Portfolio, Video and Presentation Assessment

Faculty: Engineering
Department: Design Engineering
Module name: Industrial Design Engineering
Level: Year 2 undergraduate
Approximate number of students: 90
Weighting and credit: 20% individual assessment, 80% group assessment (40% subjected to tutor and peer assessment)
Module ECTS: 12.5 across two terms
Module Type: Core

Insights colour key

Educational Developer

Inclusivity

Learning Designer

Registry

Careers

Assessment overview

Industrial Design Engineering is a second-year module where students get a chance to fully develop a product that a company could theoretically manufacture. This module follows the trend in Design Engineering to integrate project-based learning (PBL), a method that focuses on learning by doing rather than solely teaching the theory or reading. The tutors set an open-ended brief so that students have the freedom to pick a project they are truly interested in. Once they establish what problem they are going to attempt to fix, they spend the rest of the time working on their ideas and getting advice from the tutors. At the end of the module every group, made up of 4 students, presents some portfolio pages, video and a presentation to clearly convey their idea.

Design decisions

Rationale for the design of the module

The tutors design a brief that gives the students some freedom to pick a subject they want to work on. By allowing the students to choose, they become more engaged because they feel a sense of ownership over the project

The focus is on "learning by doing". This method internalises the learning more because it works by trying something out and observing whether that approach is valid or not.

At the start of the project, the students decide what user group they want to study and they interview their user group to determine what problems these people are facing. This is then presented for a formative assessment with the tutors. After this 5 mins presentation, done as a group, the tutors give the students feedback on their findings and inform them on which specific problem they should aim to solve. Each person in the group develops a potential solution and by the end of the term they all individually create a concept booklet. This is submitted as a summative assessment worth 20% of the final grade.

The following term the members of the group get back together, and they pick one of the ideas that each person has come up with to develop further. By the end of the second term, as a group they must produce a fully functional looks-like and works-like prototype, an explanatory 1 min video, a short 5 mins presentation to explain the idea and a 40-page portfolio of the idea including the user research, the insights found, the several iterations of the design, the bill of materials, the dimensions of all the pieces, a manual on how to put them all together, the company they are catering towards and how it fits with their range of products.

Creating a video that connects with the audience is a much stronger and quicker way of explaining the idea than reading about it. The portfolio pages are also very effective at displaying the details of the idea. The combination of both helps a lot with quickly sharing the idea and the output or capabilities of that student. A final presentation also teaches the

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Role: Module Leader of Industrial Design Engineering

students how to present and pitch their ideas.

Rationale for in person delivery

The module is taught mostly in person. This allows students to receive feedback a lot easier and quicker as they can simply raise their hand during the tutorials and ask for help on whatever they are currently working on.

Fit with other assessments and the programme/module

Design Engineering is a department that focuses heavily on project-based learning (PBL). This means many of the modules use a similar type of assessment method as this one. Subjects such as Gizmo (physical computing) or Human Centred Design Engineering also require students to design an explanatory portfolio with the path that was followed in order to reach the final design, build a prototype and give a presentation at the end of the term displaying the new device. In Gizmo however, the final device does not need to have a useful function, its only purpose is to demonstrate that the students have learned how to build the mechanism. Industrial Design Engineering is sort of the continuation of Gizmo, but in this case the product must be practical.

Peer Review

Industrial Design Engineering has a peer assessment at the end of the module, using WebPA. This allows each team member to anonymously rate how well each teammate has completed their job. The way it works is by awarding each student in the group a grade between 1-5 on how much they have worked on the project (1 being the lowest and 5 the highest). Each student must add a small comment about each of the other group members to explain the reasoning behind the number grade.

Practicalities

Preparing students for assessment

All the basic material needed to carry out this project is taught by the tutors in the first 6-8 weeks. After that stage, students must apply their knowledge and try out different methods to reach the desired outcome. If a student is stuck, they can always ask one of the tutors or GTAs (graduate teaching assistants) during the tutorial sessions which occur once a week. Students also use past examples as a guideline to

determine what a good video or portfolio should look like.

Marking arrangements

The presentations are scheduled a day after the deadline for the portfolio and video, so by then all the groups have pretty much finished creating content. The presentations then take place throughout a whole day. Each group has 5 mins to explain their idea and show how their prototype works. This is continued by 2 mins of questions from the examiners. After the whole process is complete a WebPA (online peer assessment) is conducted to establish how much each team member worked. Thereafter the tutors that are qualified to give out grades review the whole submission of each group, include the WebPA and their own assessment, and finally they provide a mark.

Distribution of mark weightings

35% of the final grade is allocated to the process of generation of concepts and market research carried out in the first term. In the second term another 35% of the mark goes towards the portfolio. Essentially, the project assesses how well the students can communicate their product. Of the remaining 30%, 15% is dedicated to the presentation and video. The final 15% grades the build and functionality of the product. Sometimes the device breaks the night before the presentation and students should not be heavily penalized for that. This is the purpose of having a video, a way of displaying the idea and the product working. It shows that the idea is viable and has potential.

Preparing assessors for marking assessment

The module leaders are part of the team designing the assessment criteria. The GTAs are used for support during the tutorials as they are well informed regarding what is expected of the students.

Feedback on assessments

Feedback itself is a lot more important than the mark. In this module the teachers provide an extensive one-page of written feedback. It comments on the parts students have done well and the parts that could be improved.

Software used

The students can freely pick what software they use

to produce the visual assets. Some students utilize Adobe apps such as InDesign or Illustrator because the university has bought them the license and those are the softwares used in the industry. Other students use Figma due to the ease of online collaboration when using this software.

Online adaptations

During Covid-19 students did not have access to all the machinery available at the Imperial College campus. This meant that the students could not properly build the physical prototypes required. Everything else could be done online. As a result, the course was amended to focus more on digital prototyping instead of the real-life one. Students had more time to develop their CAD models and renders. FEA (finite element analysis) and CFD (computational fluid dynamics) simulations were also introduced to see whether products could sustain the load or performance required.

Another amendment to the course was the addition of a branding section. Each team researches a company which could incorporate their concept product. Once the company is established, the team must brand their product according to that company, using similar colour schemes and brand language. Students must also carry out market research to see where their product could be positioned.

Advantages of the assessment type

- This is a very hands-on and engaging approach to learning.
- Students learn how to properly communicate and present their ideas. The portfolio and video are a very quick and effective way of displaying a concept product.
- The students get a sense of ownership over a project which can later be introduced into their personal portfolio.
- Many different transferable skills being learned too
- Leaving it open to students in terms of how much they want to develop when it comes to certain skills helps students to time manage. They will never be able to learn all these skills in the given timeframe so there are important transferable skills to learn here. Giving students freedom to decide what they want to be 'expert' on and how far they want to develop this expertise is

something that will be useful career-wise going forward. There is also an important lesson here to understand that they don't need to be expert in everything.
- Excellent alignment with employer expectations of student competencies, post-graduation
- By coming up with individual solutions and then coming together to choose one, students develop their pitching and influencing skills and the ability to defend own ideas. Showcasing the product in different formats, including a video us also is reflective of professional pitches.
- The above makes the assessment authentic in nature
- Learning how to deal with conflict within groups and understanding the different mechanisms for collaboration is important. Similarly, developing leadership and followership skills is also important;
- The size of the project does not allow students to procrastinate. The fact that you need to try-out mechanism to see whether they work or not, then let the paint dry, or fix a broken part. The nature of this type of work means that students are working continuously throughout the whole term. Students learn how to manage their time and set milestones to achieve throughout the term.
- The assessment gives students an opportunity to build up their portfolio and prepare for the Year 3 placement
- Although some of students struggled to find enough content to fill in 40 pages of portfolio, they still think that project-based learning is a fabulous teaching method as it gives student freedom and independence.
- The principle of allowing an element of choice in assessment, in this case a user group to study, is a good. A caveat is that the extent of the choice needs to be considered carefully depending on the level of the students. If students have less insight into the subject/discipline, or are at an earlier stage in their learning, choice may feel overwhelming. In this case, it can be useful to provide a level of scaffolding.

Limitations of the assessment type

- The feedback from students is that sometimes it can be too much work over the whole term. This can cause an ongoing stress on students.
- The challenge with assessing projects that differ

so much from each other is that there cannot be a written exam to determine who knows more or less, because each student decides to focus on one aspect. Therefore, the assessments we set are related to how well can you present an idea. There are a lot of good ideas out there, but they only make sense when they are communicated well, and they are shared with others. Otherwise, they just remain an idea and untouched.

- Some students mentioned that they would have wanted more feedback during class contact time. The problem is that there is literally no space in the schedule to fit more contact hours with the tutors. A possible fix could be to have more tutors going around so that groups can spend more time with them during tutorials.
- Some students mentioned that the brief was too long, so next year the key points will be summarised at the beginning.
- There were students that believe they were receiving contradicting feedback from each tutor. This is something that the module leader has to carefully look out for. If the feedback given out by the teachers is not aligned, it can end up creating a lot of confusion amongst the students.
- As with any assessment where group work is involved there is a danger of unequal distribution of workload.

Advice for implementation
- It is advisable to implement a combination of formative and summative assessments. The formative assessment should happen before summative, so that students are checked in with. They can get feedback before their grade is awarded. If the summative happens too soon then students only aim for a high mark. By introducing a formative assessment mid-way through term, students have the chance to produce something realistically confirming they are on the right track, but also giving each group a chance to shift the trajectory of the project if needed.
- Learning about teamwork is part of the module. In a team some people are more dominant than others. By allowing each team member to submit their individual concepts without being judged by the rest of the team, the quieter team members can also be heard. If you allow enough personal influence everyone will get as involved in the project and it won't feel like the whole group is

simply doing what one person thinks is right.
- The way to combine the two points made above is the following. Firstly, the whole group must go through a formative assessment which consists of explaining the reasons why they have chosen a specific user group. Later, each person in the group submits a summative assessment including their solutions to the problem the group is attempting to tackle. Between the team members and the user feedback, one of the 4 solutions is picked after a formative assessment with the tutors. Finally, the group gets back together to build the solution. The last summative assessment is to give a presentation and submit the portfolio and video. This method results in a product that involved everyone in the group.
- Some of the feedback received last year was to try to reduce the amount of study. Many students felt like they were spending a considerably larger amount of time on this module compared to other modules. To combat this issue, the team reduced the lessons and spread them throughout the term so that students had more individual working time.
- Whenever the tutors had too much influence over the project then students are at risk of losing interest. For example, when it comes to picking out one of the 4 ideas, if this decision is made as a group, then everyone is motivated to pursuit this idea. If the decision is made mostly by the tutors, the students feel like they have not chosen this path and they will feel less passionate about it.
- The assessment closely aligns with the requirements of the workplace. It is useful to contextualize this to the students though and making them aware that while the aim is authenticity, practices might differ across different workplaces and job roles. This can be especially useful for managing expectations around placements where students will not necessarily have an opportunity to make their own products.
- 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;
- Working in diverse groups where students might (or might not) declare some learning difficulties can affect performance and influence peer marking. For example, 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). 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.

- When introducing group work some consideration needs to be given to how students with specific learning needs can be successfully participating in group interactions. All students involved should benefit from inclusive practice this means that inclusivity considerations can be embedded within standard practice around preparing students for group work. This can be done through discussion around the allocation of roles and better understanding 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.

- While important for all assessments, for 'non-traditional' approaches it is particularly important that both staff and students are clear on the purposes, benefits and expectations involved. Appropriate opportunities for formative assessment and feedback built into the programme / module design can be key in this;

- 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.

- For all assessments but especially for more creative ones it is important to have a clearly defined marking rubric that is communicated to the students

- Offer some recommendations for software to use to produce a video to direct student attention to the content and demonstrating skills contained in the ILOs

- Having a more dialogic approach to feedback with opportunities for discussion around the project is a feedback approach that is well aligned with facilitating student learning. While educationally beneficial, it is often not recognised by students as feedback as the boundaries between learning and feedback are very much blurred. It is therefore useful to discuss with students the approaches to feedback that will be taken and encouraged, to establish common understanding of what feedback on the module will look like in practice.

- A video can be a very innovative form of assessment that allows students to showcase the content and their skills in a more creative way. An important consideration needs to be given to explaining to the students what the requirements are for a successful video and provide some scaffolding as to the software that can be used to create those videos. It also needs to be clear in the assessment criteria whether the quality of the final output be assessed and on what basis.