

NTSA



IITSEC 2019

Conceptual Modeling Special Event: Evaluate and Critique the Importance of Adaptive Instructional Systems Functions

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Premise

- A primary goal of adaptivity in instructional systems is to improve the instructional effectiveness of those systems
- “Effectiveness” broadly considered:
 - Improved change in ability/performance/competence pre-instruction to post-instruction
 - Improved speed of acquisition for new ability/performance/competence
 - Improved retention of acquired ability/performance/competence
 - Others...?

Observations From Human Instruction

- There are a variety of sources of variation in instruction effectiveness
 - Instructional methods and techniques
 - Instructor personality/delivery
 - Instructional situation/environment
 - Individual learner differences

Instructional Methods

- Some instructional methods are observed to be more effective than others
 - Methods can be domain-general or domain-specific
 - E.g., the self-explanation effect: Encouraging/requiring learners to explain principles and examples to themselves improves instructional outcome
 - Common-core vs. “traditional” procedures for arithmetic

Instructor Differences

- Even when using the same instructional methods, some instructors generate improved outcomes
 - Ability to engage, motivate, explain
 - Ability to adapt to individual learners and stumbling blocks
 - Mastery/understanding of the instructional methods
 - Others...?

Instructional Environment

- Some environments are more conducive to instructional effectiveness
 - Engagement? Motivation?
 - Attention vs. distraction
 - Emotional vs. dispassionate
 - Others...?

Individual Learner Differences

- There is some evidence of different learning “styles” and skill sets
 - Specific disabilities or strengths
 - Attentional factors
 - Ability to self-motivate
 - Interest in subject matter
 - Others...?

Recommendations

- Adaptivity in instruction should focus on the factors that are known to improve instructional effectiveness
 - Instructional methods: Adapt instruction to foster self-explanation, to focus on understanding vs. rote memorization, etc.
 - Instructional delivery: Adapt instruction to mimic the strengths of effective instructors. E.g., specific techniques for engagement, motivation, explanation, ...
 - Instructional environment: Adapt instruction to generate emotional and attentional environments that are known to be conducive to effective instruction
 - Individual learner differences: Adapt instruction to individual differences in learning style, cognitive strengths and weaknesses, level of competence, etc.