Design Experiments in Mathematics Education Research

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Abstract

Design experiment methodology, or design-based research as it is often also called, is a methodology for carrying out studies of educational interventions and can involve application of both qualitative and quantitative methods of data analysis. This methodology has been developed to address issues central to the study of learning, especially in relation to promoting academically important but difficult-to-achieve learning goals. Design experiments frequently involve the development, testing, and refinement of interventions and respective theoretical models, and the examination of their practical application in the "messy environments" of actual classroom settings.

In this session we will do the following:

- examine key features of design experiments;
- compare design-based research with action research;
- consider two interventions from a design experiment that we conducted in our research and use them as contexts to exemplify key features of the methodology;
- discuss broader issues related to generalizability, confounding of variables, objectivity versus bias, and bridging theory and practice; and
- discuss other examples of design-based research from participants' own areas of interest (including their own projects, if they relate to this methodology).

To make the most out of the session, you are encouraged (but not required) to read the following paper prior to the session:

Cobb, P., Confrey, J., diSessa, A., Lehrer, R., & Schauble, L. (2003). Design experiments in educational research. *Educational Researcher, 32*(1), 9–13.

If you do not have access to this paper through your library network, you are welcome to find and read another relevant paper on the topic. A point of caution is that not all researchers agree on a definition of design-based research or the key features of this methodology. More readings will be recommended during the session.