Using a Simulated Teaching Platform to Improve Teacher Practices

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Abstract. To address the diversity of student differences, educators need to actively recognize and counter patterns of bias in their teaching practices as well as in their classroom environments. The topic is highly relevant to the education field including faculty of educator preparation programs, classroom teachers and administrators. The simulated teaching environment includes research-based outcomes that show improvement in teaching efficacy and culturally diverse teaching practices. The simulation is focused on allowing educators to "practice teaching" in a variety of content areas any time benefitting from the *simEquity* experience by learning how to change instructional practices based on bias awareness and guided improvement through targeted feedback. Context appropriate recommendations for improvements in equity-based teaching practices will provide participants with the tools needed for reducing implicit bias in instruction. The cycle includes planning instruction, teaching in a simulation, receiving feedback, improving instruction for subsequent simulations and reflecting on the practices that were used with the artificially created students. One strength of using simulations is the objective feedback provided to participants that allow improvements based on actual choices made with each of the simStudents. All participants will have access for any of their colleagues and students to the "Teaching without bias" module for one year.

Key words: simulated teaching, equity and bias, teacher preparation

Background

Connections between teachers' sense of efficacy, culturally responsive pedagogy (Callaway, 2016), and student achievement (Oyerinde, 2008; Tucker et al., 2005) have been shown to exist. In order to increase low academic achievement among culturally diverse students, efforts should be made to increase teacher self-efficacy (Callaway, 2016; Tucker et al., 2005). Highly efficacious teachers are more likely to persist in helping struggling students, and are able to design and create more engaging lessons for their students (Bandura, 1997; Kitsantas, 2012; Protheroe, 2008).

SimSchool promotes pedagogical expertise by re-creating the complexities of classroom decisions through mathematical representations of how people learn and what teachers do when teaching. From its inception, simSchool's underlying artificial intelligence model was envisioned to include research-based psychological, sensory and cognitive domains similar to Bloom's Taxonomy of Educational Objectives (Bloom, Mesia, & Krathwohl, 1964). The Five-Factor Model of psychology (McCrae & Costa, 1996) served as the foundation of the student personality spectrum. This model includes the characteristics of extroversion, agreeableness, persistence, emotional stability, and intellectual openness. A simplified sensory model component with auditory, visual and kinesthetic perceptual preferences comprises the physical domain. Together the physical, emotional and academic factors were demonstrated to represent salient elements of classroom teaching and learning (Christensen et al., 2011; Gibson, 2007).

SimSchool's inference engine draws upon several instructional models and frameworks to simulate the authentic human behaviors and reactions that one experiences when teaching in simSchool (simSchool, 2018-19). These extensively researched and validated models include: 1) Cattell-Horn-Carroll Theory of Intelligence (Schneider & McGrew, 2012); 2) OCEAN model of Emotion (McCrae & Costa, 1996); 3) Interpersonal Circumplex Theory (Smith, 2013); 4) Standard models of language learning and language proficiency used to diagnose ELL students (Phakiti, Hirsh, & Woodrow, 2013); and 5) Structural functional (Case, 1993) and social constructivist theories of learning (Dweck, 1999; Vygotsky, 1962). These models are distilled into "cognitive and behavioral states" within simulated students and "cognitive and behavioral requirements" within instructional tasks. When a student has a certain quantitative reasoning ability, for example, an assigned math task has a quantitative reasoning requirement

already coded. How the student performs and behaves is a direct reflection of how well-matched expectations are to students' capabilities.

Entire school systems have adopted the simulation for various teacher professional development continuing education and tracking is included for administrators, if requested. In addition, teacher preparation programs have adopted the program to allow more "observation" hours, which are accepted by many states for up to 12 hours of observation for the teaching programs. Currently, the program is being piloted with Career Technology Education teacher education programs in high schools to allow for more practice and feedback in a safe, teaching environment.

Objectives: To address the diversity of student differences, educators need to actively recognize and counter patterns of bias in their teaching practices as well as in their classroom environments.

- This workshop will provide access to a free simulated teaching bundle in simschool.org that includes multiple modules focused on equitable teaching practices. The simulation has been implemented for both preservice as well as inservice educators to improve teaching practices.

- This interactive session will include access to and experience with a simulated teaching tool for educators that provides non-judgmental feedback based on teaching decisions made within the simulator. The feedback is focused on improving teaching practices focused on removing bias and improving equitable teaching practices.

Outline of Workshop

Content and activities

A brief overview of the simSchool platform, including login procedures and mode of operation, will be completed at the beginning of the workshop to assure that each participant has access. Next, the simulated teaching environment will be introduced and an overview of how to teach withing the environment. At the end of each simulated teaching session, feedback is provided to the user/educator to improve the next session. Best practices for using the feedback to employ best teaching practices will be shared.

The participants will be provided with a link to sign up and complete a 15-minute teaching session (based on their selected grade band) and receive system generated feedback. The presenter/facilitators will be walking around to answer questions and make sure participants are able to log in and complete the module. Reflection questions are included following the simulation. Part of this session will include discussion of the reflection questions to determine the impact of the session.

Timeline for the workshop

Introduction and overview: 20 minutes
Walk through of simulation module: 20 minutes
Planning process: 30 minutes
Planning guides will be provided to aid participants in seeing all options for selection of teaching activities at a glance. (These are provided as a pdf in the simulation system as well). Most of this session will be hands-on participation and discussion among peers and facilitators.
Participants completing module and viewing personalized feedback: 60 minutes
Implementation strategies: 20 minutes
Discussion of feedback and reflection questions: 20 minutes

Summary of instructors' qualifications

Rhonda Christensen has been an educator of elementary, middle, preservice and practicing teachers for 37 years. She is the PI and Project Director of the simEquity project funded by the NSF aimed at recognizing, remediating and reducing implicit bias to improve equitable teaching practices in schools. She has been working on the use of an innovative simulated teaching environment to improve teaching practices since 2006 and has published multiple papers in this area.

Gerald Knezek has been involved in developing standards for and delivering preservice / inservice teacher education for more than 30 years. He assisted in the design, development, and evaluation of teacher training simulators for the past 20 years.

Samantha Norton is a PhD candidate at the UNT and has been both a participant in the project as a teacher and also as a trainer of teachers. She is a fifth-year educator in Texas.

Stacy Kruse is the Director of Education and Serious Games and Strategic Partnerships for simSchool. She has spent the last 17years developing expertise in designing learning, recognition, and assessment systems for formal and informal K20, corporations, and military organizations. Ms. Kruse's focus is in finding the intersection of engagement, optimized learning outcomes, program sustainability, and equity in teaching and learning. Ms. Kruse is a recognized expert in embedded assessment and the execution of machine learning and artificial intelligence in the context of games, simulations, and assessment at scale.

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