



Research in Engineering Education Symposium &
Australasian Association for Engineering Education Conference

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WORKSHOP

Curricular Innovation through Design-Based Research

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WORKSHOP MODE

Online only

OVERVIEW OF WORKSHOP

When starting up new engineering education programs or creating significant change within current programs, there is both a need and an opportunity. The need is for the program to have continuous inputs for improvement. The opportunity is to harvest knowledge being created during the process to be shared widely. The dual cycles in a Design Based Research (DBR) study serve both. The purpose of this workshop is to share the DBR methodology and inspire participants to consider an adaptation of DBR in their next change process.

The workshop presents the utilization of DBR as an action research approach for innovation in an engineering program that provides a systematic and flexible methodology to improve the curriculum through iterative analysis, design, development, and implementation. The methodology can be instrumental to curricular innovation as it both guides the innovation and identifies the strengths and weaknesses of the curriculum at each iteration of development. Of greatest value to the broader engineering education audience is the increased understanding of how the methodology can be utilized to develop engineering curriculum in a rapidly evolving world, vital to engineering education staying relevant.

ACTIVITIES

The workshop will begin with a brief overview of DBR, with examples, followed by participants reflecting on past research experiences. The focus, for most of the workshop, will then center on participants developing DBR plans for a research question and application relevant to them utilizing a structured and shared learning experience. In-person participants are encouraged to bring a laptop.

TARGET AUDIENCE

Since DBR is a form of action research, participants should be interested in implementing a research study in a program where they are a participant in the program and seeking information that can be used to make programmatic improvements in the future.

OUTCOMES

The outcomes from the implementation of DBR are both inputs to the next iteration of the curricular or programmatic change process and research results to be published and shared with the greater engineering education community.

The outcomes of the workshop are a working knowledge of the DBR process and the beginnings of a personalized plan for future implementation of a DBR method at the participant's home institution.

KEYWORDS

action research, change process, curricular innovation

PRESENTERS' BACKGROUNDS

The authors have recently started a new engineering program. They adopted DBR at the beginning and have formally published six iterations at international engineering education conferences. Bart Johnson and Ron Ulseth are the founders of the Iron Range Engineering and Bell programs in Minnesota in the United States. They adapted the Aalborg University model of PBL to create those programs. Johnson is the Vice-President of Academic and Student Affairs in the new Minnesota North College and Ulseth is the Director of the Iron Range Bell program. Both are affiliated with the Aalborg UNESCO Center for Problem Based Learning.

Workshop timeline:

0-15 Minutes: Introductions and DBR Overview with examples

15-30 Minutes: Breakout room, describe previous work that could have fit in a DBR model and what would have been the benefit

30-45 Minutes: Individuals develop research question and plan for DBR

45-60 Minutes: Q&A and additional DBR scaffolding discussion

60-90 Minutes: Participant development of PowerPoint slide for initial two cycles of DBR application