Research Brief
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Decision-Making: What Does It Have To Do With My Teaching?

Authors: Yi-Min Huang, Matt Eliot, Jennifer Turns, Emma Rose, and Jessica Yellin
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Engineering education can be thought of as a complex design activity where educators create a range of teaching artifacts including course curricula, classroom policies, lecture notes, exams, and timelines for student group projects. In order to design such artifacts, engineering faculty must make a series of teaching decisions, each of which can impact their students' learning and engagement with course activities.

Method and Background

Some anecdotal observations suggest that engineering educators are aware of teaching as a decision-making activity. However, some faculty may not think about the number of decisions they make on a daily basis. When instructors are not aware that they are at an important decision point, creative opportunities for increasing the quality of instruction and teaching expertise can be lost.

The research team defines teaching decision-making as "a decision made during the execution of the professional responsibilities of the teacher" and this definition encompasses the notion of "a decision as a commitment to act. Action is therefore the irrevocable allocation of valuable resources" (Sutcliffe and Whitfield, 1979; Wikimedia Foundation, 2001).

Results from this study can help new engineering educators engage more effectively in teaching-related decision-making by more effectively recognizing, characterizing, and anticipating their teaching decisions.

Given the importance of decision-making in engineering education, we hope that by beginning to characterize engineering educator decisions, educators will gain a greater awareness of their decision-making by recognizing, characterizing, and anticipating decision points. Thus, the initial research questions driving this study were:

- What aspects of engineering educators' decision-making processes are prominent during their participation in the instructional development process?
- How can engineering educators make more effective decisions?

This exploratory study looks at engineering faculty decisions as expressed during the instructional development process. The study is based on the secondary use of existing data from an NSF-funded study of the teaching challenges of engineering faculty (Turns, et al., 2003). These secondary data were from transcripts of interviews with a faculty developer who consults with engineering faculty at a Research Extensive university on the West Coast who sought out assistance.

Ten transcripts from the larger data set were purposefully selected which were diverse in subject matter, involved different types of teaching and educational activities, and contained visible educator decision points. All of the selected transcripts included prominent and specific educator teaching-related issues. Researchers recognized decision points in the data by identifying language in the transcripts consistent with a commitment to a course of action, and a description of a previously made decision.

The data revealed that engineering educators discussed a wide range of teaching decisions with the instructional developer. From the debriefing transcripts, we were able to identify, code, and characterize a total of 77 teaching decision points. These teaching decision points were categorized along three dimensions:

- Magnitude: How many students will be affected by this decision?
- Immediacy: How immediate was the impact on students?
- Motivation: What was the motivation for making this decision?

What We Found

In relation to magnitude, the language used in the subset of transcripts selected for this study appeared to focus on more global decisions rather than those related to a single student or a single class. Nearly 70% of the coded decision points related to impacts affecting large groups of students.

The findings in the immediacy dimension suggest that study participants in the instructional development process focused primarily on activities which will have a direct impact on students. Nearly 66% of the decision points involved activities traditionally related to teaching, such as classroom management, curriculum design, and teaching development. On the other hand, 31% of the decision points involved activities that would eventually impact students, but only after lead time related to an intermediary stage of activity. These activities included networking, grant writing, and engineering education research.

The findings in the motivation dimension show that the majority of decision points coded were framed with a proactive approach to decision-making (63%), with 31% of the decisions framed as reactive, and 5% that could not be determined.

Implications of Findings

The researchers believe that the results of this study can help new engineering educators engage more effectively in teaching-related decision-making by helping them recognize, characterize, and anticipate the teaching decisions that they will make (or are already making). This, in turn, can lead to more efficiently acquiring relevant information, seeking expert assistance when needed, and ultimately making explicit and sound decisions and continuously refining their instructional choices. The research team developed a series of “tips” that reflect the general and specific results of this study.