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Instructional Design Memo

Student-Generated Questions Benefits and Tools

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Developing effective assessments of learning is generally the province of the instructor. Indeed, it takes subject-matter expertise and some pedagogical savvy to develop questions that will engage students and evaluate how much they know. What happens when students become the assessors and generate engaging, authentic questions for their peers as a learning activity? Is there any use to having novices develop questions, many of which will be too simple or off topic?

It turns out that, generally speaking, student-generated question posing is associated with enhanced learning and improved academic performance (Barak & Rafaeli, 2003; Marbach-Ad & Sokolove, 2000; Yu and Liu, 2005). Berry and Chew (2008), for example, found that undergraduate psychology students (n=102) who created their own questions related to course materials showed significant improvements in exam performance. Both high- and low-performing students benefitted from formulating questions, and their test scores exceeded both their prior performance and those of their peers who did not submit questions. In fact, the lowest performing students evidenced the largest improvements as a result of generating questions. **Berry and Chew found that the *number*, and not the *depth*, of questions students generated was the most important correlate to improved performance.**

Enhancing learning with student-generated questions

The benefits of student-generated questioning relate, in part, to the unique challenges associated with authoring question versus simply responding to them. Designing a question requires a student to reflect on desired outcomes and decide what content aligns with these outcomes (Denny, Luxton-Reilly, & Hamer, 2008). In the case of multiple-choice questions, students must also consider feasible misconceptions. Such activities involve practice with content analysis, a higher-order thinking skill than is required in simply responding to teacher-posed questions. As such, students who generate questions will engage in

cognitive and metacognitive strategy usage to a greater degree than in a more traditional classroom setting.

By implementing a multiple-choice question-construction activity into an undergraduate physics course (n=42), Yu and Liu (2005) found that students tended to engage more deeply with course materials. Constructing their own questions encouraged students to evaluate their own performance on an ongoing basis and to employ metacognitive strategies to selectively attend to the essential aspects of the relevant course content. Beyond these learning benefits, assuming the role of an assessor promotes a greater sense of ownership and a more positive attitude toward learning among students (Barak & Rafaeli, 2003; Yu & Liu, 2009).

Online tools to facilitate student-generated questioning

Online programs exist for facilitating students' creation and dissemination of questions among their peers (e.g. Barak & Rafaeli, 2004; Denny, Luxton-Reilly, & Hamer, 2008; Yu & Liu, 2009). Two examples include QSAI and PeerWise. Each allows students the ability to contribute questions to a test bank where their peers can access them. Students then have the option of answering a question or rating and providing feedback about the item's quality.

PeerWise (peerwise.cs.auckland.ac.nz) is free software that "supports students in the creation, sharing, evaluation and discussion of assessment questions." Students create questions and explanations of correct responses within a PeerWise "course repository," which also stores the questions, along with their answers and other related materials. The tool is used all over the world. It appears that at this time, PeerWise focuses on multiple-choice rather than open-ended questions.

Because students tend to lack exposure to question generation in formal educational settings, some approach the task with apprehensiveness (Yu & Liu, 2009). For that reason, some programs like Peerwise allow students the option of posting anonymously. To encourage equal participation among students, it is recommended that teachers provide the option for either student anonymity or use of nicknames when students are asked to generate their own questions.

References

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