Anatomy of Assessment

Year One Summer project

Faculty: Natural Sciences

Department: Physics

Module name: Statistics of measurement and the summer project

Module leader: Prof. Yoshi Uchida

Format: Laboratory-based group project

Level: Year 1

Approximate number of students: Full cohort (About 250 students)

Duration: Six weeks (Third term)

Weighting and credit: 70% of final credit

Module ECTS: 7.5

Insights colour key

Educational Developer

Inclusivity

Learning Designer

Registry

Careers

Assessment overview

The first-year project is a group-based assessment, applying skills acquired in the core year 1 undergraduate physics laboratories to independently follow open-ended questions. Under the guidance of an academic, postdoc or PhD student, each four-student group develops their own idea into a project. There is considerable flexibility permitted in the scope of the projects, which can be anything from purely experimental to purely computational, or somewhere in between these two. The projects are presented to a wider audience of parents, academics and school leavers at one of the College Open Days where students are required to record a video of up to 10 minutes serving as a fully standalone presentation of their project.

Design decisions

Rationale

In core laboratory studies, students follow scripted worksheet and work in pairs with close supervision. This is important training but it does not properly emulate real research environments. The purpose here is to simulate a less scripted research environment, allowing students to explore their own questions, and to experience the collaborative and creative aspect of real physics-based research. A major objective of the project is to convey the fun involved in research to students without micromanaging them and constraining their approach, hence a trial-and-error approach to the project is emphasized and encouraged.

Practicalities

Timeline of the project

The students are provided with details on the project midway through term 2, and are tasked with forming their own groups and deciding on possible project ideas during that term. Groups were then assigned an academic guide, whose knowledge and expertise is suited to the group's chosen topic, to work with during the duration of the project. The major work of the project then runs over the course of term 3, with the Open Day presentations and video recording in the final week of term. As many projects run in undergraduate laboratories all design and planning for the module has been done in liaison with the undergraduate laboratory technicians. Formative assessment is provided to students at regular intervals by the academic guide during the term, and the full and final summative assessment and feedback for the submitted video is given within the first two weeks of the summer holidays.

Assessment and feedback

The year 1 summer project has been a core component of the physics degree for over 15 years, and has seen gradual changes on format and assessment style from time-to-time. Emergency changes to ensure the project could run at all were made for the 2020-21 cohort to incorporate for lockdown measures including departmental closure, necessitating several sharp and major changes. Some of these changes served to improve and

strengthen the module – the most notable was the video recorded aspect of the project, which has now superseded the older format of a poster and formal report submission. Both students and assessors find the video submission better for several reasons: it aligns more clearly with the course learning outcomes, gives more freedom for creativity, is more comfortable to view and critically analyse for assessors to provide constructive feedback, both staff & students feel the grading process is fairer and less subjective than the previous system, and is generally a more enjoyable feature of the exercise for all involved.

Student's perspective

The general student and staff view of the project and its the method of the assessment is very positive, with students especially citing the freedom provided in the module which permits a depth of learning in an enjoyable way. Students also especially value the experience of going the earlier developmental stages of the project, and having the time & space to follow non-scripted trial-and-error approaches under the supervision of an academic guide. Depending on the nature of the project, students sometimes found project logistics to be difficult (some are entirely computational meaning work can be done remotely at any time, whereas other involves use of laboratory equipment with the presence of a technician providing occasionally awkward restrictions). Video productions is generally thought of as an fun activity, but also produced some frustrations, especially when recording the relatively crowded environment of an open day.

Advantages of the assessment type

- Team working can help students develop useful employability skills. Learning how to deal with conflict within groups and understanding the different mechanisms for collaboration is important.
- The principle of allowing choice in assessment is a good one for several reasons: it makes for a more student-centred approach to assessment; it is more inclusive by empowering students to work on topics of importance to them; and it fosters independence.
- The production of a 10-minute video links to skills required in science communication jobs. Being able to summarise what students are doing and deliver that summary to a specific audience, be it the management team, or in this case school leavers, is reflective of skills needed in the workplace.
- The assessment is authentic in nature as it simulates an environment that some students might be entering at a workplace.
- A pre-recorded video presentation of any kind is always a good inclusive alternative to a live presentation as it benefits students who have issues with processing speed.

Limitations of the assessment type

- When students have to produce more creative outputs, such as a video, they might spend inappropriate amount of time on the stylistic aspects as opposed to focusing on the content and the skills that are being assessed. It is therefore important to reinforce the message around what is and what is not assessed.

Advice for implementation

- It is essential to carefully lay out the assessment criteria. If the learning objectives are well defined, the assessment criteria should follow easily from that.
- Reinforce what the expectations are in relation to the video and what within it specifically will be assessed. It might be useful to provide students with some exemplars of what is expected as this will help them understand the criteria better.
- Availability of staffed laboratory time and space is of paramount important in determining the breadth of topics students can explore for experimental projects.
- The extent of the freedom that students are given needs to be considered carefully depending on the level of ability of the students. If students have less insight into the subject or discipline area, 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 pedagogical scaffolding, for example by giving some examples of the sorts of choices students have made in previous years.
- Allowing students some time to get to know each other, with a scaffolded requirement to negotiate ground rules is excellent practice. To enhance this formative process, and take advantage of the groups' intentionally diverse nature, students

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Interviewees: Prof. Yoshi Uchida, Dr Helder Crespo

could be encouraged to consider the intercultural learning potential when negotiating ground rules – e.g. how are values around group working and contribution and practical approaches influenced by background and culture, as well as previous experience? Could each student offer a ground rule that reflects their values, to be refined as a group? Setting ground rules should go beyond practical considerations and take into account the crucial emotional dimension of learning. e.g. what enables individuals to feel confident and comfortable enough to contribute to a discussion or decision-making? Is turn-taking a good idea initially?

- When introducing group work some consideration needs to be given to how students with specific learning needs can be successfully participating in group interactions. 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.

- Scaffolding a relatively new assessment type, such as video, that can potentially be quite daunting for some students is important. Explicitly discussing the format and what is expected from the video should be an inherent part of preparation for assessment.

- It is always useful to provide some suggestions as to the tools that students can use to make and edit videos. It is important to give them freedom to use what they feel comfortable with, but having some suggestions is useful for students who have less experience in the area.

- Drawing on the point above, those suggestions should align with College supported technologies. Faculty specific Ed Tech team can advise on that.

- It is useful to offer alternatives to video (especially if it involves filming oneself) in the spirit of inclusivity. Alternatives that could be considered is a written piece, such as a transcript for example (if presentation skills are not tested) or an audio version (podcast).

- It's useful to consider incorporating elements of peer assessment when it comes to assessing the process of group work. This might help highlight group members who contributed unequally.

- If team working is an important part of the programme that will be picked up on in other years and modules, it can be useful to incorporate a small task into the assessment, whereby students either reflect on how their group worked together and/or they produce a short document detailing how each member contributed.

- It is good for the learning outcomes to reflect key aspects that are being assessed such as communication and/ or creativity if they are an important part of student learning on the module.

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