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# Editorial: A Report on the 2018 National Technology Leadership Summit

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with Jon Clausen, Teresa Foulger, Michael Grant, Tina Heafner, and Elizabeth Langran

On September 27-28, 2018, national leaders from educational associations, editors of educational technology journals, directors of nonprofit foundations, federal policy makers, and corporate representatives gathered in Washington, DC, for the 2018 National Technology Leadership Summit (NTLS). As with prior years, the event was generously hosted by the American Association of Colleges for Teacher Education (AACTE).

NTLS provides an annual opportunity to facilitate dialog between educational technology and teacher educator associations with the overall intention of accelerating the impact of technology in a rapidly changing world. In particular, every year there is a panel featuring presidents of teacher educator associations discussing contemporary and pressing issues at the intersection of technology and teacher education. This year, presidents discussed ways in which their respective associations handle technology for teacher educators, existing technology trends across disciplines, and the role of technology in keeping membership for the respective associations engaged.

NTLS is also an opportunity for editors of educational technology journals to gather together and discuss opportunities and challenges in the field. This year, editors discussed the issue of conceptual drift – the ways in which over time and use an original concept or idea may begin to be used in different and sometimes unintended ways from the original concept (some more productive and some less productive). In particular, editors identified a number of constructs that have come across their desks that include such conceptual drift and/or ambiguity. They also discussed the role of the reviewers and their own roles as editors in helping our field produce conceptually robust studies in educational technology.

## Research Strands for the 2018 NTLS

The 2018 NTLS was organized around three strands: (a) TETC Cases: Program Deep and Program Wide vs. Technology in a Shrinking Educational Economy; (b) Gamemakers: Utilizing Makerspaces—Generating Tools for the Content Areas; and (c) Computational Thinking in the Content Areas: Computer Science for All.

### Strand 1

The *TETC Cases: Program Deep and Program Wide vs. Technology in a Shrinking Educational Economy* strand was led by Teresa Foulger (Arizona State University) and Jon Clausen (Ball State University and Chair of the AACTE Committee on Innovation and Technology). In 2017 a call was put forth by the U.S. Department of Education, Office of Educational Technology, for teacher educators to come together and figure out a way to assure all preservice teachers can independently teach with technology upon entry to the field. This strand focused on addressing the challenges of preparing teacher preparation institutions to infuse technology integration curriculum in a program-deep and program-wide approach. Specifically, the group discussed issues such as developing a shared vision for infusion, competing demands within educator preparation, and the socio-economic pressures from outside teachers colleges to minimize a focus on technology integration that make change difficult.Strand participants examined literature and tools that, when combined, represent the beginning of a movement across teacher education to address this challenge. This examination included the Teacher Educator Technology Competencies (Foulger, Graziano, Schmidt-Crawford, & Slykhuis, 2017), standards for the preparation of preservice teacher education candidates (Council of Chief State School Officers, 2011), standards for technology integration (International Society for Technology in Education [ISTE], 2017), and the vital role of education leaders in sustainable change (ISTE 2018; Graziano, Herring, Carpenter, Smaldino, & Finsness, 2017).

Strand participants are planning and conducting follow-up activities beyond the NTLS meeting. These efforts continue to look for synergistic possibilities and praxis between educator preparation, faculty development, and leadership in candidates' preparation to infuse technology within their instructional practices.

### Strand 2

The NTLS strand, *Utilizing Makerspaces: Generating Tools for the Content Areas*, was co-chaired by Elizabeth Langran (Marymount University and Chair, SITE Teacher Education Council) and Tina Heafner (University of North Carolina Charlotte and Vice-President, National Conference for the Social Studies) to examine several questions, including the following: How might we create the ideal, interdisciplinary gamemaker and/or makerspace for K-12 learning? How does making demonstrate or model disciplinary thinking in our content areas or areas of expertise? What additional ways of knowing does the process reveal that could generate interdisciplinary knowledge needed for college, career and civic life?

The group began by looking at a project on voter district gerrymandering developed by Tina Heafner in collaboration with Glen Bull (University of Virginia) and used disciplinary teams to explore game redesign and custom variants with the use of a die cutters, printers, and other tools maker tools. Subsequently, Joe Garofalo (University of Virginia) led the group through math puzzle activities. The group also worked on a maker activity using

HyperDuino designed and facilitated by Roger Wagner. The focus of the group was to examine how fabrication files and projects can be edited and adapted to suit a teacher's educational needs, as well as the connections that can be made with literacy, mathematics, science, history, and other disciplines.

### Strand 3

The *Computational Thinking in the Content Areas*: *Computer Science for All* strand was led by Michael Grant (University of South Carolina and AECT President-Elect) and Chrystalla Mouza (University of Delaware and CITE Editor-in-Chief). This strand examined the current landscape of efforts to promote Computer Science for All. Strand participants discussed contemporary definitions of computational thinking, the rationale driving current efforts to promote computer science, recent standards on computer science educators developed by ISTE and the Computer Science Teachers Association (CSTA), and resources available to support the teaching of computer science. Subsequently, participants engaged in interactive computer science unplugged exercises – exercises that teach computer science concepts without technology – and reflected on the experience. Roger Wagner also engaged the group in building a digital version of NIM, a mathematical game of strategy using the MakerBit. The MakerBit works with the BBC micro: bit controller and allows learners to easily connect videos and other digital media to physical models. Through this process participants discussed key computer science concepts supported by the activity, including algorithms, abstraction, and analysis. The group concluded by discussing ways in which computer science concepts can be integrated across content areas and grade levels, issues of assessment, as well as the role of teacher preparation programs in developing the next generation of computationally literate teachers.

Special thanks to Dr. Robert Russel from the National Science Foundation (NSF), who also attended NTLS and presented the objectives and scopes of NSF initiatives focusing on supporting computer science for all.

## Description of Current Issue

This issue of *CITE journal* includes an exciting collection of articles focusing on teacher preparation (see CITE General, Math Education, and Science Education) and professional development (see Current Practice and Social Studies Education) and utilizing a range of emerging technologies to support teacher learning (see General Practice).

The Current Practice section article, " K-12 Technology Leaders: Reported Practices of Technology Professional Development Planning, Implementation, and Evaluation" by Michael Karlin, Anne Ottenbreit-Leftwich, Gamze Ozogul, and Yin-Chao Liao, reports on the technology professional development design practices of technology leaders who are members of ISTE. Data from questionnaires, interviews, and artifacts indicated that ISTE technology leaders did not always plan technology professional development experiences based solely on individual teachers' needs. Rather, district initiatives or administrator requests were also taken into account, which were not always aligned with teachers' individual needs. The implementation of the professional development experiences was consistent with best practices reported in the literature but were not always sustained or continuous. Finally, evaluation of these efforts relied primarily on self-reported teacher data. The authors conclude with implications for the design of technology professional development.

The General section features two articles. The first article, "The Impact of a Teacher Education Program Redesign on Technology Integration in Elementary Preservice

Teachers" by Guy Trainin, Laurie Friedrich, and Qizhen Deng, examines the growth of elementary preservice teachers' technology integration in the context of a teacher preparation program redesign that utilized the framework of technological, pedagogical, and content knowledge. Using preservice cohorts over a 5-year period, this work examined the impact of this course redesign on preservice teachers' efficacy to integrate technology and subject areas (technology, pedagogy, and content knowledge [TPACK] efficacy) and their technology knowledge. Data were collected from 891 participants through three survey instruments. Findings indicated that participants demonstrated across-cohort growth in TPACK efficacy, technology knowledge and technology integration frequency. Further, findings indicated that modeling by teacher educators and cooperating teachers positively impacted TPACK efficacy, technology knowledge, and technology integration frequency. Finally, results indicated that although TPACK efficacy empowered preservice teachers it did not predict technology integration frequency. The study concludes with implications for teacher education programs.

The second article, "On-Ramps to Professional Practice: Selecting and Implementing Digital Technologies for Virtual Field Experiences" by Joe Sweeney, Amanda Milewski, and Joel Amidon, outlines the need to use virtual field experiences as on-ramps to professional practice in teacher education. The authors analyzed the core features of two virtual field experience platforms, namely *TeachLive* and *LessonSketch*, and identified guiding questions for teacher educators that can be used to select and use virtual field experiences as on-ramp to professional practice. These questions can also guide the design of new platforms for practice-based teacher preparation.

The Mathematics Education section article, "Novice Secondary Mathematics Teachers' Evaluation of Mathematical Cognitive Technological Tools" by Ryan Smith, Dongjo Shin, Somin Kim, and Matthew Zawodniak, reports an investigation of secondary mathematics teachers' evaluation of online dynamic geometry tools. Specifically, the study examined the features within the tools that mathematics teachers attend to, the way they interpret these features, and they ways they respond to them. Data for this work were collected based on discussions of one group of novice secondary mathematics teachers while analyzing online dynamic geometry tools designed to help students learn the Triangle Inequality Theorem. Transcripts from the discussion were analyzed using an a priori framework, previously developed by the authors, which consists of three noticing actions: *attending*, *interpreting*, and *responding*. Findings indicated that participants typically started by determining how the tools work, moved toward examining the mathematical features of the tools, and concluded by considering the tools' ability to support student engagement and thinking. Ease of implementation was also a key consideration. The study concludes with implications for mathematics teacher educators and future research.

The Science Education section article, "Elementary Education Candidates' Integration of Technology in Science Units" by Drew Polly and Ian Binns, uses the framework of technological pedagogical, and content knowledge (TPACK) to examine the ways in which elementary education preservice teachers integrated technology in science units after completing courses in both science education and technology integration. Data from this work included 63 interdisciplinary science units completed by preservice teachers. Findings indicated that preservice teachers utilized a wide range of tools in their lesson plans. Further, findings revealed that technologies included at the end of lessons were associated with higher order thinking activities, while those included at the beginning or middle of lessons focused primarily on lower order thinking activities and content presentation. Specific to science instruction, the study revealed that participating preservice teachers did not always utilize technology in ways that supported science inquiry. The study concludes with implications for teacher education and future research.

The Social Studies Education section article, "Preparing Social Studies Teachers and Librarians for Blended Teaching" by Mark Stevens, Jered Borup, and Michael Barbour, examined one school district's yearlong professional development effort to prepare social studies teachers and school librarians to design and facilitate blended learning units. Using interview and focus group data from 11 teachers, the authors found that the professional development was effective at improving participants' knowledge of blended teaching, skills and perceptions. Elements of the professional development valued by teachers included the facilitators' feedback and modeling, as well as interactions and collaboration with other participants. Implementing units with their own students, however, had the most substantial impact on teacher perceptions of blended learning. The study concludes with implications for professional development on blended learning and future research.

I hope *CITE Journal* readers enjoy these articles over the winter break. Please consider submitting a commentary!

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