Anatomy of Assessment

Capstone Project

Faculty: Medicine
Department: School of Public Health
Module name: Health Economics
Degree: Global Master of Public Health (Online)
Level: Postgraduate
Approximate number of students: 125
Weighting: 75%
Module ECTS: 5

Insights colour key

Educational Developer

Inclusivity

Learning Designer

Registry

Careers

As this course and assessment is online, students have freedom when to approach it and allows students to develop time management skills, which is important given the types of roles those students tend to go into. A lot of students are international so time management in those settings including potential time zone differences is useful. A lot of skills that employers need for Public health practitioners revolve around the ability to apply knowledge to different scenarios, elements of research, critical evaluation of information, situational judgment, interpretation and drawing conclusions – the assessment helps students develop those skills. To make this even closer...

Assessment overview

The Capstone Project (also know as, `the Capstone') is an individual-level summative assessment prepared for the Health Economics specialisation of the Global Master of Public Health (Online), the `GMPH'. The GMPH is largely comprised of senior postgraduates, many working full-time. Online content for the entire course is open from the beginning of the course, to enable students to work around their personal work-loads, however clear guidance is given as to what is expected in the live portions of the course. For example, office hours in week 2 cover week 1, live sessions are new content, et cetera.

The Capstone is designed to capture the knowledge students will have gained throughout the economic evaluation lessons in this specialisation. This project is comprised of a mix of practical and theoretical aspects, and requires students to plan, undertake, interpret, and draw policy-relevant conclusions from economic evaluations. The Capstone includes exercises related to calculating the effectiveness, cost and cost-effectiveness ratios of interventions, and also includes text-based theoretical questions to test students' broader understanding of the key principles of the course. In layman terms, the Capstone is a mix of a quantitative exam, and case-study format questions, which require students to infer the setting, and draw upon outside knowledge to place the question in context, in order to then answer the question using course materials.

The Capstone Project opens up 13 weeks before it is due. As this was an online GMPH course, the project was open from week one. Time was allotted specifically to the students (no new coursework online; no online live sessions) for weeks 8-13. The students were only able to be submit one time.

Students were able to download the Capstone at any time, and work on the questions in their own time. As the Capstone was administrated through WISEflow, the teaching and administrative team are able to monitor this progress, and found most students did download the Capstone and begin work on it within the three week study period (weeks 8-13) in which the course had suggested.

Design decisions

Rationale for the assessment

The Capstone was designed to give students the best chance to demonstrate their mastery of the core section of the course, economic evaluation. The focus of the Capstone was verbally communicated to the students multiple times in office hours and live sessions. The open-ended questions in the Capstone allows for flexibility in feedback to students. The design of the Capstone was very much linked to the type of students the GMPH included. When a cohort is largely comprised of online, professional learners, allowing for flexibility of timing and delivery is deemed an important factor. Not all students were able to attend live sessions and

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Role: Module Lecturers and GTA, respectively

...aligned with authentic practice in the workplace you could consider adding a group working component that is reflective of professional practice.

Flexibility is absolutely critical for PG programmes designed with a professional/mature cohort in mind, especially ones that have a clear vocational goal in mind. It is great that multiple types of output can be assessed effectively within the project timeframe, and such an assessment design would work fantastically within a remote learning environment. Pedagogically-speaking, this type of assessment aligns with Universal Design for Learning principles of offering students an opportunity to complete the assessment based on their own priorities, and by independently, and individually accessing and engaging with the content to be assessed. This might also resonate well with the programme-level LOs in terms of employability, especially if students completing this programme are likely to be in a professional context where individual workload management is key/central to their role.

office hours, however all sessions were recorded and posted via the online platform, Coursera.

This is a great example of authentic, in-context assessment that is well-suited for the level and proficiency of students (mature, senior working PG students). It seems that the pedagogy/rationale behind it was aligned very well with the student level and their development needs, and designed to work especially well in a remote, nearly self-paced and flexible learning modality.

The Capstone was consistent within the Online GMPH to have one overall, main assessment rather than splitting into a problems exam and a written answer exam; or generally into multiple components spread through the term. The Capstone Project supplements nicely the MCQ which is a bit more rigid in the ability to be marked, and which weighted at 25% of course value.

The Capstone is a flexible assessment. The teaching team is able to assess quantitative understanding on certain topics via calculations, and also present case-study type questions, which require some further background research, and perhaps time. It is flexible in terms of marking and feedback. As the Capstone is worth quite a large portion of the students' final grade, the flexibility on timing is nice, and no student should feel rushed to complete the assessment as students are taking the course material at varied paces, given it is an entirely online course.

Giving students flexibility and time to complete the assignments allows students with specific learning needs time to organise their thoughts and redraft their answers.

The exam was run so that students could complete the exam any time they want. In prior years, the exam was opened at midpoint. However, the module length was shortened. The summer term is 16 weeks; however, since there was no summer break for GMPH, all summer term modules were reduced to 14 weeks so there is a two week break for students prior to starting the Autumn term. The students were told repeatedly (live sessions, and office hours), that economic evaluation would be the crux of the Capstone. This helped, it is believed, to keep students on course with their online learning pace.

Why it is more appropriate than a timed exam (or two)?
The Capstone was a supplement to an online, timed MCQ, worth the additional 25% of the marks for the course, delivered at week 8 (the Capstone was due week 13). The MCQ tests a certain amount of knowledge but can be very superficial. Due to programming issues, some students have been known to find difficulty in MCQ's with multiple answers. Many complaints were made if students did not understand the verbiage if a question definitely had multiple answers, or not. It was hard to make it an MCQ exam that differentiated the class well without making it an exam which penalised those really behind. Although submitted online, as the Capstone, more variance in performance came out, and students generally seemed to have a higher comfort level completing their calculations,

research, and writing offline, and then submitting a PDF online.

It is important to ensure that software used allows for changes to be made to the layout of the question and the exam to make it accessible to all students. In terms of the font there is often an assumption that Times New Roman is a good font to use while in reality it is really difficult for anybody with specific learning difficulties to process. In terms of the layout of the exam questions on the page, having to scroll down between the question and an answer can be challenging hence the question and answer should be visible together without the need to scroll. Another consideration needs to be given to where the buttons are placed and avoiding placing next and submit buttons close together as students with visual perceptual difficulties or eyesight problems might find this challenging and accidentally click the wrong button. If a screen reader is required it is important to make sure that the text is accessible.

Open book exams are much more representative of the skills needed in the workplace. As employees, students will be able to look for information online which brings an extra element of being able to interpret information and pick the right information. Also being able to determine how to manage your time with looking for information is a useful skill to develop as this is something that an employer would expect to be done in a fairly efficient way.

All non-calculation questions took into account that students would have the ability to look online, discuss, and review. In fact, as a teaching team, it was acknowledged heavily to the students that given they had the time and ability to look things up, in some of the answers it would be built into the marking rubric had they bothered to look up the context, economic threshold, et cetera. Watch these video's on the value of open book exams and what to consider when designing open book exams.

Fit with other assessments and the programme/ module
Health Economics is a standalone elective module, so it is not driven how the Capstone fits in with the other programme assessments. However, as the online GMPH is a heavy course, typically enrolling senior health staff, globally, the programme team did look to make sure no other key programme assessments were due right around the same time as the Capstone. The students are taking (perhaps not at the same time, but within the Online GMPH) the core courses of Statistics for Public Health, Epidemiology for Public Health, Foundations of Public Health Practice, Health Protection, Health Systems Development, Population Health Improvement, and a Research Portfolio.

In addition to Health Economics, the following courses are available as optional specialisations:
• Global Diseases Masterclass
• Global Health Challenges and Governance
• Health Systems Development
• Global Health Innovations
• Infectious Disease Modelling
• Quality Improvement in Healthcare
• Participatory Approaches in Public Health
• Digital Health
• Advanced Statistics and Data Science
• Life Course Public Health

The other key summative assessment in this module was an automatically marked 45-minute MCQ, which students found more difficult. Cohort-level

The new assessment design considers the impact that assessment can have on student performance, confidence, and ability to engage effectively. The new design offers students ownership of their own individual learning trajectories in a way, and also allows for flexibility in terms of prioritising content. These design principles are good exemplars of UDL in action in terms of individualisation of learning, and potentially better developed self-regulated learning. It also allows students to take ownership of their trajectory, which contributes to managing potential assessment-related anxiety, as well as diminishing any sense of being overwhelmed due to this greater sense of ownership.

A typically used strategy to ensure students are engaged and informed in an online setting is to use already-resolved queries as a form of programme wiki, whereby each cohort adds 'knowledge' or tips as they go along. Within the same cohort, the existence of a student-facing and fully accessible forum helps resolve a lot of commonly met questions as they appear. This would also help provide a sense of belonging to the programme cohort, and allow students to share responsibility and accountability over their progress and engagement. An additional idea would be a weekly checking-in element, such as a module 'newsletter', where tutors discuss a couple of content-related prompts, or share a suggestion of where they think students might want to focus on on any given week.

feedback was given to guide the students into what knowledge they should focus on for the Capstone. The Capstone is a very different assessment, and acts as a nice contrast to the MCQ. No student should feel rushed; partial credit is available. The MCQ was not able to allow people to apply any background credit, and was more of a pure right or wrong, timed, rushed setting for an assessment.

Changes in assessment design

In the previous year each of the different sections of the project related to each other. This meant that the students were given a single case study and had to estimate the interventions, effectiveness, cost and cost-effectiveness. This made the assessment significantly harder to mark (due to issues with how to handle errors being carried forward etc). This format also increased the students' anxiety associated with the assessment as they were worried if they got one part wrong they would lose all of the marks.

To address this, the assessment was changed so that each of the sections (effectiveness, cost etc) were independent of each other – however still testing the same content/knowledge. This meant that each of the calculation questions were independent to each other – which was significantly easier to mark and change each year.

Practicalities

Preparing students for assessment

The teaching staff presented a live session on the Capstone, trying to alert students to subtleties that might be missed, e.g. needing to look up background material themselves, each question standing independently, etc. In addition, if any student wrote in a particular question about the Capstone, the teaching staff was very forthright in providing an answer, and then sharing the key answers given away with the entire cohort. The goal of the team is for everyone to learn, and succeed, and one of the difficulties in teaching such a large cohort online is reaching all of the students. Therefore, if anyone ever wants to discuss the Capstone in office hours, et cetera, that was always accepted and welcomed. The goal was for there to be no mystery as to understanding the exam. No practice exams were given in advance, as there are limited case studies in countries with the same issues as the Capstone (Vietnam, for example, or something specific to the UK), and the teaching team did not want to give away the answers. However, ample advice as to `look up country-level background', or `inferring will be necessary on these particular areas' was repeated with frequency. With respect to the MCQ, less help was offered in advance, as it was viewed to be a more straightforward assessment.

As with any assessment method, it is paramount that students understand 'the rules of the game'. They need to understand what is expected of them in terms of outputs and understand the difference between different criteria and performance at each level. With a level of flexibility built in into the assessment design, it is also useful to give them an indicative timeline so that they do not fall behind. This timeline should also include extensions linked to any need for mitigation.

Shadowing and immersion are the best strategies to get newer assessors up to speed. The rubric should be as detailed as possible, and new markers should be paired up with senior/more experienced ones for the first few hours of marking so that they can gauge expectations. Sharing and discussing exemplars from previous cohorts (from all grade points) can also be extremely helpful, especially for the more formulaic elements to be assessed (calculations etc.).

Providing a set of exemplars of what good developmental feedback is good practice regardless of context. If this is to be paired with some prior discussion of past exemplars and the provision (from more senior tutors) of their rationalisation when assigning certain marks, this would help get newer assessors up to speed much quicker. The rubric should also be rooted and constructively aligned with the LOs, and assessment criteria (if slightly different from LOs), and a clear breakdown of these should be communicated across all assessors. Some light auditing of marking (per College's assessment protocol) would also help ensure consistency across the marking team, and regular marking meetings to discuss moderation help maintain benchmarked standards.

Marking arrangements

The Capstone was marked double-blind, by questions. For example, with a cohort of 125 students, 195 marking hours were needed, which is very heavy. An additional 7 individuals were brought on board to assist with the marking. In the instance almost all of the individuals did not have a strong Health Economics background; the teaching team created a very detailed rubric, both for marking and for feedback. Thus, consistency in marking could be delivered, even with the open-ended questions. If a certain question was worth 6 points, exactly which 6 points per question was available for a student to receive a mark were laid out to assist the marker.

Quantitative problems had rubrics as well. X amount of points if this went wrong, but Y amount of points if they still maintained the right order of interventions, etc. Due to the heavy nature of the marking, there was a three week marking period, following by one week of checking for any errors, completed by the GTA/Teaching Fellow, and then marks were released. No complaints following mark release were submitted.

There is a fixed time between submission and when students receive get marks. With a cohort and small staff, 3 weeks were spent marking, including the management of 7 external markers, and the 1 week spent checking all markers had reasonable responses. Next year, as the SPH moves to check-marking, this level of detail in marking is anticipated to decrease, as mediation per question will not be necessary; also, the Health Economics team recommends Cohort-level feedback, not individual level, when so many personalised comments are required on multiple questions.

Feedback arrangements

Just as with the comments in the rubric for the markers to know how to assign points, feedback comments were assigned for each point of the entire rubric. Additionally, markers were given notes as to how many comments should be made on each section of the Capstone, whether they were comments because a student had missed a significant amount of points, or positive comments because they had completed the section accurately. In this way, the teaching team ensured each student would receive a consistent level and quality of feedback, and this eased the burden on the outside markers.

The comments worked well with the students. A rubric was built into WISEflow. The overall mark to the student was delivered via Coursera, and induvial question-level feedback, including a per-question mark was delivered via the rubric. Given the double-blind marking, and the large cohort, the level of effort to deliver a matching, mediated per-question mark, tying to the overall mark, was extremely exhaustive. Individual-level feedback, without the per-question mark, would have been advisable given the cohort size and subject-knowledge of the markers.

Management of the process

The most important part of the Capstone of course is monitoring the students seem to understand the content going in. This is always tricky,

especially in an online course. The teaching team took close note of one particular section, for example, students continued to ask about in office hours, or a large portion of the students had missed on the MCQ. If that was the case, the teaching team would proactively again try to present the material in a different way, trying to assist the students as much as possible to put them in a strong position for the Capstone.

Additionally, being very responsive to questions, both over email and in office hours was important. Some students did find it confusing when you could open the exam, and that you could submit anytime up until the deadline. As mentioned above, when a certain individual approached a member of the teaching team or programme team about being lost, they received individual attention guiding them with our recommendations as to how to reach success for the key course milestones.

Students seemed very clear on the submission process, so there were no issues with people attempting to submit the Capstone in parts. It is recommended in an online course such as the GMPH to have a dedicated live session, well in advance of the Capstone submission, to discussion expectations, and practicalities such as submitting as a PDF, through WISEflow, not in parts, et cetera. Formative feedback was gathered on the Capstone progress via office hour queries. In this instance, the Capstone really covered the material from weeks 4-7. The teaching team did not want people to miss focusing on the rest of the course so did not broadly advertise this initially, but closer to the time, did broadcast this in case any students were very lost and behind. This was not advertised on a forum, but stated verbally in weekly office hours, which were recorded and posted online.

If students wrote in a query misunderstanding, for example, if one question related to another incorrectly, every week or so the Teaching Fellow would email the entire course with the three or so most pertinent questions they had answered privately, to make sure everyone had the same information. Given the cohort never met in person, and so did not have classmates to lean on, this helped the teaching team to try and create a learning community that could support each other with any

uncertainties/confusion.

To help foster a sense of cohort-ship, both formal and informal connection and communication between students should be encouraged. A tutor-monitored 'muddiest point' forum or discussion board can help a great deal in ensuring no queries are left un-answered for too long, and the encouragement of creating student-only fora and discussion boards helps students connect with each other in a more relaxed setting. Utilising the course representatives can also aid the creation of a sense of belonging.

The students did not see sample questions, but the Capstone was discussed well in advance; an entire live session was devoted to it.

Student experience

Some compulsory courses within the programme changed. Health Economics was formally core, and is now an elective. Global Health Challenges and Governance were formally core, and are now an electives. Health Protection was an elective and is now compulsory. It is believed Global Disease Masterclass should be core, although is now an elective. As a result from the movement from core to elective, students have had less opportunity to sign up to take the course; intake tripled in the most recent term.

As mentioned above, Health Economics is currently a popular, elective specialisation in the GMPH. As the students are generally senior, management-level professionals, often the course draws healthcare-industry executives expecting more of a `discussion' style format, who can be surprised by the mathematics and technical rigour of a health economics course. Whilst this can make the first few weeks of the course difficult, generally expectations and understandings of the course settle in, and the level of engagement of the class is generally quite high. The `health' side of the course is most easily understood and the `economics' side of the course can be a bit misunderstood. Nonetheless, the coursework has been well-prepared in advance, the teaching team are well-aligned in their understanding of the content to be delivered, and eventually all parties fell in line, with some very interesting side topic discussions. There have been a few students who have been overwhelmed by the quantitative

aspects of the course. Due to the online `go at your own pace' nature of the course, some students can fall behind.

> Whenever the learning design offers students the ability to manage their own pace and sequencing of covering the materials, there is always the risk of students not being 'strategic' and pragmatic in terms of which elements they choose to engage with first. This might mean that more challenging aspects of the course are avoided and left until last/too late, therefore making the assessment seem unmanageable. The best way to avoid this happening is to provide explicit signposting at the start (or at point of enrolment if talking about completely self-paced learning), with tutor-led suggested prioritisation of the typical sequence of engagement with each learning item.

In this instance, generally the programme team is approached, and then the Teaching Fellow / Graduate Teaching Assistant is approached, and streamlined advice tailored to that individual is dispensed. Students been very thankful for this approach, and it has worked well. With a streamlined team, and a large online cohort, this is likely always to remain a challenge.

Online adaptations
This is for an online course, so no adaptations needed. However, for an in-person course, this assessment would work as well. The assessment could be distributed to the class with a large window open for submission similar to a standard exam with a due date.

The assessment window could be adapted for students who were in-person, full-time, not working professionals.

Advantages of the assessment type
• Works well for professional learners in online courses when students require flexibility, and are going through the coursework at their own pace;
• This level of flexibility allows students to develop important transferable skills around time management;
• Once time is invested in the rubric and feedback comments, it simplifies the process of needing outside marking assistance;
• Works well for a mixture of question types, such

as calculations, or longer case studies which require background research. In this setting, this is viewed as superior to a standard timed exam as can give space to reflect on answers and update as the knowledge becomes more embedded as students work through material. This is just one benefit of having early, and working in phases, but the student being able to go back to what they have worked on before submitting. This is arguably closer to how we work in real world – we draft, review, update, review…
• This ability to pause and think also caters to the needs of students who might have some learning difficulties as it reduces the time pressure and gives them more processing time;

Limitations of the assessment type
• This assessment has been run in the past with the questions interlinked (e.g. the answer to q2 depends on q1) and it made it much trickier to mark, and students were more confused by the feedback. For online / more independent learning pace courses, individual questions which are not linked are more suited to this assessment;
• Students leave to end and then do not have time required to do the work;
• Hard for students to know when to do the different components;
• Hard to give students indication of how long they should spend on the assessment;
• The biggest risk with technology is a student inadvertently submitting mid-exam, and wanting to resubmit. However, with WISEflow, the assessment is downloaded and then re-uploaded, so this issue is difficult to do accidentally unless the individual does not understand;
• One issue with WISEflow is the burden on the administrative staff's team to train teaching staff and/or markers', not knowing ahead of time who will be doing the bulk of trouble shooting;
• In WISEflow, the feedback mode is a bit tedious; it is helpful to have someone pre-create `rubric' boxes for feedback in advance. With a large cohort, and double-blind marking, individual question-marking for feedback provision may not be wise, for quality assurance.

Advice for implementation
• Be conscious at any given point in time, do the students have enough information to complete

parts of the assessment;
- Be responsive, this is very important especially in an online environment;
- Be organised with your marking rubric and feedback. It is an assessment where students can earn partial credit, and they will be eager to get it;
- Educationally-speaking, one thing to take into consideration is whether or not a sequence or timing in which students are advised to complete other programme aspects is needed or helpful for more efficient completion of the project. Good practice would see some signposting or prioritising recommended by the programme team in terms of how students access each course element (incl. assessment);
- Make sure that the questions are displayed in a way that is accessible;
- Help students reflect on their learning so that they can better understand how approaching this type of assessment with exam like components helps them develop skills needed in professional lives.