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Myrte de Alfred
Clemson University

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The Impact of Training Method on Skill Acquisition and Transfer

Myrte C. Alfred

Advisors: Dr. David M. Neyens & Dr. Anand K. Gramopadhye

Department of Industrial Engineering, Clemson University, Clemson, South Carolina



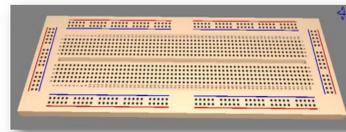
Introduction

- Learning technologies, such as simulations and virtual reality are increasingly used in both educational and organizational instruction. These tools differ in costs, ease of use, and level of physical fidelity, among others.
- Learner characteristics have been shown to impact learning strategies, effort, perseverance and ultimately performance.
- Efforts to create a more tailored learning experience through learning technologies are gaining traction as the National Academy of Engineering (NAE) has listed advanced personalized learning and enhanced virtual reality as two of its fourteen grand engineering challenges.
- Objective: To identify if training condition impacts skill acquisition and transfer and to identify if this relationship is moderated learner characteristics**

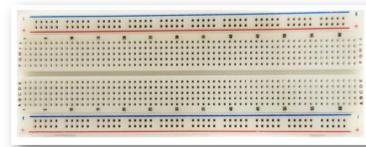
Methods



2D breadboard



3D breadboard



Physical breadboard

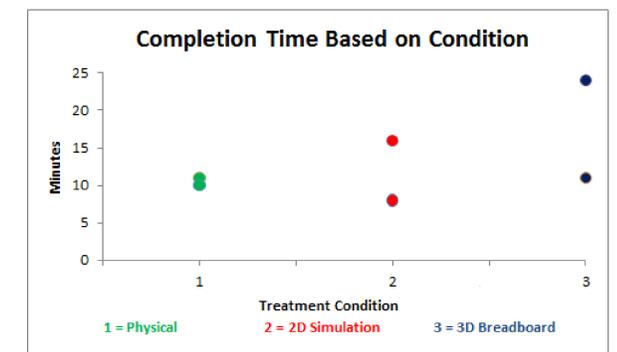
- Participants will include 60 undergraduate and graduate students
- Independent Variables**
 - Training Conditions:** 2D breadboard simulation, 3D breadboard, and physical breadboard
 - Learner characteristics:** cognitive ability, motivation, engagement, goal orientation & core self-evaluations
 - Demographics:** gender, age, grade level & major/program
 - Virtual reality experience**
- Dependent variables**
 - Post-test scores (%), task completion time (minutes) & correctness(binary)**
- The data will be analyzed using R version 3.0.2. A hierarchical linear regression will be completed for the continuous variables and a logistic regression analysis will be conducted for the dichotomous variable.

Anticipated Results

- There will be significant differences in the performance of participants due to the three training conditions (i.e., simulation, VR, and physical breadboard condition).
- The relationship between training condition and performance will be moderated by learner characteristics
 - Individuals with higher cognitive ability, learning goal orientation, and motivation will perform better regardless of the training tool
 - Individuals with a higher level of engagement will achieve greater gain scores.

Preliminary findings

Learner Characteristic	N	Min	Max	Mean	Std. Deviation
Motivation	6	3.50	4.63	3.9375	.47926
Learning goal orientation	6	3.50	4.25	3.8958	.32032
Performance goal orientation	6	3.50	4.50	3.9792	.39065
Core self-evaluations	6	2.58	4.75	3.6667	.81989



Implications

- Understanding the relative effectiveness of specific learning technologies as they relate to learner characteristics can lead to better decisions concerning the selection and design of these tools to support learning objectives
- The proliferation of online education is creating a need for more effective use of technology for learning and skill development. The use of technology in online education offers a means to provide access and increased educational opportunities for non-traditional students.

References

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