

Program Assessment based on Student-Generated Questions: An Exploratory Study

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ABET-accredited programs perform a multitude of assessments typically based on *students answering questions* [Shryock and Reed, 2008]. On the other hand, assessments based on *student-generated questions* are conspicuously absent. Considering the well-documented correlation between critical thinking and effective questioning [C. Chin, 2002], [Song, 2016] the lack of questions-based assessments is surprising and warrants examination.

This exploratory study examines the usefulness of student-generated questions in informing program improvements. The set of 763 technical questions used in this study derives from a 10-week electronics capstone course with an enrollment of 75 students. Preliminary examination of the questions reveals a wealth of useful information. For example, at least 66 questions, approximately 8.7% of the total, relate to topics covered in pre-requisite classes. The questions are specific enough to identify deficiencies and formulate a meaningful intervention. Additionally, we find that approximately 31% of the questions have low quality. The problematic questions fall into three general categories: *obscure*, *rudimentary*, and *vague*. Poorly worded questions difficult to understand make the obscure category whereas simple questions most students should be able to answer themselves make the rudimentary group. At 12.7% of the total, the rudimentary group is the largest of the three groups; this large percentage might indicate a mismatch between instructor expectations and students' capabilities. The vague questions are the least problematic of the three types. They typically involve a request for a *general and unconstrained* comparison of circuits or techniques. Such a request indicates engaged students who may lack the understanding that absolutes rarely exist in engineering.

The relatively large number of weak questions is disconcerting but expected. In an article, discussing lifelong learning of recent college graduates one reads: "A large majority of the graduates believed they had transferred information skills from college for interpreting and applying search results (76%) and reflecting on the ways they learned best (74%). Yet, far fewer—less than a third (27%)—agreed that college had helped them develop the ability to formulate and ask questions of their own." [Head, 2016]. This must also be true for our students and might justify teaching proper questioning [King, 1995].

One source we found suggests that teaching students how to ask questions also improves instructor's teaching ability: "Teachers who have taught their students how to ask their own questions report that they have become better at their craft." [Rothstain & Santana, 2011]

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