2021 Postdoc Research Symposium
12-Minute Research Talks
Education, Humanities & Social Sciences: Abstract Book

1. **Dr. Alexa Rodriguez, History of Education. "Crafting Dominicanidad: Education and the 1916 US Occupation of the Dominican Republic"**

Purpose: My research examines the 1916 US occupation of the Dominican Republic to analyze how US and Dominican stakeholders used public schools to disseminate their notions of Dominican citizenship.

Methods: Drawing on correspondence and memos from the Department of Public Instruction in the Dominican Republic and US military government, as well as periodicals and newspapers from both countries, I examine how US officials, education administrators, and guardians engaged in these efforts.

Results: Although the US military government used schools to exert state control, Dominicans individually and collectively redirected these state institutions to serve their needs and to negotiate their relationship to the state. Schools were central to how both Americans and Dominicans of all classes articulated, circulated, and practiced ideas about membership to and within the Dominican nation. From plans to create US allies in an expanding US empire to the formation of an economically productive "mulatto" rural peasantry and a cultured and informed citizenry, US officers in the military government as well as Dominican education administrators and guardians, used public schools to realize their imaginings for the Dominican nation.

Impact: This research provides two critical interventions. First, this work decenters the US in histories of American imperialism, showing that local actors were active participants in US efforts and vital to shaping their own visions of citizenship through public schools. It places the plans and actions of US officials alongside Dominicans who supported the policies, opposed them, or were more interested in the opportunities they purported to provide. Second, this dissertation gives prominence to Dominican subjects and voices by studying their statements and actions in response to US efforts. It features a range of Dominican perspectives and reactions to the US military government and the education reforms themselves, from collaboration and cooperation to resistance.

2. Dr. Hamid Nadir, Education "Elementary Teachers' Understanding and Enactment of Systems Thinking."

Purpose

Systems thinking has been identified as an important component of engineering education and is advocated by both the NGSS and NRC. Research suggests limited studies onsystems thinking, while those studies generally documented the absence of this skill in K-12. This study investigated 41 elementary teachers' understanding and perceptions of integrating systems thinking into their instruction prior to a professional development (PD) program. The following research questions guided this study:

(1) What are elementary teachers' understandings of systems thinking?
(2) How confident are elementary teachers in teaching systems thinking?
(3) To what extent do elementary teachers report that systems thinking should be included in instruction?

Methods

Participants in this study included 41 grade K-6 teachers (36 female and 5 male) from a mid-Atlantic state. Data sources included 8 multiple-choice items related to systems thinking, 3 open-ended items, and 13 semi-structured teacher pre-interviews. A convergent mixed-method approach was employed in which quantitative data (i.e., Likert survey items) and qualitative data (i.e., open-ended survey questions) were analyzed separately and interpreted collectively to develop a complete understanding of how elementary teachers perceived systems thinking (Creswell & Plano Clark, 2011; Tashakkori & Teddlie, 1998). Teachers' pre-interviews were analyzed using thematic analysis (Braun & Clarke, 2006) to triangulate the Likert items and open-ended responses in the survey.

Results

Preliminary results indicate that most of the teachers had partial understandings of systems thinking (RQ 1), were not confident on how to integrate this concept into their instruction (RQ 2) and agreed that systems thinking is important to include in their instruction(RQ 3).

Out of 41 teachers, 12 (29.3%) correctly identified a system they teach, 10 (24.4%) didnot respond to this question and 19 (46.3%) identified something in the curriculum that they teach other than a system.

Impacts

Systems thinking helps students make informed day-to-day decisions and develop explanations for observed phenomena such as declining wildlife populations, individual health symptoms, or a bridge failure. To support students in developing systems thinking skills, teachers need to be able to think critically about systems and know how to help their students develop systems thinking skills through pedagogy and curriculum. Our findings suggest a need for PD that supports elementary teachers in understanding systems thinking and increases theirconfidence in teaching systems thinking, so they can integrate systems thinking in their instruction.

3. **Dr. Miyoung Chong, Deliberative Media Lab, Media Studies. "COVID-19 in the Twitterverse, from epidemic to pandemic:information-sharing behavior and Twitter as an information carrier"**

In this study, we defined a Twitter network as an information channel that includes information sources containing embedded messages. We conducted stage-based comparative analyses of Twitter networks during three periods: the beginning of the COVID-19 epidemic, the period when the epidemic was becoming a global phenomenon, and the beginning of the pandemic. We also analyzed the characteristics of scientific information sources and content on Twitter during the sample period. At the beginning of the epidemic, Twitter users largely shared trustworthy news information sources about the novel coronavirus. Widely shared scientific information focused on clinical investigations and case studies of the new coronavirus as the disease became apandemic while non-scientific information sources and messages illustrated the social and political aspects of the global outbreak, often including emotional elements. Multiple suspicious, bot-like Twitter accounts were identified as a great connector of the COVID-19 Twitterverse, particularly in the beginning of the global crisis. Our findings suggest that the information carriers, which are information channels, sources, and messages were coherently interlocked, forming an information organism. The study results can help public health organizations design communication strategies, which often require prompt decision-making to manage urgent needs under the circumstances of an epidemic.

4. **Dr. Whitney Nicole McCoy, Education: Curriculum, Instruction and Special Education. "Development and Validation of the Content Knowledge and Affective Instrument for Computer Science (CKACS)"**

Purpose. Improved Computer Science (CS) access is critical for our nation to meet its goal of increasing diversity, equity, and inclusion in STEM (National Science and Technology CouncilCommittee on STEM Education, 2018). The nation's current focus on early grades STEM+C initiatives has revealed a need for valid and reliable tools that can measure changes in students' computer science (CS) knowledge and attitudes.

Methods. This study describes the development and validation of the Content Knowledge and Affective Instrument for Computer Science (CKACS). Pilot testing included 149 students: 32 3rd grade (21.5%), 31 4th grade (20.8%), and 86 5th grade (57.7%) from 15 schools in southeastern state. The CKACS consists of ten content knowledge questions (Cronbach's α = .79) with subscales in computing systems and impacts of computing (α = .72), data and analysis (α = .60),and cybersecurity. The affective component of the instrument (Cronbach's α = .89) included confidence (α = .80), interest (α = .85), and utility (α = .76) scales.

Results. Students demonstrated moderate levels of understanding about CS content knowledgeand moderately positive attitudes toward CS. The CKACS instrument was modified based on results of pilot testing and expert panel feedback. The final version of the instrument will be implemented in a randomized control trial.

Broader Impact. In this presentation, we will describe the K-12 CS content knowledge literature, the development and validation of the CKACS instrument, the instrument revision process, and the results of pilot testing. The CKACS instrument provides teachers, administrators, researchers, and policymakers with a valuable tool for understanding grades 3-5 students' CS content knowledge and affect toward CS before and after instruction. Understanding elementary students' CS knowledge and attitudes toward CS will enable us to better design PD that addresses teacher pedagogical practices and understandings of CS.