Student Response to Instructional Software: Implications for Improving Teaching Practices with Computer-Based Mathematics Learning Environments [Session Abstract]

Educators have embraced many forms of technology-based instruction in mathematics classes, including the use of instructional software and computer-based learning environments. Research has suggested a number of benefits to such environments, including improved student engagement; more flexible pacing and tracking of student work; use of animations and interactive tools to illuminate mathematical concepts; and better opportunities for individualized instruction, practice, and assessment. Pre-service teachers are exposed to computer-based learning environments as teaching tools, particularly in mathematics. However, teacher proficiency with the software is not enough to ensure its effective use. Teachers need to develop realistic expectations of how the software will work in their class, how students will respond to the computer-based environment, and how they can most effectively integrate instructional software into their teaching and leverage its features to facilitate learning.

The session begins with participants receiving a written description of an instructional software package covering secondary level algebra topics, with a brief explanation of its features. Participants are given the opportunity to brainstorm with one another about how best to use such a software package to facilitate learning, as well as discuss expectations about how the software will be received, how it can help students, potential pitfalls, etc. Then results of two studies (one qualitative and one quantitative) are presented. These studies were conducted in learning environments using the same software package noted above. Results include findings about student attitudes and reactions to computer-based instruction compared to "traditional" instruction, student observations about what makes computer-based instruction effective or ineffective, factors associated with students' engagement with the software, and factors associated with students' achievement in the subject matter when using the software. After viewing these research findings, participants have an opportunity to connect the results with their own observations from the preliminary brainstorming activity. Participants may share these observations and connections in an open group discussion. The session concludes with a Q&A, discussion, and summary list of take-away expectations and best practice suggestions for using instructional software, based both on the specific studies presented and on a broader context of current related research.

The format of the session is intended to actively engage participants in thinking about the topic, make the findings presented more meaningful, and model a potential way to explore similar concepts when educating pre-service and in-service teachers.