Anatomy of Assessment

Electronic Mid-term Exams

Faculty: Engineering

Department: Electrical and Electronic Engineering

Module name: Assessments across different modules in EEE with specific references to Communications module

Degree: Across EEE programmes

Level: Across Y1 and Y2 undergraduate courses

Approximate number of students: 100-200

Duration: approx. 50 minutes

Weighting and credit: 10%-20% of the final grade (usually 10% in Year 1, 20% in Year 2

Module ECTS:

Assessment overview
Mid-term exams are designed as low stake assessments with more of a formative function delivered in the middle of the module (usually 6 weeks into the term) with the main aim of checking students' progress and offering appropriate support for future learning. The exams usually consist of between 1 and 15 questions and are delivered and marked electronically via Wiseflow software.

Design decisions

What was the rationale for introducing a mid-term exam?
Mid-term exams were introduced to offer more distributed, lower stake interim assessment points allowing the lecturers and students to formally monitor learning and progress more closely and spread the assessment load for both staff and students. This encouraged student engagement with the material throughout the term (as opposed to the previous tendency to shift study to final exam revision) and provided mid-term feedback to both staff and students, while there is still time to learn and improve for end of term assessment.

Rationale for assessment type
Flexibility in the type of questions that can be used which means that usual questions can easily be translated into an electronic form and real time progress monitoring were the two reasons why we chose WiseFlow. In terms of monitoring, throughout the duration of the exam you can see how much time students are taking on each question, what percentage finished the test at what point in time which helps with identifying students needing support. The software also allows us to customise questions for students through reshuffling the order in which they appear as well as amending the values that students work with, which helps to stop collusion.

Question design
The software allows a variety of questions including MCQs, 'fill in the blank' (numerical), free text answers for mathematical expressions, fill in the table etc.

The questions tend to focus on testing knowledge and the theory part of the course with some questions around application. For us theoretical questions can be related to analysis or design, but whatever they are, they are essentially maths questions.

Automated answers design
Ensuring that all allowed variations of an answer are entered into the system is important. We test each question on GTAs who are asked to do those questions as students. This allows us to see if any types of mistakes come up with certain answers hence allows for better quality assurance of the exam.

Insights colour key

Educational Developer
Inclusivity
Learning Designer
Registry
Careers
AI

Interviewee: Zohaib Akhtar
Role: Communications module lead, the digital lead for the department and personal tutor*
*****The Case study is written up from the perspective of the role of the digital exam lead for the Department but with references to specific examples from his experience as a module lead and personal tutor.**

Electronic Mid-term Exams

Fit with other assessments and the programme/ module

The mid-term exam is an additional assessment method introduced as a diagnostic/ formative tool but carrying sufficient amount of credit to ensure students approach it with diligence. It is designed to monitor progress on the theoretical aspects of the module that provide underpinning for the more practical aspects assessed in the labs and higher order skills tested in the end of term exam.

Mid-term exams have been introduced across the majority of year groups so there is an element of continuation as the students' progress through their studies.

Practicalities

Student preparation

We do a lot of mock tests (one mock test before every mid-term) to help students get used to the software and practice types of questions they might be asked. The first mock is mandatory to ensure that every student has some practice.

Marking arrangements

The marking is set to be done automatically by the software but descriptive types of questions if used need to be marked manually. In case of mistakes in answers those need to be adjusted manually for each student.

Feedback arrangements

Students receive a pdf file with all of their answers. For some questions all they get is an indication of an answer being correct or not, in some cases the students get an indication of a range – saying that the answer would have been correct if it fell within this range and for more complex or problematic questions they might get a line or two of explanation.

The results of the midterm exam and the mid-term feedback are sometimes discussed in problem classes and in meetings with personal tutors.

Management of the process

Successful implementation across the department requires one person, a digital lead, overseeing the process, i.e. liaising with staff about appropriate question types, inputting the questions and managing potential appeals and adjustments to automatic marking.

Advantages of the assessment type

- A mid-term exam is a good way to monitor student progress and offer support for the higher stakes assessment.
- The electronic format allows for an easier way to test large classrooms and provide timely feedback that can actually inform student learning without overburdening the team – the benefits therefore are to both students in terms of quick feedback and the focus on learning and staff in terms of lower marking burden
- The analytics behind the software give an interesting and important insight into student behaviours during the mid-term exam and overall cohort performance. This data can be used to adjust future assessments and identify potential issues.

Limitations of the assessment type

- One of the issues with midterm exams is potentially assessing students when they have not learnt enough. For some courses the first chapters that the first half of the term focuses on are simply introductory and the important analytical skills only come towards the end of the term. This forces the tutors to test some of the knowledge that normally wouldn't be tested in the past as the focus would be on higher order thinking that those initial chapters only lie a foundation for. This makes it easier for the students to score marks for basics that would never be tested in isolation in the past on the end of term exams and makes it easier to pass the course based on the initial knowledge. It can also sometimes create an illusion of a student doing well and passing all of the mid-terms only to fail the higher stake exams.
- When planning a low stakes mid term assessment it is very important to consider if that is an appropriate stage to assess the students at and whether this is the right time to receive formative feedback. If it's not the right time, then it's useful to consider the need for the assessment overall and if there is a genuine need for it then rethink the timing of it.
- When it comes to embedding employability

skills, outside of developing knowledge that will be potentially used in future employment exams of this sort do not naturally lean towards transferable skills. It is important therefore to think where else, potentially around revision such skills could be developed.

- There are some limitations around software and question design/ marking. If we take maths or physics problem that needs to be calculated sequentially, for example, I may first need to calculate the speed of a falling object before using this to calculate its velocity. The results of the later stage depends on the result of previous stages. In automated marking, if a student makes an arithmetical mistake in an initial stage then everything is marked as wrong as the solutions are wrong, perhaps despite correct understanding and application of the process. In a tutor marked examination this can be recognised and if a student makes an early calculation error, but clearly understand the thinking and process they may only lose 1 or 2 marks, whereas in automatic marking they will lose all marks. One suggestion to rectify this is having more intermediate steps to a question. This, however, only works if a mistake is made lower down the problem line. Overall, in numerical questions a small mistake therefore becomes a big mistake.

- The software does not allow for any changes once the exam has been conducted. What can happen is, once the test has been conducted, we find another acceptable form of an answer or discover mistakes in a question would warrant a different answer. Ideally, it would be great to amend an answer so that the mark would be changed automatically for all students. This is unfortunately currently impossible, in such circumstances scores need to be adjusted manually, which is time and resource intensive.

Advice for implementation

- Put in reiterative feedback processes on the questions to eliminate as many mistakes as possible. On a written test when marking you can address potential mistakes with the answers immediately by adjusting the points accordingly but such mistakes are very much visible on an online test and have higher resource repercussion if discovered once the mid-term has been administered (please see the limitations)

- There should be one central person responsible for managing departmental electronic mid-terms. This helps with consistency and helps to address problems faster. Preferably this person should also be a tutor heavily involved in writing the questions and overseeing the marking because it's really important to understand traditional question types in order to make informed decisions about when to use those in an electronic format. This is an important insight that a learning technologist cannot offer. It is also important to ensure that there are other staff members that are broadly familiar with the systems to ensure continuity in case of illness.

- While we as teachers understand the difference between high and low stake assessments, students sometimes tend to approach both types with the same level of preparation and potentially same level of stress. It's important to spend some time positioning the mid-terms as an opportunity to learn and help adjust their learning and time management accordingly. Watch this video on managing students emotions and good balance.

- Ensure that whatever software you choose is supported by the College. This should be discussed and agreed with your Faculty Learning Technology teams. You don't want to find yourself in a position when you put a lot of manhours into one piece of software to not be able to use it the next year because the College withdraws the funding.

- From employability perspective, think of ways how the development of transferable skills can be supported through preparation for the exam through encouraging group revision and highlighting how group revision can support development of interpersonal skills, negotiation skills and time management skills. Watch this video on what skills exams develop from Careers.

- Ensure that the technology you choose to deliver electronic exams allows to make inclusive adjustments to the layout of individual questions and exams

- Ensure that mechanisms are put in place in terms of allowing extra time so that students with learning difficulties are not disadvantaged

- Consider the place of this assessment in the broader context of module and programme design and the ILOs. This will help to identify any points of potential over assessment.

- When choosing the right software it is advisable to liaise with the Ed Tech team as early as possible and use their experience to optimise the tool and the questions and provide instructional support about how to embed the tool for the students throughout the module;
- Quality assurance of electronic exam questions should work on the basis of the more eyes, the better hence a lot of parties should be involved in testing the questions and the answers;
- If fairness is ever an issue, with certain types of software randomisation of of answers is possible (I.e. giving students the same question but with options in different orders for MCQ types of questions or randomize numerical variables within a question).
- The College encourages staff to create opportunities where students' AI literacy can be developed. College's approach to the use of AI for assessment is outlined in "AI tools in teaching and assessment" document. If the use of AI is prohibited in exam like conditions then students need to be explicitly instructed that is the case and warned about the consequences.
- AI software can be used to help generate questions creating a pool to pull questions from while randomly generating pop-quizzes for students