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### CoAT Workshop Reflection: Classroom Assessment Techniques

The Classroom Assessment Techniques workshop was conducted online from 11/17-11/22 through the Vista system and was organized by Dr. Barbi Honeycutt. The workshop's aim was to provide resources and enjoin discussion on a variety of techniques for assessing student progress in a course (aside from examinations and quizzes). The purpose of the assessment techniques are to help instructors understand what material the students have learned, but more importantly to help the students measure their own progress and encourage them to think critically on whether they are learning or not. Approximately eight people participated in the online workshop. We were assigned to read two excellent introductory resources on classroom assessment techniques. We then posted to the forums our muddiest point (itself a CAT) regarding what we had learned as well as create a CAT for one of our own classes. Everyone engaged in discussing the other participants' posts as well.

The workshop was illuminating in a number of ways. I have always struggled with the best way to evaluate students' progress beyond simple techniques where students are asked to recall some piece of information. These techniques neither seemed particularly effective for assessing the student's progress, and it probably gave the negative impression to the students that memorization and being attentive were more important than critical thinking. The striking thing about the CATs we discussed was that their primary goal was to help the students assess their own progress in a variety of different ways in addition to serving as teaching tools. The importance of the students understanding whether or not *they* are learning never occurred to me before, though in hindsight it is of course critically important and describes a lot of my own frustrations as a student. This realization occurred to me as I was reading the details of the different CATs and the proverbial light bulb turned on.

I think that the students' self assessment and awareness of their progression with course material is critically important for several reasons. First, this self-awareness helps the students understand their knowledge acquisition with respect to the teacher's expectations. Am I studying the right thing? Do I need to study more? Do I just need to know these formulas, or do I also need to know how they are derived? I think that many students, when faced with a five-course semester, can get lost in the flood of information they are expected to learn (after all, every teacher thinks that ALL of their material is important). Understanding the expectations of the instructors can help the students orient themselves and focus on the main lessons of the course, giving them concepts on which to anchor the rest of the material.

A second boon to the students' self-awareness is that it enables them to pace themselves. Students always (and always will) cram for quizzes and exams. In addition to being stressful, cramming is basically short term memorization and entails very little actual learning. CATs at least afford the opportunity for students to say, "I really don't know this," and then act on that if they so choose. Students may oftentimes leave a class not really understanding the material. CATs can be used to reinforce the notion that some material is, indeed, important and hopefully induce the students to be active in learning that

material either through further study or consultation with peers or instructors. In this regard, CATs are probably a far more effective technique for reinforcing key concepts than homework assignments. While in the classroom and perhaps while working with peers, CATs provide a vehicle for the students to clarify their knowledge with easy access to their peers and the teaching staff and without the stress of being graded on correctness.

I think that an additional benefit of CATs and the self-awareness that they provide, possibly beyond the original intended purposes of CATs, is that they can help students evaluate the impact of their education and educational institution as a whole. I think that very often students cannot answer the question "how is this material good for me?" despite their instructor's best efforts. In fact, I think that, by default, students are inclined to discard information as pointless or meaningless and are surprised when they come upon something that is useful or interesting. I think that CATs can be helpful in changing this perception. CATs that focus on practical application of ideas, such as Application Cards, or tying together themes from other parts of the course or from other classes, such as Concept Maps, can be effective tools in the quest to demonstrate to students that their education has purpose. Establishing a more holistic view of their education may also help build more trust in the instructor and creating a greater tolerance for some of the more esoteric or difficult subject matter.

There is no question that CATs will be an integral part of any classes that I teach in the future. The benefits far outweigh the cost of creating and implementing them, and if designed well should integrate seamlessly with the instruction rather than function as an "add-on." My area of expertise is software engineering, which is the science of developing high-quality software efficiently. Nearly all students in computer science know that they will have software engineering jobs upon graduation, yet the software engineering class itself is only a minor part of the curriculum and is often viewed as the black sheep among courses. This perception results from the subject matter being quite different from other computer science courses and in the difficulty connecting the theoretical classroom concepts with their practical uses. In nearly all classroom evaluations of the software engineering course at NCSU, the students have stated that they find the hand-on laboratory periods far more instructive than the classroom lectures. I think that CATs offer a great way to close this gap, and to increase knowledge retention of more theoretical materials that are exclusive to the lectures. As discussed on the message boards, I can easily see the repeated use of Application Cards throughout the semester to teach the principles and scenarios in which students should apply particular software design patterns. Furthermore, I think that having the students distill the concepts into their essence, such as using a One-sentence Summary or identifying the defining features would be helpful for focusing the material because it is so different from the material in other courses. Once the students can focus on and understand the individual concepts in the course, a technique like a concept map would be immensely valuable in further organizing their knowledge in relation to the computer science discipline as a whole. Right now, software engineering is taught as a "bag of tools" for the students to use in the future, whereas I think the judicious application of CATs would help to create a more organized toolbox and a set of circumstances and reasons for which to apply those tools. This goal is, in my view, much closer to the intent of the term "software *engineering*."