

Paper and Keynote Abstracts
Monday, October 25, 2010

8:30am – 9:30am

Monday Keynote : **When you need a wrench, a hammer won't do**

Ann McMullan

Executive Director Educational Technology

Klein ISD, USA

When Klein ISD made the commitment to initiate a one-to-one program in 2006 many decisions had to be made. There were technical issues of bandwidth and access, economic considerations regarding cost, support, and replacement, but the pivotal question – selecting the appropriate instructional tool – focused on the reason for embarking on a one-to-one implementation in the first place. The rationale behind the decision to go with Tablet PCs was rooted in the fact that one-to-one was designed to be an innovative instructional program rather than a technology initiative.

The Tablet PC is the device that best meets the learning and teaching needs for our students and teachers in *all* content areas. Students need to be engaged in their learning. They need opportunities to inquire and to think critically, to create new knowledge and have a means to share their thinking with others. Their primary learning tool has to give them the flexibility to not only search the Internet, type essays or plug in formulas, but also to create and produce a wide variety of content, including drawings, illustrations and multimedia incorporating video and sound, as well as read electronic text and interact with it. The selection of the Tablet PC form factor, combined with a strong commitment to changing pedagogical practices integrated with ongoing, sustained professional development, are some of the leading reasons behind the success of Klein ISD's one-to-one initiative.

Today we have four campuses with one-to-one Tablet PC programs, which include one intermediate school (grades 6, 7 and 8) and three high schools. Since the inception of this program we have seen rising test scores, and declining discipline problems. In this presentation we will share the changes in instructional practices that have come about as a result of the one-to-program and review data. We will also look at the professional development that is embedded in each one-to-one program in Klein, for both teachers and administrators.

9:40am – 10:25am

A DIGITAL INK AND COMPUTER ALGEBRA SYSTEM MASHUP TO ENHANCE CLASSROOM LEARNING

Jeffrey L. Hieb

University of Louisville, USA

There are obvious benefits to using digital ink and Tablet PCs in mathematics classes. But in a one to one Tablet PC deployment the use of digital ink should not preempt or prevent the use of other software to enhance classroom learning even further. The Computer Algebra System (CAS) Maple offers extensive computation capabilities which could significantly enhance classroom learning if integrated well. This paper presents a method for presenting students with a pen friendly GUI to Maple computation capabilities relevant to a specific in-class activity. Three of these activities were developed and tested in a Linear Algebra class taught in the spring semester of 2010. Technical difficulties experienced during deployment limited the impact of the developed activities however, a statistically significant improvement on the average of one exam was observed.

STUDENT AND INSTRUCTOR TABLET PC USE INCREASES RETENTION IN UNDERGRADUATE MATHEMATICS CLASSES

Carla A. Romney

Boston University Metropolitan College and Boston University School of Medicine, USA

Undergraduate students often enter college with declared interests in one of the science, technology, engineering, or mathematics (STEM) fields, but they often switch their majors to non-STEM fields. Freshmen enroll in introductory mathematics courses to begin their formal STEM studies, but they quickly discover that these courses serve as gatekeepers to “weed out” students. Quantitative courses are often challenging for students because class time is devoted to lecture and there are few opportunities to master the problem-solving techniques that are requisite for success. To address these limitations of conventional mathematics courses, we constructed a networked Tablet PC classroom that allows students to participate in interactive problem-solving. The initial implementation occurred in College Algebra and Trigonometry (CAT) and students have progressed to tablet PC offerings of Calculus I and II. Student attendance, retention and performance were better in the Tablet PC enriched classes than in the same classes taught in non-Tablet PC settings. Tablet PCs are a promising pedagogical tool to improve mathematics instruction and concomitant retention in STEM.

INK-12: A Pen-based Wireless Classroom Interaction System for K-12

Kimberle Koile, David Reider , and Andee Rubin

MIT, Education Design, Inc., and TERC

This paper describes research conducted in the two-year NSF-funded INK-12: Interactive Ink Inscriptions in K-12 research project. In this project, we have been investigating the role that pen-based wireless technology could play in upper elementary and middle school science and math. We have conducted tablet computing trials in eight schools in the Boston, MA, area—six fourth, one sixth and three eighth grade teachers’ classrooms, working with a total of 400 students. During each of these trials, the project team helped teachers adapt their lessons to make best use of the tablets and to think strategically about pacing the lesson, accommodating different types of learners, and dealing with unexpected technological challenges. The tablets were particularly successful in (1) facilitating students’ creation of drawings and other mathematical and scientific representations, and (2) providing teachers with tools to promote classroom discussions. The research identified areas that need further work, including providing a more flexible metaphor than “slides” for lessons and student submissions, and designing professional development to support teachers in choosing appropriate student work for class discussion.

Hands-On Class:

More Information Coming Soon

1:45pm – 2:30pm

ENGAGEMENT AND RETENTION OF MARGINALIZED COLLEGE STUDENTS USING HP TABLET PC'S AND DYKNOW SOFTWARE

Carol Carruthers

Seneca College of Applied Arts and Technology, Canada

Students in college bridging programs may benefit from having subjects like math and science presented to them using a more innovative teaching style. The use of pen-based tablet technology and interactive software provides the enrichment required to engage and enhance the performance of marginalized students. Data collection of attendance and grades provides insight as to whether or not the use of this technology impacts student learning. Response to surveying gives greater understanding of thinking, and provides the opportunity for students to reflect on this teaching style. Project goals include observation of increasing student engagement, enhancing student learning and concept application, and demonstration of this teaching strategy to other educators. Early indications show that this student-centered, interactive tablet environment results in increased retention and success of students. More testing is required to determine statistical significance. The necessary adaptation in teaching philosophy to ensure students receive the full advantage of this course delivery is also discussed.

BUILDING A BETTER MATH TUTOR SYSTEM WITH TABLET TECHNOLOGY

Aaron Wangberg, Nicole Anderson, Chris Malone, Beya Adamu, Kristin Bertram, and Katie Uber

Winona State University, USA

College calculus requires students to apply knowledge and reasoning about precalculus concepts to new problems. Students that struggle to recall precalculus material, or rely upon memorization of those techniques, have trouble succeeding in calculus. This paper reports how some instructors in the Department of Mathematics at Winona State University have utilized Session, a web-based interactive digital ink tutorial program, and WeBWork, an open-source online homework system, to help struggling calculus students understand prerequisite material. We show how digital ink better engages students in the solution to mathematics problems than text-based solutions, and how question prompts, based upon Self-Explanation guidelines, help students understand the solution's steps. Pre/post-test and course grades show less-prepared calculus students interacted with the tutorials more frequently than unsuccessful calculus students. We also compare student perceptions of the effectiveness of the tutorials with a control group of students who viewed static online solutions to mathematics problems. Finally, we report modifications which will help students more fully utilize the interactive tutorials.

THE NOTE-TAKER: A TABLET PC BASED DEVICE THAT HELPS STUDENTS TAKE AND REVIEW CLASSROOM NOTES

David S Hayden, Liqing Zhou, and John A Black Jr

Arizona State University, USA

The act of note-taking is crucially important to learning in secondary and post-secondary classrooms. It helps students stay focused on the instruction, forces them to cognitively process what is being presented, and helps them better retain what has been taught, even if they never subsequently refer to their notes. This paper describes ongoing research and development of a device (called the Note-Taker) that a student can take to class to assist in the process of taking notes. It describes the principles that have guided the development of the Note-Taker prototype, and presents the results of preliminary

usability studies that have been conducted with post-secondary students who have visual disabilities.

Hands-On Class:

Robert J. Baker

Cincinnati Country Day School, USA

More Information Coming Soon

2:45pm – 3:30pm

A METHOD FOR AUTOMATING THE ANALYSIS OF TABLET PC INK BASED STUDENT WORK COLLECTED USING DYKNOW VISION

Jared J. Hatfield

University of Louisville, USA

Existing technologies and tools related to classroom management, such as DyKnow Vision, focus on the distribution and collection of student work. While this category of products focus on the generation of content, the management of student submitted work is still a manual process. Student work collected using this type of tool is generally confined to the application that was used to generate the work, requiring instructors to manually move data from one educational application to another. Instructor efficiency and enthusiasm for ink based technologies could be improved with additional tools. This paper describes the development of a custom application to export and analyze the content of DyKnow files. Our application will reduce the amount of time required by an instructor to score digital ink based student work submitted through DyKnow. After the initial step of reading the DyKnow file is overcome, the possibility for automating common administrative tasks is seemingly endless. A simple case for automation is reading in handwritten grades on a panel collected from students, and exporting student names and the assigned scores to a CSV file. More advanced application includes further automation of the grading process. These challenges are addressed and one potential solution has been developed.

OPEN POLICY FOR WIRELESS COMPUTERS IN CLASSROOMS: WHAT MAKES IT A GOOD OR A BAD IDEA?

Zdeslav Hrepic and Kimberly Shaw

Columbus State University, USA

Increasingly, studies and media articles have been looking into possible adverse effects of open policies for using wireless ready computers in classrooms. Tablet PCs, as indicated by some of those authors, are under suspicion more than laptops because they make it harder for instructor to determine whether they are used productively or for off-the-task purposes. In this study students were invited to voluntarily bring their personal wireless computers to introductory physics classes in order to utilize them with DyKnow software. We compare performance of students who consistently used computers in classroom with those who did so less frequently or not at all. We also gauge how student attitudes and recommendations related to DyKnow software and Tablet PCs vary by the type of computer that was available to them in this course.

TABLET COMPUTING, CREATIVITY AND TEACHERS AS APPLIED MICROGENETIC ANALYSTS: A PARADIGM SHIFT IN MATH TEACHER PROFESSIONAL DEVELOPMENT

Eric Hamilton and Nancy Harding
Pepperdine University USA

This effort is funded by the Institute for Education Sciences (IES) [1] and the National Science Foundation (NSF) [2]. It advances a vision for personalized learning communities in mathematics education. Tablet computing provides entrée to naturalistic handwriting and symbolic notation at the core of mathematical manipulation in K-16 and graduate learning in mathematics. The project uses this affordance to help teachers customize instruction through development of video libraries that require freehand mathematical notation and drawing. It directs teachers to what can be considered the intersection of student cognition, mathematical content, and interactive digital media. The work bridges eclectic theoretical perspectives, while leveraging tablet computers functioning in tandem with screen-imaging software. Teacher interviews suggest multiple advances in professional development.

Hands-On Class:

[More Information Coming Soon](#)

3:45pm – 4:30pm

OrganicPad as a Research Tool: Investigating the Development of Representational Competence in Chemistry

Samuel P. Bryfczynski , Sonia M. Underwood , Nathaniel P. Grove , Roy P. Pargas , and Melanie M. Cooper
Clemson University, USA

This paper describes several new features of OrganicPad - a Tablet PC molecular structure drawing application - which expands its functionality as a research tool. These main features include: (1) the improved replay of students' work, (2) the creation of Markov chains, and (3) the ability to automatically tag students' work and generate charts of data. OrganicPad now assists teachers in replaying their students' construction of assigned structures, and using a collection of replays, generates Markov chains to help expose commonly utilized problem solving pathways. OrganicPad's automatic tagging is based on predefined substructures, user-created substructures, or a series of rules based upon real-world student data. With the addition of these new features, OrganicPad is now a more useful structural research tool.

DEVELOPING A LEARNING SUPPORT SYSTEM FOR STUDENTS IN MATHEMATICS RICH DISCIPLINES

Anne Porter and Norhayati Baharun
University of Wollongong, Australia

This paper focuses on two aspects of an Australian Learning and Teaching Council funded project Building Leadership Capacity in the Development and Sharing of Mathematics Learning Resources, Across Disciplines, Across Universities. The primary aim of this project is to develop leadership capacity, which in the simplest sense is to engage others in the sharing of predominantly Tablet created video mathematics learning resources.

The resources were to cover 100 level tertiary mathematics, statistics and bridging programs and thereby higher levels of university subjects in the disciplines that used 100 level mathematics and statistics. The sharing of technical expertise in relation to creation of resources has been one of the successes of this project as has the development and trial of different genres of video. The TabletPC has been the major tool used to create resources. The creation of resources has led to questions as to the best ways to combine resources and hence the second focus on learning design for effective learning support of mathematics based subjects.

Using Tablet PCs and Pen-Based Technology to Address Poor Student Performance in an Engineering Technology Class

Robert D. Garrick and Marybeth Koon
Rochester Institute of Technology, USA

Rochester Institute of Technology offers a Pneumatics and Hydraulics lecture and laboratory class each year, and experience has shown that most students perform well in this class. However, some students struggle and receive a low grade or withdraw from the class. To address the issue of poor student performance, a structured experiment was conducted to evaluate the use of Tablet PC digital ink technology in a lecture format. The objective of this experiment was to assess how Tablet PCs could help improve student learning. To minimize variation, the class was arranged during one term to be taught with one weekly lecture in a standard lecture environment and one weekly lecture using DyKnow software and Tablet PCs. Previous experience within the department indicated that Tablet PCs and improved note taking can greatly help students who do poorly. This mixed-methods evaluation utilizes an experimental design that minimizes variation by studying one group of students, one class section, and one instructor to better isolate the effects of DyKnow/Tablet PC usage. Student attitude surveys, a student focus group, and outside observations performed by a teaching and learning professional in both the standard lecture and DyKnow/Tablet PC environments were the methods utilized to gather rich qualitative and quantitative data.

Hands-On Class:

More Information Coming Soon

Tuesday, October 26, 2010
8:30am – 9:30am

Tuesday Keynote

What's So Special About Schools & Technology?

Tony Salvador
Intel, USA

In the history of the world, “education” can be characterized as having long periods of stability punctuated by intense moments of transition. We are now in one of those moments of intense transition from paper, blackboards and chalk to an array of digital technologies. Not surprisingly, education is not the only system to undergo change in the history of the planet, not even a so-called, digital transformation. It's instructive to look and think about past transitions in

other domains, the timing, rationale, and implications for all the people involved. From this systems approach, we learn that education is both not so special and, perhaps surprisingly, very special at the same time. Second, as with many transitions of this nature it's not just about the technologies, but about what those technologies suggest, hint at and require of the systems, in this case, the teachers, students, administrations and often, but not always, the public. We'll examine recent technologies and what they can and should mean to education, and specifically to the people and their roles that comprise education systems. Finally, rather than bore you all with a treatise on the varieties of touch screens and computing devices, we'll take a unique view of how we use and design technologies in accord with the systems approach discussed above, and in the process, consider the various technical aspects of these new digital capabilities – not as an engineering exercise, but as an exercise in how the technologies we choose affect and are affected by the ongoing digital transformation of global education system. The point of this lecture is to shift our thinking away from the technologies themselves and to give us a set of tools for understanding and evaluating how specific technologies and design decisions affect education as a comprehensive system: its people, practices, resources and power.

9:40am – 10:25am

IMPLEMENTING AN INVERTED CLASSROOM USING TABLET PCS FOR CONTENT DEVELOPMENT

Jeff Frolik, Tom Weller, Paul Flikkema and Carol Haden

University of Vermont University of South Florida, Northern Arizona University, Magnolia Consulting

This paper describes the development of a course for which multiple universities developed instructional videos using Tablet PCs and screen capture software. The videos were made available online and enabled the course instructors to implement an inverted classroom course structure. Students were assigned videos (i.e., the lectures) to watch outside of class while in-class time was spent elaborating on and applying the relevant concepts. Lessons learned from student and faculty evaluations are presented.

IS TABLET-BASED TEACHING FOR EVERYONE? AN EXPLORATION OF TEACHING WITH TABLET PCS ACROSS SCIENCE AND HUMANITIES CLASSES

Murray Logan, Katharina Franke, and Nathan Bailey

Monash University, Australia

Tablet PCs have been extensively explored in science, engineering, and computer science education, and to a lesser extent in medicine, business and economics (cf. [2, 5]). However, there is relatively little literature on their potential and impact within the humanities. This study examines and contrasts student usage and perceptions of Tablet PCs in a science cohort (biology) and two humanities cohorts (history and philosophy).

The experiences reported by students in a 1st Year philosophy subject were found to be similarly positive to those offered by a 3rd Year biology cohort, suggesting that these technologies and pedagogies have the potential to facilitate more interactive and engaging teaching and learning environments across a range of disciplines and year levels. Nevertheless, the degree of utilisation and perceived usefulness of Tablet PCs in learning spaces appeared proportional to the degree to which teaching staff use and adopt the technologies. Biology and philosophy lectures made more substantial and consistent use of

Classroom Presenter 3 software than did the instructors in the history subject, and they were associated with greater reported student Tablet PC usage and higher perceived value.

AN ATTITUDINAL STUDY OF PEN TECHNOLOGY AND WEB-BASED RECORDINGS TO ACCOMMODATE STUDENTS WITH DISABILITIES IN POST SECONDARY SCIENCE, TECHNOLOGY, ENGINEERING, AND MATH (STEM) COURSES

Laura Graves and Stacey Plant

Tennessee Technological University, USA

Graduating with a degree from a post-secondary institution has become an achievable goal for many students. However, for some students the manner in which course work is presented becomes a gatekeeper to reasonable access regarding course content. Students with learning disabilities (SWLD) may be required to focus on teaching methods that are contrary to their learning strengths. Rapid note taking or intense auditory processing may interfere with their ability to focus. This limitation may be considered a form of exclusion for SWLD since they do not have the same access to successful post-secondary education as compared to their non-disabled peers. This presentation reflects an attitudinal study of SWLD at four post-secondary institutions as part of a larger National Science Foundation research study. Students attended at least one STEM course where instructors used digital pen technology as the platform for delivering course content in the classroom. This content was recorded through screen and audio capture technology that allowed asynchronous Web access. The solution employed strives to meet equitable use among all students. Six overall common themes emerged from the transcribed interviews: clarity, organization, asynchronous access, convenience, achievement, and coping mechanisms. Focus group questions reflected access, usage, and attitude toward web-based recordings and attitudes toward perceived achievement and learning in STEM courses by SWLD.

Hands-On Class: Title

Carol Carruthers

Seneca College, Canada

[More Information Coming Soon](#)

1:15pm - 2:30pm

Tablet PC vs. iPad Educational Smackdown

As has been done with the iPod and Kindle DX, we are confident that institutions, both K-12 and higher- Education, will look to deploy iPads to their students. We want to take this opportunity to issue a challenge to compare a one-to one Tablet PC environment to an environment where everyone has an iPad. We wish to engage in debate through the eyes of 21st century pedagogy and ask the question: how can the devices affect collaboration, creativity, engagement, formative assessment, and problem solving. In short: what are the pedagogical advantages of one device over the other?

Panel

Danielle Herro, K-12 Instructional Technology Coordinator

Oconomowoc Area School District, Wisconsin, USA

Dr Dani Herro recently earned her PhD in the Educational Communications and Technology program at the University of Wisconsin, Madison. Her graduate work included researching the educational value of Web 2.0 technologies, social media, virtual environments, and online games. She is an Instructional Technology Leader in the Oconomowoc Area School District (OASD), and instructs graduate classes linking research and trends with social media and digital literacy to practice.

Prior to this she worked as a classroom teacher and technology resource teacher. Her current projects at OASD include investigating the potential for literacy and learning with iPad and iPod Touch technology, writing a game-design curriculum to be offered to high school students during the 2011-12 school year, positioning the school district to offer virtual schooling for high school students, and working with teachers to augment coursework to include Web 2.0 technologies, video narration, social networking opportunities, and other age-appropriate new media literacies.

Dani has published and presented her research, writing, and curriculum in technology and education journals, and presented at technology and education conferences across the country. Herro's principal research interests and everyday work involve finding ways to help teachers and students connect relevant, motivating, engaging technology tools to (afford) complex learning.

More information on Dani can be found at
<http://crste.org/leadershipvisionaward/danielleherro.html>

Robert J. Baker, Director of Technology
Cincinnati Country Day School, Ohio, USA

Robert Baker is the Director of Technology at Cincinnati Country Day School. He has been instrumental in developing technology programs both locally and internationally with a focus on the use of tablet PCs. At Cincinnati Country Day School, Rob is dedicated to creating the most powerful teaching and learning environment anywhere. Robert is an educator first, and this allows him to look at everything through the eyes of pedagogy, not technology. Four times a year, he hosts very popular Tablet Conferences, where educators flock to Country Day from places as far away as Thailand and Australia, California and Texas, all in the pursuit of capturing the educational power of CCDS' benchmark one-to-one tablet PC program. He was the recent recipient of international The Leadership & Vision Award sponsored by CRSTE and AALF. The award is an international recognition of leaders in the field of education who have implemented programs that promote the effective infusion of technology into instruction that reflects the skills, knowledge and experience that are essential for success in the 21st century global economy. He has written for EDTECH magazine <http://www.edtechmag.com/k12/events/updates/creativity-unleashed.html>, worked closely with Microsoft http://www.microsoft.com/casestudies/Case_Study_Detail.aspx?CaseStudyID=4000000589 and Toshiba in an effort to spread the word about the pedagogical benefits of Digital Ink. He has worked as a consultant with schools across the country and presented at many conferences and workshops, most recently at the NewTechNetwork Annual Conference <http://sites.google.com/a/newtechnetwork.org/conference-2010/program/schedule/innovation-lab>

Fraser Speirs, Head of Computing and IT at Cedars School of Excellence
Greenock, Scotland, UK

Fraser Speirs is the Head of Computing and IT at Cedars School of Excellence in Greenock, Scotland. In August 2010 at Cedars, Fraser successfully led the world's first 1:1 deployment of iPads in a whole-school setting. Fraser Speirs is a Mac OS X and iPhone Developer and Director of Connected Flow, Ltd. On Mac OS X, he is best known for the FlickrExport plugins for iPhoto and Aperture, the photo search application Viewfinder and the file and folder comparison application Changes. On iOS, his Flickr client Darkslide has consistently been one of the most popular Flickr apps.

Fraser blogs regularly and is active on Twitter as @fraserspeirs. In the past, Fraser has written for Macworld.com, Mac Developer Journal and blogged at MacDevCenter. He has also worked to support the Large Hadron Collider experiment at CERN. <http://speirs.org/> information on iPads in education

Vince DiStasi, Vice President – Chief Information Officer and Assoc. Professor of Chemistry
Grove City College, Pennsylvania, USA

Dr. Vince DiStasi serves as the Vice President - Chief Information Officer and Associate Professor of Chemistry at Grove City College in Grove City, Pennsylvania. A 1988 graduate of Grove City College, he earned a Ph.D. in Chemistry in 1994 from Indiana University, Bloomington. Currently, Vince is responsible for a comprehensive information technology strategic focus impacting all areas of the College. Building on one of the early and successful 1:1 mobile computer programs in higher education, he has led the focus and implementation of Tablet PC technology to enhance teaching and learning across the curriculum. He is an investigator in a research study "Measuring Effectiveness of Tablet PCs in Teaching and Learning using Adaptive Book and Collaborative-Immersive Technologies (AB/C-IT)" which is made possible from Microsoft Research through the Tablet PC Technology and Higher Education RFP. Vince also serves on the Higher-Education Advisory Council for Hewlett-Packard, the Jenzabar LMS Advisory Board, and the Pittsburgh Executive Advisory Council for the CIO Forum & Executive IT Summit.