Design-Based Education Research in Nursing Education
Anne M. Krouse PhD, MBA, RN-BC
Challenges to Creating EBP in Nursing Education

• Outcomes research is not directly tied to the intervention and/or the design of the intervention
• Lacks clarity in the design of the intervention limiting the replicability and refinement
• Validity is in question when research is single site, single teacher
• Research focused on outcomes only has little relationship to the intervention
Design

Definition of design

transitive verb
1: to create, fashion, execute, or construct according to plan:  devise, contrive  design a system for tracking inventory

2a : to conceive and plan out in the mind  he designed the perfect crime
b : to have as a purpose:  intend  she designed to excel in her studies
c : to devise for a specific function or end  a book designed primarily as a college textbook
  a suitcase designed to hold a laptop computer
3 archaic  : to indicate with a distinctive mark, sign, or name
4a : to make a drawing, pattern, or sketch of  a curious woman whose dresses always looked as if they had been designed in a rage ...
  —Oscar Wilde
b : to draw the plans for  design a building

designing  a new bike

intransitive verb
1: to conceive or execute a plan
2: to draw, lay out, or prepare a  design  was trained to design for homes and offices

— designedly

design  

play  

play  

\-ˈzĭ-nəd-lē\  adverb
Why is design important for educational research?

• Provides guidance for application of research findings to practice
• Allows for replication and refinement
• Can test the effectiveness of the intervention and refine steps of the intervention
What is Design-based Research?

- Design-based educational research is “A genre of research in which the iterative development of solutions to practical and complex educational problems also provides the context for empirical investigation, which yields theoretical understanding that can inform the work of others” (McKenney & Reeves, 2012, p. 7).
Theoretical Considerations

- Theoretical testing *through* interventions
  - Theory is used to develop the conceptual underpinning of the study and interventions are the method by which to study the outcomes

- Theoretical testing *on* interventions
  - Theory is used to design the intervention and test the theory through
Types of Design-Based Research Studies  
(Niveen, McKenney, & van den Akker (2006))

- Validation
- Development
- Effectiveness
Characteristics of Good Design Research  (DRC, 2003)

• Goals of theory development and design are intertwined
• Cycles of design, enactment, analysis, and redesign
• Output must lead to the dissemination of theories that communicate implications to those in practice
• An account of how the design functions in “authentic settings” in relation to the contextual issues
• The development of such accounts relies on methods that can document and connect processes of enactment to outcomes of interest
“What sets educational design research apart from other forms of scientific inquiry is its commitment to developing theoretical insights and practical solutions simultaneously in real world contexts together with the stakeholders” (McKenney & Reeves, 2012, p. 7).
Instructional Design

• “Instructional design is a field concerned with systematic processes for developing instruction to reliably yield desired learning and performance results” (McKenney & Reeves, 2012, p.61).

• Theory is used in instructional design to describe the “how” and “why” of the design solution.
ADDIE

- Analysis
- Design
- Development
- Implementation
- Evaluation
Generic Model of Design Research in Education  (McKenney & Reeves, 2012)

• Analysis
• Design
• Evaluation and Effectiveness
An Overview: How does it work?

Generic model for design research in education (McKenney & Reeves, 2012)
Nursing Education Research Examples

• NLN/Jeffries Simulation Framework (NLN/JSF) (Jeffries, 2016)
  – Model: five components with associated variables; teacher, student, educational practices, design and characteristics of simulation (intervention), and outcomes.
  – Areas of design of the simulation are objectives, planning, fidelity, complexity, cues, and debriefing.
• Step 1: Analysis
  – Problem identification
    • Pre-licensure students are having difficulty interpreting ABG results
  – Assessment of the problem
    • Students perform poorly on application and interpretation test questions in NCLEX predictive exam related to ABG results
    • Content is taught in three courses in the nursing curriculum in the junior and senior years – three separate faculty teaching the courses
• What theory could be used to design the intervention?
• What are the steps of the intervention?
• What is the research question?
• What is the theory guiding the research question?
• What are your outcome variables?
• How will your data from your outcome variables inform the refinement of the intervention?
• What contextual variables may have played a role in the outcomes?
• How might testing in different contexts affect the outcomes?
Example

• Constructivist theory used to design intervention
• Intervention – ABG Self-Directed Learning Module (web-based) administered to students 1 month prior to the predictor test
  – Step 1. Pretest to assess prior knowledge and identify gaps
  – Step 2. Rationales for correct and incorrect answers provided to learner at the completion of the pretest
  – Step 3. 5 minute video with use of whiteboard to explain one element of the ABG
  – Step 4: 3 practice questions followed by immediate feedback to learner with rationale for correct and incorrect answers
  – Cycle continues for each element of ABG
  – After completion of all cycles, a post-test of 10 questions is given. If a student scores less than an 8 on the test, the student will be redirected to repeat the learning module and retake the post-test.
Example

• **Outcome variables**
  – Student time spent on module, pretest scores, number of times test is repeated, number of errors on specific analyses, student performance on AGB interpretation on predictor test
  – Contextual variables – how instructors have taught ABG analysis, changes in teaching methodology, changes in teachers, clinical experiences requiring ABG interpretation, student anxiety, student confidence, time of day module is taken, time during curriculum module assignment is required
• Education intervention research is “messy”
• Replication and refinement is essential to building EBP
• Context is important in applying educational research findings
• DBR provides theoretical support both through and on interventions
References


