13th annual conference
Information Technology Education

1st annual conference
Research in IT
Welcome to Calgary and Mount Royal University!

It is our great pleasure to host the 13th Annual Conference on Information Technology Education and the 1st Annual Research in IT Conference. This year is especially exciting since it introduces the brand new IT Research conference; our aim in this and future joint SIGITE/RIIT conferences is to provide a venue for showcasing research in information technology along with our traditional focus on teaching IT. Inspired by the new research conference, our joint conference has the theme of Working Together: Research & Education for IT.

Over the years, we have found the SIGITE conference to be both a wellspring of ideas to address issues such as the above and a much-needed opportunity to network and bond with fellow IT educators. We hope you find this year’s conference as beneficial and rewarding as the many we have attended in the past.

We are truly fortunate this year to have Randy Thompson of Venture Alberta as our keynote speaker. Randy provides a keynote that combines our interest in both IT education and IT research. Integrating his many years of experience at the head of an IT angel investors group, Randy shows us how IT departments in universities can play a key role in commercializing IT research and thereby improve local economies as well as IT education.

SIGITE/RIIT 2012 is a team effort, and we would like to acknowledge and thank Dave Armitage as Program Chair for SIGITE. Dave was last year’s Sponsorship Chair so he has been deeply involved with the conference organization for over a year. We are also very indebted to Jeffrey Brewer, who had the very difficult task of being the inaugural Program Chair for RIIT, which necessitated not only navigating many uncharted waters at ACM but also organizing reviewers and the conference schedule for both SIGITE and RIIT. We would also like to thank Rob Friedman for his successful efforts as Sponsorship Chair, Mark Stockman for his leadership and guidance as SIGITE Chair, and all of our sponsors for their generous support of this event.

We would also like to thank the many people who worked so hard behind the scenes on the many administrative challenges and needs. These include Bill Paterson as Local Arrangements Chair, Michael-Faith Uzoka as Finance and Registration Chair, April Mosqus at ACM for assistance with overall planning, Lisa Tolles at Sheridan Printing for organizing the proceedings, Jeane Vincent at the University of South Florida for the graphic design work on the conference program, and Henry Walker for administering the paper submission system.

We hope that you will find the conference’s program to be both inspiring and thought-provoking and that the conference will provide you with a valuable opportunity to share ideas with other researchers and practitioners from institutions around the world.

Randy Connolly
SIGITE/RIIT ’12 Conference Chair
Mount Royal University, Canada
SIGITE/RIIT 2012 Program Chairs’ Message

Being part of something new is always a great experience, and this year’s inauguration of the Research in Information Technology (RIIT) conference as a new companion to the more “venerable” SIGITE conference is no exception. The dual conference theme, Working Together: Research & Education for IT, emphasizes the increasing synergy between teaching and research in our field. It’s a long-standing principle among academics that research should inform our teaching; over years of SIGITE conferences, we’ve demonstrated the bi-directionality of that relationship, as teaching has often generated the source data and motivation for our research in IT education.

A strong motivation for launching RIIT was the need to recognize “research in IT” as more than a fragmented collection of pursuits in other computing disciplines. We have been watching a body of research develop that is uniquely characteristic of information technology. With a hands-on flavor and stronger connections with industry, it is clearly differentiating itself from research in more traditional computing disciplines, and is deserving of its own conference venue.

We have a selection of exceptionally strong papers this year. Making final choices of papers for presentation was anything but easy, and many quality papers could not be included due to the constraints inherent in a conference schedule. We received a total of 87 paper submissions, 18 of which were classified as RIIT submissions and the rest (69) as SIGITE submissions. Papers received a minimum of three reviews, with approximately 4.6 reviews per paper being the mean. We had a shorter than usual review time available for this year’s conferences; a large and enthusiastic group of reviewers – 134 of you! – were instrumental in getting the job done. Each reviewer handled from one to eight papers; the mean was approximately three papers per reviewer. A total of 402 reviews were submitted. Additional recognition and thanks must go to a self-sacrificing subset of reviewers who took on emergency reviews with turnaround times of less than two days.

Of the eighteen paper sessions at the dual conference, four of them feature RIIT papers, while fourteen present SIGITE papers. Nine of the forty-nine papers to be presented represent RIIT submissions; one accepted RIIT paper was withdrawn after notification. While twenty percent of accepted papers coming from RIIT submissions is a respectable number for the first year of the conference, we look forward to building on that in 2013 and beyond. We need to spread the word to our non-IT education colleagues that RIIT is open for business and will be a welcoming venue.

We have some great panel sessions on the conference schedule. At thirty minutes each, you will find concentrated discussions of significant issues by highly qualified panelists. And don’t miss Thursday afternoon’s opportunity to view the six posters selected for our conferences.

Welcome to RIIT 2012 and SIGITE 2012. Hear about the latest research in our field, meet new colleagues and link up again with old friends. And, of course, start looking forward to SIGITE/RIIT 2013. Thanks for attending!

Dave Armitage  Jeff Brewer
SIGITE’12 Program Chair  RIIT’12 Program Chair
University of South Florida  Purdue University
Organization

General Chair
Randy Connolly, Mount Royal University, Canada

SIGITE Program Chair
William D. Armitage, University of South Florida

RIIT Program Chair
Jeffrey L. Brewer, Purdue University

Sponsorship Chair
Rob Friedman, University of Washington, Tacoma

Local Arrangements Chair
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Daniel Benjamin, American Public University System
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Rick L. Homkes, Purdue University
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<td>Adnan Ahmad, Massey University</td>
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<td>Chi Zhang, Southern Polytechnic State University</td>
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<td>Stephen Zilora, Rochester Institute of Technology</td>
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Wednesday 10.10.12

**IT Department Chairs Meeting** .......................................................... 2:00pm - 5:00pm
Room: B341 - Mount Royal University
Transportation to/from Hotel to Mount Royal University will be arranged

**Registration** .......................................................... 3:00pm - 5:00pm

Thursday 10.11.12

**Registration** .......................................................... 8:00am - 3:00pm

**Executive Committee Meeting** .......................................................... 8:30am - 11:00am
Room: Galleria (18)

**Opening Session and Welcome** ...................................................... 12:30am - 1:00pm
Room: Spectrum 4

Paper Session 1 .......... **Networking and Security 1** .............. 1:00pm - 2:15pm
Room: Spectrum 4
Session Chair: Yin Pan, Rochester Institute of Technology

**Planning Organizational Security: The Health First Case Study**
Susan Lincke, University of Wisconsin-Parkside

Security is important skill for an IT professional, and allows him/her to advance and specialize in their career. We developed an Information Security course with a goal of training students for the ISACA CISA and CISM exams, and having students participate in security planning with not-for-profit organizations. The Health First Case Study enables students to practice security planning with a hypothetical Doctor’s office, including risk analysis, business continuity, information security, network security, personnel security, incident response, and physical security. Students use the Small Business Security Workbook, which leads them through the security planning process. The case study also helps students to understand the perspective of the business owner.

**Designing a Masters Program in Cyber Security and Leadership**
Bryan Goda, University of Washington Tacoma
Robert Friedman, University of Washington Tacoma

The Master of Cybersecurity and Leadership (MCL) taught at the University of Washington Tacoma is a partnership between the Institute of Technology and the Milgard School of Business. The 10-course graduate level program was initially benchmarked against existing masters programs, surveys of prospective student population were conducted, and an assessment was done on the estimated demand for MCL.
graduates in the region. The program outcomes were then mapped against the course objectives to insure the correct mix of courses and topics. The program’s admission requirements and schedule were then tailored to our expected pool of applicants. The MCL program is proposed to start in January 2013.

This paper discusses the design process and possible ways to reduce risk in the start-up of a new degree program. How a program is marketed to prospective students and what program graduates will do after program completion is just as important as the initial design of the program. Planning for the administration of the program and the assessment process is an important phase of the initial design.

**Game-based Forensics Course For First Year Students**

Yin Pan, Rochester Institute of Technology
Sumita Mishra, Rochester Institute of Technology
Bo Yuan, Rochester Institute of Technology
Bill Stackpole, Rochester Institute of Technology
David Schwartz, Rochester Institute of Technology

Identifying and attracting talented students to digital forensics programs is a crucial first step to developing professionals in this relatively young field. To respond to these challenges, we propose to develop a fun, entertaining, and yet educational forensics-course suitable for first year students in college, in an effort to identify and attract students to a forensics program.

This paper focuses on the design and development of a game-based forensics course using the game-based learning (GBL) approach. Building the game in a real computing environment that has direct access to actual forensics tools from a forensics machine and the evidence from a suspect machine. Interactive visualizations will be used to help students to understand the intangible and inaccessible abstract concepts such as deleted/hidden/encrypted/over-written digital evidence.

**Influence of Proximity to and Accessibility of School on School Choice of Information Technology Students**

Rex Bringula, University of the East

The study determined the profile, level of school choice, and influence of proximity to and accessibility of school on the level of school choice of Information Technology (IT) students. Descriptive statistics revealed that most of the respondents were male, did not have a home province, lived in Manila and Quezon City, belonged to a middle-income class, belonged to a family with five members, spent almost an hour in going to school, and utilized jeepneys and the Light Railway Transit to reach the school. They lived near their school and they perceived that their school was accessible. The university was their preferred school. Perceived accessibility of school was the only factor found to influence school choice. Thus, the null hypothesis stating that proximity to school and accessibility of the school, singly or in combination, would not influence school choice was partially accepted except. Recommendations and implications were also discussed.

**Comparing Achievement of Intended Learning Outcomes in Online Programming Classes with Blended Offerings**

Waleed Farag, Indiana University of Pennsylvania

In the past decade, there has been a noticeable increase in the number of courses/programs offered online by higher education institutions in US and worldwide. This increase makes it necessary to comprehensively study the effectiveness of these offerings to ensure that they yield comparable outcomes to traditional offerings. This research discusses findings of a multi-year, in-depth quantitative study with the objective of assessing the effectiveness of delivering computer programming courses online and analyzing the quality of this delivery mechanism. The paper addresses several aspects of comparing traditional/blended offerings with fully online offerings. Several data sets are used in this study with primarily focus on direct assessments. Specifically, this research measures the Intended Learning Outcomes (ILOs) attained by students enrolled in online programming classes and compares them to the ILOs obtained when teaching the same course in a blended format. Moreover, several other students’ success and involvement indicators are measured in both cases and compared. Besides, the paper briefly addresses other indirect assessment findings. The employed data sets have been collected over a number of years (from 2006 till 2011) to enhance the accuracy and implications of the reported statistical findings. Generally, no significant differences were found regarding the attainment of almost all of the ILOs with the exception of one that showed better performance, on average, in the online offerings. On the other hand, blended offerings yielded favorable results that are statistically significant when considering other performance criteria such as withdrawal and failure rates.
Experience with a Cross-Disciplinary Aggregated Glossary of Technical Terms

Joseph J. Ekstrom, Brigham Young University

A glossary typically provides a binding of terminology to concepts specific to a particular document or specialty. What would an aggregation of these concept descriptions reveal about how specialists in various fields use terminology? In particular would it help students and educators understand how terminology is used by specialists with whom they need to communicate? This paper provides a status report on an effort to find out. Starting with ISO/IEC 24765: Systems and software engineering vocabulary which aggregated the glossaries from 104 standards, we have created a database of 131 glossaries gathered from various sources. Though only 4% of terms have 3 or more concept descriptions, some have 10 or more. Initial analysis indicates that such a glossary can provide useful insights into potential areas of miscommunication. Simple exposure to the diversity of concepts associated with a given term will help sensitize people to the issues.

Break..................................................................................................................2:15pm - 2:30pm

Paper Session 3.......... IT Curriculum 2.........................................................2:30pm - 3:45pm
Room: Spectrum 4
Session Chair: Jeff Brewer, Purdue University

Learning by Design: Making the case for a Teaching Strategy to teach Information Systems Courses

Malak Al-Nory, Effat University
Diane Igoche, Effat University

Teaching Information Systems in the undergraduate level requires certain skills to integrate theory with practice. One of the most effective teaching pedagogies is “Learning by Design” in which learners are fully engaged in the construction and the execution of the course activities. In the experience presented in this paper, “Learning by Design” helped students of Information Systems to understand very complex Decision Support Systems concepts. Students studied the typical academic advising process and developed a decision support tool for effective academic advising to support institutional planning and optimized resource allocation. Analysis of students’ performance and assessment evidence shows students understanding of course concepts. The successful transfer of knowledge from the theory base of the course to the completion of the final course project will make a case for the use of Learning by Design as a teaching tool in an Information Systems course.

Developing and Improving Interdisciplinary Health Information Technology Certificate Programs

Chi Zhang, Southern Polytechnic State University
Han Reichgelt, Southern Polytechnic State University
Becky Rutherfoord, Southern Polytechnic State University
Bob Brown, Southern Polytechnic State University
Andy Ju An Wang, Southern Polytechnic State University

Health Information technology (HIT) professionals are in increasing demand as healthcare providers need help in the adoption and meaningful use of electronic health record (EHR) systems while the HIT industry needs workforce skilled in HIT and EHR development. To respond to this increasing demand, the School of Computing and Software Engineering at Southern Polytechnic State University designed and implemented a series of HIT educational programs. An overview of HIT workforce development initiatives and major HIT and health information management (HIM) educational resources are provided. The paper summarizes our experience in the HIT curriculum development and student feedback. Future improvement for the programs is also discussed.

Analysis and Extraction of Sentence-Level Paraphrase Sub-Corpus in CS Education

Faisal Alvi, King Fahd University of Petroleum and Minerals
El-Sayed El-Alfy, King Fahd University of Petroleum and Minerals
Wasfi Al-Khatib, King Fahd University of Petroleum and Minerals
Radwan Abdel-Aal, King Fahd University of Petroleum and Minerals

Since the advent of the Internet, plagiarism has become a widespread problem in student submissions. Paraphrasing is one of the several types of plagiarism employed by students to mask the original source. In this work, we construct a sub-corpus of paraphrased sentences by extracting all lightly and heavily revised sentences from the Corpus of Plagiarized Short Answers, using modified criteria for sentences. We then apply document similarity measures on this sub-corpus and derive some interesting features of this sub-corpus. Our findings suggest that this sub-corpus is more suited for testing paraphrase detection techniques by providing sentence-level paraphrasing samples instead of the file-level classification provided in the original corpus. Additional sentence samples may also be added to this sub-corpus to achieve variety and scale.
Educating Future IT Professionals!

The EMC Academic Alliance offers colleges and universities around the globe unique ‘open’ curriculum-based education, such as information storage and management, cloud computing and big data analytics. The courses focus on technology concepts and principles applicable to any vendor environment. Our goal is to prepare graduates to fully leverage enhanced and emerging technologies in virtualized and cloud environments.

There is no cost to institutions to join the EMC Academic Alliance and members receive numerous benefits including: faculty training, course materials, and secure web portals for faculty and students.

For more information visit [http://education.emc.com/academicalliance](http://education.emc.com/academicalliance) or contact us at [Academic_Alliance_Program_Office@emc.com](mailto:Academic_Alliance_Program_Office@emc.com).
A Holistic and Pragmatic Approach to Teaching Web Accessibility in an Undergraduate Web Design Course
Ye Diana Wang, George Mason University

Web accessibility is a fundamental instrument to support the shift towards an inclusive cyberspace and a socially responsible society, and higher education plays an essential role in this effort. This paper fills the gap of lacking literature by reporting an undergraduate Web design course that adopts a holistic and pragmatic approach to teaching Web accessibility and presenting the specific accessibility topics and techniques that are appropriate for the course scope and its assessment strategies. It is hoped that the instructional approach presented in the paper will prove beneficial to instructors facing similar demands and challenges in computing programs.

Introducing Mobile Widgets Development in an Advanced Web Technologies Course
Hend Al-Khalifa, King Saud University
Afnan Al-Subaihin, King Saud University

Mobile Widgets are mobile applications built using standard web technologies. Due to their increasing popularity and the potential they hold as the new frontier of mobile applications development, IT students need to have the essential knowledge to develop and deploy mobile widgets. To address this demand in knowledge, this paper presents our experience in improving the curriculum of an advanced web technologies course to incorporate a portion about mobile widgets development. We also report the students’ feedback obtained after exposing them to the technology along with our final remarks.

Metonymic Errors in a Web Development Course
Craig Miller, DePaul University

This paper investigates a class of database access errors that occur in the context of a web development course. While the use of an Object-Relational Mapping (ORM) simplifies database access, students still demonstrate reference errors such as mistakenly referring to the whole object rather than an attribute value that is a part of the object. Metonymy, a rhetorical device used in human communication, offers an interpretation to these errors. A study is presented where student answers are reported and analyzed in this context. Findings indicate the prevalence of reference errors and offer instructional strategies for addressing them.

Using Student Professional Development Planning to Inform Program Review
Daniel Yoas, Pennsylvania College of Technology
Anita Girton, Pennsylvania College of Technology
Sandra Gorka, Pennsylvania College of Technology
Jacob Miller, Pennsylvania College of Technology

Development and modification of academic programs is enhanced by incorporating input from the stakeholders of the program. This paper discusses the process used by an Information Assurance and Security (IAS) program to obtain input from students during their final year of the program. Students evaluated job advertisements and information assurance curriculum recommendations and compared their findings to the IAS program. Students provided recommendations on how to better facilitate student learning. Faculty plans on using the student work and recommendations as input to the Academic Review Process during the upcoming year.

Risks, Rewards and Raising Awareness: Training a Cyber Workforce Using Student Red Teams
Kellie Kercher, Brigham Young University
Rowe Dale, Brigham Young University

In this paper we discuss how a research-orientated student red-team provides free security assessments to organizations within the community. Such activities provide students with valuable skills and knowledge in dealing with real-world security issues. We present our approach to implementing such a team as a permanent fixture within our IT program’s Cyber Security Research Lab and discuss the mutual benefits that such an offering presents.
Evaluations of AODV and DSR for QoS Requirements
Hetal Jasani, Northern Kentucky University

A set of wireless mobile nodes communicate with each other without using any fixed infrastructure in mobile ad hoc network (MANET). MANET devices usually communicate in a seamless manner. There are multiple routing protocols that have been developed for MANETs. There is a need to support VoIP applications in MANETs as they gain popularity and require an efficient routing protocol. Many voice applications have strict requirements such as delay, jitter, etc. This work evaluates the performance of AODV and DSR by comparing the results while supporting VoIP applications with regular HTTP and FTP applications. IEEE 802.11n has been used at link layer for all the nodes and servers in evaluated network. An extensive set of performance experiments with a wide variety of settings has been conducted and findings based on results are concluded for these protocols.

Mapping the Cyber Security Terrain in a Research Context
Dale Rowe, Brigham Young University
Lunt Barry, Brigham Young University

In this paper we present a mapping of cyber-security research to information technology as a technical research discipline. We first discuss the evolution of IT as an academic discipline and use this to establish technical research objectives in an IT context. We then present our definition of cyber-security and a proposed research agenda based on these objectives and conclude with a discussion of current projects within our institution.

Posters/Break
Green IT: Serving Multiple Purposes
Susan Lincke, University of Wisconsin-Parkside

Assisting Students with Disabilities in Distance Education:
An Exploratory Study into Their Experiences
Ye Diana Wang, King Saud University
Gabrielle Webster, George Mason University

Desktop as a Service Proof of Concept
Andrew Eaves, University of Cincinnati
Mark Stockman, University of Cincinnati

Real-world Testing: Using FOSS for Software Development Courses
Evelyn Brannock, University of Cincinnati
Nannette Napier, Georgia Gwinnett College

Cloud Computing Performance Benchmarking and Virtual Machine Launch Time
Dylan Steinmetz, Michigan Technological University
Brian W. Perrault, Michigan Technological University
Ross Nordeen, Michigan Technological University
Jacob Wilson, Michigan Technological University
Xinli Wang, Purdue University

Identifying the Link Between Project Management Standards and Practices in IT Education and the Industry Expectations and Requirements
Faith-Michael Uzoka, University of Cincinnati
Anthony Chima, Suncor Energy Inc.
Kalen Gibb, Mount Royal University
Jody Johnson, Mount Royal University
Reception Dinner and Keynote .......................................................... 6:00pm - 9:30pm
Room: Spectrum 4+5

Why Tenure is not a Private Sector Term: A Look at the Role of Educational Institutions in a Changing World of Commercialization, Investing, and Community Development
Keynote Speaker: Randy Thompson, CEO, Venture Alberta Investor Forum

This talk will examine the following topics: why post-secondary institutions need to be involved in commercialization, how universities have changed for the better local economies, the difference between incubators and accelerators, and why commercialization times need to shorten inside of academic institutions.

Friday 10.12.12

Continental Breakfast.............................................................................. 7:00am - 8:30am

Birds of a Feather Session -
Revising the ABET IT Program Criteria........................................... 7:00am - 8:15am
Room: Spectrum 3
Moders: Mark Stockman and Ed Sobiesk
The ABET/CSAB Criteria Committee is looking at potential changes to the ABET criteria. This BoF session will be for anyone who is interested in hearing more and providing input.

Registration.................................................................................................. 8:00am - 10:00am

Paper Session 7 .......... IT Research 2 ................................................... 8:30am - 9:45am
Room: Spectrum 4
Session Chair: Mark Stockman, University of Cincinnati

Discovering Workplace Motivators for the Millennial Generation of IT Employees
Thomas Bunton, Purdue University
Jeffrey Brewer, Purdue University

This paper provides an overview on motivational research and describes the research methodology and approach that was used to identify the workplace rewards and motivators that the youngest generation of employees, the millennial generation or generation Y, finds attractive in organizations looking to hire them for fulltime Information Technology (IT) positions. Preliminary findings from a pilot study conducted at Purdue University are shared.

Identifying and Evaluating Information Technology Bachelor’s Degree Programs
Barry M. Lunt, Brigham Young University
Andrew Hansen, Brigham Young University
Bikalpa Neupane, Brigham Young University
Richard Ofori, Brigham Young University

This paper describes the process for identifying and evaluating Information Technology (IT) bachelor’s programs in the United States, in an effort to answer the question, how many IT bachelor’s programs are there in the US? Due to widespread variation in the names of academic degree programs, one cannot simply count those named Information Technology. At SIGITE 2011, a framework was presented for identifying IT programs and for evaluating their compliance to an accepted standard. This framework has been applied throughout this research. We first compiled a list of prospective IT programs to research. Each university on the list was researched by looking at their university webpage in search of a list of computing majors listed at that university. If, at a glance, these program’s required courses look similar to those required in an IT program, the program was evaluated and given a numerical score compliance factor, as compared to the standard, no matter the name of the major. This compliance factor is calculated using the assessment form that is included in this document. The results of this analysis are presented.
Resource Utilization Prediction: A Proposal for Information Technology Research

Daniel Yoas, Nova Southeastern University
Greg Simco, Nova Southeastern University

Research into predicting long-term resource needs has been faced with a very difficult problem of extending the accuracy period beyond the immediate future. Business forecasting has overcome this limitation by successfully incorporating the concept of human interaction as the basis of prediction patterns at the hourly, daily, weekly, monthly, and yearly time frames. Computer resource utilization is also impacted by human interaction therefore influencing research into predictability of resource usage based on human access patterns. Emulated human web server access data was captured in a feasibility study that used time series analysis to predict future resource usage. For prediction beyond several minutes, results indicate that the majority of projected resource usage was within an 80% confidence level thus supporting the foundation of future resource prediction work in this area.

Paper Session 8........ System Administration ......................... 8:30am - 9:45am
Room: Spectrum 5
Session Chair: Dale Rowe, Brigham Young University

Partnering with Industry to Deliver a Senior Level Course in the Bachelor of Computer Information Systems Degree Program

Ruben Yumol, Mount Royal University
Fahad Zaidi, Mount Royal University

The senior level course titled Information Systems Organization in the Bachelor of Computer Information System Program at Mount Royal University was designed to have an industry based project component. This paper describes the implementation of this project as well as the comments and perspectives of the instructor, the industry partners, and the students. The students’ perspective is written by the co-author who took this course last winter.

IT Service Management Education in Tanzania: An Organizational and Grassroots-Level Perspective

Jyri Kemppainen, University of Eastern Finland
Matti Tedre, Stockholm University
Erkki Sutinen, University of Eastern Finland

Technology transfer from developed countries to developing ones is not a straightforward process. This is due to the expertise required for utilizing technology. Literature shows that education and transfer of expertise are necessary for technology transfer, but implementation of locally relevant education is a demanding process. Development of IT students’ expertise requires adequate ICT facilities, but the effects of organizational support, human capacity, and the relevance of curriculum to the local context are crucial factors in IT service management education. This paper is based on fourteen years of experience in a Tanzanian university, and it shows the importance of the topics above for IT education in general. This paper also presents a two-tier approach to education of IT service management professionals: In that approach specific contextual factors of IT education complement generic perspectives of IT support.

Multi-perspective Survey of the Relevance of the Revised Bloom’s Taxonomy to an Introduction to Linux Course

Gregory Johnson, Polk State College
William Armitage, University of South Florida
Alessio Gaspar, University of South Florida
Naomi Boyer, Polk State College
Cliff Bennett, Polk State College

Equipping students with higher-order thinking skills as part of a program in information technology is no trivial aim. Course creation must always have this goal in mind. In particular, learning activities and assessments must be designed to teach, encourage the use of, and assess success in achieving this goal, beyond merely teaching facts, methods and techniques. In this paper, we examine the degree to which we were able to assess higher-order thinking skills in students enrolled in the first course of an online Linux system administration curriculum. To assist other educators contemplating similar efforts, we briefly describe methods used to classify quiz and assignment items using the Revised Bloom Taxonomy (RBT) and discuss results from a survey administered to students who completed the course. Lessons learned throughout the process are described.
Panel - Capstone Experiences ................................................................. 9:50am - 10:20am
Room: Spectrum 4

Capstone Experiences for Information Technology
Gregory W. Hislop, Drexel University
Joseph J. Ekstrom, Brigham Young University
Heidi J. C. Ellis, Western New England University
Sandra Gorka, Pennsylvania College of Technology

The integrative capstone experience is central to the advanced level of a four-year IT degree program as defined by the IT 2008 Curriculum Guidelines [1]. The general requirements for this experience include that students work in teams of 4-8 on a real-world project. This project should be sufficiently complex to require a team effort over many weeks. However, the implementation of the integrative capstone experience can vary widely from a design course without external clients, to projects that have real clients to professional internships and co-operative education experiences. Courses may also vary based on length, evaluation approach, process and deliverables, and instructor role.

The goal of this panel is to discuss best practices for capstone experiences for BSIT degree programs. The panel will contrast varied implementations of IT integrative capstone experiences to provide a starting point for discussion. Each panelist will briefly describe their institution’s capstone experience, discuss the benefits and drawbacks to their implementation, share issues and ideas they have for improving the capstone, and discuss student opinions of the capstone. A minimum of 35 minutes will be set aside for audience interactions.

Panel - Teaching Best Practices ......................................................... 9:50am - 10:20am
Room: Spectrum 5

Best Practices in Teaching Information Technology Development
Amber Settle (moderator), DePaul University
Deborah LaBelle, Nazareth College
Hazem Said, University of Cincinnati
Sheila S. Sicilia, Onondaga Community College

Programming is one of the most fundamental and central topics in the information technology curriculum. Because of its importance it is crucial to understand how to effectively teach development students. In this panel we share best practices for teaching programming to a variety of populations, including freshman, non-majors, and community college students. Various pedagogical approaches including pair programming, studio-based instruction, peer instruction, active learning, cooperative learning, project-based pedagogy, high-impact education practices, and CS Unplugged type activities are included.

Vendor Presentation ........................................................................... 9:50am - 11:20am
Room: Spectrum 3

EMC Academic Alliance – Educating Future IT Professionals
Kim Yohannan, EMC

Learn how you can enhance student career prospects in the world of IT through the Academic Alliance. The program offers colleges and universities around the globe unique ‘open’ curriculum-based education, such as information storage and management, cloud computing and big data analytics.

The courses focus on technology concepts and principles applicable to any vendor environment. The goal is to prepare graduates to fully leverage enhanced and emerging technologies in virtualized and cloud environments. There is no cost to institutions to join the program and members receive numerous benefits including: faculty training, course materials, and secure web portals for faculty and students.

We will also share with you the virtual storage available through our partner, NDG.

Break .......................................................................................................... 10:20am - 10:35am
Testing and Quantifying ERP Usability
Nancy E. Parks, Bentley University

Enterprise Resource Planning (ERP) systems benefit businesses while the typically complex interface can challenge end users. Many prior studies of ERP users measure attitudes rather than actual use of the ERP. This research involved testing users as they worked with PeopleSoftTM to complete an inventory procedure. An experiment measured success and time while users completed a task working with the default interface and a simplified version of the interface. Trends and participant comments validated the importance of interface usability for success, although neither complexity nor simplicity were statistically significant. Complexity was significant for task time. Interface complexity was quantified using two models: GOMS-KLM and a visual complexity model. The default complex screens required almost twice as many steps to navigate seven times the number of on-screen elements. This paper reports two studies that were part of a larger effort (Parks, 2011) blending human factors and empirical methods to assess the impact of ERP usability.

A Simulation-Based Fuzzy Multiple Attribute Decision Making for Prioritizing Software Requirements
Abdel Ejnioui, University of South Florida
Carlos Otero, University of South Florida
Luis Otero, Florida Institute of Technology

It is well known that most of the approaches proposed in recent research to prioritize software requirements have not been widely adopted. These approaches are too complex and time consuming, or inconsistent and difficult to implement. This paper proposes a new approach to prioritize requirements that is practical and easily implementable. Whereas most proposed approaches quantify requirements in precise and crisp parameters, this paper takes in consideration the imprecise nature of requirements by modeling their attributes as fuzzy variables. As such, these variables are integrated into a fuzzy multi-attribute decision making problem in which the requirements represented as attributes are ranked via the expected value operator of a fuzzy variable. The expected values of the attributes in the problem are computed by numerical simulation. This approach is easily extendable to include other attributes and can be easily customized as a decision making tool for software project managers.

Comparison of VM deployment methods for HPC education
Nicholas Robison, Purdue University
Thomas Hacker, Purdue University

Operating System virtualization has seen major adoption across many industry fields, this growth has driven penetration into more traditional settings such as high performance computing and cluster systems. Developing an effective and efficient teaching environment for virtual high performance computing systems is complicated by a wide range of virtualization systems (open source and commercial), a variety of hardware platforms, and many different storage approaches for storing and distributing virtual machine images. Coupled with the growth in virtualization is the need for reliable, high performance storage subsystems optimized for the specific performance needs of the installation. This paper describes our experiences with using virtualization for virtual high performance computing clusters for education, and compares the performance of the popular OpenNebula virtualization manager using both NFS and SSH for virtual machine image sharing. Our results show it is possible to develop an effective teaching environment using commodity desktop computers and network hardware along with open source virtualization software.
Paper Session 10........**Future of K-12 Computer Education**........10:35am - 11:50am
Room: Spectrum 5
Session Chair: Rob Friedman, University of Washington Tacoma

**MOBILE: A MOBile Instructional Laboratory Environment for Hands-on Information Technology Education**
Chris Johnson, University of Wisconsin, Eau Claire
Paul Wagner, University of Wisconsin, Eau Claire

We present MOBILE, a software system providing ad-hoc and hands-on learning environments for information technology education. Using MOBILE, instructors can hold workshops on any available computers, even in restricted lab settings or using participant computers. Features supported by this software include the ability to build and configure a workshop session on any desired information technology topic, creation and management of that session on top of any existing network, distribution and configuration of additional operating systems and applications, and the inclusion of auxiliary content relevant to the session. In this discussion paper, we describe the MOBILE infrastructure and explore an actual workflow for an instructor using it to teach a workshop on computer security. We have successfully piloted the system to conduct four highly-rated workshops at technology education conferences.

**Use of a Mobile Application to Promote Scientific Discovery Learning: Students’ Perceptions towards and Practical Adoption of a Mobile Application**
Sunmi Seol, San Francisco State University
Aaron Sharp, Seeds of Empowerment
Paul Kim, Stanford University

This paper examines what students think about the use of a mobile application as a learning support tool and describes how a mobile application helps students improve scientific discovery learning outside of school. To meet the needs of conveniently saving and retrieving student’s learning, the customized mobile application eBookMaker was developed for our two studies. This application enables students to quickly create mobile documents offering media-rich functionalities. Thirty-two fourth- and fifth-grade students in a public school participated in the studies. Each student was given an Android-powered Motorola smart phone pre-loaded with eBookMaker. In the first study, students were asked to make a mobile document about what they learned in class and fill out a survey form for their feedback about the use of a mobile application. In the second study, students were required to individually explore the scientific phenomena from their daily life, record their investigations, and create mobile documents using eBookMaker for two weeks outside of school. Based on the findings from these two studies, we can suppose that students have a positive attitude (80% of the students replied that they were mostly satisfied with a mobile application, eBookMaker) towards the use of a mobile application as an educational tool. Furthermore, a majority of students (86%) could figure out their own topics, search relevant information from a variety of sources (i.e. Textbooks or websites), and come to their own conclusion, which is a basic scientific discovery learning process, and even 24% of the students could design an experiment, conduct the experiment and draw a conclusion from the experiment, which is a more advanced scientific discovery learning process.

**Identifying Measures to Cultivate Teachers’ Competence for Teaching through Personal Learning Environment Conception: A Delphi Study**
Zaffar Ahmed Shaikh, Institute of Business Administration, Karachi
Shakeel Ahmed Khoja, Institute of Business Administration, Karachi

Personal learning environment (PLE) is a learner centered and controlled environment where learner constructs his knowledge socially and collaboratively with the help of knowledgeable peers, mentors, and teachers. Teacher, being the most knowledgeable stakeholder in this environment, has to develop a strong and multifunctional association between the two: the learner and the PLE. However, in real world scenarios, this is not the case as teachers’ current competencies are not sufficiently developed to provide desired results. A major reason for this inefficiency is the unawareness of the required roles that a teacher has to play in such environment. Our study is aimed at identifying measures to foster teachers’ competence in PLE conceived teaching scenarios. We have used the modified version of policy-Delphi in which we have worked with 34 international experts who are either associated with PLEs in one of the four dimensions: teachers, researchers, designers, or practitioners. These experts reviewed a 10-item teachers’ PLE competency developing measures list, which was developed through an exhaustive literature review. As per Delphi procedure, the consensus on measures list was developed in three rounds. During the process, participants collaboratively modified measures list at length and extended the list from 10 to 16 items. Based on the findings, we argue that institutional support is of prime importance to improve teachers’ PLE competence.

**Supported by CIPS Alberta**
Room: Spectrum 4-5

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Lunch ................................................................. 12:00pm - 1:00pm
Turning the Tables: Learning from Students about Teaching CS1

Amber Settle, DePaul University

Programming has a central role in the computing curriculum, and introductory programming classes have been extensively studied in the computer science education literature. However, most of the studies focus on the effectiveness of various pedagogical approaches on student learning and engagement, and relative little attention is paid to faculty development. The gap in the literature puts CS1 faculty interested in effectively implementing innovative pedagogical approaches in a difficult situation. This article argues that taking a behaviorist approach to the CS1 classroom can provide much-needed feedback. Students provide instructors with one of the best sources of information about effective programming instruction, both with respect to pedagogical approaches and with respect to less formal issues such as classroom management, student-faculty interactions, and course policies. Faculty who choose to listen and learn from the comments made by their CS1 students will find a wealth of information to guide them in their development as instructors.

Engaging Undergraduate Programming Students: Experiences using Lego Mindstorms NXT

Mark Anderson, Edge Hill University
Collette Gavan, Edge Hill University

In this paper, the experiences gained in adopting an approach to first year undergraduate programming classes which attempts to engage the students in problem-solving and teamworking activities are discussed. Both have a significant role to contribute in the development of employability skills. The approach taken makes use of Alice to introduce programming concepts and Lego Mindstorms NXT kits to develop Java programming skills. The module assessments combine individual and team-based components, encouraging the students to engage with their peers in order to solve the challenges they are set. This paper reports on the results achieved by the students on the module over a four year period which correlates to the introduction of the changes to the module design. The paper also considers the views of the students gathered from anonymous module evaluation forms.

A Feasibility Study on using Clustering Algorithms in Programming Education Research

Marzieh Ahmadzadeh, Shiraz University of Technology
Elham Mahmoudabadi, Amirkabir University of Technology

Designing an experiment for programming education research, in which collecting and interpreting a large number of qualitative data about programmers is required, needs careful consideration in order to validate the experiment. When it comes to finding a pattern in the programming behaviour of a specific group of programmers (e.g. novice, intermediate or expert programmers), one of the critical issues is the selection of similar participants who can be placed in one group. In this study we were interested in finding a method that could shorten the path to finding participants. Therefore, the use of clustering algorithms to group similar participants was put to test in order to investigate the effectiveness and feasibility of this approach. The clustering algorithms that were used for this study were K-means and DBSCAN. The results showed that the use of these algorithms, for the mentioned purpose, is feasible and that both algorithms can identify similar participants and place them in the same group while participants who are not similar to others, and therefore are not the correct subject of the study, are recognized.
Paper Session 12

**Distance Delivery**

1:15pm - 2:30pm
Room: Spectrum 5
Session Chair: Richard Helps, Brigham Young University

**Building a Cloud Based Systems Lab**

Joey Alexander, University of Cincinnati
Aaron Dick, University of Cincinnati
Jonathan Hacker, University of Cincinnati
Damen Hicks, University of Cincinnati
Mark Stockman, University of Cincinnati

The system administration lab at the University of Cincinnati consists of 24 high-end desktop PCs, each loaded with client virtualization software. The lab is limited to 24 students per class and does not offer remote access to the virtual machines. The students must either wait for open lab hours or purchase their own high-end systems to work on their schoolwork. To expand the number of classes taught and enable remote access to the lab, the authors created a Microsoft-based private cloud accessible from any computer on the university’s network. VPN entry to the network allows students to login to the system using a web browser to access their VM’s from anywhere in the world.

**IPv6 Certification and Course Development**

John Pickard, East Carolina University
Phillip Lunsford, East Carolina University
John Spence, Nephos6

The need to train IT professionals, especially network engineers, in the use of Internet Protocol version 6 (IPv6) continues to grow as adoption of IPv6 continues to rise. The adoption of IPv6 is driven by the IPv4 address space depletion, the proliferation of managed devices, the proliferation of mobile wireless devices, and government initiatives. An undergraduate stand-alone course in IPv6 is discussed including previous experiences starting in 2006. The current IPv6 course offering, based on a partnership with Nephos6 Inc. as the pilot of the first Nephos6 Academy, is reviewed including course topics, laboratory environment, and certification. The current course is delivered totally online and includes extensive remote-laboratory exercises, and has objectives that align with the IPv6 Forum Certified Engineer (Silver) objectives.

**Meeting MDG 2: Can IT Save Us?**

Charles Snow, George Mason University
Khondkar Islam, George Mason University

While there continues to be rapid growth in the deployment of IT-based teaching technology in the developed world, there is a much greater need to find an effective means of using such technology to reach millions of underserved children in the developing world. This paper briefly looks at the problem, the technology, and how the latter may mitigate the former.

**Break**

2:30pm - 3:00pm
Integrating Mobile Storage into Database Systems Courses

Arto Vihavainen, University of Helsinki
Matti Luukkainen, University of Helsinki
Jaakko Kurhila, University of Helsinki

The proliferation of smartphones and tablet computers is the newest paradigm shift occurring in the field of computing education. Mobile devices create serious resource and performance constraints that developers must keep in mind when creating applications for these platforms. In order to ensure that future developers have the knowledge required to create quality software solutions, academic institutions must seek to integrate mobile devices into their curricula. This paper presents an approach to integrate mobile application development in database systems courses, in the form of a short module designed to cover the approaches for persistent storage available on mobile devices. The Centre for Mobile Education and Research (CMER) has developed material, released as part of the CMER Academic Kit, including hands-on labs and assignments that instructors can freely download and integrate into their courses.

Multi-faceted Support for MOOC in Programming

Qusay Mahmoud, University of Guelph
Shaun Zanin, University of Guelph
Thanh Ngo, University of Guelph

Many massive open online courses (MOOC) have been tremendously popular, causing a stir in academic institutions. The most successful courses have reached tens of thousands of participants. In our MOOC on introductory programming, we aimed to improve distinctive challenges that concern most of the open online courses: allowing and requiring the participants to be more active in their online learning (“flipped-classroom”), demanding them to go deeper than typical CS1 course, and added incentives for participant retention by treating the course as a formal entrance exam to CS/IT degree. Our Extreme Apprenticeship (XA) method for programming education appeared to be successful in an online environment as well.

A Modified Team-Based Learning Methodology for Effective Delivery of an Introductory Programming Course

A A Modified Team-Based Learning Methodology for Effective Delivery of an Introductory Programming Course

Ashraf Elnagar, University of Sharjah
Mahir S. Ali, University of Sharjah

This paper sheds the light on an attempt to use a pedagogy integrating Team-Based Learning (TBL) for effective learning and hands-on experience in an introductory programming course. We have adopted a modified version of TBL to study its effect on students learning and to examine how teams intra- and inter-team active interactions influence students’ learning and grades. Therefore, the objectives of this work is to evaluate whether the proposed modified TBL methodology would or would not improve students’ experience of in-class engagement and their attitude about the value of using teams for learning, compared with experiences students would have had in the traditional lecture format. We refer to this method as LTBL, Lectures and Team-Based Learning, since we added a short but essential teaching component. To explore the effectiveness of this learning pedagogy, we evaluated students’ level of engagement and attitudes toward achieving course outcomes and the value of teamwork over four semesters. Our findings demonstrated that LTBL has a positive effect on the success rate and the achievement of learning outcomes.
Paper Session 14........ Industry Engagement 1..............................3:00pm - 4:15pm
Room: Spectrum 5
Session Chair: Bryan Goda, University of Washington

**IT Problem Solving: An Implementation of Computational Thinking in Information Technology**
Jaime L’Heureux, Bunker Hill Community College
Deborah Boisvert, University of Massachusetts Boston
Robert Cohen, Wellesley High School
Kamaljeet Sanghera, George Mason University

This paper describes the implementation of information technology problem-solving constructs and scenarios designed to cultivate computational thinking in information technology education at the college level via a course entitled “IT Problem Solving.” A project of Broadening Advanced Technological Connections (BATEC), these scenarios were developed by a team of researchers under the auspices of an NSF CPATH grant focusing on adapting Computational Thinking as defined by Jeanette Wing into a more applied framework in partnership with and validated by a broad set of Information Technology (IT) professionals. The methodologies used within this highly successful course at Bunker Hill Community College may be of interest to other departments with existing IT programs that would like to take advantage of the strengths of the problem solving approach.

**The Pedagogical Value of “Eduployment”: Information Technology Internships in Rural Areas**
Joseph Elarde, Heartlanding Consulting
Fatt-Fei Chong, Segi College

Providing internships for Information Technology students represents a significant issue to institutions of higher education located in rural areas where few if any organizations exist with sufficient resources to support such programs within a manageable transportation distance. This paper documents our experiences with an approach we refer to as “Eduployment” a program designed to address in part the rural internship problem.

In this paper we describe the planning, development, structure, implementation, and experiences with a faculty/student managed, University aligned, grant supported, Information Technology consulting firm’s first two years of operation, evaluating effectiveness from the educator and student perspectives.

This program contributed to changes in our Information Technology internship program, provided employment for students, and positively influenced many projects and assignments in the Information Technology program’s courseware.

With the changes we have observed, that students are better prepared for employment, understand the importance of customer service, meeting deadlines, time management, and working in teams. Thus far, all student graduates involved in the program have secured employment; moreover, 90% of the students stated that the Eduployment program was of value and prepared them for employment.

**The Geographic Information Science and Technology and Information Technology Bodies of Knowledge: An Ontological Alignment**
Brian Tomaszewski, Rochester Institute of Technology
Edward Holden, Rochester Institute of Technology

In this paper, we present a philosophical discussion of ontological alignments between the fields of Geographic Information Science and Technology (GIS & T) and Information Technology (IT) based on existing bodies of knowledge (BOKs). We argue that tighter integration of concepts from GIS & T into IT curriculum can provide three specific opportunities for IT education - enhanced spatial thinking, new interdisciplinary and innovative application areas, and student employment opportunities. We also discuss specific ideas for curricular integration based on the alignments and provide a list of free and open source GIS & T software, data and learning resources for IT educators interested in incorporating GIS & T concepts and technologies into their teaching.
Panel - IT Research .................................................. 4:30pm - 5:00pm
Room: Spectrum 4

Defining IT Research
Rob Friedman, University of Washington Tacoma
Han Reichgelt, Southern Polytechnic State University
J. Ekstrom, Brigham Young University
Mark Stockman, University of Cincinnati

Information Technology emerged as a separate computing discipline primarily because the computing disciplines that were taught in universities at the time, in particular computer science and information systems, did not meet the needs of employers. In particular, the existing computing disciplines did not meet employer needs for IT infrastructure managers. While IT was successful in meeting employer needs, it was slow to develop a distinct research agenda, and it has become clear that, if it is to gain credibility in an academic environment, it needs to do so.

Panel - Interactive Learning .........................
4:30pm - 5:00pm
Room: Spectrum 5

Interactive Learning Online: Challenges and Opportunities
Mihaela Sabin, University of New Hampshire
Amber Settle, DePaul University
Becky Rutherfoord, Southern Polytechnic State University

Higher education is a labor-intensive sector. Smaller classes, more faculty-student direct interactions, prompt and individualized feedback, and more hands-on and collaborative learning with peers raise the quality of student education. Valuable person-to-person interactions, on the other hand, are costly and, to complicate matters, indicative of the Baumol's cost disease [1]. Labor-intensive sectors that are dominated by personal services, such as education and health care, do not have rising productivity through technological innovations. These “stagnant sectors”, says William Baumol, keep up with salaries in sectors where more is produced with less, like in manufacturing, by raising costs.

Since the early 1990s online education and online learning systems have held the promise of increasing instructional productivity and reducing costs without sacrificing educational quality. There is no evidence to date that such promise has materialized. The impetus of the newest developments with free online courses offered by Ivy League research universities to hundreds of thousands of students might drastically transform how we teach more and better with less. The innovation that prompted this panel is called Interactive Learning Online (ILO), and has the distinctive feature of highly interactive, machine-guided instruction that can be scaled to accommodate a large number of students who benefit from targeted and personalized learning [2].

A generic software platform that would permit faculty at diverse institutions to develop ILO content with customized feedback loops and machine-guided interactivity does not exist. Bacow et al. [2] observe that it would be “foolishly inefficient to rely on a ‘hundred flowers’ approach”. They recommend that we collectively investigate how to: (1) design, develop, and maintain
Saturday 10.13.12

Continental Breakfast................................................................. 7:00am - 8:30am

Paper Session 15....... Industry Engagement 2......................... 8:30am - 9:45am
Room: Spectrum 4
Session Chair: Joseph J Ekstrom, Brigham Young University

Transforming Programming-Intensive Courses with Course-Embedded Research
Evelyn Brannock, Georgia Gwinnett College
Nannette Napier, Georgia Gwinnett College
Kristine Nagel, Georgia Gwinnett College

In this paper, we discuss the Software Engineering Research Project (SERP) initiated at GGC College, a public four-year institution in southeastern United States. The long-term goal of SERP involves motivating students to pursue graduate degrees, research careers, or challenging industry work. Before students can engage in software engineering research, they need to develop a deeper appreciation for professional practice, scholarly literature, and research paradigms. To that end, we have identified activities to embed in two junior-level programming-intensive courses: Software Development I and Advanced Programming. Our three-pronged approach includes attendance at professional events, participation in a research project, and exposure to computing research at a leading research university. In this paper, we detail our goals and objectives for the SERP program, illustrate a course redesign for two of the courses, and provide initial results from a pilot study.

Three Years of Design-based Research to Reform a Software Engineering Curriculum
Arto Vihavainen, University of Helsinki
Matti Luukkainen, University of Helsinki
Thomas Vikberg, University of Helsinki

Most of the research-oriented computer science departments provide software engineering education. Providing up-to-date software engineering education can be problematic, as practices used in modern software development companies have been developed in the industry and as such do not often reach teachers in university contexts. The danger, and often the unfortunate reality, is that institutions giving education in software engineering end up teaching the subject using outdated practices with technologies no longer in use. In this article we describe a three-year design-based research where the goal has been to design and reform a software engineering subtrack within our bachelor curriculum that would make it possible for the students to have strong up-to-date theoretical and practical skills in software engineering without a need to remove any of the existing theoretical aspects.

Supporting the Review of Student Proposal Drafts in Information Technologies
Samuel González López, Instituto Nacional de Astrofísica
Aurelio López-López, Instituto Nacional de Astrofísica

In many cases, academic programs or courses conclude with a thesis or research proposal text, elaborated by students. The review of such texts is a heavy load, especially at initial stages of drafting. This paper proposes a model that allows linguistic and structural review of some essential elements in proposal drafts of undergraduate students. The model aims to support the review from vocabulary to the argumentation in the draft, and is part of an intelligent tutor to monitor student progress. This work presents the initial results in terms of lexical and global coherence analysis of proposal drafts of students. Lexical analysis is done in terms of lexical density, lexical diversity, and sophistication. Global coherence is evaluated using the Latent Semantic Analysis technique. Our results show that the level reached so far by the analyzer is adequate to support the review, taking into account for one section the level of agreement with human reviewers.

Paper Session 16 - Interesting Topics..............8:30am - 9:45am
Room: Spectrum 5
Session Chair: Bill Paterson, Mount Royal University
Dwindling numbers of female computer students: What are we missing?
Donna Saulsberry, New Mexico State University

There is a common agreement among researchers that women are under-represented in both 2-year and 4-year collegiate computer study programs. In spite of twenty years of research, the number of women graduating with computer degrees continues to decline, suggesting that perhaps there are causal factors that have not been identified. This paper describes an alternate approach; asking a group of female students who are pursuing a computer technology degree at a community college to describe experiences which have affected their academic success. A significant finding was that the women struggled to understand the deductive problem solving method used by the instructors and the pace of the classes made it difficult for them to work out their own problem solving approach. (This paper is taken from a broader dissertation which explored other facets of the women’s experiences as well.)

Engaging Students by Intertwining Puzzle-Based and Problem-Based Learning
Jalal Kawash, University of Calgary

In this paper, we describe our experience in a first-year computer science course on problem solving that is aimed at non-majors. The majority of the target audience of this course is from management and social science faculties. The course is unique in the sense that it covers proper problem solving skills that are typically only covered in a course directed at computer science or engineering students. We describe how puzzles are used as bait that lures the target audience to subjects such as logic, algorithms, and graph theory. That is, we discuss how we intertwine puzzle-based and problem-based learning in order to engage, an often unmotivated, crowd. Our initial assessment of the approach shows that the use of puzzles is perceived by students as helpful to learn the course material. Furthermore, it is contributing to their interest in computing.

Comprehensive Design of Cyber Physical Systems
Richard Helps, BYU Information Technology
Francis Mensah, BYU Information Technology

In recent years there has been a confluence between different fields addressing the broad field of embedded computer systems (cyber-physical systems). Traditional microcontroller-based systems have become more capable and now frequently feature 32-bit processors with networking capabilities. Single-board computers have shrunk to credit-card size and low-cost systems are available—significantly overlapping the application domain of microcontroller systems and, thirdly, mobile platforms (smartphones, tablets, e-readers etc.) also share many characteristics of these systems and overlap their design and application domains. These systems each have their own design communities, tools and standard approaches. However their commonality and overlapping application domains indicate that they share common design problems. The evolution into newer application areas also brings new problems. The situation becomes more complex when these systems are integrated into larger diverse systems.

Design approaches and design problems for these different types of embedded system are reviewed. Overlapping and non-overlapping characteristics and design issues are analyzed. A comprehensive design approach tailored to these cyber-physical systems is proposed. The comprehensive approach addresses design issues not only for all three of the overlapping fields but also systems that incorporate aspects from multiple fields. It also includes factors sometimes neglected when systems are developed within their own narrower design domains.

One of the findings of this investigation is that design in this domain requires a diverse set of skills, usually only found in multi-disciplinary teams. One discipline that is needed but has not traditionally contributed much in this domain is Information Technology. Another finding is that designers trained in the IT discipline with a systems-oriented approach have specific design skills that are necessary for successful design of these diverse systems.

Break ................................................................. 9:45am - 10:00am

Paper Session 17 ...... IT Research 4 ...................... 10:00am - 10:50am
Room: Spectrum 4
Session Chair: Sam Chung, University of Washington, Tacoma

A Survey of SCADA and Critical Infrastructure Incidents
Bill Miller, Brigham Young University
Dale Rowe, Brigham Young University

In this paper, we analyze several cyber-security incidents involving critical infrastructure and SCADA systems. We classify these incidents based on Source Sector, Method of Operations, Impact, and Target Sector. Using this standardized taxonomy we can easily compare and contrast current and future SCADA incidents.
Improving Accuracy in Face Tracking User Interfaces using Consumer Devices
Norman Villaroman, Brigham Young University
Dale Rowe, Brigham Young University

One form of natural user interaction with a personal computer is based on face pose and location. This is especially helpful for users who cannot effectively use common input devices with their hands. A characteristic problem of such an interface, among others, is that face movement is expected to be small and limited relative to a significantly larger control area (e.g. a full resolution monitor). In addition, vision-based algorithms and technologies that enable such interfaces introduce noise that adversely affects usability. This paper describes some of these problems in detail and presents potential solutions. Some basic face tracking user interfaces with different configurations were implemented and statistically evaluated to support the analysis. The different configurations include the use of 2D and depth images (from consumer depth sensors), different input styles, and the use of the Kalman filter.

Paper Session 18........ Web Development and HCI 2......... 10:00am - 10:50am
Room: Spectrum 5
Session Chair: Craig Miller, DePaul University

Teaching Mobile Web Application Development: Challenges Faced And Lessons Learned
Peter Alston, Edge Hill University

Given the increasing popularity of smartphones and their accompanying applications, a number of Higher Education (HE) institutions in the UK are offering a mobile applications development module as part of their undergraduate degrees. Each institution has their own method of implementing such a module and will also have certain restrictions to work within.

This paper reports on the author’s experiences of delivering a Mobile Application Development module to 3rd year undergraduate Web Systems Development (WSD) students and the challenges faced in developing an alternative curriculum for a module originally intended for Computing students with experience using the Java programming language. Module evaluations indicate that the alternative curriculum provided to WSD students was well received and the practical hands-on tutorials used in the delivery of the module give students a sense of empowerment and the confidence they need to succeed.

App Inventor for Android in a Healthcare IT Course
Bonnie MacKellar, St. John’s University

App Inventor for Android is a new programming environment that allows novice programmers to build applications for Android mobile devices. In this paper, we describe a healthcare IT course in which students with little or no programming background built healthcare related mobile applications. The course was designed based on the principles of studio-based learning, with students completing and sharing projects of their own choosing. Mobile applications were used to illustrate the role of IT applications in healthcare and teach design and user interface principles. In this paper, we discuss our experiences with this augmented course, describing the rationale, the process of introducing the new material, the student-designed applications, and the results from the course evaluation.

Panel 5 - CS/IT Outreach ................................................................. 11:00am - 11:30am
Room: Spectrum 4+5

CS/IT Outreach from a Canadian Perspective
Daryl H. Hepting (moderator), University of Regina
Gerry Donaldson, University of Calgary
Peter R. King, University of Manitoba
Danny Silver, Acadia University

The panel will give a representation of very encouraging CS/IT outreach efforts in Canada offered by various organizations working in this space. These include (in alphabetical order); the Canadian Association of Computer Science/Association d’Informatique Canadienne (CACS/AIC), comprising post-secondary institutions offering Computer Science degrees; the Canadian Information Processing Society (CIPS), known as Canada’s Association of I.T. Professionals; the Canadian Coalition for Tomorrow’s ICT Skills (CCICT), an industry-led coalition of employers, universities and industry organizations with the aim of ensuring availability of ICT professionals for Canadian organizations; and the Computer Science Teachers Association (CSTA – international, with chapters forming across Canada), a membership organization that supports and promotes the teaching of computer science and other computing disciplines.

Closing Session and Farewell ...................................................... 11:30am - 12:00pm
Room: Spectrum 4+5
2013: Why Not Bring the Family?

SIGITE-2013 promises to be the best yet.

The 14th Annual SIGITE will again be joined by the 2nd Annual Research in IT (RIIT) conference. As the word continues to get out about RIIT, we expect many more submissions to this conference, as well as a continuation of the high quality submissions we receive for SIGITE.

SIGITE/RIIT 2013 will be held in central Florida, and that’s great news for those of you who would like to bring your families. October is typically one of the “slowest” months at the many theme parks and attractions in Florida, so is an ideal time to visit – less time in lines. Although we do not yet have our conference hotel identified, we can guarantee you that it will be within an hour’s drive (and, in some cases far less than an hour’s drive) of famous Florida mega-attractions like Disney World, Sea World, Universal Studios, Busch Gardens Tampa, and (for those with lego fanatics for kids) the world’s newest and largest Legoland park, Legoland Florida! More traditional, “old-time” Florida attractions still beckon: Silver Springs, Sunken Gardens, and the underwater mermaid shows at Weeki Wachee Springs. Just a little less known are great experiences like Gatorland, Bok Tower, Dinosaur World, Fantasy of Flight, Green Meadows Farm, Lion Country Safari, the Lowry Park Zoo, the Dali Museum and the Florida Aquarium, to name just a few.

In your SIGITE-2012 event bag you will find a questionnaire about your plans and preferences for SIGITE-2013. Please fill this out and drop it off at the registration desk; this will help us plan as effective and enjoyable a conference as possible.

See you in 2013!