PREPARING FACULTY TO TEACH WITH TECHNOLOGY: A FOCUS ON SELF-EFFICACY

Kristen Fye
University of North Carolina at Charlotte
krfye@uncc.edu

Nina Gabrielle Bailey
University of North Carolina at Charlotte
nbaile15@uncc.edu

Allison McCulloch
University of North Carolina at Charlotte
allison.mcculloch@uncc.edu

Jennifer Lovett
Middle Tennessee State University
jennifer.lovett@mtsu.edu

Keywords: professional development, undergraduate education, technology

NCTM (2015), AMTE (2017), and CBMS (2012) have all pointed to the importance of preparing secondary mathematics teachers [PSMTs] to teach using mathematical action technologies (e.g., CODAP, Desmos, GeoGebra). However, a recent nationwide survey of accredited PSMT preparation programs found that while most programs do integrate technology in at least one course for PSMTs, many do not include opportunities to engage with a variety of mathematical action technologies and two programs reported that they do not include technology at all. In addition, responses to open ended questions indicated that faculty expertise is one of the reasons mathematical action technologies are not used more widely (Authors et al., 2020). To address this issue a 6 day virtual workshop on teaching undergraduate courses for PSMTs with mathematical action technologies was conducted. The workshop provided opportunities for faculty who teach mathematics, statistics, and methods courses to learn about technologies that are appropriate for use in their courses and are commonly used in secondary schools. Participants were organized into Teaching Interest Groups with opportunities to collaborate on ways in which they would incorporate what they were learning into their instruction. An overarching goal was to support the development of faculty self-efficacy for using the technologies and self-efficacy for using the technologies in their instruction.

To study faculty self-efficacy we used a survey methodology (Groves et al., 2009). Seventy participants representing 52 universities across 31 states participated in the workshop. Participants each completed a pre- and post- self-efficacy survey regarding the technologies presented in the workshop sessions. Participants rated their comfort level in using the technologies for themselves as well as teaching with the indicated technologies. The 24 question survey used a 6 point likert scale - where 1 represented “not comfortable at all” and 6 represented “extremely comfortable.” A repeated measures ANOVA was performed to assess the difference in self-efficacy as rated on the pre- and post- surveys (Norman, 2010). Preliminary findings suggest that participants began the workshop with low self-efficacy for using and teaching with the newer technologies commonly used in secondary schools today, while some reported higher levels of self-efficacy (and experience with) older technologies (e.g., TI-84 graphing calculator). A full analysis will be presented along with implications for future faculty development related to preparing to teach using mathematics and statistics technologies.

Acknowledgements

This work is supported by the National Science Foundation (NSF) under grant DUE grant

1954692 awarded to UNC Charlotte. Any opinions, findings, and conclusions or recommendations expressed herein are those of the principal investigators and do not necessarily reflect the views of the NSF.

References

Authors (2020)

Association of Mathematics Teacher Educators. (2017). Standards for preparing teachers of mathematics. http://amte.net/standards

Conference Board of the Mathematical Sciences (CBMS). (2012). The mathematical education of teachers II. Providence, RI, and Washington, DC: American Mathematical Society and Mathematical Association of America.

Groves, R. M., Fowler, F. J., Jr., Couper, M. P., Lepkowski, J. M., Singer, E., & Tourangeau, R. (2009). Survey methodology (2nd ed.). John Wiley & Sons Inc. https://doi.org/10.1163/156913312x619391

National Council of Teachers of Mathematics (2014). Principles to actions: Ensuring mathematical success for all. Reston, VA: NCTM.

Norman, G. (2010). Likert scales, levels of measurement and the "laws" of statistics. *Advances in health sciences education*, *15*(5), 625-632.