

Mini Workshop - How to Improve Teaching and Learning: Selecting, Implementing and Evaluating Digital Resources in the *Engineering Pathway*

Joseph G. Tront, Flora P. McMartin, Alice M. Agogino
 jgtront@vt.edu, flora.mcmartin@gmail.com, agogino@berkeley.edu

Abstract - Are you trying to integrate interactive simulations, applets, case studies, courseware or other web-accessible materials into your classes? Where do you go to find these digital learning materials? How do you evaluate the quality of the materials you do find? Are there digital learning materials available that are aligned with the ABET criteria? Are there related resources for assessing student outcome assessments that you can use? How can you customize your course website with supplemental materials for students? How can you find a collection of self-studies that can be used to guide a department as they prepare for the ABET review process?

This workshop introduces faculty who are interested in integrating digital learning materials in their courses to a set of criteria and methods useful in selecting and evaluating the quality of these materials to help achieve their course goals. The workshop focuses on the 10,000 educational resources cataloged in the *Engineering Pathway* digital library (www.engineeringpathway.org) and goes through the resources and tools available for faculty to use to locate, evaluate and select helpful digital learning materials to achieve their teaching and learning goals. Participants will be introduced to a general intellectual framework for integrating digital learning materials that stresses identifying the particular learning objectives and pedagogies for the use of particular materials. Participants will be introduced to two sets of evaluation criteria, those used in the *Premier Award for Excellence in Engineering Education Courseware* and another set that is used to guide catalogers as they register materials in a digital library. They will have a hands-on opportunity to apply these criteria to better understand the metrics for quality in digital learning materials, and how to apply these metrics to materials they are considering using to help achieve their course goals.

The workshop also helps faculty locate courseware that can help satisfy the ABET criteria for evaluation. For those preparing for the ABET review process, the *Engineering Pathway* identifies a number of self-study that can be used to guide departments in the development of measurement instruments and processes. Lastly, the workshop will introduce new tools for student engagement with history of technology and well as

current news in each discipline. Annotated textbooks with links to context-sensitive links to *Engineering Pathway* resources will also be explored.

Index Terms – Digital library, NSDL, adopting resource material, adapting courseware, active learning, student engagement, educational technology,

LEARNING OBJECTIVES

Workshop participants:

- Will be able to apply a general framework for integrating digital learning materials in their course activities that matches their learning objectives for a given activity.
- Will be able to use educational digital libraries to locate and select digital learning materials for use in their courses.
- Will understand the breadth and depth of resources available through educational digital libraries, as well as the features each uses to help its users select materials.
- Will be able to use a set of criteria to evaluate the quality and potential usefulness of a given digital learning resource to meet a particular learning objective.
- Will be able to find related material to support student self-learning, motivation and assessment.

PRESENTATION LENGTH

The workshop will be 90 minutes of presentation and interaction. Participants are encouraged to be prepared to engage with the presenters in a lively discussion on how the digital library resources and be used in their teaching environments.

Intended Audience

WHO SHOULD ATTEND

Engineering faculty members from the broad spectrum of computing and engineering disciplines can benefit from

attending this workshop. The desire to improve teaching and learning through the appropriate use technology is the only prerequisite. Participants should also be willing to partake in the lively discussions that this workshop generally invokes.

CONTACT INFORMATION

Presenters: **Joseph G. Tront**, Virginia Tech,
jgtront@vt.edu, 540-231-5067

Flora McMartin, Broad-Based Knowledge,
flora.mcmartin@gmail.com

Alice M. Agogino, University of California,
Berkeley, agogino@berkeley.edu

PRESENTER'S QUALIFICATIONS

Dr. Joseph G. Tront is a professor in the Bradley Department of Electrical and Computer Engineering at Virginia Tech. He has had a leadership role in the NSF sponsored engineering education coalition called SUCCEED where he was the director of the center for computing and communications for the nine university coalition. In his work in education digital libraries, he is the editor for the Engineering Pathway digital library and is co-editor for the engineering collection of MERLOT. Dr. Tront also serves as editor for the *Premier Award for Excellence in Engineering Education* – an international award competition aimed at recognizing outstanding non-commercial courseware for use in engineering education. He has published articles in various venues describing the appropriate use of technology in higher education. He is also developing tools and techniques for using Tablet PCs in the classroom where his work is sponsored by Microsoft and HP. He is currently playing a lead role in Virginia Tech's Tablet PC Requirement initiative in which all entering engineering students are required to own a Tablet PC. In 2010, Dr. Tront was named the W.S. "Pete" White Professor for Improving Engineering Education. He has presented this workshop at over 25 venues for audiences comprised of university educators.

Flora P. McMartin is the founder of Broad-based Knowledge, LLC (BbK), a consulting firm focused on

assisting educators in their evaluation of the use and deployment of technology assisted teaching and learning. Throughout her career she has served as an external evaluator for a number of CCLI and NSDL funded projects associated with community building, peer review of learning materials, faculty development and dissemination of educational innovation. She is PI for the project "Where Have We Come From and Where Are We Going? Learning Lessons and Practices From the Projects of the NSDL" which is building an online history of the development of the NSDL. She is also PI on "Learning from the Best: How Award Winning Courseware has Impacted Engineering Education"; this research focused on determining how high quality courseware is being disseminated and how it is impacting student learning, teaching practices and the authors' careers.

Alice M. Agogino is the Roscoe and Elizabeth Hughes Professor of Mechanical Engineering and is affiliated faculty at the Haas School of Business in their Operations and Information Technology Management Group She has served in a number of administrative positions at UC Berkeley, including Associate Dean of Engineering and Faculty Assistant to the Executive Vice Chancellor and Provost in Educational Development and Technology. Prof. Agogino also served as Director for Synthesis, an NSF-sponsored coalition of eight universities with the goal of reforming undergraduate engineering education, and continues as PI for the Engineering Pathway (www.engineeringpathway.org) and SMETE.ORG digital libraries of courseware in science, mathematics, engineering and technology. She has authored over 150 scholarly publications; has won numerous teaching, best-paper and research awards; and is a member of the National Academy of Engineering (NAE). At NAE she served on the Committee on Engineering Education, working on the *Technologically Speaking* and the *Engineer 2020* projects. She is currently a member of the National Research Council's Board on Education and the Committee on Maximizing the Potential of Women in Academic Science and Engineering, which recently released the report *Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering*.