Research Brief
Center for the Advancement of Engineering Education
NSF Grant ESI-0227558

We All Take Learners Into Account in Our Teaching Decisions: Wait, Do We?

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Source: Proceedings of 2008 American Society for Engineering Education Conference

Creating a learner-centered environment within an instructional setting is a goal which engineering faculty are encouraged to achieve. However, there is little research about how engineering educators actually incorporate learner issues into their teaching. This paper describes how three engineering educators talked about learners in the context of talking about teaching decisions.

Implications of Findings

Teaching decisions represent a context for the use of information such as student diversity, student prior knowledge and misconceptions, and learning styles. We used narratives about teaching decisions from three educators to explore issues of how engineering educators take learners into account. These results support moving the conversation from a question of whether educators take learners into account to a question of how educators take learners into account.

These results can be used to identify implications for research and dissemination practices in engineering education. For example, educators did not report getting information from education literature, suggesting that researchers need to consider mechanisms other than conference publications and journal articles to get their research into the hands of educators.

The results also suggest that a core strength of the educators' processes is that they are already thinking about learners, as evidenced by their descriptions of interactions with students, their use of faculty ratings and evaluations, implementation of active learning in the classroom, and descriptions of how they derive information about their students. Faculty developers can build on this knowledge when designing activities to help educators become more effective.

These results also suggest possible areas of future research, e.g., how to gain a better understanding of the form of educators' knowledge about their learners. Interview information was sometimes presented as factoids, while at other times like information from a student-centered theory. Additional topics for research could include student ratings, student/teacher interactions, and active learning along with better understanding faculty information about students from the perspective of their students in their classes, in their departments.

Methods and Background

This paper addresses the following questions: a) To what extent are engineering educators currently taking learners into account in their teaching? b) How do engineering educators characterize their learners when they do take them into account (what information do they use; how is the information organized)? and c) Where do engineering educators get information about their learners?

All three participants believed that student ratings and evaluations were a way for students' voices to be heard and validated, but each of them had a different view of their student ratings.

This study used the Critical Decision Method (CDM) approach to gain insight into teaching decisions made by engineering educators. Following a semi-structured interview protocol, faculty were asked to describe two specific teaching decisions that they had made recently: a decision made during the planning stage of a class, and an interactive decision that they made "on the fly" during an interaction with students. Educators were asked to provide background information about themselves, to define a teaching decision in their own words, to summarize their process for making teaching decisions, and to choose decisions that were memorable, recent, and interesting to them.

Participants included 33 engineering faculty from 10 engineering departments at a major research-oriented university. Interviews ranged from 45 to 90 minutes, and were recorded and later transcribed. Of the faculty interviewed, 12 were full professors with tenure, 7 were associate professors with tenure, 7 were assistant professors on a tenure track, and 7 were non-tenure track faculty. Women were deliberately oversampled with 23 male and 10 female faculty participating.

This paper focuses on 3 representative participants, (2 men, 1 woman; 2 full professors and 1 associate professor), in order to provide rich initial answers to the research questions. For these three case studies, analysis focused on the portions of the narratives in which faculty mentioned anything to do with learners for evidence of (a) how they talked about learners generally, (b) how they characterized learners, (c) how they used information about learners, and (d) what was the source of their information about learners.

What We Found

Although participants were not asked explicitly the extent to which they considered learners in making decisions about their teaching, they all mentioned students as being an important factor in their teaching decisions.

The participants' discussions about students were rich, nuanced, and extensive, encompassing a significant portion of their narratives about teaching. This analysis focuses on: interacting with groups of students (e.g., in class or during labs); interacting with individual students (e.g., during office hours or through electronic forums); student ratings; and active learning strategies or pedagogies.

In terms of teacher/student relationships, participants used very different analogies to describe them: parent/child and senior colleague/junior colleague. From the two faculty who used the parent/child analogy, there seemed to be a sense of responsibility for the students, much like a parent would feel responsible for their own child. In contrast, the other faculty member referred to his students as "budding professionals" and alluded to them as junior colleagues in a mentoring relationship. The common thread between these two analogies was that both models acknowledged a power differential inherent in the relationship, but they differed in the type and level of responsibility that the participants assumed students should take for their own learning.

Descriptions of individual and group interactions with students also differed between the participants. Two of the faculty used the analogy of "audience" for a classroom of students. All three spoke of reading students' body language to understand the students' interest (or lack of interest) in a specific topic. These visual observations sometimes led directly to a decision to change the pace of a lecture or the course of a discussion. Ideas about interacting with individual students also varied among the participants. For instance, one had an open door policy and expected students to seek him out when they needed help. Another faculty member had very strict boundaries about face-to-face interaction and expected these interactions to take place exclusively during office hours or during scheduled appointments.

All three participants believed that student ratings and evaluations were a way for students' voices to be heard and validated, but each of them had a different view of their student ratings. One faculty felt that his student ratings could be negatively affected by disgruntled students and was not satisfied with his ratings. Another was reasonably satisfied with his ratings but still felt that he could improve his ratings. The third faculty participant was very satisfied with her ratings and indicated that she monitors her ratings closely and valued the results of mid-term ratings. She considered student feedback from these evaluations when making teaching decisions to adjust aspects of the course.

Active learning was also reported as being used by all three participants. Each one incorporated active learning into their courses for different reasons, but all indicated that it was valuable in facilitating student learning.

None of these three educators had formal teaching training; however, they all explicitly mentioned using their own experiences as an educator when making decisions about learners. Sources of information about their students seemed to be derived primarily from the faculty member's personal experiences of interacting with students and observing student behavior. Occasionally these educators used their own experience as a learner as a stand-in for their students when making decisions. To a lesser extent, participants reported obtaining information about students through discussions with colleagues. Sources of information mentioned least were campus teaching resources and educational literature. These faculty also used student feedback in making decisions about adjusting their courses.

This work contributes to efforts in the engineering education community to promote effective teaching by raising questions about and benchmarking what educators are currently doing when taking learners into account.

www.engr.washington.edu/caee June 2008