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Design Research for Advancing the Integration of Digital Technologies into Teaching and Learning
Developing and Evaluating Educational Interventions

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Summary by Linda Catalano, Rapporteur

Dr. Tom Reeves of The University of Georgia critiqued the state-of-the-art of educational technology research and encouraged the use of design research to develop and evaluate educational technologies in higher education. He stated that educational researchers have thus far not been able to provide compelling evidence that the integration of technology into higher education enhances teaching and learning. He said that new design research strategies, however, could improve educational research and demonstrate the value of educational technologies.

Little can be generalized from most past efforts in qualitative research. Meta-analyses of quantitative research indicate that these efforts have not fared much better. As a result, many have begun to question the value of educational research. Unfortunately, most educational research is conducted and presented for other researchers and rarely linked to a research agenda or concerned with any practice. Educational research has had little impact upon work in schools.

The U.S. Department of Education has taken the position that educational research must take the form of randomized control studies, as utilized in much of medical research. Given the current administration's commitment to "No Child Left Behind," such a position on educational research will have wide implications.

However, many leading educational researchers and scholars do not believe that the "medical model" is applicable to education. Reeves summarized these arguments:
- Double blind experiments are impossible in education
- Implementation variance reduces treatment differences
- Causal agents are not easily or accurately specified

Reeves stated that a major problem with current educational research is that it fails to distinguish between research goals and methods. Methods are tools. Educational goals may be theoretical, predictive, interpretivist, postmodern, design or action oriented. Methods, in contrast, may take quantitative,

qualitative, critical theory, historical, literature review, or mixed-methods form. Once one has defined goals, one can choose suitable research tools.

The goal of design research is to solve a local problem and obtain generalizable results. Design research follows an iterative process of

- Identifying problems with practitioners
- Developing prototype solutions
- Testing the solutions *in situ*
- Deriving design principles

Reeves illustrated these steps with an example from an undergraduate course in the geosciences.

The biggest problem for educational technologists and educational researchers is to keep pedagogy ahead of technology. Reeves emphasized that it takes a great deal of effort for faculty to integrate technology into their teaching, i.e., to change their pedagogy. He also stated that, contrary to common assumptions, students might not be ready to take advantage of educational technologies.

The educational community needs to study and attend to all learning domains: not just cognitive and affective, but also conative. The last has received little attention. We need to incorporate student and faculty will, desire, level of effort, drive, mental energy, self-determination, and intention into our designs and research.

We should evaluate our research efforts by measuring their ability to improve educational practice.

Seminarians followed this presentation with an active discussion.