Teacher Training, Implementation, and Professional Development for Mobile, Hybrid, and Online Learning

Special track alongside the 14th International Conference on Mobile, Hybrid, and On-line Learning,
TTIPD 2022, June 26–30, 2022

Rachel Van Campenhout
Research and Development
VitalSource
Pittsburgh, PA, USA
e-mail: rachel.vancampenhout@vitalsource.com

Abstract—**This special track focused on teacher training, implementation, and professional development for mobile, hybrid, and online learning. The four papers selected for this track are described in this editorial. The diversity of context for each contribution highlights the need to support educators across diverse settings as teaching and learning online expands in increasingly complex ways. Overarching themes and directions for future research based on the papers in this special track are discussed.**

Keywords-teacher training, implementation, professional development, online learning, learning engineering, educational robotics, electronic slide decks.

I. INTRODUCTION

While the global pandemic intensified the research focus on online, hybrid, and mobile learning for students, attention must also be paid to how teachers are prepared for teaching and learning in these modes, as well as successful approaches to implementing online educational tools and practices. Whether in primary/secondary education, higher education, or informal learning environments, teachers have incredible influence over student learning. How teachers choose to implement online learning environments and online tools can greatly impact student outcomes. More research on teacher implementation practices is needed to learn how educators can maximize student learning in various learning contexts.

Additionally, how teachers are trained and prepared through professional development influences their implementation practices, confidence, and abilities. Teacher education programs can shift how new teachers work in online, hybrid, and mobile environments and use those tools for tomorrow's students. Professional development strives to continue teacher education on those topics to support teachers in an ever-evolving educational landscape. Research on effective training and professional development for various teaching applications will continue to spread ideas and practices that will support and prepare teachers, in turn supporting the students they teach.

This special track includes diverse researchers and practitioners on this topic of teacher implementation and teacher preparedness for online, hybrid, and mobile teaching and learning. The submissions included range from K-12 to higher education, from simple technology such as slide decks to complex technology such as Lightboard. The submissions also offer different insights based on the stage of development from pilot programs and initial findings to programs that had multiple cycles of iterative improvement. Lastly, there are two papers that focus on learning engineering, with suggestions on how to develop, implement, and refine training, implementation, and professional development for educators.

II. SUBMISSIONS

A. Fostering Communities of Practice

In the short paper titled, "Fostering Communities of Practice: Insights from an Online Educational Robotics Professional Development Pilot," the authors included surveys in an initial professional development pilot for educational robotics [1]. These pilots were created to fill a need for teachers in K-12 schools who need support as they begin to incorporate educational robotics into their existing curriculum. Educational robotics is typically not covered in traditional teaching programs, so finding alternative solutions to support teachers is paramount. In this professional development pilot, teachers met online in synchronous sessions once a week while completing learning content and assignments outside of class, in a flipped-blended model. Particular attention was given to fostering a sense of community between teachers. Teachers were given a pre- and post-survey on robotics interest, self-efficacy, coding and knowledge, and community of practice. Notes were also taken by the researchers as the classes progressed. Results showed increases in each category. Future research is planned to make adjustments to the program and evaluate larger groups of teachers.

B. Multimedia Learning Principles

In this submission titled, "Multimedia Learning Principles and Instructional Design Among Teachers," the author created a research pilot to identify the extent to which teachers understood and implemented key principles in their electronic slide presentations [2]. Two multimedia principles were identified for their ability to introduce extraneous cognitive load when misused: the coherency and redundancy principles [3]. The researcher created a survey to evaluate

teacher's knowledge of these principles and their level of adherence to them when making their own slide decks. The respondents provided valuable data that suggested professional development could bridge existing knowledge gaps. Future improvements to the survey and expanded research are planned given the results of the pilot.

C. Designing and Implementing a Lightboard Learning Experience

In the submission titled, "Designing and Implementing a Lightboard Learning Experience for Instructors Through the Learning Engineering process" the authors describe multiple iterations of instructor training for the Lightboard technology [4]. Learning engineering was used to design and implement the learning experience for instructors at Massachusetts Institute of Technology, including cycles of change due to feedback and technology changes. The instructor training program developed for this technology highlights the necessity of incremental change over time and outlines the benefits of planning for this process. This example of learning engineering-based development also showcases the benefits of design decision and justification tracking as a method to ensure a learner-centered approach. Suggestions for teams and practitioners engaged in similar training efforts are discussed.

D. Developing Instructor Training for Diverse & Scaled Contexts

The last submission, titled, "Developing Instructor Training for Diverse & Scaled Contexts: A Learning Engineering Challenge," applies the same learning engineering practice to the challenge of training instructors across many different contexts [5]. In this paper, developing online courseware serves as the initial challenge to illustrate the learning engineering process, but it is then noted that the effectiveness of the learning technology is related to its application by the instructor. Therefore, a new challenge is identified of providing training on effectively utilizing the courseware that addresses they myriad of unique needs of each teaching and learning context. The learning engineering process is detailed using this example and broader applications are discussed.

III. CONCLUSION

In this collection of papers, themes can be identified. On the most basic level, we see a need to provide training and support to educators no matter the complexity of the learning technology. Whether it's for the ubiquitous slide deck used at some point by nearly every student and educator, robotic kits that combine construction with computer science for children, online courseware for college students, or Lightboard technology for university instructors, technology at any level should be accompanied by meaningful training and support.

One common theme across all papers is the need to provide this support in continuing professional development and training instances. Traditional teacher education programs cannot cover all topics and are often unable to quickly adopt new technologies, as in the case of educational robotics. Continuing to train teachers in K–12 classrooms through professional development programming is not only a way to provide new material, but impact teacher self-efficacy and foster communities of practice as well [1]. Additional support is also necessary in higher education, as instructors must learn new technology on an ad hoc basis. What instructors are able to incorporate into their teaching practice—whether Lightboard technology or a courseware learning resource—will directly impact their students, so continued instructor and faculty training is just as valuable in higher education as it is for K–12 teachers.

Finally, these submissions all indicate that iteration is a critical component to successful trainings. Two papers apply learning engineering as a practice and process to develop trainings for technology [4][5]. In each, iteration is addressed at length as a natural and planned part of the process wherein data informs future decisions and changes. These iterations continually improve the training solution for educators over time. Though this was not explicitly a topic discussed in [1] and [2], these pilot studies for K–12 teachers are, in fact, early iterations of teacher trainings where there is a plan to learn from the pilot data and improve future iterations. As technology continues to change, so too should training and professional development for educators.

These papers suggest interesting directions from future research, from investigating the effectiveness of scaling training programs to support hundreds or thousands of instructors, to helping teachers reduce cognitive load through presentation design, to fostering communities of practice for teachers bringing robotics into the classroom. By sharing practices and approaches from diverse contexts in this special track, new approaches and perspectives may be developed to support educators in the future.

REFERENCES

[1] L. Harter and J. McKenna, Fostering Communities of Practice: Insights from an Online Educational Robotics Professional Development Pilot. *Proceedings of eLmL 2022: The Fourteenth International Conference on Mobile, Hybrid, and On-line Learning. 2022.*

[2] L. Beaulieu, Multimedia Learning Principles and Instructional Design Among Teachers: A Pilot Study. *Proceedings of eLmL 2022: The Fourteenth International Conference on Mobile, Hybrid, and On-line Learning. 2022*

[3] R. Mayer, Multimedia learning (3rd ed). Cambridge University Press, 2020.

[4] L. Totino and A. Kessler, Designing and Implementing a Lightboard Learning Experience for Instructors Through the Learning Engineering Process. *Proceedings of eLmL 2022: The Fourteenth International Conference on Mobile, Hybrid, and On-line Learning. 2022*

[5] R. Van Campenhout and A. Kessler, Developing Instructor Training for Diverse & Scaled Contexts: A Learning Engineering Challenge. *Proceedings of eLmL 2022: The*