Education in the Cyberlearning Era: New Challenges, Opportunities, and Applications

Xiaozhong Liu  
School of Informatics and Computing  
Indiana University  
Liu237@indiana.edu

Michelle Kazmer  
College of Communication & Information  
Florida State University  
mkazmer@fsu.edu

Michael Twidale  
Graduate School of Library and Information Science  
University of Illinois  
mmsubram@umd.edu

Noriko Hara  
School of Informatics and Computing  
Indiana University  
hara@indiana.edu

Mega M Subramaniam  
College of Information Studies  
University of Maryland  
mmsubram@umd.edu

In the past decades, the emerging web technologies significantly impact learning and education settings. A number of web-based applications, e.g., Wikipedia, MOOC and social media tools, are revolutionizing the way that students access, consume and understand the complex scientific content in an educational environment. For instance, some contend that cyberlearning tools represent a disruptive technology that can transform educational practices, and many universities are mining online education resources to offer massively MOOCs. As another example, among the emerging web technologies impacting learning settings today, wikis stand out as one that epitomizes the transformation from an instructor-centered world to a more learner-centered one. With their knowledge generation, collaboration, and editing capabilities, wikis can be empowering tools for education. Despite the promise of a more efficient personalized learning experience, however, many instructors and students traversing this landscape of cyberinfrastructure-enabled open education have difficulty finding high quality and relevant resources. For instance, in recent studies (Liu 2013; Liu et al., 2015), graduate students claimed that complex models, formulas, and methods in the readings were too difficult to understand because of their limited knowledge in computer science and mathematics, and they found, currently, few existing systems/online tools could efficiently help them.

In this panel, we will propose a number of key challenges, opportunities and applications of education in the cyberlearning era, from both learner and instructor perspectives. In more specific, the panel will explore the following question and problems:

- How can we identify novel factors that may positively influence students’ learning experience and understanding of scientific content in an educational environment?
- How can we utilize the novel cyberinfrastructure and sophisticated algorithms to help students efficiently access the most helpful open educational resources (OER) online to enhance their learning experience?
- How can we utilize novel methods to characterize a student’s (computational) personalized emerging information needs while reading and learning a course environment?
- Given the inherently collaborative nature of much scientific practice, and the desirability of collaborative learning indicated in the education literature, how can we leverage the interactive affordances of cyberinfrastructure to improve learning and create a realistic environment for the co-creation of knowledge?
- In the context of K-12 informal learning, how can we scaffold cyberlearning related literacies, particularly for populations that are disadvantaged in terms of access to literacy instruction?
- In a world where people will be exposed to ever more computer applications and upgrades, how can we help students to acquire the skills to learn new technologies themselves?
- Given the growing number of online resources, many learning challenges become in part a search challenge. The answer to your learning need (and also your technology learning need) may exist in part online – provided you have the appropriate skills to search, assess quality, and make use of partial solutions. How can we help students search better in order to learn better?
The panelists will present various perspectives on the theoretical and practical advancement of cyberlearning, which address various topics in social science, education and computer science. Xiaozhong Liu and Noriko Hara, from Indiana University, will also share their recent efforts in OER-based scaffolding, which helps students to understand scientific readings in a course environment. In their experiment, they collected more than half million OERs, i.e., Wikipedia pages, YouTube videos, GitHub source codes, slides, and online tutorials, to help students to better understand the essence of the course required readings. They will also discuss how sophisticated algorithms, i.e., text mining and graph mining methods, can be used to auto-characterize student emerging information needs while reading publications collaboratively. Michael Twidale will share his recent work on computational metacognition — looking at how we might teach students certain skills to manage their independent and social learning of new technologies. Michelle M. Kazmer and Mega M Subramaniam will share their recent studies in e-learning.

**PANELIST BIOS**

**Xiaozhong Liu** is an Assistant Professor in the School of Informatics and Computing at the Indiana University Bloomington. His research interests include information retrieval, natural language processing, text mining, human computing, and digital library education. Dr. Liu is the designer of a number of cyberlearning tools, e.g., ScholarWiki and OER-based PDF Reader. While most computer scientists focus on how to help users to access information, in his project, he will be devoted to help students understand information. In his recent studies, he proposed graph-mining and information retrieval algorithms to help students access high quality OERs while reading scientific readings in a course environment. He received PhD from School of Information Studies, Syracuse University.

**Noriko Hara** is an Associate Professor in the School of Informatics and Computing. Her research in Social Informatics emphasizes online knowledge sharing, communities of practice, and collective behaviors in mediated environments. Specifically, she examines the means by which collective behaviors are enabled and/or impeded by information Technology. She is currently completing an U.S. National Science Foundation funded research project looking at tacit knowledge sharing in life science graduate programs. She is the author of *Communities of Practice: Fostering Peer-to-Peer Learning and Informal Knowledge Sharing in the Work Place* from Springer, and a co-editor of *Global Wikipedia: International and Cross-Cultural Issues in Online Collaboration* from Rowman & Littlefield. She received a Ph.D. in Instructional Systems Technology at Indiana University and was a postdoctoral research fellow in the NSF Science and Technology Center at University of North Carolina, Chapel Hill.

**Michelle M. Kazmer** is a Professor in the School of Information at Florida State University. Her research focuses on distributed knowledge, particularly in collaborative e-learning and in health knowledge creation and sharing. Recently she was a co-PI on the Habitat Tracker project, investigating field-based science cyberlearning among 4th and 5th grade students. Professor Kazmer has created many courses – in-person, hybrid, flipped, and fully online – including a recent undergraduate course on information seeking, co-creation, and use with a focus on collaboration and explicit use of formal information value assessment frameworks. She is currently serving on the State of Florida’s Open Access Textbooks & Education Resources Task Force. Professor Kazmer has been teaching online since 1997 and conducting research into cyberlearning since 1998. She has published 20+ articles and chapters focused on specifically cyberlearning; edited the volume *Learning Culture & Community in Online Education* with Caroline Haythornwaite; and has been PI/co-PI on related grants from the NSF, NIH, IES, and IMLS. Her B.S. in Mechanical Engineering is from Columbia University, and her Ph.D. in Library and Information Science from the University of Illinois at Urbana-Champaign.

**Mega M Subramaniam**, from the University of Maryland will share the scaffolding strategies that her HackHealth research team has devised to facilitate the mastery of cyberlearning related literacies (Subramaniam, et al., 2015; in press). HackHealth ([http://hackhealth.umd.edu](http://hackhealth.umd.edu)) is an after-school program conducted at middle school libraries (includes Title 1 schools that primarily serve young adults from low socio-economic populations) in the Washington D.C metro area that is focused on facilitating the learning of various literacies that are essential to increase young adults’ health information literacy levels, their health-related self-efficacy, and their understanding of the crucial link between their daily health-related behaviors and their ability to maintain their health and prevent disease. In this program funded by the National Library of Medicine, young adults choose a health topic that is personally relevant and/or they are curious about, and utilize digital resources (primarily the open Web) to obtain credible information about these health topics. The program culminates with a creation of product (such as a digital poster, Prezi, remixed song, and interpretive dance) that these young adults will share with their peers and family members. The 12-week program was designed using the design-based implementation method (Collins, Josephy, & Bielaczyc, 2004) that allows the researchers to work closely with the young adults and librarians to determine what types of scaffolding strategies that are needed, the extent that these scaffolding techniques are needed, and the success of such scaffolding techniques particularly with young adults who have no prior digital literacy learning at their schools or homes.
Michael Twidale is a Professor of the Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign. His research interests include computer supported cooperative work, computer supported collaborative learning, and human computer interaction. Current projects include studies of informal social learning of technology, technological appropriation, metrics for open access, sociotechnical systems design, collaborative information retrieval, computational metacognition, and long term scientific database management. His approach involves the use of interdisciplinary techniques to develop high speed low cost methods to better understand the difficulties people have with existing computer applications and so to design more effective systems.

REFERENCES


