'	18.6%	15.5%	13.2%	23.6%	34.1%
	Girls'	5.3%	3.0%	1.5%	1.6%	2.5%
	Coed.:	9.7%	9.0%	5.2%	4.9%	11.5%
Doing 2 + Commerce Subjects	Boys'	20.9%	20.5%	15.8%	0.0	0.0
	Girls'	8.8%	8.2%	4.4%	0.0	0.0
	Coed.:	16.2%	22.1%	8.1%	0.0	0.0
Doing 2 + Accomplishment Subjects	Boys'	6.7%	4.0%	2.5%	1.9%	2.7%
	Girls'	33.7%	34.1%	30.2%	47.3%	40.6%
	Coed.:	24.3%	18.2%	16.7%	29.6%	21.3%
No. of Pupils in each Category of School in each year	Boys'	1,232	1,064	1,067	728	593
	Girls'	1,654	1,308	974	643	561
	Coed.:					
	Boys	328	271	167	91	67
	Girls	351	272	240	112	55

Appendix Table 7A.15: *Analysis of Variance of No. of Hons. Subjects taken in L.C., by Sex, School Type, Year*

Source of Variation	*df.*	*Sum of Squares*	*Mean Square*	*F*	*P*
*Main Effects:**	6	2,979.8	496.6	102.8	.000
Sex	1	60.4	60.4	12.5	.000
School Type	1	91.0	91.0	18.8	.000
Year	4	2,754.7	688.7	142.6	.000
2—Way Interactions:	9	841.9	93.5	19.4	.000
Sex x School Type	1	74.5	74.5	15.4	.000
Sex x Year	4	715.2	178.8	37.0	.000
School Type x Year	4	16.1	4.0	0.8	.503
3—Way Interactions:	4	38.88	9.72	2.01	.09
Sex x School Type x Year	4	38.88	9.72	2.00	.09
Total Between Group	19	3,860.6	203.2	42.1	.000
Total	11,768	60,596.2	5.15	$R^2 = .05$	

*Three categorical independent variables are employed: — sex of pupil (1, 2); type of school — single sex or coed. (1, 2); and year — 1965(1); 1968(2); 1972(3); 1975(4); 1978(5).

Appendix Table 7A.16: *Analysis of Variance of No. of Science Subjects taken by pupils by Sex, School Type and Year*

Source of Variation	*df.*	*Sum of Squares*	*Mean Square*	*F*	*P*
Main Effects:	6	1,769.7	295.0	319.0	0.0
Sex	1	1,566.0	1,566.0	1,693.6	.000
School Type	1	21.0	21.0	22.8	.000
Year	4	223.9	56.0	60.5	.000
2—Way Interactions:	9	178.9	19.9	21.5	0.0
Sex x School Type	1	0.2	0.2	0.2	.64
Sex x Year	4	160.2	40.1	43.3	.000
School Type x Year	4	15.3	3.8	4.1	.002
3—Way Interactions:					
Sex x School Type x Year	4	8.49	2.12	2.3	.06
Total Between Group	19	1,957.1	103.0	111.4	0.000
Total	11,768	12,821.1	1.09	$R^2 = .14$	

Appendix Table 7A.17: *Analysis of Variance of No. of Commerce Subjects taken by Sex, School Type and Year*

Source of Variation:	*df.*	*Sum of Squares*	*Mean Square*	*F*	*P*
Main Effects:	6	496.3	82.7	169.4	0.0
Sex	1	67.7	67.7	138.7	.000
School Type	1	4.3	4.3	8.9	.003
Year	4	446.1	111.5	228.3	.000
2—Way Interactions:	9	33.6	3.7	7.6	.000
Sex x School Type	1	18.6	18.6	38.2	.000
Sex x Year	4	7.5	1.9	3.8	.004
School Type x Year	4	8.3	2.1	4.2	.002
3—Way Interactions:					
Sex x School Type x Year	4	3.3	0.8	1.7	.154
Total Between Groups	19	533.1	28.1	57.5	0.000
Total	11,768	6,271.4	.533	$R^2 = .08$	

Appendix Table 7A.18: *Intercorrelations amongst School and Curricular Characteristics in 1968 and 1978*

	1 *School Size '68*	2 *Curric. Size '68*	3 *Curric. Growth 68-78*	4 *School Growth 68-78*	5 *Fee Paying*	6 *Boys' School '68*	7 *Girls' School '68*	8 *Coed. School '68*	9 *Change to Coed.*	10 *Conn./ Ulster*	11 *Munster*
1) School size '68	1.00										
2) Curric. size '68	.54*	1.00									
3) Curric. growth 68-78	−.02	−.60*	1.00								
4) School growth 68-78	−.09	.06	.19*	1.00							
5) Fee paying schools	−.06	.15*	−.18*	−.15*	1.00						
6) Boys' school '68	.13*	−.07	.08	−.28*	.10	1.00					
7) Girls' school '68	−.06	.14*	−.08	.37*	−.12	−.83*	1.00				
8) Coed. school '68	−.13*	−.14*	.02	−.16*	.03	−.26*	−.31*	1.00			
9) Change to Coed.	−.23*	−.25*	.26*	−.02	.06	−.02	.09	−.11	1.00		
10) Connaught/Ulster	−.04	.03	.10	−.12	−.12	−.14*	−.05	.32*	.09	1.00	
11) Munster	−.12	−.12	−.03	−.05	−.19*	.05	−.03	−.04	.01	−.31*	1.00

*Significant at $p \leq .05$.

APPENDIX 8: *Appendix to Chapter 8*

Appendix Table 8.1: *The Number of Full-time Teachers and Estimates of the Completeness of the Qualification Data on all Full-time Teachers and of all Maths and Science Teachers in the 94 Sample Schools*

Type of school	*Total No. of full-time teachers in school*	*No. of full-time teachers for whom all registration data is available*	*% of all full-time teachers for whom registration (qual.) data is not available*	*Total No. of Maths and Science teachers in school*	*% of all full-time Maths and Science teachers with qualification data missing*
Girls' Secondary*	595	521	12.4	177	9.0
Boys' Secondary*	512	422	17.6	188	14.9
Coed Secondary*	251	208	17.1	76	14.5
Vocational Schools	490	453	7.6	133	15.0
Community Schools	428	328	23.4	108	10.2
Total	2,276	1,932	15.1	682	12.6

*All subjects in the sample are included.

Appendix Table 8.2: *Percentage of all Teachers in Schools (Whether Full or Part-time) who are Part-time*

	Secondary Schools				
	Girls'	*Boys'*	*Coed*	*Vocational schools*	*Community schools*
			per cent		
Percentage of all teachers* who are part-time	14.0	7.4	13.1	19.0	4.5
Percentage of all Maths/ Science teachers who are part-time	6.3	2.6	3.8	8.3	1.8

*Of all teachers mentioned in Time Table returns. "Part-time" = all teachers not receiving an incremental salary.

Appendix Table 8.3: *Correlations Between the Percentage of Boys and Girls in Schools Taking Honours Maths and the Relative Level of Maths and Science Qualifications of Teachers in Schools*

Qualification of teachers within schools:	*Take-up of hons. Maths*****			
	Percentage of boys in school doing hons. maths in the I.C.	*Percentage of girls in school doing hons. maths in the I.C.*	*Percentage of boys in school doing hons. maths in the L.C.*	*Percentage of girls in school doing hons. maths in the L.C.*
	(N = 64)**	(N = 58)**	(N = 64)**	(N = 58)**
1. Percentage of full-time teachers in school qualified in maths or related science	+.02	−.24	−.01	−.03
2. Percentage of all teachers teaching maths who are qualified in maths	−.05	−.14	−.10	−.10
3. Percentage of those teaching maths in senior cycle who are qualified in maths	−.11	−.10	−.27*	−.19
4. Percentage teachers qualified in science	+.26*	+.22	+.28*	+.30*
5. Percentage teachers qualified in physics	+.26*	+.42*	+.26*	+.43*
6. Percentage teachers qualified in chemistry	+.29*	+.32*	+.31*	+.28*
7. Percentage teachers qualified in languages	+.21	+.30*	+.34*	−.20
8. Percentage teachers qualified in commerce	−.08	−.17	−.11	−.18
9. Percentage teachers qualified in accomplishment subjects	−.39*	+.02	−.49*	−.29*
*Kind of school****				
10. Boys' school	.45*	—	.49*	—
11. Girls' school	—	+.25*	—	−.24
12. Coed sec. school	.14	+.28*	.07	.23
13. Community schools	−.01	+.09	.06	.57*

*P ≤ .05, two tailed test.

**Boys in boys' or coed schools, girls in girls' or coed schools. (Three very small coed. schools have been excluded from the analysis), includes schools where Hons. Maths not taught.

***All dummy variables (1 = schools identified; Ø = else)

****Take-up rates are based on returns from interview with Leaving Cert. and Inter Cert. pupils in 1981.

Appendix Table 8.4: *Correlations Between the Percentage of Boys and Girls in Schools Taking Science and the Relative Level of Maths and Science Qualifications of Teachers in Schools*

Qualifications of teachers within schools:	*Performance of Pupils* Percentage of Boys in school doing Science in the I.C.	Percentage of Girls in school doing Science in the I.C.	Percentage of Boys in school doing 2 or more Science subjects in the L.C.	Percentage of Girls in school doing 2 or more Science subjects in the L.C.
	(N = 64)**	(N = 58)**	(N = 64)**	(N = 58)**
1. Percentage of full-time teachers in school qualified in Maths or related Science:	.15	.14	−.00	−.26*
2. Percentage teachers teaching Maths who are qualified in Maths:	.11	.25*	−.06	−.10
3. Percentage of those teaching Maths in senior cycle who are qualified in Maths:	.07	.14	−.14*	−.02
4. Percentage teachers qualified in Science:	.11	.36*	.45*	.44*
5. Percentage of Science teachers qualified in Science:	−.16	.03	.21	.35*
6. Percentage teachers qualified in Physics:	.08	.30*	.39*	.57*
7. Percentage teachers qualified in Chemistry:	.13	.28*	.47*	.41*
8. Percentage teachers qualified in languages:	−.05	−.25*	.34*	.11
9. Percentage teachers qualified in Commerce subjects:	−.06	.00	−.17	−.49*
10. Percentage teachers qualified in Accomplishment subjects:	−.07	−.31*	−.41*	.01
*Kind of School****				
11. Boys' school:	.13	—	.33*	—
12. Girls' school:	—	−.27*	—	.30*
13. Coed Sec. school:	−.25*	−.01	+.26*	.05
14. Community school:	−.09	.22	+.12	.13

*p ≤ .05, two tailed test.

**Boys in boys' or coed. schools, girls in girls' or coed schools (3 very small coed. schools have been excluded from this analysis). Includes schools where Science is not taught.

***All dummy variables (1 = schools identified; 0 = else).

APPENDIX 9: *Appendix to Chapter 9*

Appendix Table 9A.1: *Mean Values for Each Sex on Variables Used to Predict Probability of Choice of Higher Maths and Physics (Standard Deviation in Parentheses)*

Those pupils who may choose Higher Maths			*Those pupils who may choose Physics*		
Variable	*Boys' Mean*	*Girls' Mean*	*Variable*	*Boys' Mean*	*Girls' Mean*
IGPA	5.18	5.05	IGPA	4.97	4.76
	(0.95)	(0.91)		(0.96)	(0.91)
UNIVSCI	0.38	0.18	UNIVSCI	0.32	0.15
	(0.49)	(0.39)		(0.47)	(0.35)
JOB 1	2.17	2.83	MATHLIT	1.42	1.49
	(1.50)	(1.34)		(0.28)	(0.31)
DIFFICULTY	0.65	0.64	INTEREST	0.68	0.59
	(0.48)	(0.48)		(0.47)	(0.49)
MATHLIT	1.38	1.44	TECHDIP	0.13	0.06
	(0.26)	(0.30)		(0.34)	(0.24)
SUBJEVAL	2.92	2.97	USE	0.86	0.74
	(0.52)	(0.53)		(0.35)	(0.44)
EDIMAGE	2.51	2.58	EDIMAGE	2.57	2.68
	(0.73)	(0.71)		(0.72)	(0.75)
WORK	4.36	1.70	SOCIAL	2.80	3.06
	(1.00)	(0.79)		(0.47)	(0.44)
SOCLASS	3.11	3.49	TEACHVAL	2.61	2.70
	(2.00)	(2.24)		(0.56)	(0.60)
TECHDIP	0.09	0.06	UTILVAL	1.77	1.71
	(0.29)	(0.24)		(0.44)	(0.43)
LCEXPT	2.21	2.14	LCEXPF	2.13	1.97
	(0.74)	(0.70)		(0.73)	(0.65)
			SOCLASS	3.18	3.60
				(1.99)	(2.20)

Appendix Table 9A.2: *Mean Values for Each Sex on Variables Used to Predict Probability of Choice of Chemistry and Biology (Standard Deviation in Parentheses)*

Those pupils who may choose Chemistry			*Those pupils who may choose Biology*		
Variable	*Boys' Mean*	*Girls' Mean*	*Variable*	*Boys' Mean*	*Girls' Mean*
IGPA	4.86	4.73	IGPA	4.60	4.31
	(1.05)	(0.95)		(1.10)	(1.07)
UNIVSCI	0.30	0.11	ICSCI	0.92	0.58
	(0.46)	(0.32)		(0.27)	(0.49)
COMMSOC	0.20	0.10	CERT	3.13	2.81
	(0.40)	(0.30)		(0.89)	(0.85)
TECHDIP	0.14	0.05	NURSING	0.01	0.16
	(0.34)	(0.22)		(0.09)	(0.37)
MATHLIT	1.43	1.48	COMMSOC	0.17	0.08
	(0.28)	(0.31)		(0.38)	(0.28)
SOCIAL	2.81	3.04	USE	0.86	0.94
	(0.48)	(0.40)		(0.35)	(0.24)
UTILVAL	1.81	1.70	INTEREST	0.83	0.87
	(0.43)	(0.43)		(0.37)	(0.33)
PEDEXPS	2.65	2.55	DIFFICULTY	0.55	0.61
	(0.46)	(0.49)		(0.50)	(0.49)
SOCLASS	3.01	3.95	SUBJEVAL	2.86	2.88
	(1.96)	(2.16)		(0.53)	(0.52)
FATHED	4.70	3.44	UTILVAL	1.77	1.70
	(2.56)	(2.47)		(0.46)	(0.45)
			SOCIAL	2.82	3.05
				(0.48)	(0.44)
			HHTASK	2.16	2.90
				(0.65)	(0.75)
			EDIMAGE	2.66	2.80
				(0.73)	(0.72)
			LCEXPT	2.50	2.41
				(0.53)	(0.52)
			SOI 1	3.08	3.56
				(1.84)	(1.16)
			PEDEXPS	2.56	2.45
				(0.49)	(0.49)
			SOCLASS	3.18	3.94
				(1.99)	(2.17)

APPENDIX 10: *Appendix to Chapter 10*

Appendix Table 10.1: *Percentage of Girls and Boys entering Apprenticeship or Related Training one year subsequent to leaving schools by the level of education received*

	Level of Education Received			
Sex of pupil	*Pre-Intermediate Certificate Examination*	*Intermediate Certificate Examination*	*Leaving Certificate Examination*	*Total*
Male	25% (276)	36% (294)	14% (565)	22% (1,135)
Female	7% (123)	8% (192)	1% (747)	3% (1,062)

Source: Special Tabulation from National Manpower Service, *School Leavers' Survey, 1981.*

Appendix Table 10.2: *The relationships between number of honours attained in the Leaving Certificate Examination and probability of Third Level Education and Status of Job, in first year after leaving school, 1981. (Percentages achieving third level education do not add up to 100, the percentage not going on to third level represents the difference)*

	Number of Honours in Leaving Certificate Examination									
	0—1		*2—3*		*4—5*		*6+*		*Total*	
	M	*F*	*M*	*F*	*M*	*F*	*M*	*F*	*M*	*F*
					per cent					
Third Level Education Achieved										
University	10.1	1.4	7.6	1.1	38.9	9.3	52.8	42.7	24.1	7.9
Regional Technical College	12.1	6.8	29.9	6.9	20.4	10.5	10.2	6.1	18.3	7.7
Teacher Training College	0.0	0.0	0.0	1.7	0.9	8.7	0.9	18.3	0.5	4.6
Nursing	0.5	5.8	0.7	7.4	0.0	12.2	0.0	4.9	0.4	7.7
Other Third Level Courses	12.6	4.4	11.1	6.9	5.6	5.2	1.9	2.5	10.1	4.8
Total (N)	(207)	(295)	(144)	(175)	(108)	(172)	(88)	(82)	(547)	(725)
*Status of Job** (For those at work)										
1—3	15.4	13.0	13.8	13.3	17.0	29.2	44.4	33.3	16.7	17.6
4—5	33.3	76.0	43.7	78.3	60.4	63.5	44.4	66.7	42.7	72.7
6	28.5	2.4	18.4	2.5	11.3	0.0	11.1	0.0	20.6	1.8
7—8	22.0	8.7	24.1	7.5	13.2	7.3	11.1	0.0	20.6	7.7
Total %	100	100	100	100	100	100	100	100	100	100
N	(123)	(208)	(87)	(120)	(53)	(96)	(18)	(27)	(281)	(454)

Note: *Hall-Jones, modified scale: 1 — 3 = Upper Non-manual; 4 — 5 = Lower Non-manual; 6 = Skilled; 7 — 8 = Semi and Unskilled Manual.

Source: Special Tabulation from National Manpower Service, *School Leavers' Survey, 1981.*

Appendix Table 10.3: *Percentage of Boys and Girls with Different Number of Science Subjects in Leaving Certificate Examination by Type of Institution and Third Level Course taken: 1981 School Leavers' Survey*

	Number of Science Subjects in Leaving Certificate Examination							
	0		*1*		*2 +*		*Total*	
	M	*F*	*M*	*F*	*M*	*F*	*M*	*F*
	per cent							
Type of Institution:								
University	19	4	19	7	54	43	26	9
Teacher Training or Nursing	0	5	1	11	1	20	1	12
Regional Technical College	17	2	21	17	15	3	19	8
Type of Course:								
Engineering/Applied Science	15	1	25	6	53	23	28	6
Arts/Commerce	19	9	16	14	7	23	15	13
Total Number	178	328	284	348	121	75	582	752

Source: Special Tabulation of National Manpower Service, *School Leavers' Survey, 1981.*

Appendix Table 10.4: *Percentages of Males and Females Gainfully Occupied ("at Work" for 1979 Figures) in Various Occupations Between 1951 and 1979*

Occupation	*1951* %		*1961* %		*1966* %		*1971* %		*1979* %	
	M	*F*	*M*	*F*	*M*	*F*	*M*	*F*	*M*	*F*
Agricultural Workers, Forestry, Fishing	47.3	21.0	42.9	14.7	37.9	11.4	31.7	8.8	24.5	6.2
Electrical and Electronic Workers	0.8	0.1	1.1	0.3	1.6	0.7	2.2	1.1	3.4	1.5
Leather and Leather Substitute Workers	0.9	1.0	0.7	1.0	0.6	1.2	0.5	1.1		
Textile and Clothing Workers	1.1	9.0	1.2	8.7	1.3	8.3	1.5	8.5	1.5	6.1
Food, Beverage and Tobacco Workers*	1.1	1.9	1.3	1.7	1.4	1.6	1.8	1.8	1.9	1.2
Paper and Printing Workers	0.4	1.0	0.6	1.2	0.7	1.2	0.7	0.9	0.8	0.6
Other producers, makers and repairers	0.2	0.4	0.4	0.5	0.5	0.8	1.4	1.6	2.4	1.3
Unskilled Workers	4.9	0.9	5.9	1.0	8.6	0.3	10.6	0.3	7.3	0.4
Foremen and supervisors of manual workers	0.7	0.2	0.9	0.3	1.2	0.4	1.6	0.4	1.7	0.4
Transport and Communication Workers	6.4	0.6	6.6	0.8	6.7	1.0	6.9	1.3	6.6	1.4
Storekeepers, Warehousemen, Packers, Bottlers*	1.0	2.1	1.4	2.9	1.6	3.2	1.7	2.8	1.9	1.8
Clerical Workers	3.5	11.7	3.9	16.2	4.2	19.3	4.3	23.3	4.5	28.2

Appendix Table 10.4: *Percentages of Males and Females Gainfully Occupied ("at Work" for 1979 Figures) in Various Occupations Between 1951 and 1979*

Occupation	*1951* % *M*	*1951* % *F*	*1961* % *M*	*1961* % *F*	*1966* % *M*	*1966* % *F*	*1971* % *M*	*1971* % *F*	*1979* % *M*	*1979* % *F*
Commerce, Insurance and Finance Workers	7.8	12.6	8.3	13.6	8.6	13.4	8.8	12.4	9.6	12.8
Service Workers	2.4	24.4	2.7	21.2	3.0	20.2	3.6	17.5	4.5	14.8
Administrative, Executive and Managerial Workers	1.0	0.3	1.2	0.2	1.6	0.3	2.0	0.3	3.6	1.1
Professional and Technical Workers	3.3	11.6	4.6	14.4	5.2	15.3	6.3	17.6	9.2	20.6
Other	17.0	1.2	16.3	1.3	15.4	1.5	14.3	0.4	16.7	1.2
Total (aged 14 +) gainfully occupied:	939,374	322,552	821,529	286,579	829,060	289,144	831,664	287,867	883,400	377,400
% gainfully occupied (14+) (15+ for 1979 figures)	85.6	30.4	82.4	28.6	81.4	28.3	79.2	27.3	75.3	28.7

*The classification of these occupations was changed slightly between 1951 and 1961.
Source: Census of Population of Ireland 1961, 1966 and 1971. Labour Force Survey 1979.

Appendix Table 10.5: *Percentage of all Females at Work Employed in the Main Occupations of Females from 1951 to 1979. (From 1951, 1966 and 1971 Census Figures and 1979 Labour Force Survey.)*

Occupation	*1951** *(Rank)*	%	*1961* *(Rank)*	%	*1966* *(Rank)*	%	*1971* *(Rank)*	%	*1975* *(Rank)*	%	*1977* *(Rank)*	%	*1979* *(Rank)*	%
Agriculture, Forestry, Fishing	(2)	21.0	(3)	15.1	(5)	11.8	(6)	9.1	(6)	7.1	(6)	6.2	(5)	6.2
Leather, Textiles, Clothing	(6)	10.0	(6)	9.7	(6)	9.5	(5)	9.5	(5)	7.5	(5)	6.8	(6)	6.1
Clerical Workers	(4)	11.7	(2)	16.3	(2)	19.6	(1)	23.6	(1)	25.6	(1)	26.5	(1)	28.2
Commercial, Insurance, Finance	(3)	12.6	(5)	13.6	(4)	13.5	(4)	12.5	(4)	12.9	(4)	12.8	(4)	12.8
Professional and Technical	(5)	11.6	(4)	14.6	(3)	15.5	(2)	18.0	(2)	20.3	(2)	21.5	(2)	20.6
Service Workers	(1)	24.4	(1)	20.6	(1)	19.7	(3)	16.9	(3)	15.0	(3)	14.4	(3)	14.8
Total %		91.3		89.9		89.6		89.6		88.4		88.2		88.7
Total number females aged 14 +** at work	322,552		277,999		280,791		278,332		297,500		298,800		322,500	

*1951 figures represent number of gainfully occupied females (as opposed to number actually working) as percentage of all gainfully occupied females.

**Figures for 1975, 1977 and 1979 (from Labour Force Survey) deal with those aged 15+.

Appendix Table 10.6: *Occupations in which Females are Disproportionately Employed, 1951-1979. Percentage of All those Gainfully Occupied ("at Work" for 1975, 1977 and 1979) in Various Occupations who are Female**

	1951	*1961*	*1966*	*1971*	*1975*	*1977*	*1979*
Percentage of all those gainfully occupied/at work who are female	25.6	25.9	25.9	25.7	27.8	27.6	28.0
Leather, Textile, Clothing	63.2	63.7	63.5	62.5	63.3	58.4	61.4
Food, Beverages, Tobacco	36.9	30.6	28.5	25.7	26.3	21.5	20.2
Paper and Printing	44.7	40.6	38.0	29.7	37.1	32.6	24.1
Other Producers	37.4	32.7	36.3	29.6	17.4	17.4	18.1
Storekeepers, Packers, Bottlers	42.1	42.6	41.3	35.5	34.8	30.2	26.7
Clerical Workers	53.7	59.4	61.9	65.0	69.7	69.0	71.0
Commercial, Insurance, Finance	35.8	37.0	35.3	32.7	34.7	33.7	34.4
Service Workers	77.4	73.1	70.0	62.5	60.5	58.0	56.0
Professional and Technical	54.8	52.2	50.2	49.1	50.0	48.4	46.6
% all females gainfully occupied/at work employed in above occupations	75.7	81.4	84.5	87.5	85.0	85.0	82.5

**Source: Census of Population* for 1951 to 1971 Figures; *Labour Force Survey* (1979 revised estimates) for 1975 to 1979.

Appendix Table 10.7: *Percentage of Career Guidance Counsellors spending a Certain Number of Hours on Guidance, Administration and Teaching (Controlling for Non-response and Non-applicability)*

		Number of Hours per Week						
		0	*1-5*	*6-10*	*11-15*	*16-20*	*20 +*	*(N)*
On Guidance	%	—	6.1	19.7	25.8	37.9	10.6	66
On Administration	%	48.4	46.8	4.8	—	—	—	62
On Teaching	%	11.9	43.3	23.9	7.5	9.0	4.5	67

Appendix Table 10.8: *The Degree of Involvement of Career Guidance Counsellors in Selection of Students for Entry to School and in Allocation of Pupils to Classes (Controlling for Non-response and Non-applicability)*

		Main Person Involved	*Significant but Not Main Person*	*Minor Involvement*	*Not Involved*	*(N)*
Selection of pupils for entry	%	17.3	23.1	1.9	57.7	52
Allocation of pupils to classes:						
in Entry Year	%	28.4	28.4	9.0	34.3	67
in Group Cert.	%	12.9	25.8	6.5	54.8	31
in Inter Cert.	%	13.6	22.7	15.2	48.5	66
in Leaving Cert.	%	7.9	25.4	15.9	50.8	63

Appendix Table 10.9: *The Degree to Which the Career Guidance Counsellor is Involved in the Structure/Design of Classes at Various Levels (Controlling for Non-response and Non-Applicability)*

Structure/Design of Classes:		*Main Person Involved*	*Significant but Not Main Person*	*Minor Involvement*	*Not Involved*	*(N)*
in Entry Year	%	5.9	33.8	11.8	48.5	68
in Group Cert. Year	%	3.1	21.8	12.5	62.5	32
in Inter. Cert. Year	%	1.5	31.3	13.4	53.7	67
in Leaving Cert. Year	%	—	27.0	11.1	61.9	63

Appendix Table 10.10: *Degree to which Career Guidance Counsellors is Involved in Timetabling at Various Levels (Controlling for Non-response and Non-applicability)*

Timetabling at		*Main Person Involved*	*Significant but Not Main Person*	*Minor Involvement*	*Not Involved*	*(N)*
Entry Year	%	1.5	7.4	4.4	86.8	68
Group Cert.	%	—	3.1	6.3	90.6	32
Inter. Cert.	%	1.5	7.4	5.9	85.3	68
Leaving Cert.	%	1.5	7.6	9.1	81.8	66

Appendix Table 10.11: *Degree to which Career Guidance Counsellor is Involved in Packaging Subjects at Various Levels (Controlling for Non-response and Non-applicability)*

Packaging Subjects at:		*Main Person Involved*	*Significant but Not Main Person*	*Minor Involvement*	*Not Involved*	*(N)*
Entry Year	%	10.0	21.7	20.0	48.3	60
Group Cert.	%	3.6	28.6	17.9	80.0	28
Inter. Cert.	%	7.8	28.1	18.8	45.3	64
Leaving Cert.	%	6.5	43.5	12.9	37.1	62

Appendix Table 10.12: *Degree to which Career Guidance Counsellor is Involved in Subjects Offered to Pupils at Various Levels (Controlling for Non-response and Non-applicability)*

Subjects Offered:	*Main Person Involved*	*Significant but Not Main Person*	*Minor Involvement*	*Not Involved*	*(N)*
in Entry Year	6.1	27.3	22.7	43.9	66
for Group Cert.	3.4	24.1	24.1	48.3	29
for Inter. Cert.	4.5	27.3	19.7	48.5	66
for Leaving Cert.	4.8	33.3	19.0	42.9	63

Appendix Table 10.13: *Degree to which Career Guidance Counsellors is Involved in Helping Students to Choose Subjects at Various Levels (Controlling for Non-response and Non-applicability)*

Subject Choice at:		*Main Person Involved*	*Significant but Not Main Person*	*Minor Involvement*	*Not Involved*	*(N)*
Entry Year	%	21.4	21.4	8.9	48.2	56
Group Cert.	%	17.4	13.0	8.7	60.9	23
Inter. Cert.	%	17.2	27.6	13.8	41.4	58
Leaving Cert.	%	55.6	30.2	7.9	6.3	63

Appendix Table 10.14: *Degree to which Career Guidance Counsellor is Involved in Helping Pupils Choose Jobs/Careers on Leaving School at Various Levels (Controlling for Non-response and Non-applicability)*

Choice of Job/Career After:		*Main Person Involved*	*Significant but Not Main Person*	*Minor Involvement*	*Not Involved*	*(N)*
Group Cert.	%	79.4	8.8	—	11.8	34
Inter. Cert.	%	88.1	3.0	3.0	6.0	67
Leaving Cert.	%	95.3	3.1	—	1.6	64

Appendix Table 10.15: *Percentage of Boys and Girls who Regard Certain Significant Others as Very Important, Important and Not Important in Deciding on Inter. Cert. Subjects (Controlling for Non-response, Presence of Guidance Counsellors in the School, and Presence of Choice of Subjects)*

		Career Guidance Counsellor	*Ordinary Teachers*	*Principal*	*Mother*	*Father*	*Friends*
Boys	Very Important	10.1	13.0	8.7	30.5	22.7	6.5
	Important	21.3	26.4	18.9	44.0	42.5	33.9
	Not Important	68.5	60.1	72.4	25.6	34.8	59.5
	(N)	(572)	(599)	(609)	(630)	(617)	(613)
Girls	Very Important	13.0	14.1	8.7	44.0	26.7	10.6
	Important	24.4	30.9	24.3	42.4	42.6	41.4
	Not Important	62.6	55.0	67.0	13.6	30.7	47.9
	(N)	(1,008)	(1,034)	(1,047)	(1,083)	(1,095)	(1,072)
Total	Very Important	12.0	13.7	8.7	39.1	25.2	9.1
	Important	23.3	29.4	22.3	43.0	42.6	38.7
	Not Important	64.7	56.9	69.0	18.0	32.2	52.2
	(N)	(1,580)	(1,633)	(1,656)	(1,713)	(1,647)	(1,685)

Source: Leaving Cert. Pupils' Responses.

Appendix Table 10.16: *Percentage of Boys and Girls Regarding Certain Significant Others as Very Important, Important and Not Important in Deciding on Leaving Cert. Subjects (Controlling for Non-response and Presence of the Guidance Counsellor in the School)*

		Career Guidance Counsellor	*Ordinary Teachers*	*Principal*	*Mother*	*Father*	*Friends*
Boys	Very Important	19.8	13.0	8.3	29.6	25.1	7.3
	Important	32.6	36.3	21.9	44.5	43.9	34.8
	Not Important	47.6	50.7	69.7	25.4	31.0	57.9
	(N)	(1,296)	(1,357)	(1,345)	(1,400)	(1,328)	(1,363)
Girls	Very Important	20.7	17.4	8.1	43.1	28.0	10.2
	Important	35.7	40.8	23.6	43.5	40.8	42.3
	Not Important	43.6	41.7	68.3	13.5	31.1	47.5
	(N)	(1,723)	(1,754)	(1,734)	(1,774)	(1,660)	(1,754)
Total	Very Important	20.3	15.5	8.2	37.1	26.7	9.0
	Important	34.4	38.9	22.9	43.9	42.2	39.0
	Not Important	45.3	45.6	68.9	18.9	31.1	52.0
	(N)	(3,019)	(3,111)	(3,079)	(3,174)	(2,988)	(3,117)

Appendix Table 10.17: *Percentage of Boys and Girls who Discussed Jobs with Certain Significant Others "Quite a Lot," "Vaguely" and "Never" (Controlling for Non-response and Presence of Guidance Counsellor in School)*

		Career Guidance Counsellor	*Ordinary Teachers*	*Principal*	*Mother*	*Father*	*Friends*
Boys	Quite a lot	46.8	16.6	5.5	63.5	52.6	56.3
	Vaguely	41.6	46.9	28.1	32.9	38.2	37.4
	Never	11.7	36.4	66.4	3.6	9.2	6.3
	(N)	(1,405)	(1,391)	(1,382)	(1,410)	(1,337)	(1,419)
Girls	Quite a lot	48.9	20.3	4.9	79.4	45.1	81.7
	Vaguely	40.2	50.0	30.5	19.4	41.9	17.1
	Never	10.9	29.7	64.6	1.2	13.0	1.2
	(N)	(1,803)	(1,783)	(1,769)	(1,777)	(1,672)	(1,804)
Total	Quite a lot	48.0	18.7	5.1	72.4	48.4	70.5
	Vaguely	40.8	48.7	29.5	19.4	40.3	26.0
	Never	11.2	32.6	65.4	1.2	11.3	3.5
	(N)	(3,208)	(3,174)	(3,151)	(3,187)	(3,009)	(3,223)

Appendix Table 10.18: *Degree to which Career Guidance Counsellor is Involved in Personal Counselling at Various Levels (Controlling for Non-response and Non-applicability)*

Personal Counselling in:		*Main Person Involved*	*Significant but Not Main Person*	*Minor Involvement*	*Not Involved*	*(N)*
Entry Year	%	37.1	32.3	16.1	14.5	62
Junior Cycle	%	38.1	33.3	14.3	14.3	63
Senior Cycle	%	46.8	33.9	11.3	8.1	62

Appendix Table 10.19: *Correlations between Amount of Time Available to Career Guidance Counsellor for Various Duties and Involvement in Decisionmaking, in Subject Choice, in Job Choice and in Pastoral care at Various Levels (N. = 68 total, but it varies depending on the issue)*

	Number of Hours per Week Spent on:			
	Guidance	*Administration*	*Teaching*	*Administration and Teaching*
Degree of involvement in decision to:				
(a) add subject to curriculum	−.15	.21	.22*	.31*
(b) change admission policy	−.51*	.07	.48*	.56*
(c) employ a new teacher	−.15	.03	.27*	.30*
Degree of involvement in subject choice:				
(a) in entry year	.03	.04	−.01	−.01
(b) for group cert	.23	−.01	.10	.10
(c) for inter cert	.18	.08	.05	.08
(d) for leaving cert	.33*	.18	−.31*	−.22*
Degree of involvement in job choice after:				
(a) Group cert	.05	.08	−.16	−.14
(b) inter cert	.10	.04	−.07	−.06
(c) leaving cert	.25*	.08	−.30*	−.26*
Degree of involvement in Personal Counselling				
(a) in entry year	.33*	.04	−.33*	−.29*
(b) in junior cycle	.36*	−.11	−.34*	−.31*
(c) in senior cycle	.37*	.16	−.37*	−.29*
Degree of involvement in pastoral care programme	.12	.27*	−.06	.03

*Significant at $p \leq .05$.

APPENDIX 10.A: *Microelectronics and Clerical Employment*

There are several reasons why developments in office technology are likely to have a profound effect on the employment of clerical workers in particular. First, many of the tasks performed by clerical workers — typing, filing, message carrying (Sleigh *et al.*, 1979) — are of a routine nature and lend themselves to some degree of automation. Secondly, investment in technology in the office has, to date, been very low compared to industry. Estimates in the US in 1975 put the figure for capital equipment per worker at $2,000 per office worker and $25,000 per manufacturing employee. The equivalent UK estimates are £500 and £5,000 sterling, respectively (NBST Report, 1981). Thus, there is a great deal of scope for labour displacing investment in office technology (Science Policy Research Unit Report, 1982). Thirdly, standard products can be marketed for the office sector which will meet the needs of a variety of users with minimum "customisation" (Sleigh *et al.*, 1979, p. 54). This tends to reduce the cost of microelectronic office equipment. The price of word processors, for example, has been falling and sophisticated screen based models were available for under £4,000 sterling in 1981 (SPRU Report, 1982). Finally, rising office costs provide a major impetus to introduce equipment which will increase cost effectiveness. The Stanford Research Institute (*Business Week*, 30.6.75) estimated that office costs in the US, formerly accounting for 20-30 per cent of total company costs, had risen to 40-50 per cent by 1975.

However, in spite of the strong impetus towards use of microelectronics in the office, it seems likely that several factors will work to slow down any large scale change from manual to automatic processes. Atkinson (1980) in discussing this gives three reasons: first, because of a conservatism on the part of both management and labour and a general lack of awareness of the potential of microprocessors; secondly, a lack of resources in terms of skilled staff and capital for investment in office equipment; and thirdly, problems of design of the equipment and assimilation into the ongoing processes of office work. In addition, the need to communicate with non-computer users — either other businesses or the general public — would tend to slow down the arrival of the fully "paperless office". Another relevant factor in the decision to introduce microelectronic equipment would be the volume of office work. Because of the high initial cost of much of the equipment, the volume of work and expected productivity gains would need to be large in order to justify their introduction.

Thus, the electronic office is unlikely to be fully realised for some time although its ultimate advent seems inevitable. In the following section we examine some of the characteristics of the clerical workforce and the relative importance of clerical work for women and men over time.

Given that the electronic office is on its way, what are the likely effects on employment? We have seen that women are concentrated in office employment and any changes in office operations are likely to affect them seriously. The SPRU Report (1982) listed some of the studies of the employment consequences of microelectronics in the office giving forecasts of job losses.

The authors caution that no one of the quantitative forecasts is likely to be reliable but that it is significant that all the reports forecast substantial job losses. The severity of the forecasts ranges from a loss of two million typing and secretarial jobs in Germany by 1990 to a shift in employment from low grade clerical work towards higher grade computer systems work with a reduction in employment by up to 15 per cent by 1985 in Britain, if present rates of growth are not maintained.

The Census and Labour Force Surveys indicate that the number of jobs in clerical work has been rising. The expansion in office work generally is likely to slow down any losses due to technology for some time — especially since the introduction of office technology is slowed both by trade union opposition and by lack of investment capital. However, it would be foolish to use this likely delay as an excuse to ignore the ultimate employment consequences.

What will actually happen when microelectronic equipment is introduced into an office? First, as the NBST Report (1981) points out, insistence by the Trade Unions on slow change and redeployment makes it unlikely that redundancies will occur on a large scale. There will be a period of adjustment where existing files are transferred onto a computer medium and staff are trained to operate the terminals and word processors. A study by the Central Computer Agency in Britain (1978) indicated that the learning and familiarisation curve for operators of word processors and typing management can take months rather than weeks to level out. During this time productivity will continue to rise. Retraining and redeployment will be available for some of the former clerical workers. Because of the characteristics of the mainly female clerical workers, however, a high level of "natural wastage" is likely to mean that retraining and redeployment will be for the few rather than the majority. This could be especially true in Ireland where lack of nursery facilities as well as strong social pressure force women to leave the labour force upon the birth of their children. Arnold, Birke and Faulkner (1981) in their 1982 article, point out that it is this primary loyalty to home and family which is socially expected of women which makes women easier to displace from work than men. Thus, there is a danger that rather than retraining female clerical staff, employers will simply wait for them to leave with little hope of returning at a later date to a contracting clerical labour market.

Bird (1980, p. 57) points out that job losses in clerical and typing work which are replaced by new technical jobs would tend to represent a movement of work from women to men. This shift in Britain has been reduced by an overall growth of office jobs in the 1960s and 1970s. Gershuny (1978) estimates that the number of new skilled jobs created by automation will be fewer than the total number of jobs saved. This is especially true in view of the fact that the falling price of electronic "hardware" is creating pressure to economise on "software" by buying in software "packages" rather than employing programmers or system analysts (*Computing*, 1981).

The points so far have tended to assume a static economy with no growth in the amount of office work to be done overall. Because of the high labour costs in office work, however, expansion is likely to take the form of "jobless growth" of the kind occurring in the output of the departments of Health and Social Security in the UK (SPRU, 1982 p. 57). We have seen that a smaller number of skilled jobs are likely to be created by a microelectronic boom. Also, Sleigh *et al.*, (1979, p. 56) point out that new technology will make it possible for us to handle and exploit far more information than at present. It may be false to assume that organisations will seize upon the labour saving benefits of technology — ignoring the other benefits concerning the availability of a large amount of easily retrievable information. The authors argue that jobs are likely to be created in the field of information usage. This may be especially true in the Civil Service since there is never any shortage of demands on government to provide new services and the freeing of resources by computer usage makes it possible to respond to these demands. They point out that in the British Civil Service, between 1970 and 1977, the number of major computer installations rose from 107 to 140 and that, though the justification for each installation was the staff saving it would make possible, in the same period staff in the categories most likely to be affected rose from 170,000 to 200,000.

Thus, the picture for future employment generally may not be as bleak as the direst forecasts lead us to believe. However, the jobs created by new technology in the office — be they technical, in computing or in information usage and analysis — are likely to bear little resemblance to the clerical and typing jobs which will be lost. Given this possible growth in opportunities in new areas it is important that we look closely at the kind of education girls are receiving. Rather than preparing large numbers of them for clerical employment which may soon be unavailable, we should begin at the post-primary education stage to prepare them for the types of jobs that are likely to provide a boom in opportunities by the time they leave school.

Some suggested syllabus changes reported by Frain and Healy (1982) include modifying the Leaving Cert. Maths course to include a section on computing and dividing the Higher Maths course into two sections — one dealing with engineering-related Maths concepts and used as an entry for engineering degree courses; the other dealing with pure mathematics. A reason for concern is the decline in the number of Leaving Cert. students taking Higher Maths since 1977, given the large projected increase in demand for engineers. Other suggestions include an updating of the Physics syllabus to include elements of electronics and the development of a new course in technology which would cover engineering drawing and design; materials and process technology; applied mechanics, fluids and thermodynamics; electrical and electronic technology and impacts of technology on society. The authors caution that efforts to preserve international comparisons have made the mathematics higher course less practical and more difficult. Perhaps the present concern in our educational system with academic comparisons should be balanced with a concern for practical relevance to work in an increasingly technological society.

APPENDIX 11: *Appendix to Chapter 11*

Intervention Programmes

These have been most developed in the United States from the introduction of federal legislation in 1972 which outlawed sex role discrimination in schooling.

The introduction of Title IX in the United States in 1972 gave official recognition to the negative effects of sex-role stereotyping in schools. This piece of legislation required that "no person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any educational programme or activity receiving Federal Financial assistance". The US Department of Health, Education and Welfare issued regulations two years later which provided guidelines for the implementation of the act. The regulations covered admissions, treatment and employment and affected virtually every public school in the country as well as the large number of post-secondary institutions which receive Federal assistance. However, as Wirtenberg and Nakamura (1976) argue, legislation alone — even if strictly enforced — is not enough. In the first place, many schools manage to avoid the spirit of the legislation by, for example, requiring a specific request from a girl to do Technical/Workshop courses. Thus, while the school technically complies with the ruling that sex must not be a factor in allocating pupils to courses, it makes it more difficult for pupils to choose non-traditional courses by subtly stressing the fact that to do so would be to fly in the face of convention. In the second place, legislation does nothing to reduce the attitudinal barriers — on the parts of parents and teachers as well as pupils — regarding what is proper for each sex.

In response to this inadequacy a number of intervention programmes were organised — often receiving Federal funding. Similar concerns in Sweden, Britain and elsewhere have led to a number of programmes being undertaken in those countries. The following few examples illustrate the nature of these interventions.

The non-sexist intervention project of Guttentag and Bray (1976) was aimed at 409 children in three school systems in Boston at kindergarten, fifth grade and ninth grade levels. The aim was to study how sex-role attitudes could be changed through the school system. Prior to intervention the children's sex-role attitudes were measured. The project placed a great deal of emphasis on non-sexist teaching materials and the teachers participating in the intervention were trained in non-sexist interventions. The intervention with the pupils lasted six weeks and teacher-pupil interactions were observed by the researchers. The actual intervention with the pupils was undertaken by the teachers using the material — texts, music and film as well as games and discussion ideas — provided by the reseach team.

The attitude survey revealed that pupils were less likely to stereotype themselves than to stereotype others — as measured by self rating on personality characteristics. Also they were more likely to stereotype peers and adults of the opposite sex than those of the same sex.

Following the intervention the sex-role attitudes of the children were reassessed. At all levels the impact of the intervention on girls was greater than that on boys — the differences being most pronounced among ninth grade pupils. Ninth grade boys tended to show stronger sex-role stereotyping following the intervention than before it. The girls' attitudes regarding occupational roles and their lists of jobs for women broadened significantly. The girls also showed greater flexibility in their lists of qualities men and women may have, while the ninth grade boys remained more rigid in their attribution of ideal personality characteristics to both sexes but especially to females. The fifth grade boys changed little following intervention. Even at kindergarten level girls were more interested in, and affected by, the intervention than boys.

The lower impact of intervention on boys was also found in a series of evaluated workshops organised by Kesselman (1974). A series of workshops were run for teachers dealing with sex-role stereotypes. Teachers showed fewer such stereotypes at the end of intervention. Teachers then set up workshops for fifth and sixth grade students. The results found that girls held fewer stereotypes at the end of intervention whilst among the boys the results were ambiguous.

Guttentag and Bray (1976) suggested that peer group pressure on the boys may have played a part in their reluctance to abandon stereotypes. Safilios-Rothschild (1981) points out that non-sexist materials may be less salient for boys since the fiction used, for example, tends to have fewer male characters. In addition the occupations, occupational roles and personality characteristics regarded as typically "masculine" generally receive more prestige and are associated with greater power than those regarded as feminine. (On the question of personality characteristics, Guttentag and Bray (1976) noted that children of both sexes tended to rate themselves slightly towards the masculine end of the scale indicating that they deemed these characteristics desirable in themselves.) Unless the relative status of the "masculine" and "feminine" occupations, roles and characteristics can be questioned in itself, boys are unlikely to consider that they have anything to gain by abandoning sex-role stereotypes which favour their own sex.

The EQUALS project at the Lawrence Hall of Science at Berkeley is concerned with a more specific area than those of the programmes described above. It grew out of an awareness of "math avoidance" in girls. The aim of the project was to increase teachers' awareness of the problem and to develop strategies which would help to change pupils' attitudes to mathematics (Krienberg, 1981). The main components of the programme are, first, to provide information on female enrolments in mathematics to increase teachers' awareness of the problem; secondly, to provide materials and instruction to build teachers' and students' confidence in doing mathematics and thirdly, encouragement of teachers in using EQUALS material and of students in their career aspirations. The impact of the programme has been assessed. Eighty-one per cent of teachers found the mathematics materials and activities suggested by EQUALS useful and continue to use them while 87 per cent rated the career activities similarly. The schools where the EQUALS programme has been operating show a slow but steady increase over the years in the number of young women taking advanced mathematics courses as well as a significant increase among females in awareness of non-traditional career areas. The results reported by Krienberg indicate that it is possible to concentrate on one subject area and successfully intervene to increase participation.

The Girls Into Science and Technology (GIST) project in Manchester is another project which attempts to intervene in specific subject areas — this time that of Physical science and Technical crafts (Smail, White, Kelly 1982). The project has been working with the junior cycle pupils in eight post-primary coed schools in the Manchester area — following them from entry to the end of third year choice of subjects. This age group was chosen because of the finding that girls' attitudes towards science frequently decline sharply over the first three years of post-primary education.

Like the EQUALS project, teachers are involved from the start. They were given information on girls' underachievement in Science and Technology and intervention strategies were suggested. In addition, "de-stereotyping" exercises were organised to create awareness among teachers of the unconscious tendency to treat boys and girls differently in the classroom despite the egalitarian ideology of teachers generally. Information on the research that has been done on sex differences in the classroom and on the origins of these differences was also provided.

Another aspect of this project was the VISTA programme where women scientists and technologists were recruited to speak to the pupils about their work. By using video facilities and examples of the pupils' written work the women were given a picture of the language level and interests of the pupils with whom they would be speaking. The response to the talks has been positive and the impact of the talks on the pupils seems to increase as they become more familiar with the experience. Since the pupils whose educational experience is being followed by the GIST programme have not yet reached third year, however, it will be some time before the full impact of the intervention can be assessed.

A more informally organised project concerned with girls' participation in science grew up in a large mixed London comprehensive on the initiative of

Hearn (1979). Hearn as head of the science department in the school became concerned with girls' underachievement in the physical sciences. The first step in remedying the situation was to offer an open invitation to sixth form students to take scientific studies — even if no science had been done previously. The problem was discussed with pupils during science lessons and the importance of Physics in careers — especially careers with a biological flavour — was stressed. The non-science staff were also involved.

The careers officer dealt with the topic with both parents and pupils. The Director of Studies and third year tutor interviewed pupils before their third year options are finalised and the Director of Studies gave a talk on which criteria should and should not be used in making a choice. The girls were also involved in giving demonstrations to parents in the science labs, in giving an exhibition of posters showing third year exam results of both boys and girls in physical sciences — which indicated that the girls did as well as the boys — and in giving an exhibition of career posters, many with a biological flavour and many requiring physics.

As a result of relaxing the entry requirements to scientific studies by sixth formers as well as the concentrated effort to change pupils and parents attitudes, Hearn reports a growing interest shown in physics by the most talented of the girls, as well as a significant increase in uptake of scientific studies by girls.

A project in Sweden described by Brock-Utne (1981) was designed to give both boys and girls an experience of non-traditional work situations while still at school. Grade eight pupils (14 year olds) have a period where they get acquainted with different work-places — sometimes through excursions and sometimes through a short period of work. It was found that girls usually went to traditionally female jobs while boys usually went to "male" jobs. In the 1976-77 school year in several of the municipalities, pupils were given a list of jobs which they were to rate either male or female. The girls were then asked to choose a job they had rated as male, the boys one they had rated as female for their work experience programme. Pupils' attitudes were negative at first — especially the boys'. The girls had more and generally higher status jobs to choose from, and the boys had to choose many lower status jobs. Their attitudes changed during the experiment however. In one municipality 100 per cent of the girls and 93 per cent of the boys thought that the practice should be followed in years to come. The work leaders generally responded positively and found no difficulty in putting the pupils to work. In two of the eleven municipalities who had submitted the results of the experiment many of the pupils made non-traditional choices at the next level.

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