Medical student use of an online formative assessment resource

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With the rising use of elearning in higher education, an ever-increasing amount of research has been conducted into its educational value. However, such research has been found to focus on academic staff perspectives and course design, rather than student perceptions. When developing elearning resources, staff need to understand not only their academic value, but also how students use and experience elearning. This paper reports on a recent research project that evaluated medical student use and experience of an elearning formative assessment resource that was redesigned to enhance interactivity and feedback. The aim of redevelopment was to help students assimilate and build on their knowledge of paediatric asthma management and begin to apply this knowledge in a clinical context. This study investigated how students used the resource, their evaluation of its effectiveness, including the role of learning for professional competence versus preparation for assessment, and their recommendations for improvement. This research will inform the redevelopment of the resource and the design of future elearning resources.

Keywords: Student evaluation, online formative assessment

Background

Formative assessment provides students with the opportunity to practise the skills and knowledge that are the goals of their course in a non-threatening environment (Kibble 2007, Byron *et al.* 2004, Crooks 1988). Online formative assessment improves on its paper-based forerunner in that it enables students to receive automatic feedback, making this feedback more relevant to their learning (Byron *et al.* 2004, Crooks 1988). Research into student use of online formative assessment resources in the medical, dental and biological sciences has found that students who use such resources regularly outperform those who do not (Kibble 2007, Peat *et al.* 2004, Byron *et al.* 2004, Henly 2003).

While formative assessment is acknowledged as a valuable learning tool, it is summative assessment that has been found to guide student perception of what is important to learn and the time they devote to it (Crooks 1988). In particular, Crooks (1998) notes the facility of some students to identify cues that will enable them to obtain high marks economically, which may not coincide with the goals of the course. This is particularly relevant in a professional program such as medicine, where clinical educators expect students to focus their learning on professional competence, as well as preparation for assessment.

Over the past decade, an increasing amount of research has been conducted into the value of elearning in assessment, learning and teaching. However, a 2005 UK literature review of evaluations of elearning in higher education institutions found that such evaluations often focus on the academic perspective or course design, rather than students' perspectives (Sharpe *et al.* 2005). In particular, the study highlighted that staff developing elearning resources and practices need to know how learners use and experience elearning.

The Discipline of Paediatrics and Child Health at The University of Sydney has recently redeveloped an elearning formative assessment resource for fourth year medical students on paediatric asthma diagnosis and management. The elearning resource, which previously consisted of open-ended questions with model answers, supplements a lecture and workshop on paediatric asthma. The updated resource aims to provide greater interactivity and more feedback to help students assimilate and build on their knowledge of paediatric asthma management and begin to apply this knowledge in a clinical context. It consists of ten clinical scenarios, each with three questions that are multiple choice or extended matching. For each question, there is feedback on the correct answer choice and a detailed explanation of the answer. Our aim in this study was to investigate the students' use and experience with a pilot version of the resource, and to elicit their suggestions for improving the usability of the resource. The information gained from the pilot study will be used to improve the elearning asthma resource and inform future development of elearning resources for use in a blended learning environment.

Purpose

The primary aim of the pilot study was to evaluate how medical students use the elearning asthma resource, in particular, whether the students: a) read the case scenarios and questions; b) consider the answer choices before selecting the most appropriate response, rather than guessing to receive the feedback; and c) read the detailed explanation.. Secondary aims were to evaluate the students' experience of the educational value of the elearning materials compared with other support materials and student recommendations for improvement of the resource.

Method

Three groups of students trialled a pilot version of the elearning asthma resource during three paediatric rotations in 2008. After each trial, the students completed a paper-based survey, which used a five point Likert scale for ratings. The survey was divided into four sections: 1) demographic data; 2) student use of the resource, in which the same question was asked with both positive and negative stems; 3) student experience of the resource, comparing it to other educational media; and 4) comments for improving the resource. Finally, the students participated in focus groups. The research continued until saturation of data was achieved for the focus groups. Data was analysed using thematic analysis, which involved identifying the common themes from the transcripts of the focus group and coding the data accordingly.

Results

Ten students participated in the trial, of whom four were female and six male. The demographic data demonstrated that the students were representative of the general student cohort. Analysis of the student survey and focus group data revealed three main themes: a) student use and experience of the elearning resource; b) assessment driving student use of elearning resources, rather than learning for professional practice; and c) improving the student experience of elearning resources. The results are outlined below.

Student experience and use of the elearning asthma resource

The student experience of the elearning resource was very positive and compared well with other media for learning about paediatric asthma. All students agreed or strongly agreed that the elearning asthma resource was a useful supplement to the paediatric asthma lecture and workshop. The majority of students (90%) agreed or strongly agreed that the resource would help to improve their clinical practice. The opinions about the usefulness of this resource in comparison to searching the Web for information were more disparate, with 80% of students agreeing or strongly agreeing that the resource was more useful than searching the Web, 10% of students reporting a neutral opinion and 10% disagreeing or strongly disagreeing that the resource was more useful than searching the Web.

In describing their use of the resource, all students reported that they chose the most appropriate answers to the questions rather than simply selecting any response to receive the explanations. In addition, the majority (90%) of students read the explanations thoroughly and 30% would have liked more detailed explanations. The majority of students (90%) reported that they read all the scenarios.

In terms of reading the scenarios, a number of students explained their question-attack strategy of first reading the question and only then scanning the scenario for relevant information. One student explained:

> The scenarios … might have nothing to do with [the question]… I guess you skim the scenario, then actually read the question and go back if you need it.

What drives student use of elearning resources

Much of the discussion in the focus group concerned the students' evaluation of the effectiveness of the elearning asthma resource, in particular, their motivation in using online formative assessment resources. Comparing the elearning asthma resource to other media, the students reported that they found the elearning asthma resource better for learning than simply reading on the Internet. One student commented:

> It's better than just reading online, 'cause you have to go through the thought process of which answer it is. Then if you get it wrong, … you remember it better. Whereas if you just read it, sometimes it just goes in one eye and out the other.

The role of prioritising in student learning was evident. The students claimed that the Graduate Medical Program provides them with a large amount of Web-based material for learning in areas of personal interest. However, it is the students' prioritising skills that directs their learning, as one student explained:

> The underlying philosophy is a little bit naïve. It assumes the Rudolf Steiner School of Medicine approach: "Here [are] some things you might be interested in. Why don't you go and find out everything you can about that?"… But you're dealing with professional students who have learnt the hard and fast art of learning exactly what they need to know.

Above all, exams have the greatest influence on learning and guide prioritisation, rather than professional competence. In addition, areas of no personal interest may become a priority if they are expected in the exams. Two students discuss this below:

> Student A: It's a horrible thing to say in this company but, being a wannabe surgeon, I don't want to get into asthma that much.
> Student B: But before your exam you're going to do it, right? You can't be a surgeon unless you pass your exam.

Consequently, the extent to which the students second-guess exam content is marked. One student noted:

> Obviously if you've asked this question in an online [activity], it makes me think that you guys would like me, as a medical student, to know about it. Because if you wouldn't like me to know about it, you wouldn't ask … This makes me think, "Okay, where's the reference? Where can I read up on that?"

Similarly, when deciding what *not* to prioritise, a student commented, 'I was reading through the answers and thinking, "This is a bit too special. I don't know if I really need to know this right now."'

Student recommendations for elearning resources

The students made a number of recommendations for future development of elearning formative assessment resources. One of the key recommendations is that they be self-contained as study aids. As one student explained:

> The problem is… if you do this online quiz and then… you find you have to do a lot more research afterwards, I think that would discourage people from using it [and] telling their friends about using it.

The students also asked for a summary, or 'take home message', for the questions. One said, 'There are four or five things that are easily put into a paragraph that medical students are expected to know.' Another said, 'It would be nice to be able to compile it all and print it… and put it into my textbook.' In addition, the students asked for more details for 'people who like extras'. Many students asked for references to studies and links to websites to confirm details outlined in explanations. Others asked for details that 'you can't find in a textbook'.

The students also recommended that the elearning asthma resource score their attempt. One student said:

Giving more feedback on the students' performance would make it even better. A way that engages, tells you… "If this [were] a real exam, you would get a B, or whatever." You might do it again just to have the A..

Finally, the students suggested the resource could analyse their areas of weakness. One student said:

You could have the breakdown of the results as for pharmacology and devices. Then you know, … "Pharmacology's the one I need to work on"... I find that helpful because after a while of doing multiple choice, you kind of forget which ones you knew.

Conclusion

Medical students today are very comfortable with the use of elearning resources. With the vast amount of information available, students must become efficient in selecting and using this information to further their learning. eLearning resources developed by medical programs may have advantages over traditional learning resources. However, the developers of such resources must be aware of how the students approach the use of elearning resources; resources that do not cater to student needs will not be used.

The role of examinations in traditional medical schools, as well as other disciplines, is well established. In the 1960s McMaster University reshaped medical school teaching with the introduction of a problem based curriculum and the elimination of any examinations (Simpson 1976). In an article summarising the sequence of changes in assessment over the course of the programme's history, Cunningham (2002) argues that what the assessment is used for, and not the assessment itself, is what impacts on student learning. As long as assessments are used as barriers to progression, students will focus their use of resources, including elearning resources, in a manner that they perceive will be most efficient to enhance their success on these assessments. Our goal of enhancing the clinical application of the information provided in this paediatric asthma elearning resource will be lost unless the clinical application is reflected in student assessments.

Our study supports our expectation that medical students see elearning resources as a potentially efficient method to support learning. eLearning resources have the potential to cater for different learning styles as well as different levels of knowledge, providing students with efficient tools for learning. Future research is needed to develop tools for students to use to evaluate and select elearning resources. Finally, our study confirms our belief that students should be involved in the development of elearning resources to optimise their development.

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