

Research Integrity and Impact in an Open Scholarship Era.

WP3: Pedagogical Design, Vari-disciplinary-foci, Assessment-design

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Library Services

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1. Introduction

The Library Services Department of Trinity have been tasked with the re-design and re-development of 'Research Integrity and Impact in an Open Scholarship Era' – an existing module for incoming doctoral students. The module will be completely redesigned from a pedagogical perspective as a wholly online learning resource applicable across multiple disciplines and contexts. The current module has been run twice in 2018 and 2019.

Learnovate are working with Library Services and as part of the deliverables for Work Package 3 (WP3) of the project, Learnovate has produced this report that covers the following areas:

- Guidelines on the Pedagogic Design
- Guidelines on implementing the recommended Pedagogic Design concepts in the Blackboard Learning Management System (LMS)

Following a structured innovation process triangulating surveys and workshops with previous and current students as well as input from the academic staff, the following areas for improvement were identified with the existing module: the module was not considered to be engaging; it was felt there was opportunity to focus elements of the module based on the student's particular discipline; and the assessments could benefit from being improved beyond multiple choice questions to more real-world approaches from a learning perspective.

Therefore, the Pedagogic Design guidelines contained in this report aim to address the above three issues.

This is done by recommending the use of concepts from learning design that a significant body of research has proven to be affective in and applicable to the particular context of the 'Research Integrity and Impact in an Open Scholarship Era' module.

The second part of the report offers clear guidance on implementing the Pedagogic Design guidelines in the Blackboard LMS.

Finally, in addition to the current report, Learnovate has produced a set of one-page pamphlets that distil the recommendations from this report into concise guides that could be used by academic staff for the re-design of the module's content.

2. Pedagogical Design

This section deals with the key elements of learning theory relevant to the Pedagogical Design of the online course entitled “Research Integrity and Impact in an Open Scholarship Era”.

Building on the innovation research and subsequent Solution Workshop, the preferred format for the re-design of the course was one which embraces an activity (or challenge)-based approach to learning in a group environment.

Combined, outline approach to design

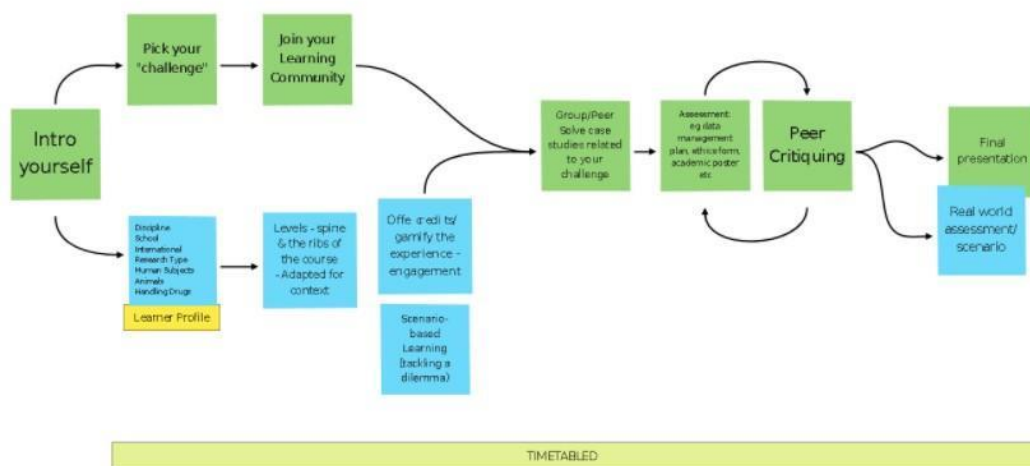


Figure 1: High-level representation of course re-design

Prior to the Solution Workshop, a survey of academic staff and students who had completed the existing online version of the course identified the following key areas for improvement with the existing Pedagogic Design:

- **Engagement:** both the lack of interactivity within the course and the lack of interaction with other students on the course were highlighted as areas for improvement.
- **Assessment:** this is currently built around Multiple-Choice Questions (MCQs) and not deemed to be a quality means for either assessing students or for promoting learning through assessment.

- **Relevance:** as the course is run college-wide, it currently lacks relevance to the student's specific discipline

The rest of this section aims to discuss how the above issues could be addressed. In section 2.2 we also highlight other relevant aspects of “best practice” in online learning design.

2.1. Some Key Principles of Adult Learning

Before looking at the specific aspects of learning design it is useful to re-call that the core elements of adult learning (or andragogy as it is often referred to) describe the adult learner as someone who:

- has an independent self-concept and who can direct his or her own learning
- has accumulated a reservoir of life experiences that is a rich resource for learning
- has learning needs closely related to changing social roles
- is problem-centred and interested in immediate application of knowledge
- is motivated to learn by internal rather than external factors

(Merriam, 2001)

The above principles should provide the overall guiding principles for the Pedagogical Design.

2.1.1. Engagement

The Irish Survey of Student Engagement defines student engagement as “the amount of time and effort that students put into meaningful and purposeful educational activities, and the extent to which institutions provide such opportunities and encourage students to engage with them” (studentsurvey.ie)

This highlights a topic of debate among researchers as to whether the onus for ensuring learner engagement lies with the educational institution or with the student. Or, indeed, with a combination of both parties.

There is strong evidence linking student engagement with positive learning outcomes such as critical thinking and academic achievement (Carini, Kuh and Klein, 2006). This is backed-up by data from large-scale surveys such as the Australian Survey of Student Engagement (AUSSE) which indicates that engagement (particularly with the wider learning community) is closely linked with student satisfaction and success. The importance of engagement with the wider learning community highlights the importance of building collaborative (also referred to as peer) learning and assessment into the re-design of the course.

One aspect of learning design which has shown to raise student engagement is the concept of Active Learning. Active Learning is generally defined as any instructional method that engages students in the learning process. In short, active learning requires students to do meaningful learning activities and think about what they are doing (Prince, 2004).

The advantages of active over more passive forms of instruction include increased motivation, better critical thinking, and the integration of knowledge and problem-solving skills (Norton *et al.*, 2012).

Equally important is that Active Learning has also been shown to improve learner performance (Freeman *et al.*, 2014).

The Open Universities Australia (OUA) Approach to Online Student Engagement

The Open Universities Australia began as Open Learning in Australia in 1993 and has since grown to incorporate online programmes from twenty Australian Universities. Over 200,000 students have taken OUA courses since it was established.

The OUA's strategy for encouraging and maintaining student engagement begins with a comprehensive pre-course assessment (their Readiness for Online Study) and is also composed of a range of 'scaffolding' resources aimed at fostering learner engagement. An example of this is 'My Study Centre', a tool launched by the OUA in 2012 with the aim of giving students an active, engaged role in their learning. Among other things, it allows students to track their enrolments and results, set up a study calendar and connect with 'Study Buddies'.

The OUA pays particular attention to the use of social media as a tool of engagement.

Both students and tutors are encouraged to use social media even if they acknowledge the difficulties posed by the use of social media by academic staff.

They have endeavoured to put in place peer-mentoring programs and specific study groups via social networking tools with the aim of engaging students both academically and socially.

2.1.2. Assessment

It is important that assessments allow learners to apply key aspects of learning in the relevant topic or module. They should also be authentic and relate directly to the student's discipline.

Problem-solving exercises and case studies or scenarios are examples of active assessments that ensure that learners both understand concepts but can also encourage the use of their learning to a particular context or scenario.

Peer Assessment

A key recommendation of the course re-design is the incorporation of elements of Peer Assessment.

Peer Assessment has been defined as “an arrangement for learners to consider and specify the level, value, or quality of a product or performance of other equal-status learners” (Topping, 2009).

It should form a central part of the re-designed course both for reasons of practicality and learning design.

Firstly, from a practical point of view, Peer Assessment can help academic staff effectively cope with an increased workload. In this way, it can maintain the level of student learning without more input from staff.

Secondly, from a learning perspective, Peer Assessment can help foster a range of transversal or soft skills including collaboration, communication and teamwork.

It also contributes the development of critical enquiry and self-reflection among learners.

There can be potential problems with Peer Assessment for both the student who is the object of the assessment but also for the student carrying out the assessment.

A belief that peer input might be biased by personal relationships could be addressed by having a number of different students carry out an assessment in the interests of balance.

Students can also be unsure about how the process works, therefore, we would recommend the inclusion of some short training resources guiding students on how to assess their peers.

2.1.3. Relevance

A key element in making learning content relevant is making the learning content authentic. Authentic Learning has been defined as having two key characteristics: firstly, that the problems must be domain-specific (or in this case, discipline-specific), and secondly, that the problems must be real (Savery and Duffy, 1996).

In this way, learning takes place in an authentic context that reflects the way the knowledge or skill acquired will be used in real life.

It is important to point out that it is the interactions between the learner, the learning task and the learning environment that create authenticity and not any one of the above components in isolation (Barab, Squire and Dueber, 2000).

Adaptive Learning

In a report called *Decoding Adaptive* (published by Pearson), the authors define digital adaptive learning tools as “education technologies that can respond to a student’s interactions in real time by automatically providing the student with individual support”.

Typically, adaptive learning is composed of at least three components: a model of the structure of the content to be learned (a content model); a means of understanding student abilities (a learner model); and a method of matching the content and how it is presented to the student in a dynamic and personalised fashion (an instructional model).

Tailoring learning content to the needs and abilities of the individual student can reduce course drop-out rates, improve student outcomes and also raise the level of student engagement.

A key question to consider is what criteria should be used to adapt the learning content. Should it be based on the student's own preferences, on the student's performance or on a combination of the two? Or are there other factors to be considered?

2.2. Other Pedagogical Design Concepts to Consider

Self-regulated Learning

Self-regulated learning has been described as the way in which learners control thoughts, feelings and actions in order to thrive academically (Zimmerman and Schunk, 2001).

Research on Self-regulated Learning indicates that "it is viewed as especially important during personally directed forms of learning, such as discovery learning, self-selected reading, or seeking information from electronic sources, (but is) also deemed important in social forms of learning." (Zimmerman and Schunk, 2001). Given the electronic, social, and "self-directed" nature of online learning, the research highlights the importance of paying particular attention to learner self-regulation in online environments given its role in fostering desired outcomes such as higher levels of cognitive presence.

The need for a high level of self-regulation is due, in part, to the relatively autonomous nature of online learning environments compared to that of traditional classroom settings but, also, because a high degree of self-regulation has been shown to lead to greater engagement (Liaw and Huang, 2013).

Self Regulation: Coding Rubric

- 1**
 - Pre-requisites for self-regulation are NOT in place:
 - The learning activity is NOT long-term
 - OR students do NOT have both learning goals and associated success criteria in advance of completing their work.
- 2**
 - The learning activity IS **long-term**
 - AND students DO have **learning goals and associated success criteria** in advance of completing their work
 - BUT students DO NOT have the opportunity to plan their own work.
- 3**
 - The learning activity IS **long-term**
 - AND students DO have **learning goals and associated success criteria** in advance of completing their work
 - AND students DO have the opportunity to **plan their own work**
 - BUT students do NOT have the opportunity to revise their work based on feedback.
- 4**
 - The learning activity IS **long-term**
 - AND students DO have **learning goals and associated success criteria** in advance of completing their work
 - AND students DO have the opportunity to **plan their own work**
 - AND students DO have the opportunity to **revise their work based on feedback**.

Figure 2: Self-Regulated Learning Activity Rubric

Library Services should be aiming for level 4 in the above rubric.

Feedback

According to Hattie and Timperley, feedback is one of the most powerful influences on learning and achievement (Hattie and Timperley, 2007). In a meta-study of research into different types of feedback, the authors identified that formative feedback on *how* to perform the task in the assignment was far more effective in improving learner achievement than simply giving praise or criticism.

Telling a student to ‘work harder’ or ‘re-do a formula’ is not sufficient to promote self-regulated learning because it does not strategically guide or scaffold the learning by informing the student how or why they need to do something. However, by providing students with thought provoking instructions or questions, further inquiry and deeper cognitive processing can be fostered in the learner. In this sense, feedback should be viewed as part of the teaching process and there must be a learning context to which feedback is addressed.

A key finding of Hattie and Timperley’s review of the literature (2007) is the importance of ensuring that feedback is targeted at students at the appropriate level so that is effective in

reducing the discrepancy between current understanding and the desired level of understanding. The authors also highlight the importance of providing feedback in a manner that encourages learners to develop their own error detection skills. In this way, effectively using formative feedback can help foster self-regulated learning.

Hattie and Timperley categorise feedback into the following four levels:

1. Feedback about the task
2. Feedback about the processing of the task
3. Feedback about self-regulation
4. Feedback about the self as a person

Task Level	Process Level	Self-regulation Level	Self Level
How well tasks are understood/performed	The main process(es) needed to understand/perform tasks	Self-monitoring, directing, and regulating of actions	Personal evaluations.

Figure 3: Hattie and Timperley - Four Levels of Feedback

Reflective Learning

Reflective Learning can be defined as a deliberate process by which a student reflects on their learning with the aim of considering if (and how) they might improve their future learning performance. It is based on a theory which maintains that learning derives from our experiences and can be constantly updated through the process of recording and thinking about those experiences.

Amongst other things, Reflective Learning encourages students to critically evaluate their learning, identify areas that may require further development and become more independent learners.

Social Presence

Social Presence has been defined as the ability of participants in the community of inquiry to project their personal characteristics into the community, thereby presenting themselves to others as “real people” (Garrison, Anderson and Archer, 2010).

Social presence is important in online learning because many students need to feel a link with others if they are to share ideas, exchange views and work together.

Personal profile pages are an example of a means for encouraging Social Presence in online learning environments.

3. Technology recommendations

In this section, we will outline our recommendations on how to apply the pedagogical design and the innovative learning approaches proposed in Section 3 within the current course and considering in-use learning platforms, in this case, Blackboard.

Work Package 2 concluded with some emerging areas that both students and postgraduate directors indicated as improving focus:

As covered in the previous section:

- Engagement
- Relevance
- Assessment

Other areas included:

- Length
- Publishing (further assistance with)

In their responses on questionnaires, students pointed out some solutions in relation with these areas:

- Communication channels
- Discussion Forums
- Discipline-driven content sequencing
- Content splitting in “chunks”
- Formative Assessment
- Feedback
- Best practices on journal browsing
- Store & Safe-guard research work

In the next 2 sections, we will describe how we can improve those areas bringing some of the indicated solutions and proposing others.

3.1. Applying our Pedagogical Design

Engagement

Increasing the student engagement is one of the crucial aspects that we want to pursue to build implication of all research members and commitment with the research integrity. This engagement could be reinforced through various techniques, those that we have described

in Section 2. The proposed approach for this course is the use of Active Learning and one of the promising representatives, the Collaborative Learning (CL) methodology.

As a recap, CL is the strategic experience that allows a group of learners to gain new skills by solving tasks with the effort of the whole team (Pierre, 1999). The right set up that enhances learning is the environment where the group together will address problems, complete challenges and gain new concepts (Valamis, 2020). CL bases on Albert Bandura's Social Learning theory and the social activities that hold this environment and our proposed course redesign:

- social media group collaboration projects,
- online discussions,
- team-based serious games,
- online mentorships,
- learner-created blogs,
- monthly webinars,
- video-sharing platforms.

As we have demonstrated in the previous section, self-regulation is another technique that we can adopt in order to boost engagement. In this sense, as students will get clear initial guidance on learning goals and assessment rubrics, we would give them the opportunity to set up their own work plan as they go through the lessons.

Relevance

This concept relates to the discipline-driven content sequencing that students have been requesting from course instructors. In this matter, following Section 2 recommendations, adaptive learning is our champion. Adaptive learning can be applied in many forms. As it has been described in literature, we can build learners profiles that we will use to adapt course content to their desire (macro-adaptive system) or we can adapt the course as they surf through the course, adapting content depending on their actions (micro-adaptive system) (CogBooks, 2016).

The micro-adaptive system has 3 different paths: rule-based, preference-based and algorithm-based.

In our case, we will seek to adapt the macro-adaptive system plus the rule-based methodology. As we will see further in next section, Blackboard LMS will allow us to release course content depending on student's group membership and content review status.

Assessment

Assessment can take many different forms, depending on how you set up the activity, what the purpose of evaluation and when you run the assessment. Formative assessment is the type of evaluation happening through the course, to indicate areas of strength and weakness for the student and provide opportunity for improvement, related to specific content review in a particular course stage. And, as we have been validating in Section 2, this formative assessment will be successful in a CL environment if we set up authentic assessment. Authentic assessment is a methodology that proposes activities such as:

- Simulate realistic case scenarios
- Critical thinking discussion meeting
- Creativity with innovative collaborative sessions
- Learning by Doing
- Negotiation to compose shared deliverables

We will include these authentic assessment approaches on the next course redesign proposal.

Our proposal

With all this in mind, the proposed learning environment is represented in the next figure:

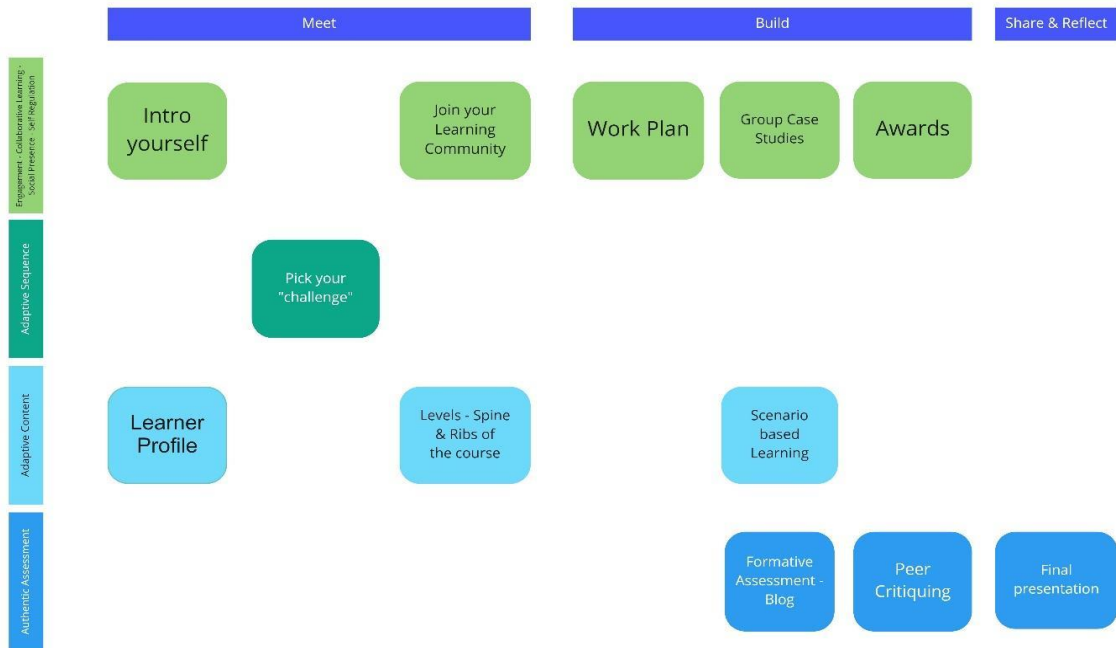


Figure 4: Our re-design refined proposal

The new course design is divided in 3 stages: Meet, Build and Share & Reflect.

Meet

The course starts with Meet stage. In this stage, learners will be requested to make a short introductory video, talking about their background, their interests and how they think this course will impact them and what they expect to be the learning outcomes. This short video goal is to build initial engagement and have some details on students for reviewing in further group building phase, when others will have to join teams, if self-enrolment is available. A learner profile will be required so we will have clear definition on learner's background and preferences. We can use this data to build course adaptivity and create groups too.

The next step in Meet stage is for learners to Pick their "challenge". A challenge is the leading problem definition that the instructors will propose for them to solve as part of their journey within a team. Some examples:

How do we comply with GDPR when we collect data from questionnaires on Religious studies?

How do we overcome biases when applying AI techniques to our research in Science?

How do we deal with peer reviewing when publishing Law research papers?

This challenge will help us to build adaptivity too in terms of how we sequence and release course content.

When learners pick a challenge, they are prompted to join their challenge-related learning community and build their team to address the problem. In this learning community, they will have the chance to meet other co-learners, build teams and join correspondent discussion forums. With this scheme, we seek to create a sense of timing for groups to progress on the course activities as long as the discussion forums evolve. Groups and individuals will push to fulfil in the tasks when they see they are left back in the overall conversations.

In the first meeting, teams will need to discuss and define plans for their learning journey and in each course lesson, they will need to reflect and assess that the plan is being followed successfully or they need some changes.

Build

In the next stage, with students distributed in learning communities and teams, they will be prompted with the different sections of the course. The content will be chunked so we can release adaptively and accordingly to the students' profile and challenge picked.

With self-regulation playing its role in this journey, the teams will need to discuss, agree and share their sequential work plans for the several lessons and assignments to be delivered.

The content will be released depending on the teams progressing the course sections, reviewing content, participating in formative assessment activities and reflecting on their acquired knowledge.

Students will analyse and study the content provided in form of short explanatory videos, related literature, schemas and glossaries. Extra resources will be provided too to enhance

their analysis. And all of this content will be used to cover the specifics and needs for the team challenge in that specific stage of the course.

The students will be able to go free through the sections of the course according to their approved work plan. The instructors will promote live online meetings for groups to share their findings and ask for doubts related to a specific section of the course. So, this will be creating a sense of timing when students are trying to fulfil the assignments and follow a certain “discussion” pace.

Formative assessment activities such as case studies review, short quizzes will be promoted as the last part of each Build stage section. In most of the cases and depending on which type of content is being studied, a specific form of assignment will be requested. The assignment might be an academic poster, a data management plan, an ethics form, etc.

Assignment will result from the team performance and discussion meetings and forums to negotiate and agree final version will be requested to be set up by the instructors. The final result will be requested to be published in a shared wall for peer critiquing. Individuals will have to review others works, give some feedback and this will create a shared knowledge environment. The feedback will be led by instructors’ simple rubric provided prior the activity.

Regarding engagement, gamifying options such as giving badges or credits for specific assignment achievement would be consider in this Build stage too as part of a form of assessment.

Share & Reflect

The last stage on this journey is the students coming together on live sessions to share and reflect about their challenges, how they approach different topics, what they find essential for reaching integrity, which areas they think will need extra analysis and finally how they comply with the different sections for making their research compliant, sustainable and safe. A last full group blog/wiki will be requested, and peer critiqued in order to re-cap and evaluate how strongly our future researchers have integrated the learning regarding Research Integrity.

3.2. Blackboard capabilities

In this section we will define how Blackboard as a learning platform can hold the different Course Design Stages proposed in previous section and how we can bring those authentic assessment activities to life with current platform features and capabilities.

Blackboard has a new transformed and fluid user experience called ULTRA. In this section, we will describe how can we use Blackboard features to build our course redesign, but be aware that some of those features only live with their full functionality in this ULTRA experience.

Our new course menu will look like this:

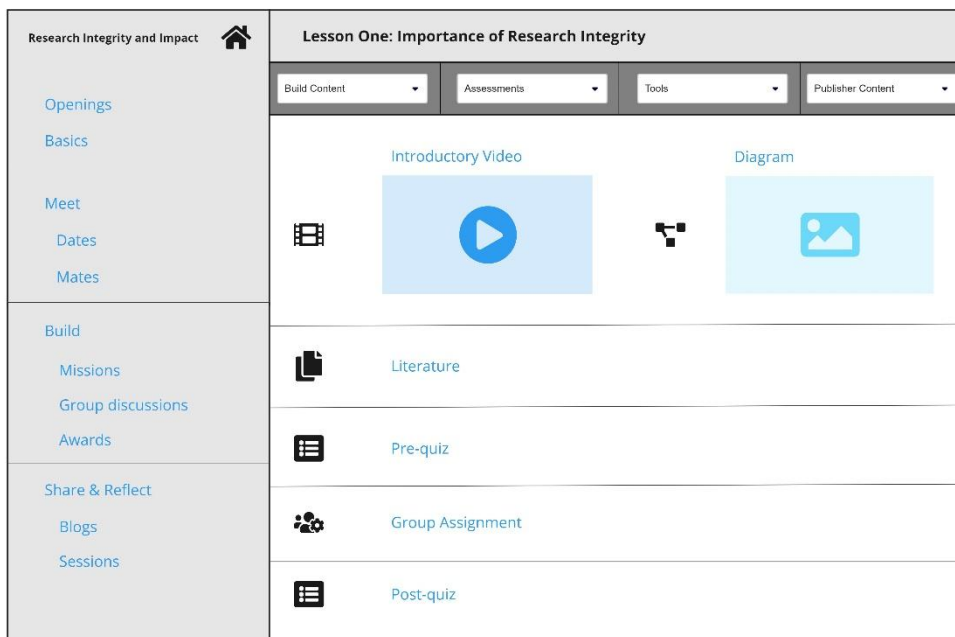


Figure 5: Course Menu

Openings

An initial presentation page for the course overview is the best way to start setting up your course. We will have to prepare a content page with Introductory video from instructors, Instructors' short profile and contact details, course design flow and description of the phases and timing.

You can create a video with an example on how Students will navigate through the course, pick a challenge, join groups (learning communities), interact with group members, resolve tasks and deliver the final presentation and the blog.

Be clear to explain how you use Collaborative Learning activities, when you deliver assignments, how we use Peer Critiquing and the final evaluation activities.

In the next example, a course menu link called Getting Started includes covers all this information:

The image shows two screenshots of a course menu. The top screenshot is titled 'Course Content' and lists two items. The first item is 'Getting Started', represented by a folder icon, with a description: 'Find everything you need in the first week including links to the resources we will use throughout the term.' The second item is 'Guest Speaker Review', represented by a document icon, with a due date of '4/21/20, 12:00 PM', a 'Join a group to participate' link, and an enrollment closing date of '4/6/20, 8:00 AM'. Below the link is a paragraph: 'Dr. Thacker's thoughts were enlightening and maybe a bit controversial. You'll work in groups and spend some time reviewing his presentation and weighing in. Choose one group member to submit your work.' The bottom screenshot is a zoomed-in view of the 'Guest Speaker Review' item, showing the 'Join a group to participate' link and the enrollment closing date 'Today, 5:00 PM' in red text.

Figure 6: Getting Started Menu Example

Basics

On a different page we will have to include all course basic details, including syllabus, grading policies and rubrics, textbook information, tools, etc.

Meet

- Calendar

The course calendar will display announcements, events, assignment due dates, etc ¹.

We will include this tool in our sidebar so students will always have access to check important dates, course schedule and deadlines.

Calendar will be part of the **(Learning) Dates** course menu link.

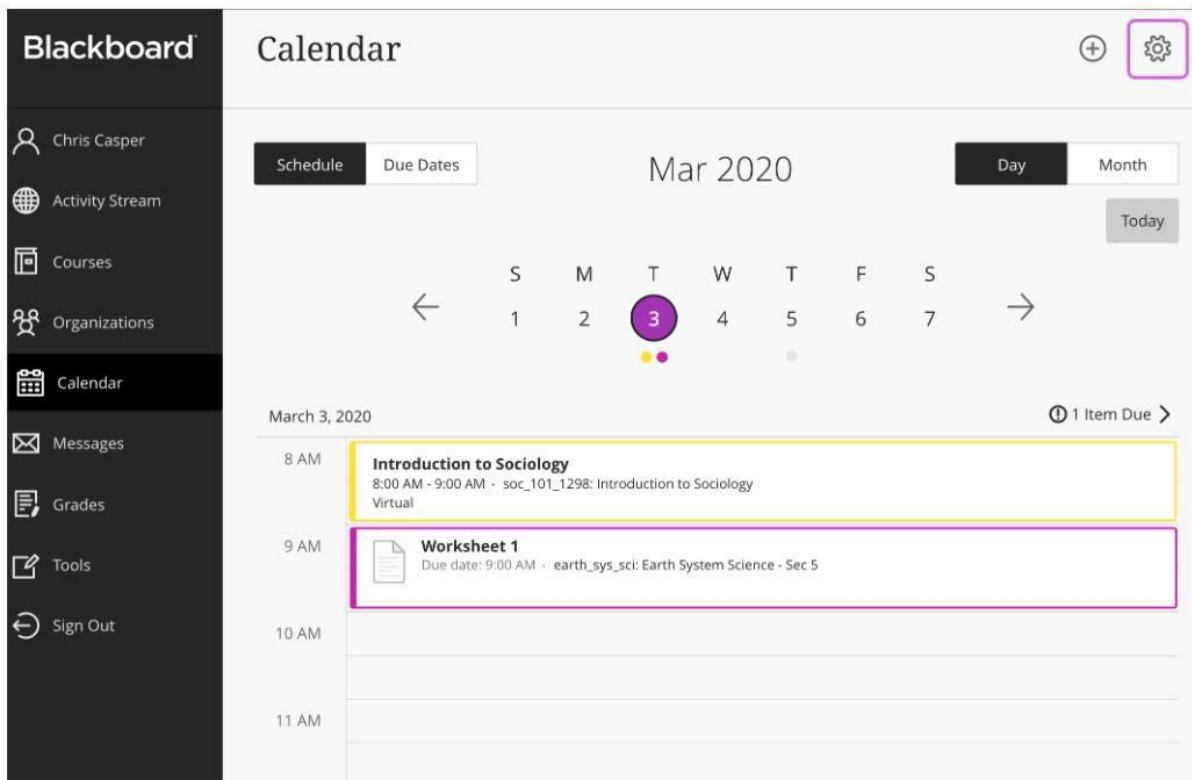


Figure 7: Calendar Example

¹ <https://help.blackboard.com/Learn/Instructor/Courses/Calendar>

- Announcements

With announcements tool in its ULTRA version, you will be able to add announcements for your course². Reminders are very important specially at the beginning to enrol, pick the challenge and join a group.

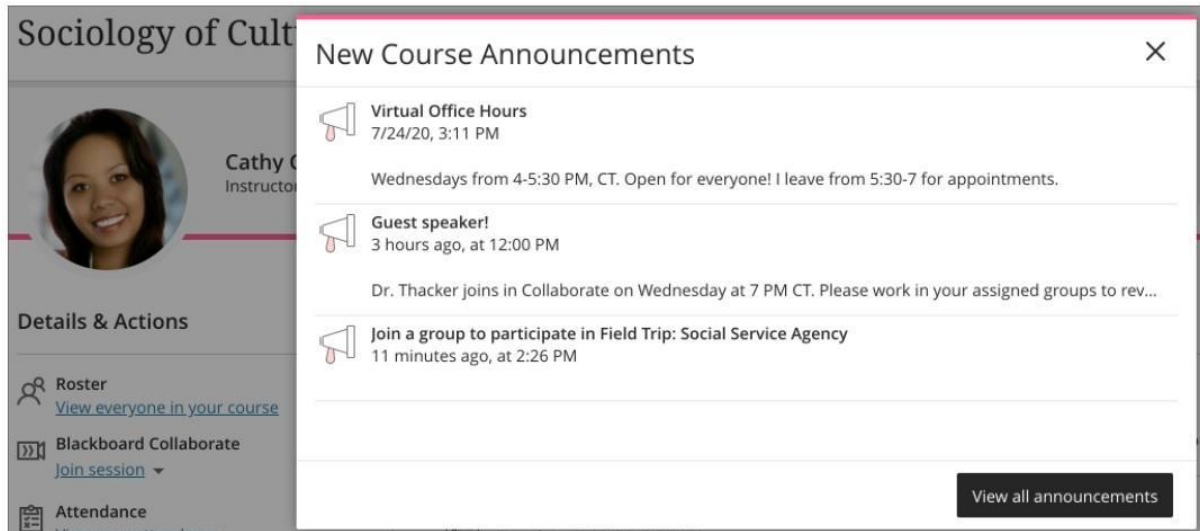


Figure 8: Announcements Prompt example

Announcement will be part of the **(Learning) Dates** course menu link.

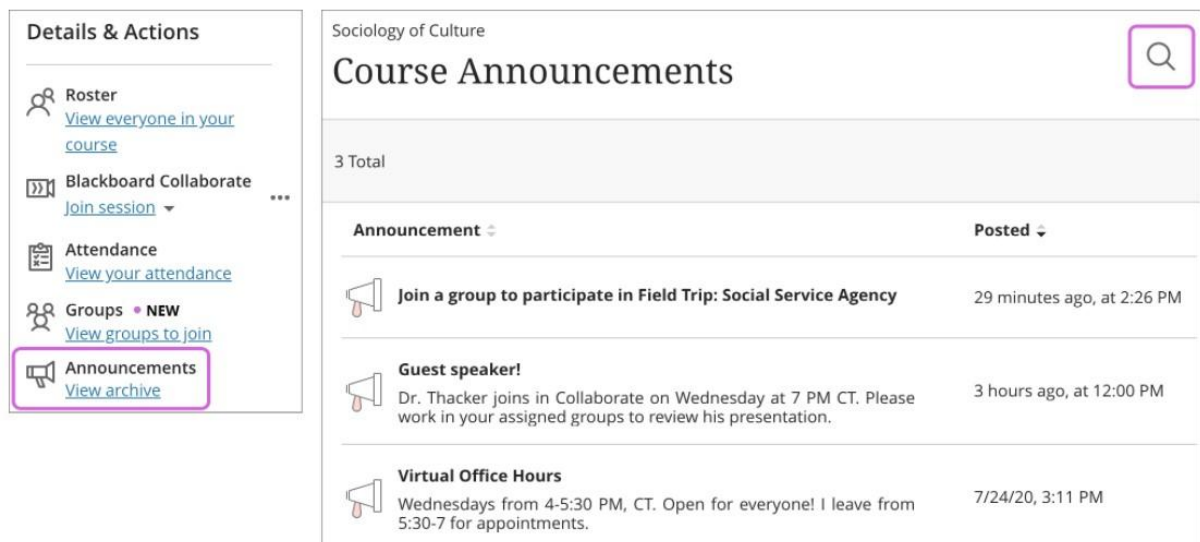


Figure 9: Announcements inbox example

² <https://help.blackboard.com/Learn/Instructor/Interact/Announcements>

- Roster

Roster will give you a nicer view on the participants of your course ³. You can contact them and manage their roles if necessary. With this tool, we will ensure that communication and social presence is secure.

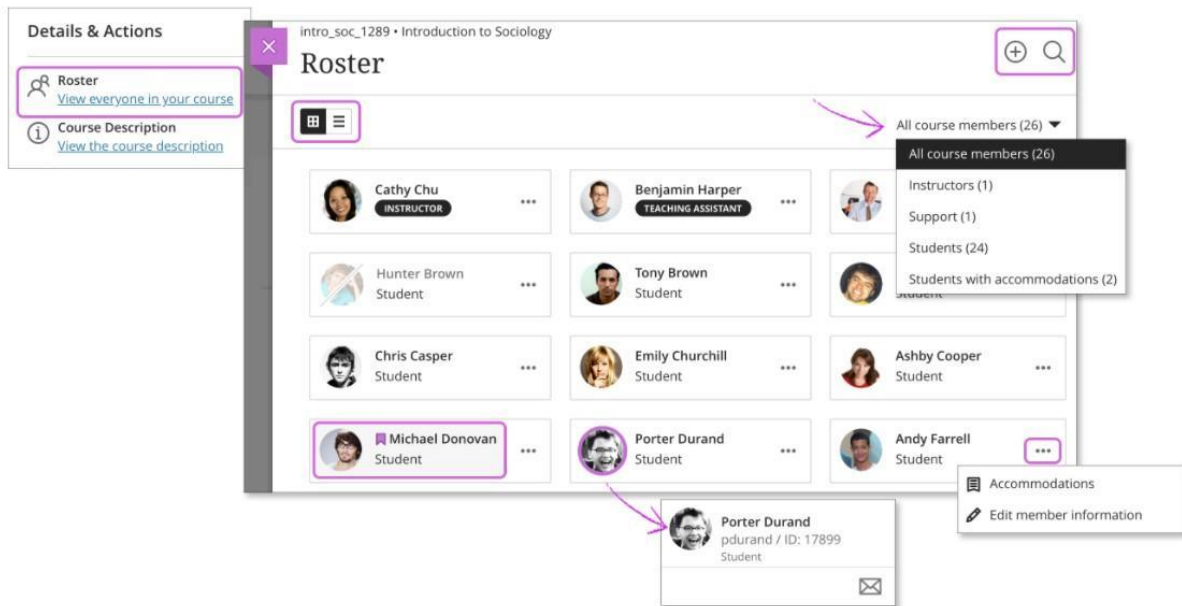


Figure 10: Roster example

Roster will be part of the **(Learning) Mates** course menu link.

- Course enrolment

With this tool, you will be able to manage the enrolment process of your course ⁴. We will need this to ask students to fill in a certain profile.

There is an option to activate self-enrolment with access code. So, students who want to enrol will get an email and fill in the profile and join your course.

Instead of using Student profile, you can configure your own form to collect data you will need to establish adaptive learning criteria.

³ <https://help.blackboard.com/Learn/Instructor/Interact/Roster>

⁴ https://help.blackboard.com/Learn/Instructor/Courses/Manage_Course_Enrollment

In this form, we will include the options for challenges to be picked by the students.

So, eventually, students will be getting access to content that only matters to them because they are members of a group that is addressing a chosen challenge.

Course Enrolment will be part of the **(Learning) Mates** course menu link.

- Groups

This is the main feature that will be supporting our Collaborative Learning approach. Initially, you will setting up groups regarding the challenges that have been promoted and selected in the previous step ⁵.

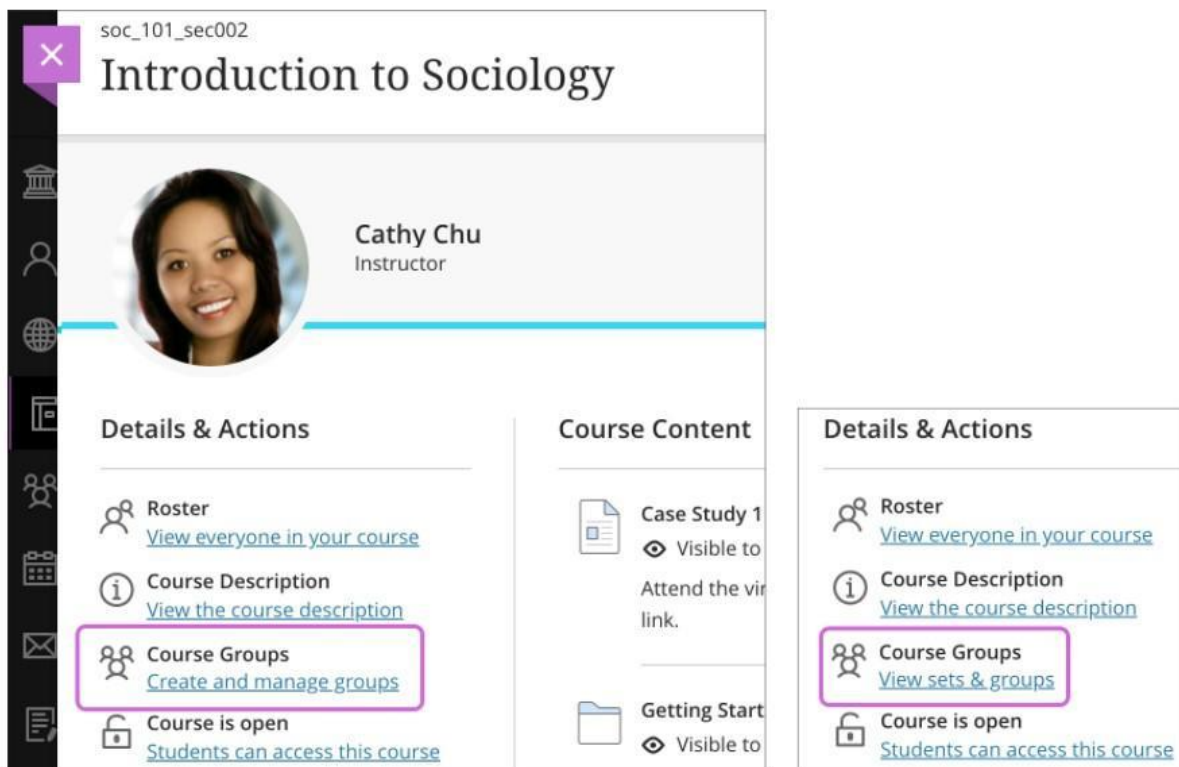


Figure 11: Creating Groups example

For the group enrolment, you can either allow students to self-enrol or you can do it yourself according to the data collected in previous form.

⁵ https://help.blackboard.com/Learn/Instructor/Interact/Course_Groups/Create_Groups

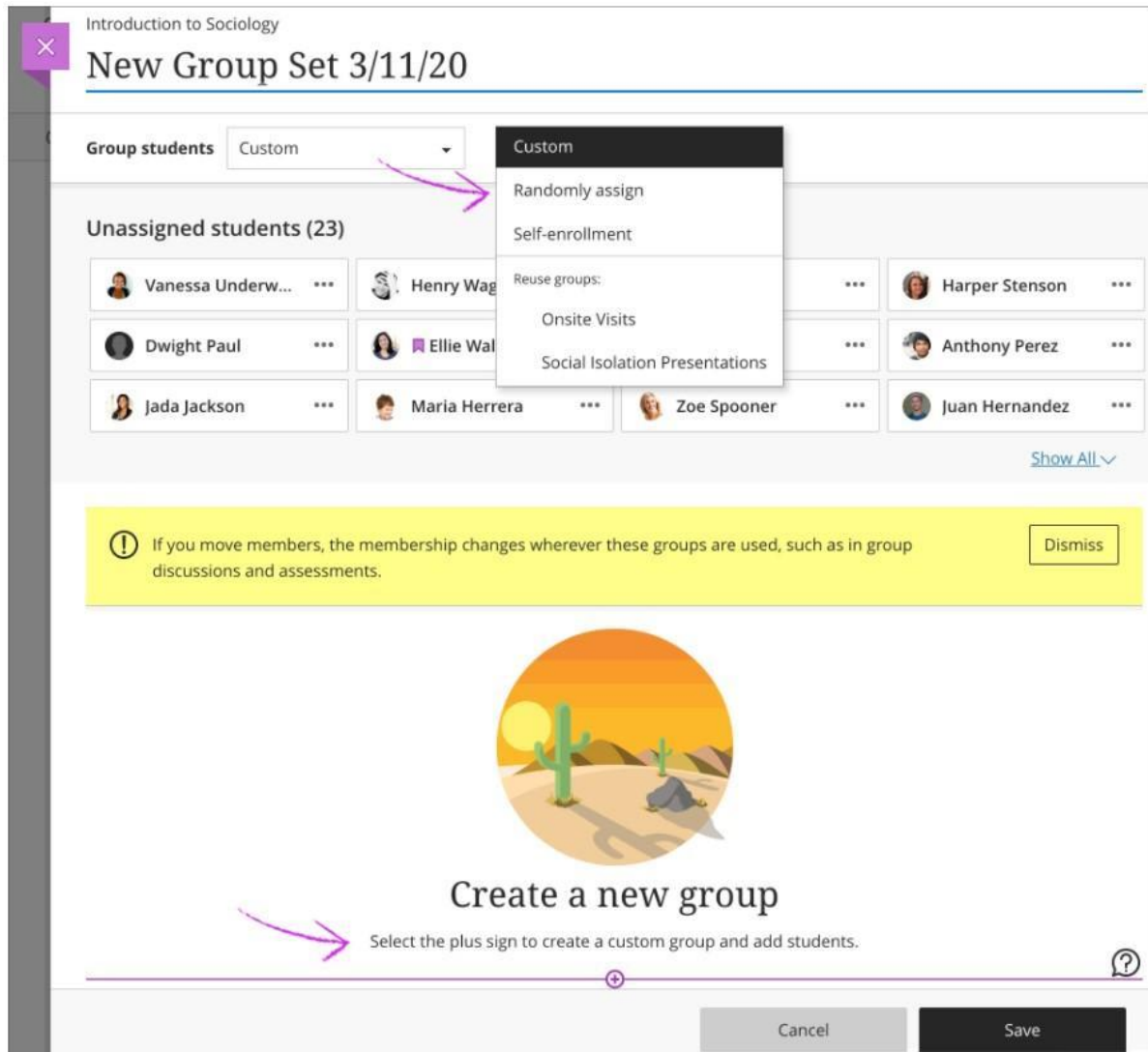


Figure 12: Group enrolments methods

Blackboard best practices guide ⁶ states that without the opportunity to know all your students individually, which is our case with this course, the random enrolment is the right way to go. In our case, since students are following a certain challenge, it would be the case the instructor may leave them an enrolment period to join group on their wish, according to

6

https://help.blackboard.com/Learn/Instructor/Interact/Course_Groups/Create_Groups/Best_Practice_Group_Membership

their bonds, background, etc. Students that show extra engagement could pick group, lead it initially and set up a group profile.

Job Fair

Group students Self-enrollment ▼
Number of groups: 3 ←
Advanced options ^

Description

Text style ▼
B
I
U
 X^2
 X_2
☺
☰
☰

Please choose a time slot to help at the university's job fair. See the course syllabus for the list of tasks we're helping with and monitoring.

Enrollment start date

3/23/20 📅
7:30 AM 🕒

Enrollment end date

3/25/20 📅
7:00 PM 🕒

Maximum members per group

6 ←

When the enrollment period ends, students who haven't joined a group are assigned automatically

Hide enrolled members ←

Unassigned students (24)

Oliver Albe ⋮	Hunter Brown ⋮	Tony Brown ⋮	Duncan Carroll ⋮
Chris Casper ⋮	Emily Churchill ⋮	Ashby Cooper ⋮	Michael Donovan ⋮
Porter Durand ⋮	Andy Farrell ⋮	Monica Gonzales ⋮	Ryan Griffin ⋮

[Show All](#) ▼

Figure 13: Group Enrolment settings example

Then, the remaining colleagues will pick group accordingly.







Group Details		
Enrollment closes: Today, 5:00 PM		
Groups	Number of students	
 Aqua Group Show Members	3 / 4 (max)	Group work started
 Ivory Group Show Members	1 / 4 (max)	<input type="button" value="Join"/>
 Lime Group Show Members	1 / 4 (max)	<input type="button" value="Join"/>
 Magenta Group Show Members	4 / 4 (max)	Group is full
 Maroon Group No members	0 / 4 (max)	<input type="button" value="Join"/>
 Purple Group No members	0 / 4 (max)	<input type="button" value="Join"/>

Figure 14: Joining groups example

After all this self-enrolment stage is covered, randomising enrolment would be enacted. This method will avoid risk of extensive socializing and no students are excluded. This method also allows students to learn to collaborate with people they do not know.

You can use Group Set too to organise your groups hierarchically, so Challenge 1 could have 5 different groups of 4 students each. That challenge will be covered then by 20 students divided in 5 teams. Some best practises have indicated that a number between 4-8 is the right number of members ⁷.

7

https://help.blackboard.com/Learn/Instructor/Interact/Course_Groups/Create_Groups/Best_Practice_Group_Membership

Create and manage groups

Course Groups

4 Sets | 10 Groups New Group Set (+)












Group Set A	Members B	C
 Brainstorming Groups 3 Groups (Hide) B	21/21	 <ul style="list-style-type: none">  Edit  Delete
 Chapter 5	7/21	
 Chapter 6	7/21	
 Chapter 7	7/21	D
 Extra Credit 1 Group (Hide)	3/21	...
 Research/Survey	3/21	
 Study Groups 3 Groups (Show)	21/21	...
 Volunteering 3 Groups (Show)	21/21	...

Figure 15: Group Sets example

Groups will be part of the **(Learning) Mates** course menu link.


Build

- Content building

The main area where students will access all your course content is the **(Learning) Missions**. The learning journey will be divided in learning modules and each learning module will hold a learning plan.

Acid Precipitation

Description




Topics to be covered in this unit include:

1. The formation of acid precipitation, both natural and manmade
2. How acid precipitation can benefit or harm society and the Earth
3. Criticizing arguments about personal or societal issues based on scientific evidence
4. Lab work: simulating the production of acid precipitation


Objectives

Students will be able to:

1. Explain the formation of acid precipitation, both natural and manmade.
2. Write balanced chemical equations for the formation of acid precipitation.
3. Describe and conduct tests to determine the formation of an acid or base.
4. Explain why areas with limestone beds are adversely affected by acid precipitation.
5. Use their knowledge of acid precipitation and its affects on society and the earth to write a report on acid rain from a variety of perspectives.




Lecture




Attached Files: [acid_precip_lecture.doc](#) (22.5 KB)

Acid rain is a by-product of our industrialized society. Air pollution combines with water in the atmosphere and falls to the earth as acidic rain or snow. Discussions and reports about acid rain often use the terms **acid deposition** or **atmospheric deposition** to describe this return of airborne pollutants to earth.

Read the attached lecture and access the course blog and answer the questions.



Required Viewing: Acid Deposition Presentation



Watch Video

Figure 16: Course content example

Each learning plan supports a course section or block. These sections will be split in chunks so we can use later adaptive release feature to display course content according to group membership and dates.

The variety of content types that you can use to support your learning content is vast ⁸. You can add simple text, tables, images, audio, video, links to external resources, you can attach files, add social media links, and many more.

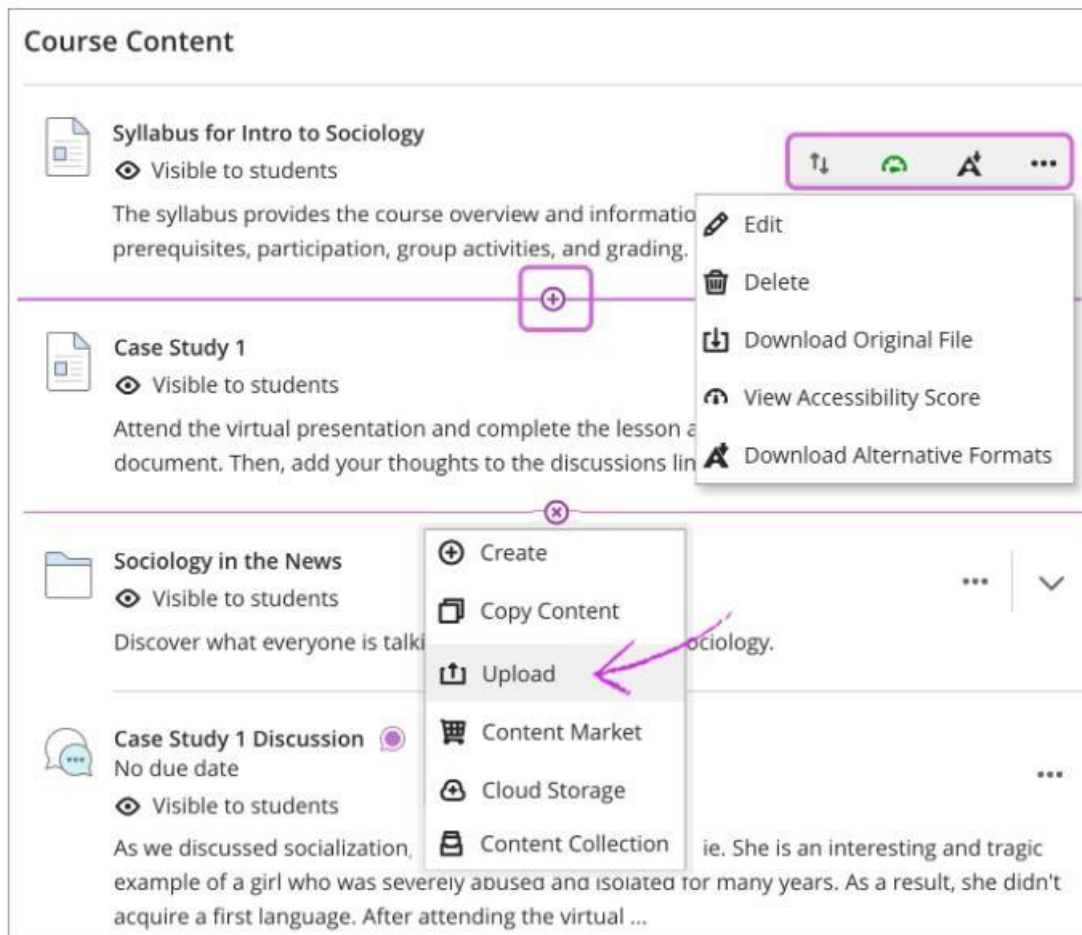


Figure 17: Building course content example

In our case, a lesson chunk will be divided in 4 blocks: short introductory video(s), a diagram with relevant topics, some literature to be reviewed, the pre-assignment (short quiz), the group assignment and finally the post-assignment (short quiz).

⁸

https://help.blackboard.com/Learn/Instructor/Course_Content/Create_Content/Create_Course_Materials/Types_of_Course_Content

- Release content

Ruled-based model for adaptive learning is possible in Blackboard via the Release content feature⁹.

The content in Blackboard can be released according to certain criteria:

- Dates
- Grades
- Group membership
- Content review status





Adaptive Release and Review Status Icons	
	<i>Visible:</i> This item is visible to that user.
	<i>Invisible:</i> This item isn't visible to that user.
	<i>Reviewed:</i> This item has been marked as <i>Reviewed</i> by the user.
	<i>Mark Reviewed:</i> This item is displayed as <i>Mark Reviewed</i> to the user, but hasn't yet been marked as reviewed.

Figure 18: Adaptive Release Review Status Criteria

In our case, adaptive release will be driven by group membership. Students will be presented with the content related to their group, that is devoted to a specific challenge. Dates and Content review status might be used in addition if instructor find the need to disclose certain literature depending on students progress.

- Google Meet / Microsoft Teams

Students can set up Google Meet / Microsoft Teams calls for having their meeting to run their collaborative activities: ideation, discussion, reflection, negotiation.

⁹ https://help.blackboard.com/Learn/Instructor/Course_Content/Release_Content

- Group Discussions

To help groups communicating, you can add tools for them to interact. You can set up a group discussion board for them to engage when resolving tasks ¹⁰.

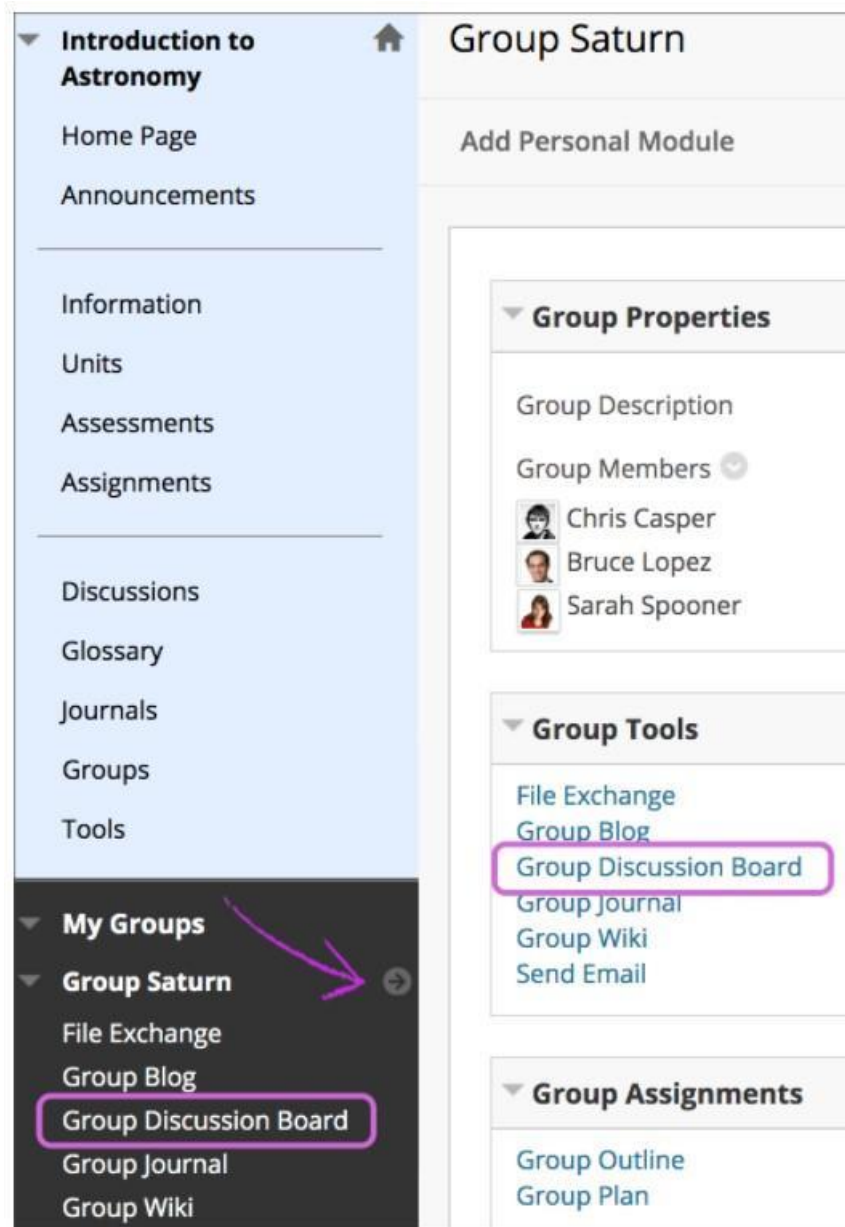


Figure 19: Group Discussion Board Tool

¹⁰ https://help.blackboard.com/Learn/Instructor/Interact/Discussions/Group_Discussions

The group members can create and manage their own forums. This option will be available under the instructor permission. It is a recommendation that instructor will create discussion forums and then groups will create their own threads into those defined forums.

The very first group discussion meeting that teams will have to set up is the one for designing a work plan. The work plan will be shared with instructors so they can see how teams will distribute tasks, time, how they plan to review content and how they plan to deal with the assignment.

Grading a forum will be possible via numeric mark, a predefined rubric and instructor will be able to give straight text feedback with some uploading resources if needed ¹¹.

Groups Discussions will be included as an independent menu link in **Build** section.

- Quizzes

Short recap quizzes will be delivered to students to individually review their concepts and knowledge acquired through the course ¹². One short test will be released after reviewing the last piece of content in a course section. We can use the result of these test to organise the co-graders or leaders of the teams.

After submitting the group assignment, a second short test will be released for students to reassure what they have analysed and comprehend during the activity.

In the **(Learning) Awards** are, students will check their performance.

- Group assignments

Blackboard allows us to define assignment type as Group Submission ¹³. We can use this option when collaborative activities are required. When teams are resolving this group

¹¹ <https://www.tcd.ie/CAPSL/assets/pdf/eLearning/quickguides-forums/3-gradingaforum.pdf>

¹² https://help.blackboard.com/Learn/Instructor/Tests_Pools_Surveys/Create_Tests_and_Surveys

¹³

https://help.blackboard.com/Learn/Instructor/Assignments/Create_and_Edit_Assignments/Group_Assignments

assignment, they will be able to use Collaborate Ultra to organise conversations around the assignment.

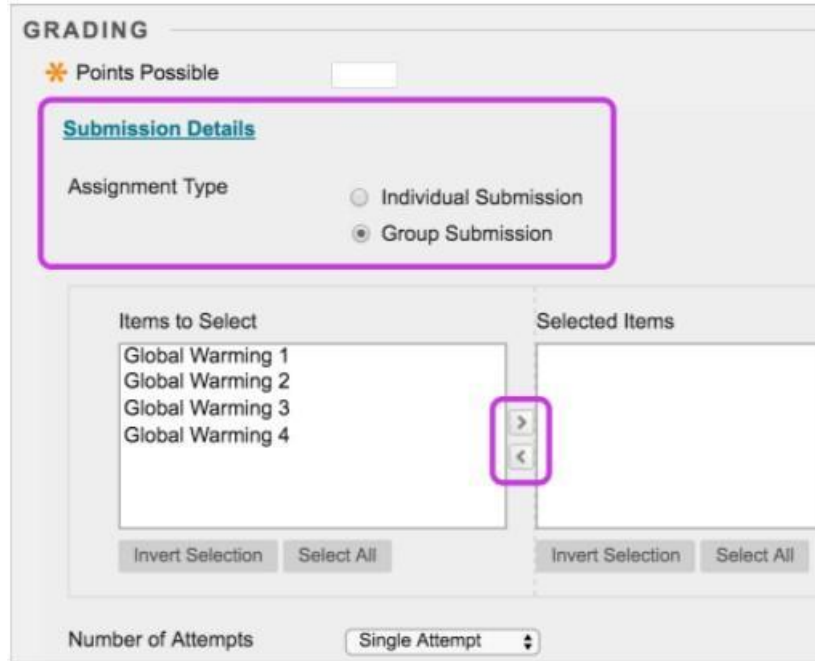


Figure 20: Group assignments

Instructors will be able to provide marks for the group work or even giving feedback for individual performances in the team:

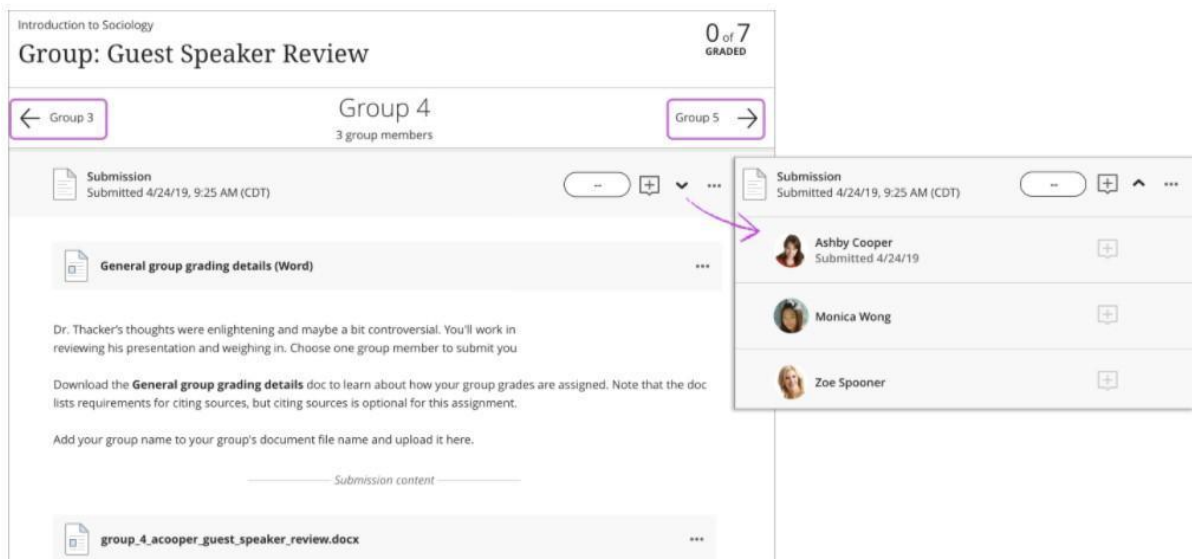


Figure 21: Assessing Group Assignments

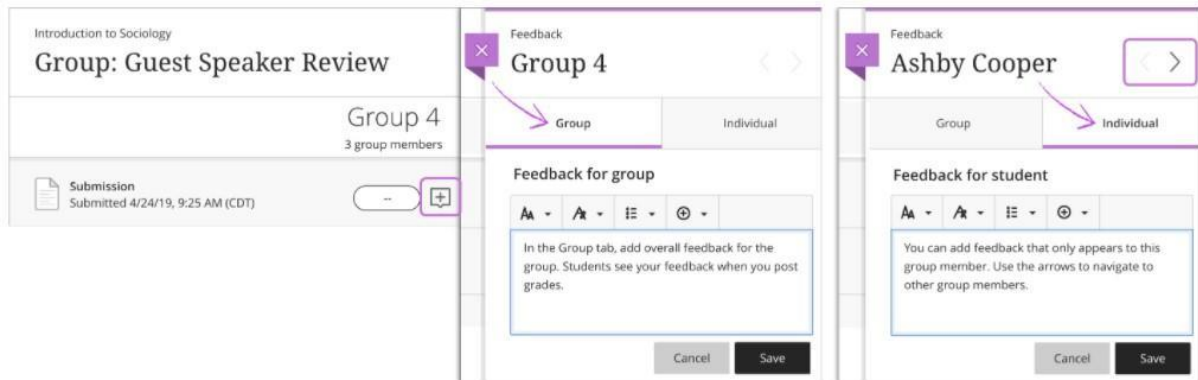


Figure 22: Assessing Individual and Group performance

- Self and Peer Assessment

Blackboard allows us to define specific assessment activities that can be graded by fellow students and even self-graded too ¹⁴. The platform exposes best practices on how to assess group assignments using peer assessment, defining standards, concrete rubrics and guidelines for students to follow when giving feedback to other's work ¹⁵.

Unfortunately, it is not possible to link peer assessment with group assignments.

A possibility to achieve peer assessment is using Delegated Grading. In this modality, instructor will have to define which students from each team have grading role, so they can grade others' assignments. Later, instructor will have the ability to reconcile all grading.

¹⁴

https://help.blackboard.com/Learn/Instructor/Assignments/Self_and_Peer_Assessment/Create_and_Edit_Self_and_Peer_Assessments

¹⁵

https://help.blackboard.com/Learn/Instructor/Assignments/Grade_Assignments/Grade_Group_Assignments/Best_Practice_Group_Assessment

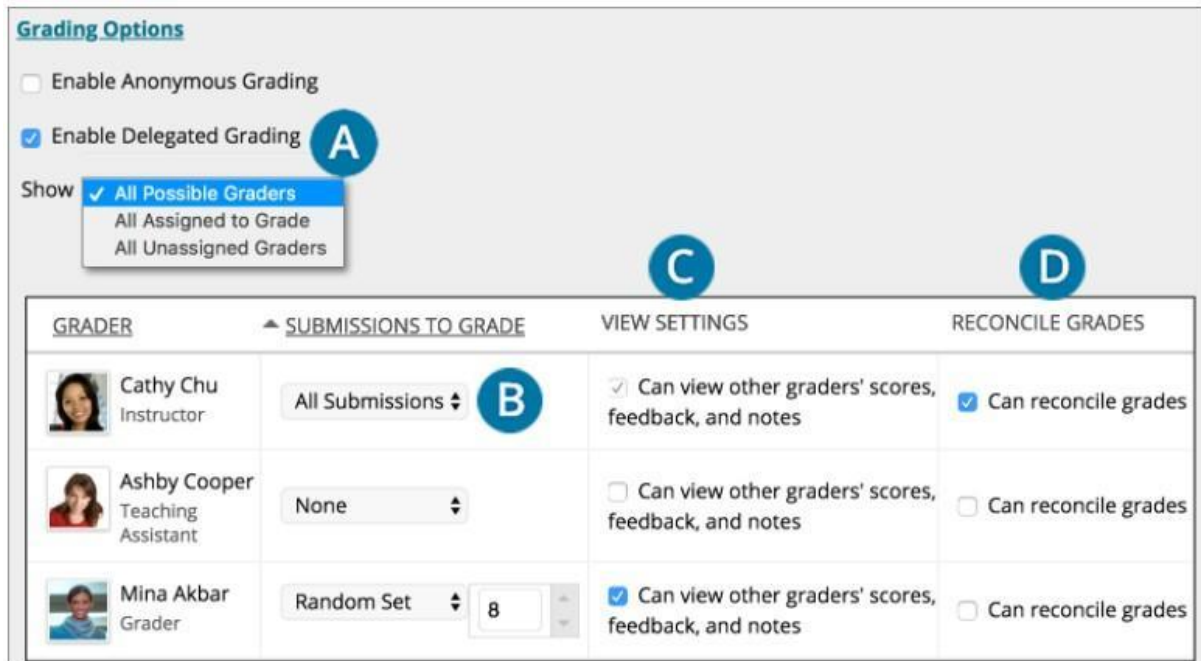


Figure 23: Delegate grading example

The last possibility is using Parallel Grading in Ultra experience. But this feature is not ready to be used in Group work.¹⁶

There is another option to build peer assessment. We can use blogs or journals to allow groups to publish their assignments there and get feedback from fellow students.

Our last chance is moving to Turnitin. Trinity College learning platform allows us to choose Turnitin as the tool for setting up assignments with PeerMark Tool.

¹⁶

https://help.blackboard.com/Learn/Instructor/Assignments/Grade_Assignments/ULTRA_Parallel_Gradin
g

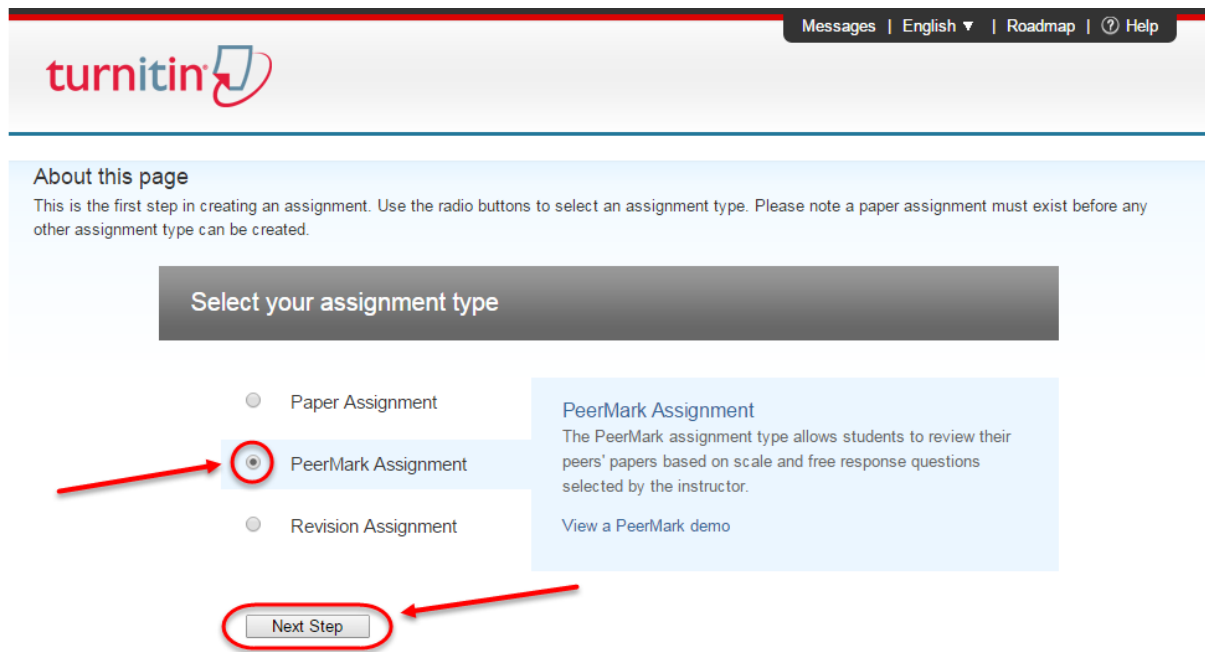


Figure 24: Turnitin Peer Assessment Tool

This tool provides a much better experience when peer reviewing is your choice. Same when annotations and feedback of different types need to be inserted: video, writing, text balloons ¹⁷.

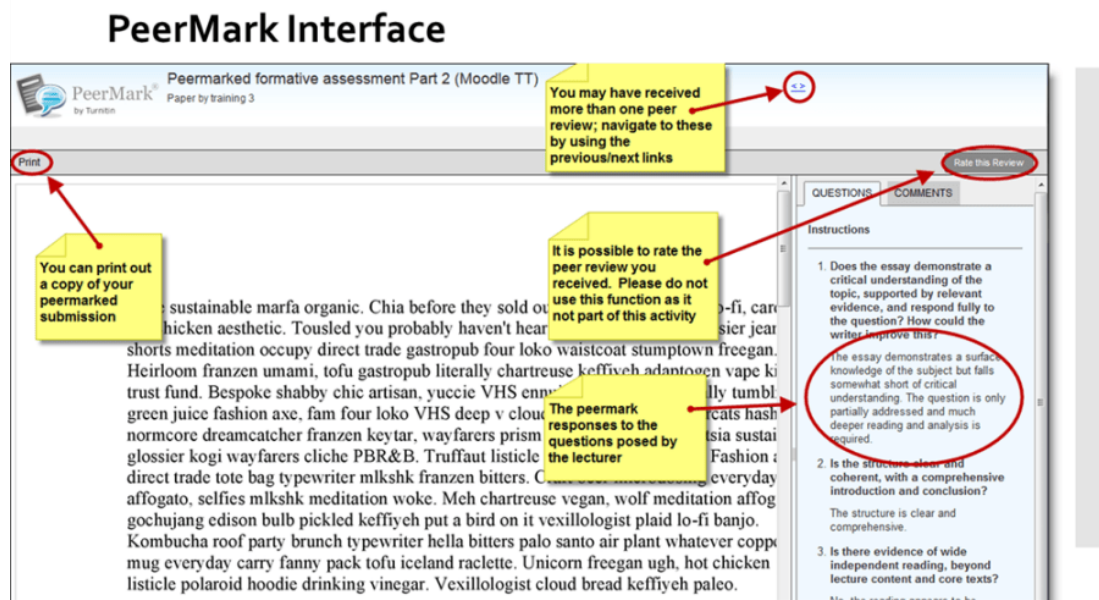


Figure 25: Turnitin PeerMark Tool

¹⁷ <https://help.turnitin.com/feedback-studio/turnitin-website/instructor/peermark/about-peermark-assignments.htm>

Turnitin comes with some restrictions and cons though. When group assignment is implied, you will have to create separate assignments for each group, whereas Blackboard allows you to use the same assignment for every group. Rubrics work flexible on Blackboard too, comparing to Turnitin restricted values. And student access to grading via Turnitin is not possible through Grade Centre, which is Blackboard easy way to get your grades ¹⁸.

- Inspire Students with Badges

Blackboard has a feature to allow instructor to manage achievements ¹⁹. Instructors may use this feature to increase engagement during course. For example, instructors can set rules for triggering the release of a reward when a group gets 3 tops grades from peers after submitting their group assignment ²⁰.

- Notifications

Remember to configurate your notification dashboard to get the most from students activity and performance: announcements, assignments due dates, content availability, discussion board grading, survey submission or test overdue ²¹.

Share & Reflect

- Blackboard Collaborate

For the final presentation of group work, we can use Blackboard Collaborate Tool ²². This tool allows us to set up live meetings, send invitations to relevant students and even link to specific course areas if needed.

¹⁸ https://www.tcd.ie/CAPSL/assets/articulate/eLearning/BlackboardVsTurnitin/story_html5.html

¹⁹

https://help.blackboard.com/Learn/Instructor/Performance/Achievements/Create_and_Manage_Achievements

²⁰

https://help.blackboard.com/Learn/Instructor/Performance/Achievements/Best_Practice_Put_a_Badge_on_It

²¹ https://help.blackboard.com/Learn/Instructor/Courses/Set_Up_Notifications/Notifications_Settings

²² https://help.blackboard.com/Learn/Instructor/Interact/Blackboard_Collaborate

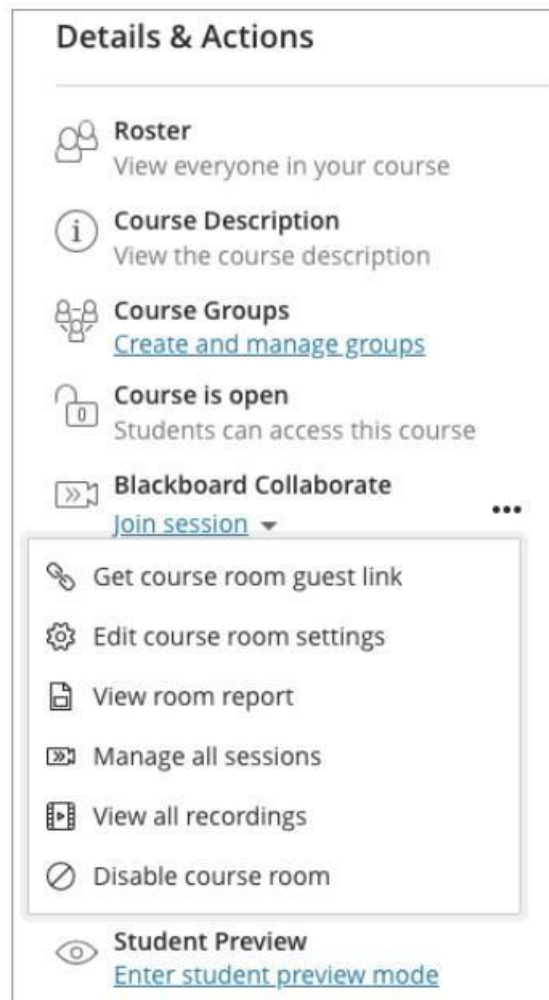


Figure 26: Collaborate Ultra Tool

Blackboard Collaborate Ultra may be useful to set up specific live meeting sessions during the course to help groups keep in touch, discuss and even meet instructors for resolving doubts and review work if needed. The tool allows to distribute groups in separate Breakout Groups, so members can concentrate on their own work in the Multiple Sessions.

And these multiple sessions can be supervised or not, but attendance reports will be generated for instructors to review later.

All these meetings in Blackboard Collaborate will be announced and managed on the **(Learning) Sessions** course menu link.

- Blogs

Each group will own their blog to build their final assignment to be reviewed and graded by instructors at the end of the course ²³.

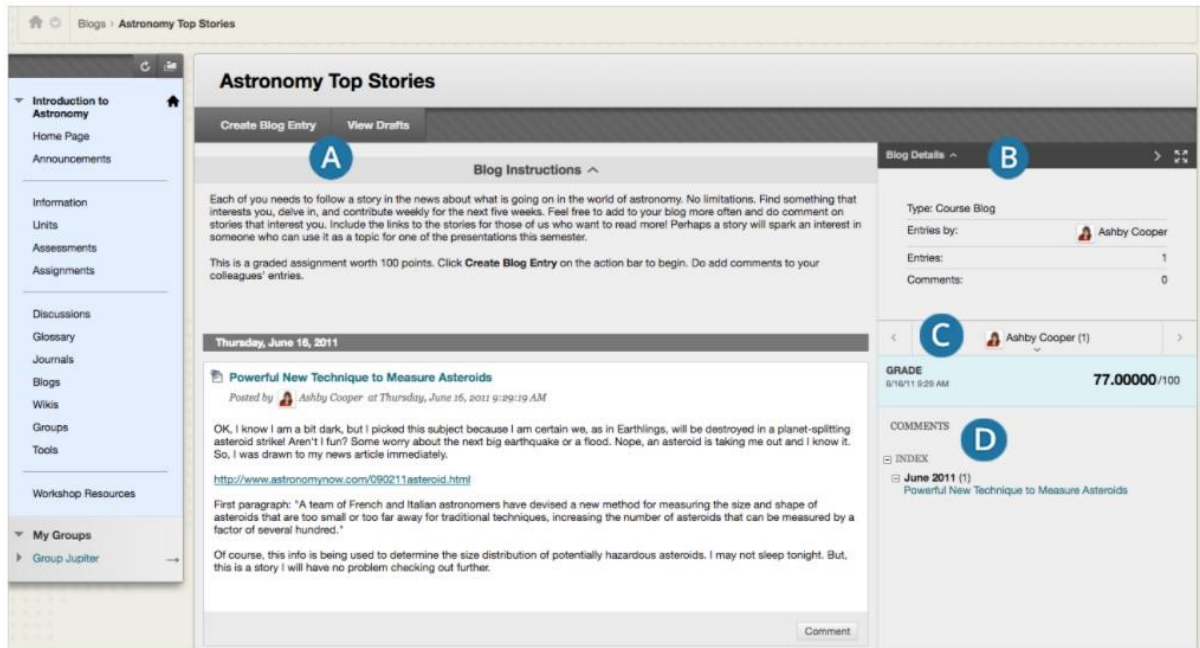


Figure 27: Blog example

An initial rubric for evaluating a blog will be discussed, agreed and distributed by course instructors prior the beginning of the course. A rubric could be also a document to **compare** the group assignment submitted work, so they can run their own self-assessment. ²⁴

²³ <https://help.blackboard.com/Learn/Instructor/Interact/Blogs>

²⁴ <https://help.blackboard.com/Learn/Instructor/Grade/Rubrics>

Grid View		List View	
	Novice	Competent/Proficient	Distinguished
Purpose and Focus	<input type="radio"/> Points: 15 (15%) Limited awareness of audience and/or purpose	<input type="radio"/> Points: 20 (20%) An attempt to establish and maintain purpose and communicate with the audience	<input type="radio"/> Points: 25 (25%) Establishes and maintains clear focus; evidence of distinctive voice and/or appropriate tone
Development of Ideas	<input type="radio"/> Points: 15 (15%) Minimal idea development, limited and/or unrelated details	<input type="radio"/> Points: 20 (20%) Unelaborated idea development; unelaborated and/or repetitious details TO depth of idea development supported by elaborated, relevant details	<input type="radio"/> Points: 25 (25%) Depth and complexity of ideas supported by rich, engaging and/or pertinent details; evidence analysis, reflection and insight
Organization	<input type="radio"/> Points: 15 (15%) Random or weak organization	<input type="radio"/> Points: 20 (20%) Logical organization	<input type="radio"/> Points: 25 (25%) Careful and/or suitable organization
Scientific Language	<input type="radio"/> Points: 15 (15%) Incorrect and/or ineffective language	<input type="radio"/> Points: 20 (20%) Acceptable, effective language	<input type="radio"/> Points: 25 (25%) Precise and/or rich language

Figure 28: Rubric example

The blog will contain all assignments that the group have been submitting during the course.

And we can have peer feedback by allowing non-group members to add comments.

Blogs will be part of the **(Learning) Blogs** course menu link.

3.3. Future implementations

During the course, many data will be generated in relation to students submitting assignments, participating in group discussions and constructing peer critiquing.

Blackboard platform has different options to collect and visualize these data depending on the granularity and the course activity that needs to be checked.

Analytics for Learn

This is a service that allows instructors to generate reports for the course²⁵. These reports can contain informative data about students interactions, submissions, grades, students comparison, etc.

Report	Description	Last Run	
Activity Compared to Others	Compare your activity to your peers.	10/19/17, 11:44 AM	Run Report
Course at-a-Glance	Compare this course to others in the same department	Never	Run Report
Activity and Grade Scatter Plot	This report plots the distribution of student activity against their grades in this course.	10/24/17, 12:44 PM	Run Report
Activity Matrix	View a representation of student activity in this course.	Never	Run Report
Course Submission Summary	View a summary of user submissions for this course.	Never	Run Report

Figure 29: Course Analytics Reports

Student Activity Details

Timing and grades for your students can be capture using the Student Activity Details tool that is provided by Blackboard platform²⁶.

²⁵ https://help.blackboard.com/Learn/Instructor/Performance/Analytics_for_Learn

²⁶ https://help.blackboard.com/Learn/Instructor/Performance/Course_Reports/Student_Activity_Details

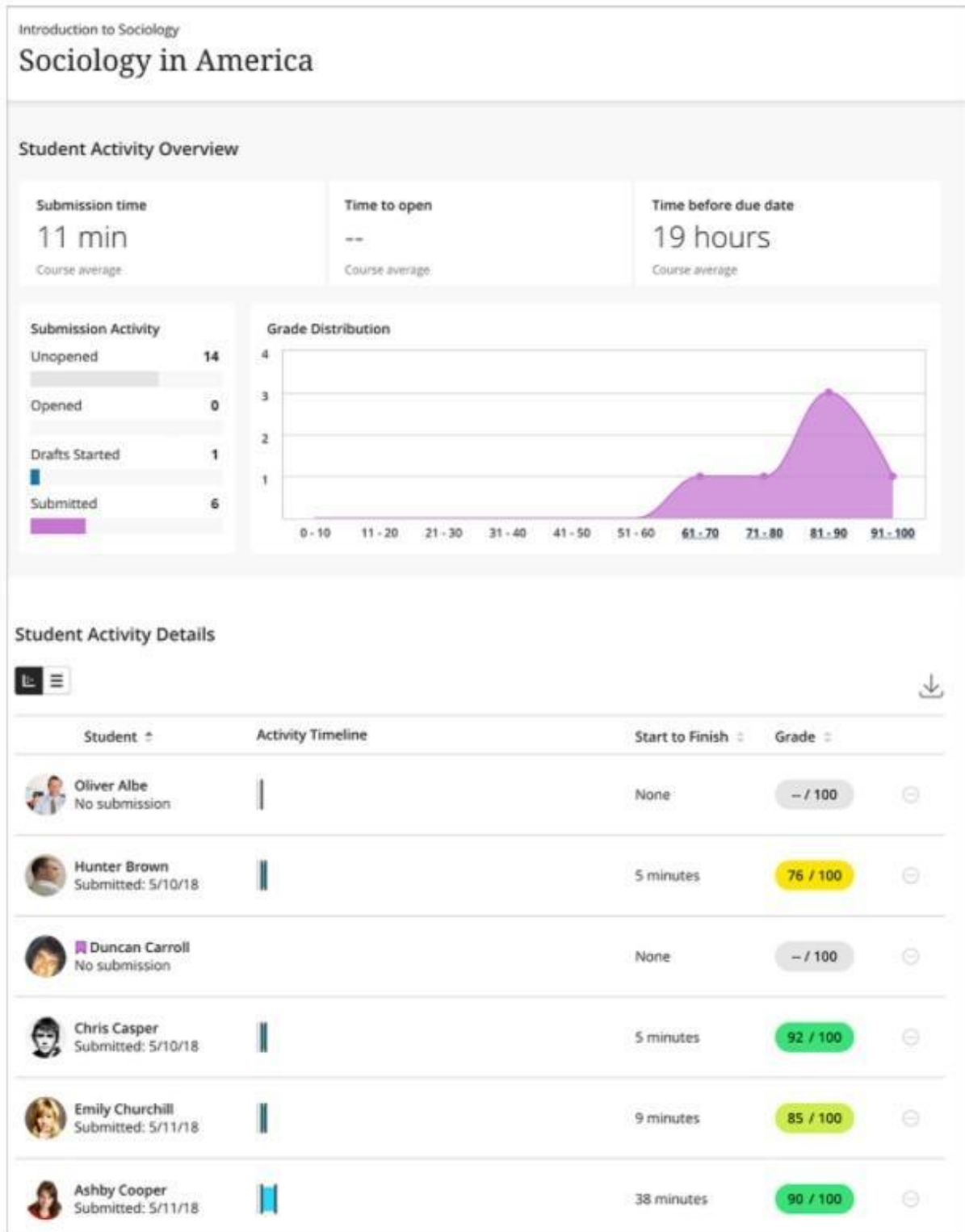


Figure 30: Student Activity Detail Dashboard

With this tool, instructors can follow when students initiate assignments and deliver results. It gives you the opportunity to check who reviews instructor’s feedback. And also, how

students perform in group discussions and if anyone needs some extra help during the course.

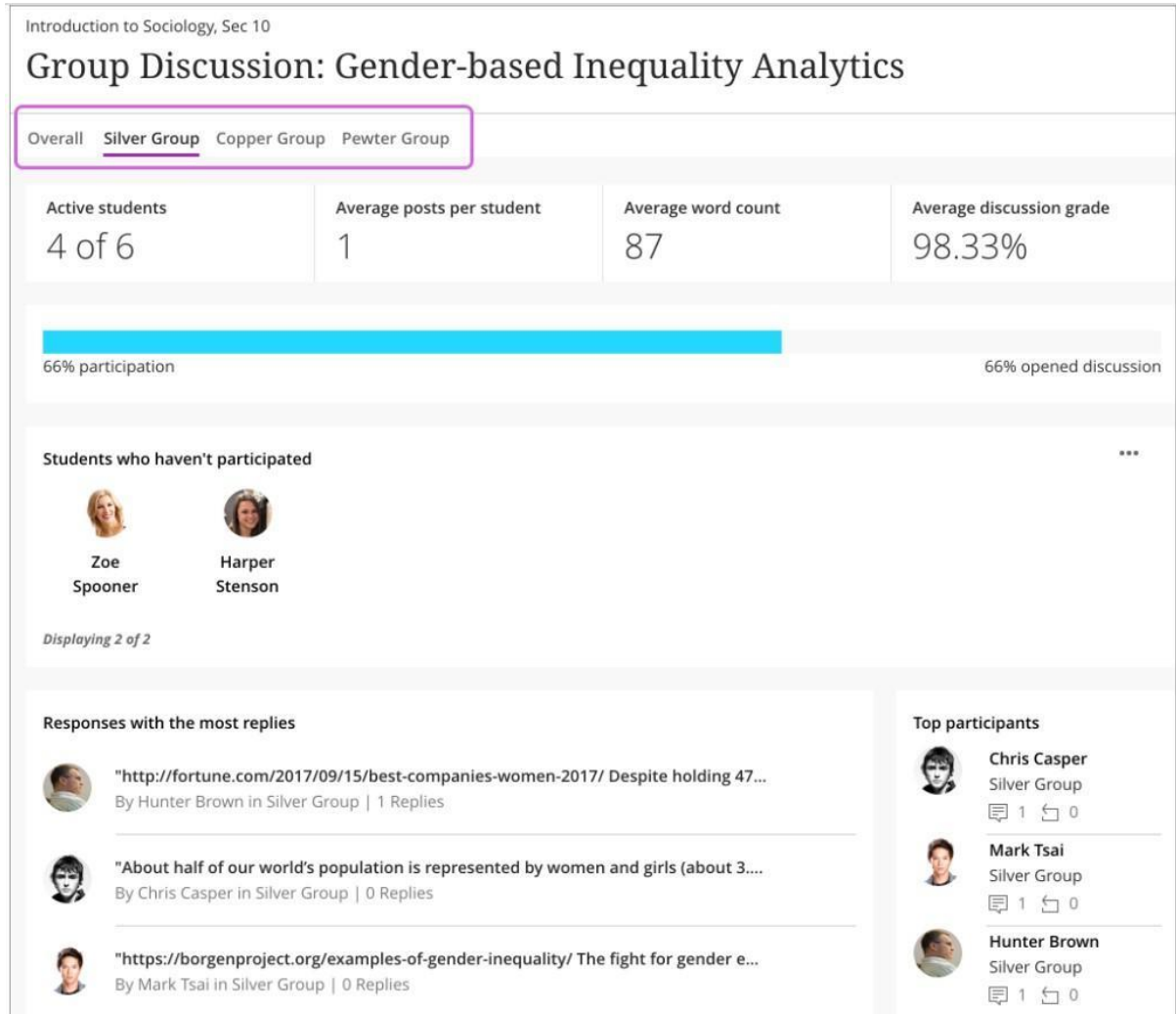


Figure 31: Group discussion Analytics Dashboard

Performance Dashboard

This dashboard ²⁷ that Blackboard platform provides is an extra tool where instructors can get quick access to numbers for each student enrolled in the course. Those numbers will represent last course access, review status, how the adaptive release process is made up for

²⁷ https://help.blackboard.com/Learn/Instructor/Performance/Performance_Dashboard

them and the current status, how many discussions boards they have been participating in and even grades.

Performance Dashboard										
Last Name	First Name	Username	Role	Last Course Access	Days Since Last Course Access	Review Status	Adaptive Release	Discussion Board	Customize Retention Center	View Grades
Dubois	Alyssa	adubois	Student	Feb 15, 2013 12:01:31 PM	4	0		3	3/5	
Farrell	Andy	afarrell	Student	Feb 18, 2013 1:26:48 PM	1	0		3	1/5	
Cooper	Ashby	acooper	Student	Feb 19, 2013 9:21:39 AM	0	0		0	1/5	
Lopez	Bruce	blopez	Student	Feb 19, 2013 9:23:47 AM	0	0		1	1/5	

Figure 32: Performance Dashboard

Building Blocks

The next step that will enhance engagement, relevance and assessment on your course is designing, implementing and deploying what are called Blocks ²⁸. Blocks in Blackboard environment are pieces of Java code that software engineers can produce and embed within the platform to take advantage of its potential. These scripts can e.g. read student performance data, analyse it and deliver new adaptive release strategy that will create an improved journey for that student in real time.

Explore RESTfull APIs

Blackboard platform provides access to RESTfull APIs ²⁹. These APIs are public access routes that external developers can use to manage course content, release new automated

²⁸

https://help.blackboard.com/Learn/Administrator/SaaS/Integrations/Compare_Building_Blocks_and_Rest

²⁹ <https://developer.blackboard.com/portal/displayApi>

announcements or retrieve grading data for analysis, among others. These public APIs will be the channels that our deployed Building Blocks (Java web apps) will use to access our course data to produce improved experiences for students.

4. Other platforms

Blackboard is the current LM in use at Trinity College Dublin. While for ease of adoption it would appear to make sense to avail of this technology it is not necessarily the case and indeed Trinity may change LMS in the near future. In this last section before closing our report, we would like to include some brief review on extra features that we have found in other LMS that might enhance our course redesign and give us some extra ideas to be adopted.

- Instructure (CANVAS)

The Canvas LMS platform allows instructors to distribute students in groups and it has the option to choose who in the group is the leader randomly or manually ³⁰.

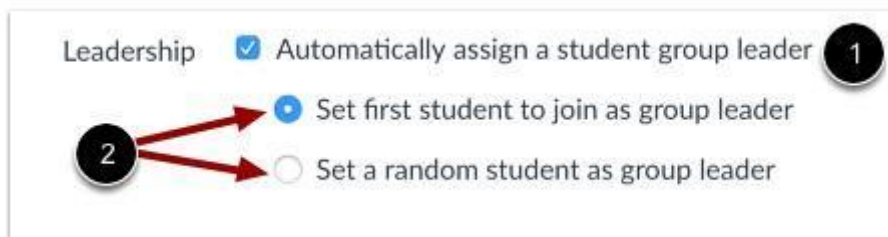


Figure 33: Assigning group roles

Canvas allows instructors to distribute course assignments for peer critiquing with the Peer Review tool:

³⁰ <https://community.canvaslms.com/t5/Instructor-Guide/How-do-I-assign-a-student-leader-to-a-group/ta-p/944>

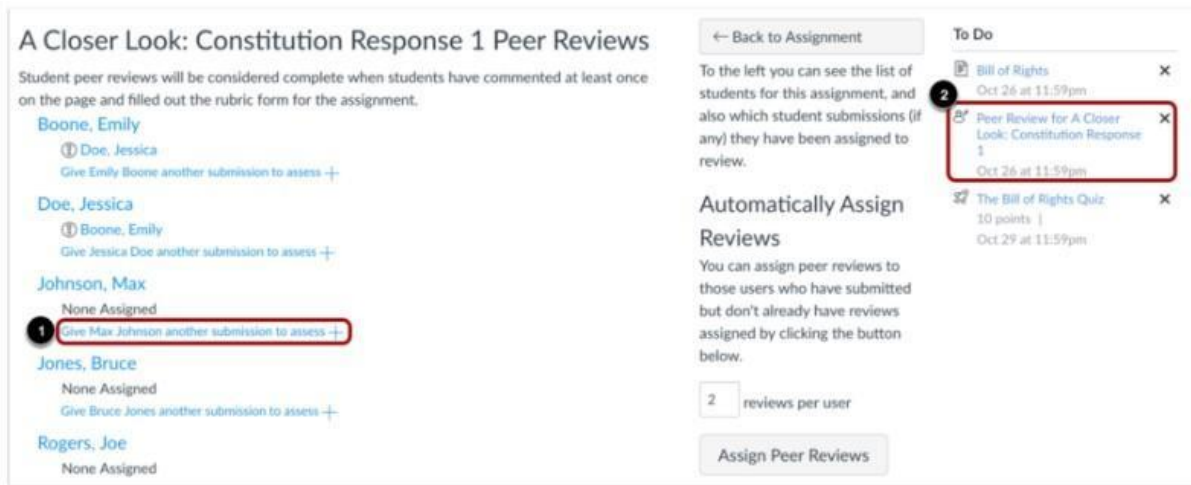


Figure 34: Canvas Peer Review Settings

This tool will request students to review and comment on other colleagues works:

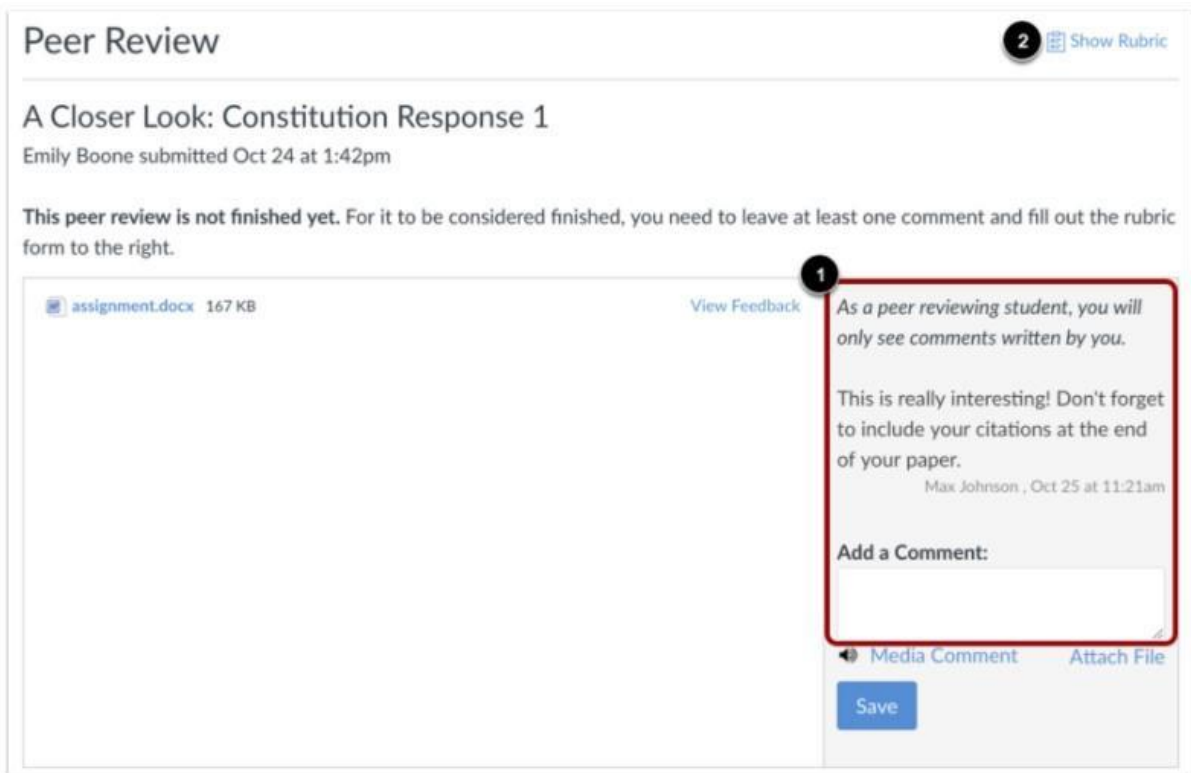


Figure 35: Canvas Peer Review Tool

And this platform allows instructor to set a group assignment for peer critiquing too:

Group Assignment

This is a Group Assignment

Figure 36: Setting a group assignment

In Canvas, instructors are also able to create rubrics to apply to group discussions, that can help us accelerate and improve the assessment process:

Discussion Rubric				
Criteria	Ratings			Pts
Follow Instructions	4 pts Full Marks	0 pts No Marks		4 pts
First Post	3 pts Full Marks	0 pts No Marks		3 pts
Second Post	3 pts Full Marks	0 pts No Marks		3 pts
Discussion Outcome view longer description threshold: 3 pts	5 pts Exceeds Expectations	3 pts Meets Expectations	0 pts Does Not Meet Expectations	5 pts
Total Points: 15				

Figure 37: Rubric for Group Discussion

- Brightspace

Desire2Learn delivers Brightspace LMS platform that has some extra features that can enhance our student engagement, improve content relevance and speed-up assessment.

The **engagement** is being approached from the content side, allowing instructors to upload in-line audio, video and other media from repositories or external sites. The platform provides integrated video capabilities for your meetings, group presentations and all those with embedded feedback. There is virtual classroom tool called **Bongo**³¹ available in the platform. Instructors can use this tool to distribute students in groups to work collaboratively in activities, discuss their progress, chat asynchronously, schedule virtual meetings, upload presentations and peer-evaluate their work.

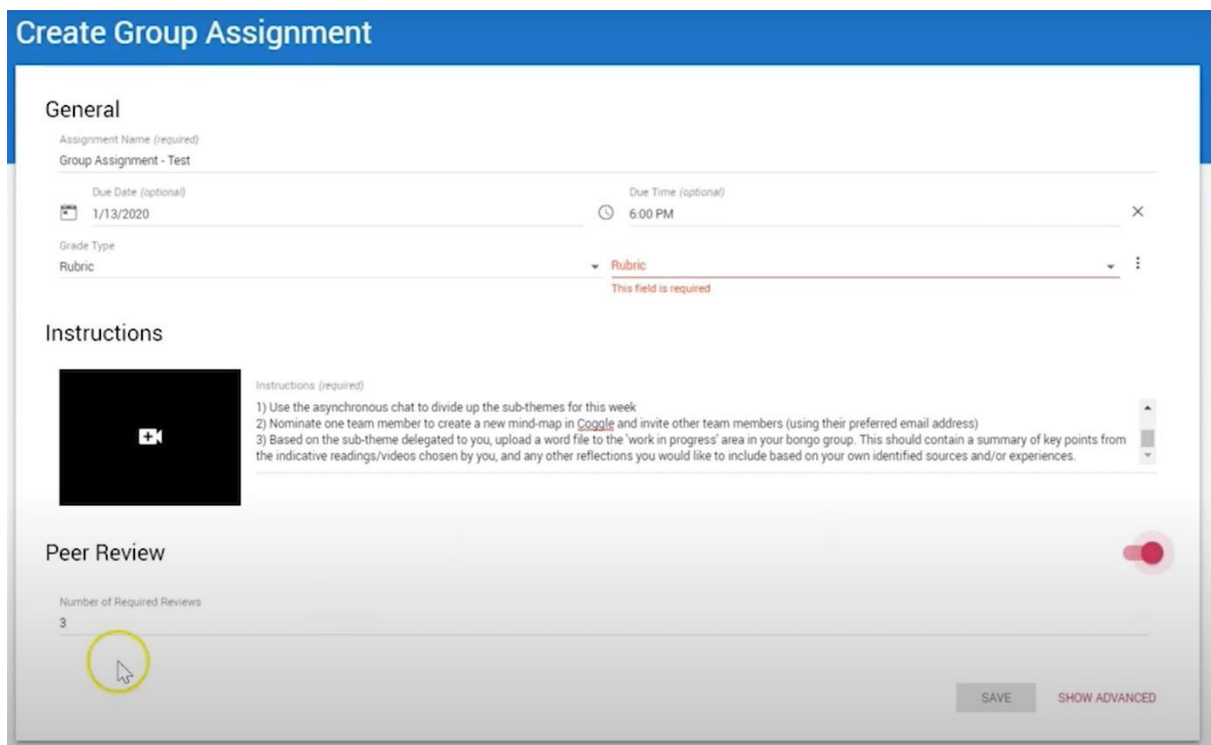


Figure 38: Brightspace Group Assignment Tool

Relevance of content is secured via personalized learning experiences. The course has gamified content and delivers individual achievements and award to students through their learning journey.

Assessment enhancement comes with meaningful feedback in-line annotations tools, rubrics and even audio-video feedback pieces.

³¹ <https://www.bongolearn.com/technology/>

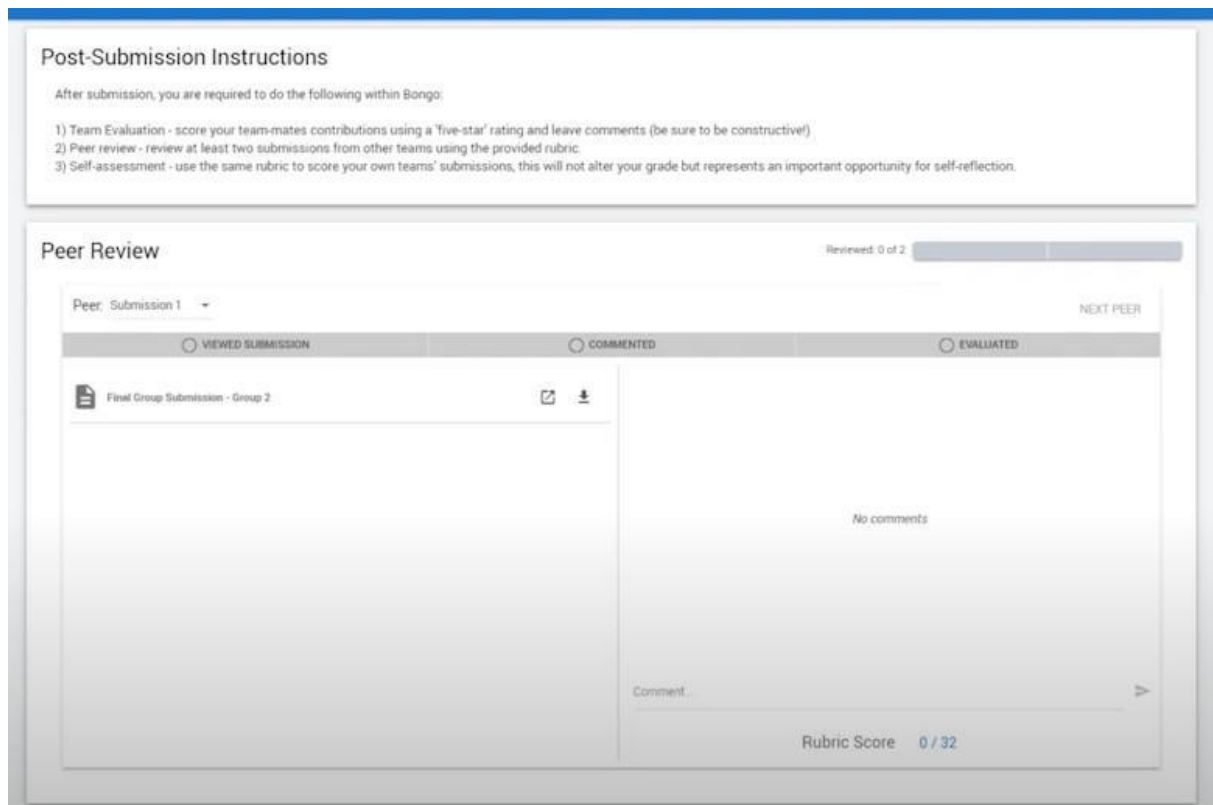


Figure 39: Brightspace Peer Review Tool

The platform leverages all information data from student performance via the Class Progress Dashboard. Instructors can extract and analyse student’s activity during the course, how often they review content, in which step of journey they are, how active they are in discussions and how their grades are.

- Moodle

Moodle is the open-source LMS alternative that many institutions have adopted and redesigned for their learning experience.

Moodle can hold our proposed course design with the Grouping Users tool. With groups created, instructors can **restrict** activities or course content to those groups:

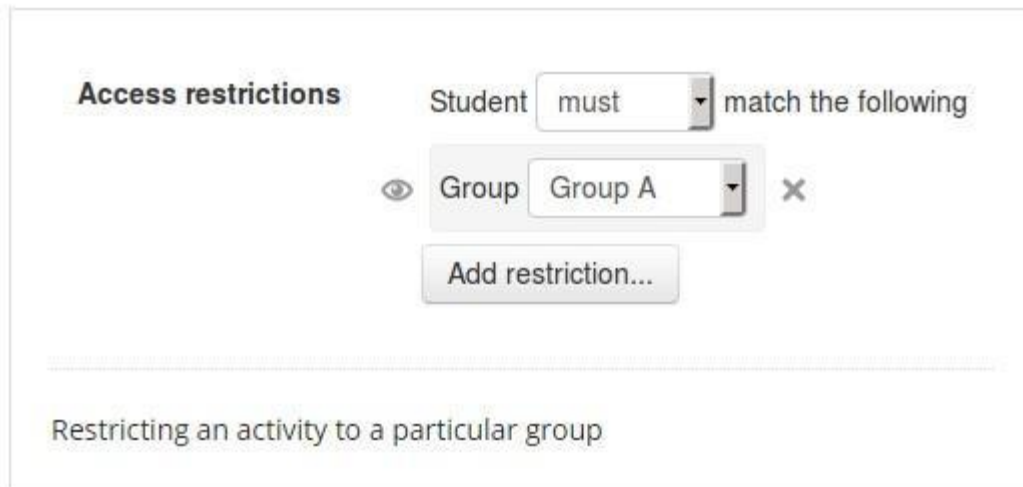


Figure 40: Moodle Restricted Content Access

In this way, you can bring adaptivity to your course content release process. Restriction can be according to certain criteria such as dates, grades, group membership or activity review status.

When groups are built, the instructor can create group discussion forums for the collaborative discussions. And those forums can be graded too:

The screenshot shows the 'Group Discussions' interface in Moodle. At the top, there are two tabs: 'Separate groups' (selected) and 'All participants'. Below the tabs is a button labeled 'Add a new discussion topic'. The main content is a table with the following columns: 'Discussion', 'Started by', 'Group', 'Replies', and 'Last post'.

Discussion	Started by	Group	Replies	Last post
First impressions	Sam Green	Team Lion	0	Sam Green Mon, 20 Apr 2015, 2:10 PM
First impressions	Sam Green	Team Panther	0	Sam Green Mon, 20 Apr 2015, 2:10 PM
First impressions	Sam Green	Team Tiger	0	Sam Green Mon, 20 Apr 2015, 2:10 PM

Figure 41: Moodle Group Discussions

Also, Moodle allows instructors to deliver assignments for peer critiquing:

Workshop grades report ▾















First name ▾ / Surname ▾	Submission ▾ / Last modified ▾	Grades received	Grades given
 James Watson	Source Materials JW modified on Monday, 11 January 2016, 11:50 AM	- (-)<  Brian Franklin 56 (-)<  Sherlock Holmes - (-)<  Mrs Hudson - (-)<  Michael Moriarty	- (-)>  Brian Franklin - (-)>  Sherlock Holmes - (-)>  Mrs Hudson - (-)>  Michael Moriarty
 Sherlock Holmes	Sherlock Submission (Final) modified on Monday, 11 January 2016, 11:50 AM	- (-)<  Brian Franklin - (-)<  Mrs Hudson - (-)<  Michael Moriarty - (-)<  James Watson	48 (-)>  Brian Franklin 48 (-)>  Mrs Hudson 16 (-)>  Michael Moriarty 56 (-)>  James Watson
 Michael Moriarty	MM SM modified on Monday, 11 January 2016, 11:51 AM	- (-)<  Brian Franklin 16 (-)<  Sherlock Holmes - (-)<  Mrs Hudson - (-)<  James Watson	- (-)>  Brian Franklin - (-)>  Sherlock Holmes - (-)>  Mrs Hudson - (-)>  James Watson

Figure 42: Moodle Peer Assessment Dashboard

- FutureLearn

FutureLearn is an education platform that can enhance our course experience. In this platform you can provide powerful visual content, engaging material, build discussion forums, and create peer assessment and feedback activities.

- Knewton

Knewton, from Wiley, has just released their newest product called Alta. Alta is a complete courseware solution that, based on adaptive learning techniques, delivers a personalized learning experience to improve students' performance. And this adaptive learning experience is just-in-time delivering content and extra support to students according to their performance.

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