



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

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

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output or capabilities of that student. A final presentation also teaches the 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

Portfolio, Video and Presentation Assessment

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.

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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.