Anatomy of Assessment

Integrating peer and self-assessment into module group work assessment design

Faculty: Engineering

Department: Bio engineering

Module name: Design and Professional Practice 2

Degree: Biomedical Engineering and Molecular Bioengineering

Level: Year 2 Undergraduate

Format: Project based (team projects)

Approximate number of students: 180

Weighting and credit: 4 assessments at 25% each

Module ECTS: 10

Assessment overview

This case study focuses on embedding peer and self-assessment into the assessment of group work. This occurs during the Year 2 Design and Professional Practice module, which consists of four assessments:

- a product specification document;
- a group presentation;
- Demonstration Day (which includes a group poster presentation);
- and final report.

Students are assigned to a project group (of approximately 10 people) based on their project preferences and complete all the assessments in the same group throughout the year. They peer assess the group presentation and peer and self-assess how they worked in the group in the final report that brings together their work on the entire module.

Overview of assessment methods on the module

There are four summative assessments in total, each weighted at 25% and each supported with formative learning and assessment activities:

- product specification document (PSD) - a written document produced by the teams outlining the product they will be developing.
- Group presentation – each group presents their potential product as outlined in the PSD to their tutors and peers.
- Demonstration Day – each group produces a poster outlining their product and a prototype of their product that is summatively assessed.
- Final report – this assessment brings all of the learning from the module together and consists of two parts - a standard technical and group reflection on how they approached the project and what they might do differently in the future.

Design decisions

Rationale for group work and assessment choice

The assessment structure models what students might be experiencing going into the industry hence is based on authentic assessment principles. Engineering is inherently a team-based discipline, very few engineers work in isolation. As such team working is one of the transferable skills that employers look for in their graduate employees.

The nature of the projects

The projects that the students work on address authentic problems in biomedical design that require solutions; by the end of the project each group will be close to having a product that could be made and marketed to real clients. The projects are different every year but tend to be centred around disability and frugal healthcare, i.e. making games and toys accessible for users with disabilities or specific medical needs, for example designing a more engaging exercise system for children with cerebral palsy or designing smart packaging for those with peanut allergies.

Insights colour key

Educational Developer

Inclusivity

Learning Designer

Registry

Careers

Interviewee: Dr Ian Radcliffe, Senior Teaching Fellow, module tutor and lead

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Practicalities

Assigning groups
The groups are formed based on students' project choices. The module team puts out a project list every year and the students get to pick three choices in order of interest. Students are asked to provide a short 'tweet'-like justification of why they should be allocated their chosen project. This resembles authentic practice.

The groups tend to be relatively large – approximately 10 people. The reason for such large groups is to diversify students' group learning experience (in terms of range of skills and personalities within the group) and develop skills around working in a large group dynamic.

Preparation for group work
As the module is based on group work, the first two taught sessions go into group working and team building. These sessions are an opportunity for the group members to get to know each other, allow them to set ground rules for group working and develop their listening, communication and accommodation skills. Please download the full case study for a description of activities used.

Monitoring group work
The four assessment points plus regular contact with project supervisors help the module team monitor progress, in terms of students' group work and group behaviours. This is also done in a more formal way through utilising OneNote. OneNote pages are set up for each group so that they can document all their meeting notes and use the pages for communication. This is also supplemented with Teams channels.

Tutor marking arrangements
The tutors mark and provide feedback for all assessments. For PSD tutor feedback is provided at the formative stage via Turnitin with detailed comments around how the PSD could be developed further. The marking criteria can be found here.

Group presentations are assessed by the tutor and peers with the assessment criteria being generated by the students. An example of a marking form can be found in the download section. Each presentation is marked on a group basis so there are no individual scores for individual presenters. The Group Presentation is marked by multiple members of staff (ideally between 3-5) including technicians assisting on the projects. The averaged peer assessment mark is then added to these as if it was an extra marker.

The poster and the demo day is solely assessed by the tutors. The marking criteria is sent out to the students before the day so they know what to expect. The Demonstration Day is open to other academics in the department (including technicians helping students with the project) and the external examiners if they are on site who are all involved in marking. This allows for a good collation of opinions from about seven sources altogether to give the final average grade from all of those sources for the demonstration and the poster.

The final report is marked by the tutors (and combined with peer scores) according to the marking criteria.

Peer marking arrangements
There are two instances during the module where peer assessment is integrated: for presentations, where the output is assessed; and the final report, taking into account the overall experience of working in a group whilst delivering the project.

When it comes to peer-marking of presentations, each student is allocated three videos to do a peer assessment on. The scores were aligned to the marking criteria which were developed through discussion with the students in the supervisor session.

Peer assessment also takes place at the end of the module with the final collated group grade. WebPA (Feedback Fruits from this year on) is used to get the students to rate the input of their fellow teammates against a marking criteria that is based on the ILOs. The group grade is then put into WebPA and an individual grade generated based on the peer scores which allows for a variation up to 25% in the final grade. All resources can be found in the download section of the webpage.

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Marking self-assessment (reflection)

The reflective element is attached to the final report. The students are asked to reflect on how they performed as a team and what they would do differently. The marking of the reflective part takes place more holistically meaning it is one of the criteria for the final report assessment.

Establishing grades from tutor, peer and self assessment

The self- assessment grade is included in the WebPA system. Students evaluate each other and themselves for contribution to the project. The group grade is input to WebPA and it automatically calculates the individual grade based on their peer assessment / self-assessment scores. The grade therefore is a combination of self-assessment of how they think they did versus how they think everybody else did in their group only. The students have access to the qualitative comments their peers submitted about their work as well as numerical grades.

The group grade is generated from the 4 assignments (each contributing 25%). This mark is then adjusted by up to 25% (so in theory a team member in a group scoring 80% who scored really poorly in the peer assessment could end up with an individual grade of 60%).

Preparation for peer marking and peer feedback

Students are prepared to peer assess and give feedback to others through a taught session that focuses on developing basic skills around this area. The students are presented with the rationale for using those approaches and the value of them in developing transferable skills as well as their own understanding of assessment criteria and feedback practice. As students generated the criteria for the presentations themselves, they already have a good understanding of what is expected from them.

Preparing students for reflecting

To prepare students for summative reflection the module team conducts a session where they encourage reflective thinking. The session focuses on the students reflecting on their experiences so far through considering what they would tell themselves if they could start again, what would they do differently and advice they would provide to themselves. This activity is conducted as a group session with their supervisor.

Provision of feedback

Across all of the assessments students get qualitative feedback, tutors provide feedback on each of those assessments, in addition there are instances of peer feedback for the presentation and the final report. For the presentation the students are instructed to give three comments about each of the presentations that they watched: 1) what's good about it 2) what's not good about it and 3) what could be improved.

The students generally approach the task of giving feedback well. Seeing comments from their peers allows them to see how others perceived their contributions and calibrate perceptions of own performance and their own feedback.

Online adaptations

The assessments were delivered in a similar form during the pandemic with some alterations to the group presentations and the Demo Day. During Covid, group presentations were pre-recorded. Similarly, the Demonstration Day during Covid was conducted as a video presentation. It is currently held as an in person event as it is much more rewarding.

Strengths of peer assessment, self assessment and group work in the context of the module

- Peer assessment of the Group Presentation encourages student to consult the assessment criteria and in some cases produces some insightful comments;
- WebPA/ Feedback Fruits provides individual grades based on input to the project as a whole which otherwise could not easily be produced;
- Students are going to have to work in a group no matter what they do. There are hardly any job descriptions that do not equivalent a group working collaborative element. This is specifically the case with Bioengineering as the nature of the industry is that it consists of many small to medium companies. Hence the nature of the industry and the associated pressures placed on smaller companies make group work even more intense. Learning how to deal with conflict

within groups and understanding the different mechanisms for collaboration is important. It is important to note that it won't be just product design teams that students will be working in but also the marketing teams and product sales teams and also clients. As the industry is developed around pockets of expertise this groups work will take place on several levels hence the ability to adapt to working in and with different groups is extremely important;

- Peer assessment of the Group Presentation encourages student to consult the assessment criteria and in some cases produces some insightful comments;
- WebPA/ Feedback Fruits provides individual grades based on input to the project as a whole which otherwise could not easily be produced;
- Students are better placed to review each other's input into the project than the supervisor who would only have 30 minutes contact time a week with the group;
- The Peer Assessment element acts as 'carrot and stick' to encourage engagement in the project;

Limitations of peer assessment, self assessment and group work in the context of the module
- The peer assessment will always produce a negative reaction in some students who either don't trust their peers to grade them fairly or think that somehow others will be gaming the system;
- Peer assessment to be done well requires a lot of effort and preparation
- The reflective element is really difficult to achieve and is very hard to teach in the supervisor sessions;
- The group working is the probably the most difficult aspect of the module, particularly for 2nd year students who are heavily loaded, quite often a couple of students over the cohort will disengage from the projects which leads to frustration and conflict in the team. During Covid, trying to do the teamwork remotely made this situation significantly worse;
- Working in big groups can be tricky as there might be imbalance in how groups are subdivided. It becomes progressively difficult to address individual difference and make all students feel comfortable in large groups. This means that it is

more difficult to monitor students' with specific learning needs and make sure they do not 'disappear' into the larger groups.

Advice for implementation
- When deciding on the number of assessments ensure that the work required to perform them can be done within the allocated time as indicated by the ECTS value. It is also useful to take the broader programme level view to identify how assessments on one module overlap with others. This should help avoid over-assessing and ensuring that assessment diet is appropriate for the hours of effort;
- Ensure that preparation for group work focuses on the discussion around how to handle issues within groups, such as somebody not contributing as required or the group not distributing the workload appropriately – discussing management of teams is important;
- When using activities that prepare students for group work it is important to make sure that they do the required activities rather than jump straight into discussing their projects. This is something that the facilitators should be attuned to;
- Make sure you create an opportunity to help students better understand how others, including those with specific learning needs such as dyslexia, autism, dyspraxia etc learn and communicate. Individuals should be mindful of that and think about the delegation of individual tasks that are appropriate to what individuals can do. Therefore part of preparation for group work is considering how others can be mindful and empathetic towards other group members;
- The discussions around being mindful and empathetic are also important when peer marking is involved. An awareness that not everybody should be able to keep an eye contact for an extended period of time or that not everybody will be able to express themselves clearly and verbally because of 'labelling problems' (I.e recalling of known information on the spot quickly) is important. As much as you want to ensure standards of professional competence are maintained, there should be an awareness in the student group (as with the teaching staff) that

there are certain things that shouldn't be marked heavily down because they could be a part of neurodivergent condition and there should be sensitivity given to these individuals;

- Some believe that students take peer assessment more seriously if they are required to give a mark, so if you choose to adopt that approach, like staff, students need preparation for peer assessment. As well as being introduced to assessment criteria and rubrics / mark schemes ahead of time, it is beneficial to allow students to use these tools to assess exemplars of students' work with different strengths and aspects for development. You should seek permission to use anonymised exemplars from the originator or create examples based on typical student work;

- It is useful to consider what is more valuable – peer feedback or peer marking or both. Thinking of the pros and cons of each and considering the end goal of learning on the module can help decide on the most appropriate route;

- Template standardization for peer assessment across the programme where there is a heavy group work and peer assessment component that builds on previous experiences, can also help with student preparation. A level of familiarity with how the software is set up and how the marking rubrics are set up can help build students' confidence with how to approach the task;

- Make sure that the rules of engagement in peer assessment activities are clear to the students from the start. This is where a good explanation about what the learning outcomes are for that module and how students are expected to demonstrate them is extremely useful as well. This could help manage students' expectations and emotions around modules that are creative yet can be considered quite challenging;

- There is definitely value in group reflection but from careers perspective practising individual reflection is also extremely valuable as it aligns more with authentic practice that students will experience in a workplace. Students (or employees) will be asked to do a group analysis but in terms of professional development doing an individual reflection is more common and having an opportunity to practice this alongside group reflection/ analysis would help them develop skills to get the job in the first place and work through performance review processes. This is why fleshing individual reflection alongside the group one can be very valuable;

- it's helpful to allow students to remain in the same group throughout the year to develop and refine working relationships, build trust and mutual understanding, and address tensions. This is important for rising to the demands of assessed group work - typically our students are learning to apply new concepts and completing complex, unfamiliar tasks. For many people, for many reasons, the social and emotional effort involved in getting to know and cooperating with new people increases the cognitive load, in a way that can compromise the intended learning. This may be particularly relevant if you identify as being from an underrepresented group, such as LGBTQ+ or an ethnic minority, or have additional cognitive challenges such as working in a 2nd or 3rd language or having a specific learning difference such as being autistic or having ADHD;

- Given the nature of the industry it is extremely beneficial to give students an opportunity to work in different group sizes. Potentially there is more scope for conflict in a bigger group than there is some smaller groups so learning how to handle it in a professional way is an important skill;

- While you might have some preferred channels for student communication, as is the case with One Note pages and Team channels, you still might find it that students prefer using their own channels such as Whatsapp. Setting up those more official channels can take a lot of time and it can be quite frustrating to see them not being used. Establish early on whether you want to have insight into what is happening in groups and find ways that students can provide evidence;

- Patience is key, especially with having students to transition from using their technologies to the more official ones (here move from Whatsapp to OneNote). There will be teething problems and consistency is key – it's a process and a journey;

- When assigning video submissions it is important to be clear about what the output expectations are so that students don't spend unnecessary amount of time producing high quality videos

when creativity and quality of output in terms of visuals is not assessed. The priority should be ensuring that the ILO that the video relates to is appropriately measured.