

Announcing the Final Examination of Constance Marie Doty for the degree of Doctor of Philosophy in Physics

Date: November 17th, 2021

Time: 10:30 a.m. (eastern)

Zoom Link: <https://ucf.zoom.us/j/93917429231?pwd=Qk5tdmlpNThsWVVPV3EzazQ5TWNEZz09>

Meeting ID: 939 1742 9231

Passcode: 887378

Dissertation title: Optimizing Mixed-Reality Simulator to Support STEM Graduate Teaching Assistants in Developing Student-Centered Pedagogical Skills

Abstract: Physics graduate teaching assistants (GTA) often instruct student-centered lab and recitation sections at large universities, creating the opportunity to positively impact students. However, as STEM GTA professional development varies by institution and discipline, GTAs rarely receive feedback about their teaching. In K-12 teacher preparation, “microteaching”, where a teacher teaches a lesson to peers acting as students, is used to provide feedback. Research has demonstrated benefits to microteaching in K-12 teacher and STEM GTA preparation, but practicing teachers find microteaching can lack authenticity. Recently, researchers have explored integrating technology, like simulation, in pedagogy training to provide a more authentic training experience. However, research is limited on the impact of using simulators for STEM GTA training.

Following a mixed-methods approach, this dissertation presents three studies that focus on the impact of rehearsal in the mixed-reality simulator, TeachLivE™, on physics GTAs’ teaching practices. Study One used observations to investigate GTAs’ use of a questioning strategy both during simulator sessions and while teaching in their actual classroom/lab. We found facilitator feedback was important to GTAs’ rehearsal of questioning during simulator sessions, and we observed an immediate impact on their use of questioning in the classroom. In Study Two, we analyzed student interviews to explore students’ perspectives of GTAs’ use of strategies to resolve group dynamics issues. We found GTAs helped to resolve content-related group challenges but not group dynamics challenges. In Study Three, we analyzed student interviews to investigate student feelings about GTAs’ use of specific pedagogical skills. We found most students felt nervous if their GTA used cold call, but error framing decreased anxiousness or elicited feelings of support, and most students did not feel interrogated by their GTA’s use of questioning. Overall, these studies demonstrate the utility of simulation to prepare STEM GTAs to use student-centered teaching skills.

Outline of Studies:

Major: Physics

Educational Career:

M.S. University of Central Florida, Summer 2018

B.S. University of Central Florida, Fall 2015

Committee in Charge:

Dr. Jacquelyn J. Chini (Chair)

Dr. Zhongzhou Chen

Dr. Eduardo Mucciolo

Dr. Erin K. H. Saitta (External Committee Member)

Approved for distribution by Dr. Jacquelyn J. Chini, Committee Chair, on November 3, 2021.

The public is welcome to attend remotely.