

Faculty	Health and Behavioural Sciences
School	Pharmacy
Activity	Certainty Based Multiple Choice Questions
Lead	Mr Karl Winckel, supported by Ms Debbie Leung
Course	PHRM3012 Quality Use of Medicines
Average no. of students	175 - 250

The course

- Quality Use of Medicines for Pharmacists focuses on medicines to treat cancer and infectious diseases.

Flexible and Active elements

- Intervention made in 2016 to include Certainty Based MCQs (CBA MCQs).
- CBA MCQs are Multiple Choice Questions that a student will answer A, B, C, D, or E to alongside indicating their level of certainty or confidence. This aims to address both the accuracy and confidence of students' knowledge.
- MCQs have been criticized by many for not adequately assessing critical thinking. Certainty based assessment designed with complex case based questions is one way to address these criticisms.
- Certainty based assessment has been shown to encourage self assessment, reflection, and justification of 'knowledge', promoting active, constructivist learning.
- Five Online CBA MCQs were deployed before known difficult lectures (infectious diseases lectures). Students were informed that they must complete these prior to the lectures to obtain marks, however were open for one week after relevant lectures, so students could amend their answers. Multiple attempts were allowed, and discussion with peers was encouraged.
- The CBA MCQs were carefully designed to test higher level thinking and probe confidence in knowledge. Proponents of CBA MCQs have predominantly advocated using negative marking to discourage confident yet inaccurate answers (Gardner-Medwin and Curtin 2007). This contravenes UQ Policy and has significant ethical concerns. As such innovation differs from published work on CBA MCQs.
- A novel approach was used whereby students were given a mock patient outcome for their decision and confidence level in MCQ selection. An example of this this mock outcome was a video of a doctor/ pharmacist in a hospital discussing why the pharmacist had made such a poor decision and that this had caused an admission to hospital.

Learning outcomes

- Case based scenarios ensured student learning and subsequent decisions became more real and transparent as they were more engaged in the scenario.
- Indicating their level of confidence assisted students to self assess their knowledge which is an essential skills for ongoing CPD and lifelong learning.

Recommended resources

Gardner-Medwin, AR, and Curtin, N, (1996), 'Confidence assessment in the teaching of physiology', *J Physiol*, 494:74

Gardner-Medwin, AR, (2006), 'Confidence-based marking: towards deeper learning and better exams', In C Bryan & K Clegg (eds.) *Innovative assessment in higher education*. London: Routledge.

Gardner-Medwin, AR and Curtin, N, (2007), *Certainty-Based Marking (CBM) for Reflective Learning and Proper Knowledge Assessment*, In *Assessment design for learner responsibility*. Available here (accessed 4 April 2016)

Top tips for implementation

1. Don't negatively mark even though the literature supports this, as this is against UQ Policy.
2. If it doesn't work it doesn't necessarily mean it's a bad idea. Spend time explaining to students why CBA is useful to THEM as the students who were engaged did quite well. You may need to explain what you are trying to achieve many times. The effort expended doing this is worth it.
3. CBA can be useful for course coordinators as well as students to see how well students understand content and may guide changes to your course.
4. The design of the question is more important than the certainty based aspect. Engage a learning designer to support you.
5. Speak to other academics working in this space at UQ. The literature tends to gloss over the hurdles.

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What the students say

I feel that these certainty based assessment questions were: quite effective for helping me reflect on my knowledge about the various questions. They're a positive experience which definitely expanded my thinking and studying techniques.

They helped my learning because: it gave me a more 'real life' approach to the assessment. As Doctors and patients require a certain level of confidence when speaking to their pharmacist, having a practice run with this was great.

4th Year Pharmacy student

I feel that these certainty based assessment questions were: an excellent opportunity to test my knowledge while also providing me the opportunity to reflect on my knowledge prior to having to submit an assessment piece. By taking into consideration how confident I felt about each answer it prompted me to research the answer over the next week to ensure I knew everything about the question and that my answer was the best that I could possibly provide.

They helped my learning because: it helped my learning by prompting me to further research the literature surrounding the question. This allowed me to extend my knowledge past just rote learning an answer to understanding why this answer was the best option for the question which provided me with a much better real-world application for the knowledge.

4th Year Pharmacy student

I feel that these certainty based assessment questions were: really useful to me knowing where I was going wrong with my study and where I needed to dedicate more of my time. I felt that they were useful to my studies in the QUM subject because it is such a knowledge based but also confidence based course, you can't dispense health information without being sure of yourself.

They helped my learning because: they narrowed in on exactly where I was struggling and allowed me to study better, focussing on what I wasn't so confident on.

My other thoughts around these questions were: These quizzes also showed me that I had to be confident in what I was saying to patients in future, because one day I would be saying this to a patient in front of me and they would completely trust the information I give them. So it has to be right but more importantly I have to know its right. I think that was impressed on me the most while attempting these questions.

4th Year Pharmacy student

I feel that these certainty based assessment questions were: an excellent way for students to understand and grasp the knowledge of the topics.

They helped because they allowed students to deal with uncertainty in the first attempt. For the second attempt students were able to build confidence upon further discussion, research and learning of the material.

4th Year Pharmacy student

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