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Sara Callori – TSSA Grant Report

Name of Conference Attended: American Association of Physics Teachers - APT New Physics and Astronomy Faculty Workshop (<http://www.aapt.org/Conferences/newfaculty/nfw.cfm>)

Teaching Strategy Studied: The AAPT New Faculty Workshop (NFW) is an intensive four-day workshop for providing new faculty members with an introduction to a variety of teaching strategies. This included sessions on Peer Instruction, Think-Pair-Share, Just-In-Time Teaching, problem solving, and interactive engagement in upper level courses. Some sessions were devoted to introducing participants to online resources and trying out computer based instructional tools, such as the PhET simulations (<https://phet.colorado.edu/>) and Physlets Java simulations (<https://www.compadre.org/physlets/>). We also attended sessions on how to use physics education research findings and tools to improve student learning. This includes resources like PhysPort (<https://www.physport.org/>), an online repository for physics education assessments that can be used to take and analyze data on student learning.

Impact on/How Applied to Current Teaching: There were several outcomes from the NFW that I have utilized in my current teaching. While I was previously utilizing several teaching strategies, such as peer instruction and group problem solving, particularly in our lower division courses, I found that the computer and online simulations have become a larger part of my lecture style. I not only use them as demonstrations but have incorporated them into my laboratory sessions as pre-lab activities (students can virtually experiment at home) and in-class worksheet activities. This past fall I taught my first upper division courses and was able to use resources demonstrated in the upper division sessions to make my Materials Science and Engineering course more interactive. This included whiteboard activities, which we practiced during the NFW (<http://physics.oregonstate.edu/portfolioswiki/swbq:swbq>) and PhET simulations used by students in class rather than just to demonstrate examples.

After the formal workshop I joined a NFW faculty online learning community (FOLC), which has had a tremendous impact on my current teaching. The FOLC was made of a small cohort of NFW participants from my session and ran from January 2017 – December 2018. We participated in biweekly online video meetings and outside meetings communicated online through a social media platform. As part of the FOLC I also did a “scholarship of teaching and learning” (SOTL) project where I assessed the effectiveness of a new teaching technique. For my project I specifically looked at the use of clickers in my Introduction to Electronics course and was guided through the project with help and feedback from my peers. Additionally, a colleague from CSU San Marcos and I realized we were both teaching and interested in new approaches to similar upper division materials courses. We shared our new course content and activities and this helped me create worksheets for the course that used online PhET simulations to explore topics in materials physics.

Another major outcome that has resulted from the NFW and my participation in the FOLC has been the role of assessment in my courses. Using the tools and examples introduced at the NFW, I have been more deliberate in using tools to help collect feedback and data on the effectiveness of various teaching techniques. For my FOLC project I used a combination of student surveys, clicker data, exam scores, and prior physics courses to study the role clicker activities play in helping students understand the course content. I am currently redesigning our General Physics I laboratories and am using a survey from physics education research to “pre-test” this year’s students so results can be compared against next year’s group after the new lab activities are rolled out. (<http://cperl.lassp.cornell.edu/PLIC>) This will help me understand whether the new labs are helping students develop experimental and critical thinking skills, a major goal of the instructional laboratory.