

Examples: Impact of SoTL Research

Example #1

My SoTL research is recognized for its impact nationally. In 2018, I received the Association of Mathematics Teacher Educators Annual Early Career Award. In 2021, I received the national School Science and Mathematics Association award for Excellence in Integrating Science and Mathematics Education. The impact of my NSF-funded SoTL research resulted in being showcased as the CCIE Featured Faculty (and #1 published CCIE faculty) in UCF Office of Research 2020-2021 Annual Report, sharing the story of my two current SoTL grant projects (see evidence uploaded).

The NSF Noyce Grant (PI) awarded 2021, is first in nation to result in K-8 mathematics teachers earning a doctoral degree, representing a transformational partnership between UCF CCIE and CoS, Orange County Public Schools (OCPS), and non-profit City Year Orlando. It serves Central Florida and national interest providing novel teaching and learning information by determining how a doctoral program can identify the most effective ways to grow experienced teachers as leaders in implementing the Catalyzing Change framework. Through this research, as described in NSF summary, our doctoral graduates (i.e. Fellows) are expected to have a lasting impact in our community by "directly impact[ing] more than 200 additional teachers of K-8 mathematics, more than 30 administrators in their buildings, as well as the estimated 9000 students in the schools where the Fellows teach and more than 200 Corps members and 2000 students served by City Year."

The NSF Improving Undergraduate STEM Education (IUSE) grant (UCF PI) awarded 2020, a 4 institution collaborative, leverages networked improvement communities and the PrimeD framework (I co-developed) to assess the transformation of undergraduate mathematics teacher preparation by positioning undergraduate students as researchers in their own classrooms investigating well-defined problems of practice. This project employs design-based research following multi-group treatment-only longitudinal, triangulation mixed methods design. This research examines the hypothesis that by providing a common frame of reference (PrimeD framework) for undergraduate secondary mathematics teacher preparation, linkages to practice will be strengthened and enhance how internships inform our undergraduate program. By improving the teaching of our undergraduate students and those at partner institutions, this study will impact more than 150 undergraduate teacher candidates and produce long-term improvement in each teacher preparation program.

Since 2017, I've disseminated my SoTL-related research through 13 refereed journal publications (and 3 under review). Several publications have received top recognition as most downloaded articles/published in highest ranked journals. Further, my SoTL research enabled me to write 5 books whose impact is evidenced through their course adoption in teacher education undergraduate/graduate programs across the country.

My SoTL agenda is seamlessly aligned to preparing doctoral students to conduct their own SoTL research and includes mentoring GRA's on my SoTL NSF grants, mentoring numerous students resulting in co-authored publications and presentations, and mentoring dissertation/thesis research.

Plans for further action include disseminating findings from SoTL research of my two NSF grants (which continue through 2024, 2026) and a career of grant-funded SoTL research to drive systematic, large-scale transformation in the teaching and learning of undergraduate and graduate mathematics teacher preparation.

Example #2

Research Methodologies

Following a design-based research approach, my SoTL work begins with design of an instructional innovation, followed by its implementation and evaluation, and concluding with reflection on further innovations to continue improvement. Because my SoTL work involves innovations not previously studied, in the exploratory phase my students, colleagues, and I used qualitative research, conducting interviews, questionnaires, and teacher candidate reflections (e.g., Regalla, Hutchinson, Nutta, & Ashtari, 2016), moving to quantitative research for confirmatory analysis (e.g., Lavery, Nutta, & Youngblood, 2019).

Teaching and Assessment Innovations

Continuing alongside my research about the integrated teacher preparation curriculum I developed and implemented, my recent SoTL research has focused on creating simulation sessions in a virtual classroom including three English learner (EL) avatars, Edith at the beginning level of English proficiency, Edgar at intermediate, and Tasir at advanced. To develop authentic representations, I created speech behavior patterns for each level and trained the simulation actors to respond to teacher candidate questioning as ELs at the three levels would. This process of piloting with simulation actors occurred initially with me as teacher candidate and eventually with teacher candidates in my sections of TSL 4080 and 5085. Subsequently my colleagues and I conducted qualitative research with my classes that showed teacher candidates' increased sense of efficacy in communicating with ELs.

Impacts on Student Learning, Dissemination of Results, and Plans for Further Action

During the same period, I collaborated with two doctoral students to examine the impact of our interns on their ELs' learning gains, which showed that our teacher candidates narrowed the gap between ELs and non-ELs on unit tests. Armed with these encouraging data, I reached out to TESOL colleagues in CAH to serve as co-PIs in a grant proposal for which I am PI, Micro-credentialing of English Learner Teaching Skills. Through MELTS, we developed 10 online video-based instructional modules that prepare teacher candidates in seven courses in the Elementary Education B.S. degree to improve their communication with ELs during instruction of social studies, math, science, literature, reading skills, writing, classroom management, and meetings with parents. We developed 10 simulation protocols aligned with the video modules, used with 500 Elementary Education teacher candidates who earned digital badges for successfully demonstrating ability to communicate effectively with the ELs in the virtual classroom.

Based on the success of MELTS, we submitted a proposal to establish a similar project for bilingual teacher candidates in dual language programs, and were awarded \$2,691,315. In 2020 with colleagues in Science Education, my work was applied in a \$300,000 NSF grant for which I am a co-PI, deepening my research through the rigorous supervision of NSF collaborators.

This body of scholarship, beginning with the development of a curriculum integrating a focus on communication with ELs, culminated in three federal grants, the first simulated EL avatars in the US, two books, three book chapters, and eleven articles and proceedings. Most important of all, however, is the growth in competence and confidence of our teacher candidates to successfully reach all students in their classrooms.