48th NAWI Annual Conference - 2013
Indianapolis, Indiana

"Engaging Minds for 21st Century Learning and Innovation: STEM in an E-Blended World"

May 21–22, 2013

Conference Program (PDF)

Presentations

TUESDAY, MAY 21

Welcoming Address
David Russomanno, Ph.D., Dean
Purdue School of Engineering and Technology, IUPUI

MOOC, STEM, and STEAM - Practical Strategies for Enhancing Teaching and Learning
Darrell Bailey, Ed.D., Professor
Department of Music and Arts Technology, Purdue School of Engineering and Technology, IUPUI

The recent development of MOOCs (Massive Open Online Courses) in higher education represents a unique opportunity for global learning. Combined with ongoing efforts in cross-disciplinary learning, including STEM and STEAM approaches, innovations in social academic learning can provide a major enhancement for cross-disciplinary interactions. Dr. Bailey will provide an overview of the MOOC movement in the U.S. and will demonstrate a MOOC course currently being taught. "Music for the Listener" is an undergraduate course on how to listen to music. It features music from A.D. 600 to the present, both classical and popular genres. Unique to the class is CourseNetworking, a new teaching and learning environment rich with

social media tools that provides students the ability to interact directly with media-dependent course content. The course is truly global in its reach with students from many countries and languages. Also, Dr. Bailey will highlight concrete examples of integrating music into science, technology, the arts, and math.

10:00–11:00 ONE-HOUR CONCURRENT SESSIONS

"Gameification"—Using OpenSim and Minecraft in the Classroom
Mike Riley, Teacher, Electronics/Computer Technology, Bartholomew County School Corporation
Connor Boyle, Student, Columbus Area Career Connection
William "Jacob" Brown, Student, Columbus Area Career Connection
Gray Drake, Student, Columbus Area Career Connection
David Gipson, Student, Columbus Area Career Connection

Come to this session to observe the use of Minecraft and OpenSim in the classroom and how they are used to teach concepts of digital electronics, computer technology, leadership, and teamwork. This is a student-led project in which students build the servers and manage the day-to-day use as network and program administrators. Highlights will include the "apprenticeship programs" students have created to train other students. Participants will have a chance to take a walk in our virtual worlds.

Successful Teaching Using Computational Thinking Via Scenario-Based Learning
Chuck Winer, Purdue University Calumet, Professor and Head, Computer Information Technology and Graphics Department
Anastasia Trekles, Clinical Associate Professor, Instructional Technology, School of Education, Purdue University Calumet

Learn how to engage your students in a new learning methodology. This interactive one-hour presentation will focus on how to teach Computational Thinking (CT) via Scenario-Based Learning (SBL). See how teacher participants are able to use our Google Sites SBL template to develop their own scenarios in any discipline

that they teach. This presentation is based on the experiences of our NSF CPATH ASSECT grant (NSF CCF 0939089).

Developing Entrepreneurial Skills for Manufacturing and Engineering Students

Dr. Karen Wosczyna-Birch, State Director, Connecticut College of Technology, Executive Director, Regional Center for Next Generation Manufacturing, Connecticut Community Colleges
Eric Flynn, Electrical Engineering Program Coordinator, Gateway Community College
John Birch, Executive Director, Life Support and Sustainable Living Program
W. Charles Paulsen, Associate Director, Life Support and Sustainable Living Program
Wendy Robicheau, Project Assistant, CT College of Technology's Regional Center for Next Generation Manufacturing

With the advent of powerful 3D CAD programs and increasingly available 3D printing resources, the potential for students to take their own design into prototype has never been greater. We will demonstrate an example part as it goes from a paper sketch to a working prototype, and how it can be achieved in the classroom in mere weeks. Further, we will focus on how, with these available resources, students can approach problems differently, with an eye on entrepreneurialism.

11:10–12:10 ONE-HOUR CONCURRENT SESSIONS

Workforce Development of Workplace Specialist I CTE and STEM Teachers: Increasing Qualified Subject-Area Teachers through Innovative Teacher Preparation and Licensing

David Nickolich, Ed.D./MBA/SPHR, Clinical Assistant Professor of STEM Workforce Education and Development, Director of STEM Initiatives in the Purdue School of Engineering and Technology at Indiana University Purdue University at Indianapolis (IUPUI)
Dr. Sam Cotton, Associate Professor, Department Chair, Department of Technology, Ball State University
Dr. Peggy Wild, CFCS, State Director of Career and Technical Education for Indiana, Assistant Director for College and Career Readiness at the Indiana Department of Education
Dr. Kathleen Marrs, Associate Dean for Academic Affairs and Associate Professor of Biology, Purdue School of Science, and Director of the IUPUI Woodrow Wilson Indiana Teaching Fellowships at Indiana University Purdue University at Indianapolis
Dr. Kim S. Nguyen, Principal Investigator of the NSF Robert Noyce Teacher

Scholarship Grants, Indiana University-Purdue University Indianapolis (IUPUI)
Dr. Charles Feldhaus, Associate Professor and Chair of M.S. Programs, Technology Leadership Communication Department in the Purdue School of Engineering and Technology at Indiana University Purdue University at Indianapolis (IUPUI)

Learn how the collaborative efforts of the Indiana Department of Education, universities, and K-12 schools forged successful Workplace Specialist CTE & new STEM teacher preparation and licensing paths. This interactive session will explain the innovative Workplace Specialist I program for new CTE teachers and new STEM teacher development programs in Indiana, as well as innovative STEM scholarship programs to serve urban youth in high-needs schools. This will be followed up by an open discussion where the speakers and participants will have opportunities to share related experiences.

The Marriage of A+ STEM Education and the MIT FABLab Program: An Idea Whose Time Has Come
Makeda Stephenson, Co-founder and Executive Board Member, Technology, Innovation and Entrepreneurship Project, Inc.
Donalyn Stephenson, President and Co-founder of the Technology, Innovation and Entrepreneurship Project, Inc. (The TIE Project, Inc.)

America is on the brink of a shift in its education model. The well-merited focus on science, technology, engineering, math, and now art by K-12 curriculum planners is gaining momentum in cities from coast to coast. In Digital Fabrication Teaching and Learning Centers (TLCs), FABLabs and Maker Spaces, MIT's FABLab program is bringing a new, unifying, and exciting dimension to the burgeoning rescripting of our educational system by capturing the imagination and stimulating innovation.

Moving Toward An Alternative Competency-Based Credentialing System: Measuring Learning on Outcomes and Performance
Keith W Bird, Senior Policy Fellow of Workforce and Postsecondary Education, Corporation for a Skilled Workforce

There is increasing momentum to create employer-driven, quality-assured, industry-defined standards with aligned competencies, curriculum, assessments, and credentials. These standards will provide the foundation of a new credentialing and skills system for the U.S. that will facilitate job creation and economic development. This demand-driven

system will allow individuals to move freely between education and non-credit work-based learning and education and receive market relevant credentials for the competencies they have acquired regardless of where and how they have learned them. It also will promote consistent quality assurance processes to ensure portability of credentials; market relevance of these credentials; and transparency of credentials to employers.

LUNCHEON

Career and Technical Education and STEM Education in Indiana
Glenda Ritz, Indiana Superintendent of Public Instruction, Indiana Department of Education

1:30–2:30 ONE-HOUR CONCURRENT SESSIONS

How 2 Today: Teaching STEAM Projects Now
Chris Connors and **Daniel Landers III**

How 2 Today is a portfolio of projects that can be implemented with minimal supplies and tools. The concepts behind the projects connect the student and teacher to authentic STEAM topics. These projects are excellent starting points to deeper study as time, materials, tools, and classroom knowledge are built. If you are looking for a way to get started teaching students to make, this is an excellent way to begin. Examples of the projects can be found at http://how2today.wordpress.com.

Raising the Bar: Building the Pipeline through STEM Education
Yvonne M. Spicer, Ed.D., Vice President of Advocacy & Educational Partnerships
National Center for Technological Literacy®, Museum of Science, Boston™, Boston, Massachusetts

The landscape of education has increasingly become more standards-based and driven by accountability of student achievement. In the 21st century the stakes are high and educators are challenged to raise the bar for all students. This presentation will focus on STEM cultural awareness, standards implications, challenges, and opportunities to inspire our students in the 21st century.

Participants will learn best practices to improve the pipeline of STEM literate students, specifically students of color and females.

Bridging CTE and the 21st Century Workforce: The Role of Skill Standards and Competency-Based Education
Dave Wilcox, President, Global Skills X-Change (GSX)
Walla Elsheikh, Director of Education Strategy, GSX
Lauren Serpati, Educational Psychologist, GSX

Skill standards form a foundation for competency-based education (CBE), which is an approach to bridging career and technical education (CTE) with 21st century workforce demands. CBE uses competency as a measure of learning, rather than seat time. The goal of this session is to provide participants with the ability to generate and evaluate skill standards. This allows students to extend knowledge and skills necessary to demonstrate competency while learning within the context of work.

3:00–4:00 ONE-HOUR CONCURRENT SESSIONS

Coaching in Workforce Development: The Power of Dyadic Exchange
Toby Egan, PhD, Associate Professor, Purdue School of Engineering and Technology, IUPUI, Purdue University Graduate School

This session will look at the use of coaching in education and support of employees, developing emergent STEM learners and facilitators, and developing our next generation of makers and thought contributors. Coaching is a growing area of educational and managerial practice that has emerged to be greater in importance as students, employees, and community members find themselves in a historically unique situation—communicating and learning from often highly individualized "e-Contexts" and often communicating or exchanging communication in one-on-one contexts. These contexts are new and important developmental opportunities that can be life changing for individual careers and, ultimately, the workforce overall. Research indicates that individual career decision-making is ultimately influenced by a small number of individuals in one-on-one contexts. Participants will gain key insights regarding the potential impact they can have through the use of coaching in workforce development contexts.

Advancing a Statewide STEM Agenda through Grassroots Strategies
Nicholas Balisciano, Education and Training Program Manager, Connecticut Center for Advanced Technology, Inc. (CCAT)

Most states with comprehensive STEM education efforts have generous support from government, academia, businesses, and/or foundations. When those do

not yet exist, what can be accomplished through marginally funded grassroots efforts? Learn what stakeholders in one state are doing—including developing a definition of integrated STEM and a model for interdisciplinary STEM professional development—to create a foundation for a nascent statewide STEM education initiative. Then, brainstorm and discuss what might work in your state.

Problem-Based Learning in the Academic Environment: Beyond Classroom Activities to Terminal Degrees
Paul E. Coakley, Ed.D., Principal, Rainier School District
Eric Blackford, Consultant, Education Northwest

Bridges and Hallinger (1995) define problem-based learning (PBL) as a student-centered pedagogy in which students learn about a subject through the experience of problem solving. Problem-based learning has not only proved to be an effective K-12 setting, but can also be an effective method for conducting action research, master's thesis, and doctoral research. This session highlights problem-based learning, coupled with research and development (R&D), as an increasingly effective method to conduct education research in higher education institutions.

4:15–5:15 ONE-HOUR CONCURRENT SESSIONS

Building a Wind Farm in Your Classroom: Integrating STEM and Sustainability
Jim Gibson, Illinois Valley Community College

Experience how renewable energy projects can engage students in STEM and interest them in the many job opportunities in emerging technical careers. With support from a National Science Foundation grant, Illinois Valley Community College is utilizing a new "green" program to promote career education and commitment to sustainability and innovation. In this session, work in teams to build a mini wind farm while learning to offer similar, cost-effective activities in the classroom. View **the presentation**, and read the **Building a Mini Wind Farm handbook**.

The Toothpick Factory: A Simulation Game for the Soft Skills
Dr. Marilyn Barger, P.I. and Executive Director, FLATE: Florida Advanced Technological Education Center of Excellence, Tampa, FL

Looking for a job? The Toothpick Factory is hiring! As difficult as finding new employees might be, retaining them is also a great challenge. Even those with strong technical skills often lack adequate soft skills. FLATE Center for Advanced Technological Education's "Toothpick Factory" offers a great way to focus participants on soft skills in a fun, hands-on simulation of a workplace environment.

Moving STEM from In-class to E-World: Plug 'N' Play Does Not Work
Michele Wedel, Founder and President, BizEd Consulting, and Adjunct Instructor at IUPUI
David Nickolich, Ed.D./MBA/SPHR, Clinical Assistant Professor of STEM Workforce Education and Development, Director of STEM Initiatives in the Purdue School of Engineering and Technology at Indiana University Purdue University at Indianapolis (IUPUI)

Successfully porting classroom STEM courses and training sessions to an E--World environment is not as simple as just putting the syllabus, text, and assignments online and expecting it to work. Distance education, especially STEM topics with the need for hands-on practice, labs, and extensive solving of example problems, must be designed from the ground up for them to be effective in online/distance education environments. This interactive session will provide a clear strategy for taking existing in-class courses and redesigning them for the online environment. We will review the unique instructional design challenges that STEM topics present, how to approach the redesign from a practical perspective, and provide a process to repurpose the course work in an effective and efficient manner.

EVENING ACTIVITIES

Reception and NAWI Annual Business Meeting
Featuring the Purdue School of Engineering and Technology, IUPUI Music Technology Department Jazz Ensemble led by pianist Dr. Easton Stuard, Director of Jazz Studies

WEDNESDAY, MAY 22

Day Two Opening Session Keynote
The Hidden Face of Reality
Ann Higdon, Founder and President, Improved Solutions for Urban Systems (ISUS)

Ann Higdon is president and founder of Improved Solutions for Urban Systems (ISUS). The organization began in 1992 to develop more effective ways to educate and train underachieving, dropout and court-involved youth. ISUS created three schools between 1999 and 2006. In the 2011 ranking of the 58 conventional and charter public schools in Dayton, OH, the ISUS Schools placed 1st, 2nd, and 3rd highest in academic performance.
The ISUS concept is high school plus. For a student, this means industry certification, apprenticeship, college credits, real work experience and a life changing perspective. Students alternate between hands-on, academic and post-secondary coursework. Healthcare students volunteer in hospitals and nursing homes, computer students refurbish computers that are gifted to inner-city children; advanced manufacturing students fabricate wall panels for construction students who rebuild entire neighborhoods. Both student and community outcomes are crafted to be impactful.

9:00–10:00 ONE-HOUR CONCURRENT SESSIONS

Reflections on Building University/Industry Partnerships: An Experiential Learning Approach
Michele Summers, Associate Professor at Purdue University, College of Technology at Lafayette
Sue Ann Ford, SPHR, Corporate Manager for Organizational Development at Wabash National Corporation, Lafayette, Indiana

Increasingly colleges and universities are partnering with industry to educate today's workforce. Companies gain a competitive advantage through workers who are better educated, and each development dollar expended directly correlates to a company's bottom line. It is no wonder educators and business leaders alike are increasingly interested in advocating higher education for their workforce. This interactive panel of faculty, industry personnel, and students will

introduce effective strategies and techniques to improve learning outcomes in the classroom. **View the presentation**.

PBL, Service Learning & Experiential Learning - We Know it Works, but HOW?
Laurie Kash, Ph.D., Special Education & Student Services Director, Rainier School District
Michael Carter, Ed.S., Superintendent, Rainier School District

We know when we teach using hands-on methods, students do better in our classes. But why and how is that? Explore a study of this phenomenon: at-risk students who were instructed using "perceived-risk" methods (such as problem-based learning, service learning, and showcases) where the learner experiences effects of eustress (positive stress) performed better in school and made gains in pro-social behavior and developed resistance to deviant-risk behavior after participating in this curriculum. In this entertaining workshop, explore the ramifications of this study and develop plans for engaging your students more fully. **View the presentation**.

The Changing Global Context of the Virtual Workforce
Dr. James A. Ejiwale, Jackson State University, Jackson, Mississippi
The technological revolution occurring in today's marketplace has made it possible for many companies to be innovative about the way and where work is done. This is the next evolution of the Web. To get the job done, due to digital revolution, companies have turned to a virtual workforce to harness the benefits of connectivity and effective information-sharing among stakeholders to get the job done. More importantly, the success of coordinating work among a virtual workforce for profitability in a rapidly changing global environment depends on "effective indirect communication" between the leadership and the virtual workforce. This session will address the importance of effective communication as a necessary tool for the success of e-leadership and productivity improvement in the virtual work environment.

10:15–11:15 ONE-HOUR CONCURRENT SESSIONS

Integrated Science, Technology, Engineering, Art, and Mathematics (STEAM): Bridging Art and Sciences in the 21st Century
Mary Rasley and **Steven Weitz,** Lehigh Carbon Community College, Schnecksville, PA

By placing art and computer science students together in an introductory game development course, an understanding of both fields is fostered. Students work in teams to complete projects, taking on either the art or programming role then swapping for subsequent projects, resulting in an increased understanding of the

challenges that would be faced in the workplace for both fields. Find out the benefits and potential pitfalls of this innovative approach to STEAM education.

Building a Successful STEM Workforce Pipeline
Kyle J. Brenner, Director, Career and Vocational-Technical Education, Worcester
Technical High School, Worcester, MA
Brian Potter, Guidance Department Head, Worcester Technical High School, Worcester, MA

Building a successful STEM pipeline involves partnerships with business, industry, and postsecondary institutions. At Worcester Technical High School (WTHS), more than 350 industry advisors drive the curriculum and instruction in 24 technical programs. This has transformed the school from the lowest-performing school in the district and state to the highest-performing district school and a national model for career technical education. WTHS created unique entrustments with business, industry, and postsecondary institutions to prepare our graduates with the 21st century skills necessary for successful employment in the workforce. Students hone their competencies through a variety of authentic learning components (i.e., 16-bay automotive area, 126-seat restaurant, full service bank, etc.).

11:30–12:30 ONE-HOUR CONCURRENT SESSIONS

Partner or Predator: Fostering Relationships for Your Organizations That Are Built to Last
Carletta Sullivan, Community Liaison, McKenzie Center for Innovation & Technology, Metropolitan School District of Lawrence Township, Indianapolis, Indiana
David Nickolich, Ed.D./MBA/SPHR, Clinical Assistant Professor of STEM Workforce Education and Development, Director of STEM Initiatives in the Purdue School of Engineering and Technology at Indiana University Purdue University at Indianapolis (IUPUI)

Ever had a promising partnership fail, flop, or just die out? Do you know a colleague who failed to see the perspective of the partner? With increasing emphasis on "extended learning opportunities," retention of partners and the creation of new ones will become increasingly important for education. K-12 pathways, high school/university partnerships, and business/school connections will increase the need for well-managed partnerships that sustain over time. The presentation will include information about connecting education and businesses in ways that are sustainable.

Learn how to avoid the constant cycle of developing new partners to support your programs. This interactive session will look at no cost/low cost options that

add value and will identify improvements in school/company image, social responsibility, long-term values, and a paradigm shift in thinking about school/community networking. The need for a good partnership strategy execution plan is very high. Come learn how to foster relationships for your organizations that are built to last.

Problem-Based Learning (PBL) Implementation Strategies for STEM Courses
Fenna Hanes, Senior Director of Professional and Resource Development, New England Board of Higher Education
Nicholas Massa, Professor, Laser and Fiber Optic Technology, Springfield Technical Community College

The New England Board of Higher Education's authentic, industry-based "Problem-Based Learning (PBL) Challenges" are being incorporated into secondary and postsecondary STEM courses to enhance students' content knowledge, critical thinking skills, and ability to work in teams. Attendees will be introduced to the web-based multimedia "PBL Challenges" (case studies) in the fields of sustainable technologies and optics and photonics, and will learn how to implement the challenges and assess student learning. Attendees will receive instructional materials to take back to the classroom. **View the presentation**.

GET $: Writing successful NSF ATE Grants
Dr. Marilyn Barger, P.I. and Executive Director, FLATE: Florida Advanced Technological Education Center of Excellence, Tampa, FL
Dr. Karen Wosczyna-Birch, State Director, Connecticut College of Technology, Executive Director, Regional Center for Next Generation Manufacturing, Connecticut Community Colleges

Learn the details about the NSF ATE program, which is targeted at building capacity for the technician workforce needed for advanced and emerging technologies. NSF ATE can provide support to a broad array of technical programs from advanced agricultural technologies to welding. Funds are targeted for two-year college programs, which include their partner schools, and programs at secondary level. Attend this session to learn about the ATE program and learn how to develop a strong and successful proposal.

LUNCHEON AND PANEL DISCUSSION

The Modern Apprenticeship: Effective Industry Partnerships in Secondary and Postsecondary Education
Speaker/Moderator:
Carol D'Amico, Vice President, East Region, Project Lead The Way

Carol D'Amico leads a team of directors of school engagement and works with state leaders to support PLTW's implementation in the Eastern region of the United States. She comes to PLTW as a leader in education at the local, state, and national levels. Previously, D'Amico served as Assistant Secretary for Vocational and Adult Education for the United States Department of Education. She was Executive Vice President and Chancellor of Ivy Tech Community College of Indiana. She also served as President and CEO of Conexus Indiana.

Participants:
Kenneth Boone, Skilled Maintenance Group Leader, Toyota Advanced Manufacturing Technician Program, Toyota Motor Manufacturing Indiana
Kyle Brenner, Director, Vocational & Technical Education, Worcester Technical High School
Arthur Haase, Dean, College of Technology, Vincennes University
Brian Potter, Guidance Department Head, Worcester Technical High School

U.S. employers continue to cite recent graduates' lack of mastery of both technical and soft skills as critical barriers to workforce entry, while at the same time graduates lament that they cannot find jobs without prior work experience. Many jobs, particularly in the technical sector, remain vacant due to a lack of qualified candidates, yet students continue to graduate from secondary and postsecondary institutions without a skill base on which to be hired. How do we as educators ensure that we are arming students with the skills necessary to achieve their goals? When a diploma is not enough, what is?

To answer that, educators are increasingly re-examining the way we teach and the way we learn, often favoring hands-on, problem-based instructional methods over typical lecture-based approaches. So what is the modern apprenticeship? This panel will explore innovative apprenticeship and internship models in secondary and postsecondary education with an emphasis on ways educational institutions can effectively partner with industry, ensuring high quality education for students and future job placement for their graduates.

The Toyota Advanced Manufacturing Technician Program (AMT) includes a two-year degree in Computer Integrated Manufacturing: Robotics that combines cutting-edge curriculum, paid working experience, along with learning highly sought-after business principles and best practices of a world-class manufacturer. Students earn a wage while attending college and gain work

experience with a global manufacturing leader. Over two years, students can earn as much as $30,000 in salary, which can cover all of a student's education expenses. While not guaranteed, graduates hired by Toyota have the potential to earn as much as $64,000 yearly, plus excellent benefits. Other manufacturers seek professionals with this level of experience and training, plus graduates may pursue a bachelor's degree in fields such as engineering, technology, or business.

Worcester Technical High School (WTHS) opened the doors to its new campus in fall 2006. Now in its seventh year of operation, the school has 1,400 students in 24 technical programs, boasts a 96.4% four-year graduation rate and a 1.5% drop out rate, the lowest in the City of Worcester, MA, despite being the largest of seven high schools in the city. The current demographics consist of: 53% female, 47% male, 63% qualify for free or reduced lunch, 21% are special needs. Ethnic backgrounds reflect the city's demographics.