# **AECT 2020 Research and Theory Division Panel Proposal**

# Systematic Reviews of Research on Learning Environments and Technology: A Very Special Issue

## **Short Description (75 word)**

This session brings together researchers who contributed to a special issue of ETR&D on systematic reviews of the research on learning environments and technology. Panelists have conducted overviews of the research literature in one the following areas: social media, open textbooks, MOOCs, flipped classrooms, wearable learning, mobile learning, and adaptive learning. These researchers will detail key findings from their research studies. They will also point to untapped areas of research that await further exploration.

Session Coordinator/Chair: Curtis J. Bonk, Indiana University

## **Presenters and Topics:**

## **Panelists/Presenters and Topics:**

- 1. Social Media and the School Context: A Scoping Review of Research in Education and Related Fields, Vanessa Dennen, Hajeen Choi, and Kari Knisely, Florida State University
- 2. A Comprehensive Systematic Review of MOOC Research: Research Techniques, Topics, and Trends from 2009 to 2019, Meina Zhu, Wayne State University and Mimi Miyoung Lee, University of Houston
- **3.** Systematic Review of Adaptive Learning Research from 2009 to 2018: Examining Learner, Content, and Instructional Characteristics, Florence Martin University of North Carolina at Charlotte and Yan Chen, University of New Mexico
- 4. "Like, Comment, and Share": Professional Development Through Social Media in Higher Education, Tian Luo, Old Dominion University, Candice Freeman, Old Dominion University, Jill Stefaniak, the University of Georgia.
- **5.** A Systematic Review of Mobile Game-based Learning in STEM Education, Fei Gao, Bowling Green State University
- 6. A Meta-Analysis of Wearables Research in Educational Settings Published 2016-2019, Byron Havard, University of West Florida

Session Moderator: Curtis J. Bonk, Indiana University

## Abstract

There has been an increase in the use of learning technologies such as MOOCs, social media, open educational resources, synchronous online technologies, adaptive technologies, mobile technologies, etc. These technologies are referred to as emerging technologies, a term that indicates that their status and use in educational contexts is still fairly fluid (Veletsianos, 2010). Early research in an area typically focuses on what Borko (2004) refers to as "existence proofs," or one-off studies of individual implementations. It takes time for a more systematic, mature

body of research to emerge, and for research gaps to fill in. In response, this special issue brings together a collection of systematic review articles, each focusing on a different aspect of emerging learning technologies. This has led to a need for a strategic approach to review research on the use of these emerging learning environments and technologies. A systematic review is a methodology used to systematically examine secondary data from published studies and synthesize and report findings based on the research questions. Meta-analysis studies are also considered as systematic reviews.

In effect, the intent of the special issue is to provide an overview of the current state of research on various emerging technologies, to characterize the major findings or implications of this research, as well as to identify gaps and opportunities for future researchers. Listed below are the abstracts from the seven teams of panelists. Each will present for 8-10 minutes followed by a question and answer session at the end.

## Social Media and the School Context: A Scoping Review of Research in Education and Related Fields

Vanessa Dennen, Hajeen Choi, and Kari Word, Florida State University

This scoping review of research explores which disciplines have studied social media as it relates to education and, more broadly, use by students of high school and college age. The sample explores ten years of research (2009-2018). A search of Web of Science yielded 580 relevant peer-reviewed articles published through the end of 2018, with 260 (44.8%) of these articles focused on education. Research in this area has been on a steady upward trajectory since 2009, the first year when relevant social media articles appeared. About half of this research was conducted in North American settings, and quantitative surveys were the most popular data collection method. Findings show that within education, the dominant themes of research were use as a teaching tool, school communication, digital literacy, social issues, and teacher professional development. Outside of education, the dominant themes were negative behaviors, health issues, identity development and management, digital citizenship, and teen culture and relationships. This review shows several areas where education researchers and practitioners would benefit from attending to research conducted outside of our discipline. Although the field of educational research sufficiently addresses issues like teacher professional development and pedagogical uses of social media, the larger issues that affect our students and, in turn, the school context are being explored in other disciplines.

# A Comprehensive Systematic Review of MOOC Research: Research Techniques, Topics, and Trends from 2009 to 2019

Meina Zhu, Wayne State University Mimi Miyoung Lee, University of Houston

This study examines the research methods, topics, and trends of empirical MOOC research to gain a comprehensive understanding of the MOOC phenomenon through reviewing 477 empirical MOOCs research published from 2009 to June 2019. The results indicate that: (1) the

majority of studies adopted quantitative research methods followed by mixed research methods and qualitative research methods, (2) the most frequently adopted data collection method was survey, followed by platform database and interviews, (3) almost half of the studies used at least two data collection methods such as survey and interview, (4) the majority of researchers adopted descriptive statistics for data analysis, followed by inferential statistics and content analysis, (5) the research topics primarily focused on students, followed by design-focused, context and impact-focused, and instructor-focused. Among these student-focused topics, learner retention, learning experience, social learning, and engagement were the most mentioned, and (6) the affiliations of the first authors of the MOOC studies were mainly from the U.S. followed by China and Spain. Implications and future research were discussed.

## Systematic Review of Adaptive Learning Research from 2009 to 2018: Examining Learner, Content, and Instructional Characteristics

Florence Martin and Yan Chen, University of North Carolina at Charlotte

This systematic review of research on adaptive learning used a strategic search process for published research to synthesize findings on adaptive learning. A total of 61 articles on adaptive learning were analyzed to describe the current state of research and identify gaps in the literature. A number of descriptive characteristics including publication patterns, instructional context, and research methodology components were recorded. The count of adaptive learning articles published fluctuated across the decade and peaked in 2015. During this time, the largest concentration of adaptive learning articles appeared in Computers and Education. The majority of the studies were conducted in higher education in Taiwan and United States, and the greatest concentration was in the Computer Science discipline. The studies were also examined for their research focus, adaptive strategies, and adaptive technologies. The research was aligned to various instructional design phases, with more studies examining design and development, and implementation and evaluation. In terms of adaptive strategies, the authors examined both adaptive sources based on learner model and adaptive targets based on content and instructional model. Learning style was the most examined learner characteristics while adaptive feedback and adaptive navigation were the most examined adaptive targets. This study has implications for adaptive learning designers and future researchers on the gaps in adaptive learning research. Future studies might focus on the increasing availability and capacities of adaptive learning as a learning technology to assist individual learning and personalized growth.

## "Like, Comment, and Share": Professional Development Through Social Media in Higher Education

Tian Luo, Old Dominion University, Candice Freeman, Old Dominion University, Jill Stefaniak, the University of Georgia

In recent years, professional learning networks (PLNs) and online learning communities of practice (CoPs) enabled by social media have emerged as a conduit and communal space for faculty members to engage in professional learning. This systematic review provides a current synthesis of research surrounding social media and professional development in higher education. Articles published in peer-reviewed journals between 2009- 2019 were reviewed and

23 articles that met our selection criteria were included for further analysis and synthesis in this review. The findings suggest that research and practice on social media-supported professional learning is still in its infancy stage. Despite that social media-supported PLNs and CoPs show potential for contributing to faculty professional learning, challenges exist in sustaining faculty participation and engagement, as well as effectively navigating the social media space, especially for novice social media users. Practical implications and future research recommendations are discussed.

## A Meta-Analysis of Wearables Research in Educational Settings Published 2016-2019 Byron Havard, University of West Florida

The integration of wearables in education environments to enhance teaching and learning is an emerging area of research. However, many studies lack the rigor of formal research designs and results are inconclusive. The purpose of this meta-analysis was to examine the overall effect of wearable use on learning and motivation outcomes and describe the characteristics of the studies that contribute to this effect. Searches for wearables research were conducted in three databases that yielded 144 results after duplicates were removed. Searches in four additional databases did not reveal any supplementary results. Coding based on specific inclusion criteria resulted in 12 studies with 20 effect sizes published between January 2016 and August 2019. It should be noted that while this result was statistically significant, the heterogeneity was also statistically significant. A discussion of the findings, implications, and limitations are provided.

## A Systematic Review of Mobile Game-based Learning in STEM Education Fei Gao, Bowling Green State University

Research on mobile game-based learning has been gaining attention in the past few years. To understand the potential of mobile game-based learning in STEM education, a systematic review was conducted. Based on a set of inclusion and exclusion criteria, 30 articles published during the years of 2010 through 2019 were included. Analyses were conducted to identify the contexts of studies, research foci, research methodologies, measures, research instruments, and the mobile game features. The findings suggest that the majority of studies on mobile game-based learning in STEM education were conducted with elementary and middle school students. The studies covered a variety of topics in math and science, but there is a lack of long-term interventions. Multiple measures and instruments were adopted in most of the reviewed studies. However, limited studies moved beyond the simple comparison of game-based approach and traditional approaches. Mobile features such as portability, social interactivity, and contextual sensitivity were more frequently studies as compared to connectivity and individuality. Although current research has greatly increased our understanding of mobile game-based learning in STEM education, future research is needed to draw upon what we have already know about learning and motivation and address the fundamental question of when mobile game-based learning is an appropriate approach for learning in STEM education.

## Appendices

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## **Participant Bios:**

#### **Session Moderator:**

**Curt Bonk** is Professor of Instructional Systems Technology at Indiana University Bloomington. He is a passionate and energetic speaker, educator, writer, educational technologist, and entrepreneur. Curt has been consistently listed by Education Week as a top contributor to the public debate about education. In November 2017, he was fortunate to be awarded the Online Learning Journal Outstanding Research Achievement Award in Online Education from Online Learning Consortium in Orlando, Florida. Dr. Bonk has spoken in dozens of countries around the world and authored or edited 12 books exploring global and societal aspects of emerging learning technologies including "The World Is Open" and "MOOCs and Open Education Around the World." He may be contacted at cjbonk@indiana.edu.

## **Panelists:**

## **Bios (in alphabetical order)**

**Dr. Yan Chen** is a Postdoctoral Fellow in the Program of Organization, Information and Learning Sciences and the Department of Chemical and Biological Engineering at the University of New Mexico. Her research interests focus on computer-supported collaborative learning, learning sciences, instructional design, and educational equity for multicultural/multiethnic education. She can be contacted at <u>yanchen@unm.edu</u>.

**Hajeen Choi** is a doctoral candidate in Instructional Systems & Learning Technologies at Florida State University. Her research focuses on othering and the student experience in online classes. She may be contacted at <u>Hajeen.choi@fsu.edu</u>.

**Vanessa Dennen** is a Professor of Instructional Systems & Learning Technologies at Florida State University. Her research is situated in both formal and informal learning environments and focuses on identity development, knowledge management, and knowledge brokering within online networks and communities of practice. Vanessa currently serves as Editor in Chief of *The Internet and Higher Education*. She may be contacted at <u>vdennen@admin.fsu.edu</u>.

**Candice Freeman** is completing an Instructional Design and Technology doctoral program at Old Dominion University; her research interests focus on problem-based learning in the workplace, cognitive apprenticeship in medical education, and workforce development using social media. Candice has over twenty years of professional experience in healthcare, quality assurance, and higher education, holding both didactic and clinical education faculty roles at the 2-year and 4-year college levels. At present, she is an online instructor in the Clinical Laboratory Science Distance Education program at Winston Salem State University and the Director of Laboratory Services with McLeod Health in South Carolina. She can be contacted at <a href="https://cfree002@odu.edu">cfree002@odu.edu</a>.

**Fei Gao** is Associate Professor of Instructional Design and Technology at Bowling Green State University. Dr. Gao's research is focused on how to make learning more efficient, effective, and engaging by tapping into innovative technologies. She has been examining the types of interactions and learning enabled by online technologies, designing technology-mediated learning environments, and exploring pedagogical methods that promote effective learning in such environments. Her work has been published in peer-reviewed journals, such as, the Internet and Higher Education, the Journal of Educational Computing Research, and British Journal of Educational Technology. Fei may be contacted at <u>gaof@bgsu.edu</u>.

**Byron Havard** a Professor in the College of Education and Professional Studies at the University of West Florida where he teaches courses in the Department of Instructional Design and Technology. He has nine years of corporate experience in instructional design and technology integration with AT&T, IBM, and Mitsubishi Electric. Prior to joining UWF, he served as an Assistant Professor in the Department of Instructional Systems and Workforce Development at Mississippi State University for three years. His interests include online collaboration and communication media, and instructional strategies for emerging technologies. He may be contacted at <u>bhavard@uwf.edu</u>.

**Mimi Miyoung Lee** is Professor and Associate Chair in the Department of Curriculum and Instruction at University of Houston. She received her Ph.D. in Instructional Systems

Technology from Indiana University at Bloomington in 2004. She is an expert in critical ethnography and design-based research as well as online, flexible, and open forms of learning. Mimi has published research on STEM-related professional development programs, global and multicultural education, cross-cultural training research, interactive videoconferencing, woman leaders in Asia, self-directed learning from MOOCs and opencourseware (OCW), and emerging learning technologies such as wikis. She may be contacted at <u>mlee7@uh.edu.</u>

**Tian Luo** is an Assistant Professor of Instructional Design and Technology at Old Dominion University. Formerly, she worked as an instructional design professional in both higher education and corporate settings. Her research centers on teaching and learning with and through social technologies and media, as well as designing social media-supported learning environments. She may be contacted at <u>thuo@odu.edu</u>.

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**Jill Stefaniak** is Assistant Professor in the Learning, Design, and Technology Program at the University of Georgia. Her research interests include the professional development and the decision-making processes of instructional designers, contextual factors that impact design, and the use of cognitive apprenticeships as an instructional framework. She may be contacted at <u>jill.stefaniak@uga.edu</u>.

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**Meina Zhu** is Assistant Professor in the Learning Design and Technology program in the College of Education at Wayne State University. She received her Ph.D. degree in the Instructional Systems Technology program at Indiana University Bloomington and her master's degree in educational technology at Beijing Normal University. Her research interests include online education, open education and MOOCs, online discourse analysis, mobile learning, self-directed learning, STEM education, and active learning. Dr. Zhu has published her work in such places as IRRODL, the Internet and Higher Education, the Canadian Journal of Learning and Technology, and Online Learning, and Distance Education. She can be reached at <u>meinazhuiu@gmail.com</u>.