ASCUE

ASSOCIATION SUPPORTING COMPUTER USERS IN EDUCATION

"Continuing Second Quarter Century of Service"

Proceedings of the 2014 ASCUE Summer Conference

47th Annual Conference
June 8-12, 2014

North Myrtle Beach, South Carolina

Edited by Peter Smith
Saint Mary's College
Notre Dame, Indiana

Association Supporting Computer Users in Education
"Our Second Quarter Century of Resource Sharing"

Proceedings of the 2014 ASCUE Summer Conference
46th Annual Conference
June 8 – 12, 2014
Myrtle Beach, South Carolina
Web: http://www.ascue.org

ABOUT ASCUE

ASCUE, the Association Supporting Computer Users in Education, is a group of people interested in small college computing issues. It is a blend of people from all over the country who use computers in their teaching, academic support, and administrative support functions. Begun in 1968 as CUETUG, the College and University Eleven-Thirty Users' Group, with an initial membership requirement of sharing at least one piece of software each year with other members, ASCUE has a strong tradition of bringing its members together to pool their resources to help each other. It no longer requires its members to share homegrown software, nor does it have ties to a particular hardware platform. However, ASCUE continues the tradition of sharing through its national conference held every year in June, its conference proceedings, and its newsletter. ASCUE proudly affirms this tradition in its motto: "Our Second Quarter Century of Resource Sharing"

ASCUE's LISTSERVE

Subscribe by visiting the site http://groups.google.com/a/ascue.org/group/members and follow the directions. To send an e-mail message to the Listserve, contact: members@ascue.org Please note that you must be a subscriber/member in order to send messages to the listserve.

NEED MORE INFORMATION

Direct questions about the contents of the 2014 Conference to Jeffery LeBlanc, Program Chair, ASCUE 14, University of Northwest Ohio, 1441 N. Cable Road, Lima, OH 45808, 419-998-3107 jaleblan@unoh.edu817-472-3090, Web: http://www.ascue.org

Association of Small Computer Users in Education
ASCUE 2013-2014 Board Members
(years remaining in office including current year)

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Keynote Speaker

Bryan Alexander is senior fellow at the National Institute for Technology in Liberal Education (NITLE). He researches, writes, and speaks about emerging trends in the integration of inquiry, pedagogy, and technology and their potential application to liberal arts contexts. Dr. Alexander's current research interests include emerging pedagogical forms enabled by mobile technologies, learning processes and outcomes associated with immersive environments (as in gaming and augmented reality), the rise of digital humanities, the transformation of scholarly communication, digital storytelling, and futurist methodologies. Dr. Alexander is author of Future Trends in Technology and Education, a monthly report that surveys recent developments in how education is changing, primarily under the impact of digital technologies. Its purpose is to help educators, policy-makers, and the public think about the future of teaching, learning, research, and institutions. Dr. Alexander is also the author of The New Digital Storytelling: Creating Narratives with New Media, published in April 2011 by Praeger. He is active online, combining research with communication across multiple venues and tweets steadily at @BryanAlexander.

Born in NYC, Dr. Alexander earned his Ph.D. in English from the University of Michigan in 1997, completing a dissertation on Romantic-era Gothic literature. He taught English literature, writing, information literacy, and information technology studies at Centenary College of Louisiana from 1997 through 2002. He was a 2004 fellow of the Frye Leadership Institute. He lives on a Vermont homestead with his family, where they raise animals and crops, combining broadband with a low-tech lifestyle.

Conference Workshops

These will be held in the late afternoon for 90 minutes during the conference.

Workshop 1
ADA Compliancy and Captioning – Creating Captions with Free or Inexpensive Software
Date: Monday, June 9, Water Oaks II
Time: 3:30pm - 5:00pm
Instructor: Steve Anderson, Sr., University of South Carolina Sumter

As ADA compliancy continues to grow in importance, preparation for both online and on-the-ground classes are seriously affected by the 504-508 Laws of the ADA Act of 1973. This session will focus on ONE aspect of ADA compliancy—the requirement that video footage be properly closed-captioned to make the educational resource readily accessible to those with hearing (or other) impairments. There are tools available that help with speech-to-text conversion and you will be introduced to a few of them during this session. We will narrate a video in real time to demonstrate how accurately some of these processes have become, and how easily they can be used both in real-time narration, and with pre-produced videos where captions are desired/required "after the fact." This workshop will focus on Camtasia Studio™. We will use a narration produced during the session, one created a few semesters ago, and one downloaded from YouTube. Workshop attendees should plan on having Camtasia Studio installed on their laptop computers prior to the workshop. There is a free trial available: http://www.techsmith.com/download/camtasia/ After demonstrating how to create and edit captioning, we will also discuss some philosophical questions regarding the extent to which such legislative man-

dates can severely handicap the faculty/staff responsible for compliance. These handicaps may well pose a threat to the vast majority of the non-impaired, as many faculty will opt to drastically reduce the number of reusable learning objects. We will also discuss what the current Best Practices are.

About the Presenter

Steve has been presenting at national and international conferences for over 25 years... almost exclusively in pedagogy and leveraging technology bot online and "on-the-ground." His most recent interests have been concentrated in perfecting the "Flipped Classroom" model, especially in low level college math classes. Lately, ADA compliance has been required when posting video footage, so suddenly my interest area has grown to include how to caption efficiently and effectively.

Workshop 2
No Coding Required – Creating Your Custom Software Using Microsoft SharePoint
Date: Tuesday, June 10, Water Oaks II
Time: 3:00pm - 4:30pm
Instructor: Luke Van Wingerden, University of South Carolina Upstate

In this workshop attendees will receive hands on experience creating a process or solution within Microsoft SharePoint applying the concepts and ideas showcased during an earlier session "Breaking down Microsoft SharePoint - A practical guide to getting started and winning?". The presenter will select a process from an attendee and walk all attendees through hands on creation and automation of the process. Attendees will be provided with a User ID and password, as well as access to a production instance of SharePoint they will use for this session. The User ID will remain active for 2 weeks following the conference to allow attendees to showcase the process they built to their colleagues. There will be NO CODING in this session and this session does not require any previous SharePoint experience. The following tools will be showcased and used: SharePoint browser enabled foundation tools, Microsoft InfoPath and SharePoint Designer. (Microsoft InfoPath and SharePoint Designer are optional based on the process being created) This session requires a device (laptop recommended). Resort wireless coverage may limit attendee participation but will not prohibit the session from occurring.

About the Presenter

Luke VanWingerden is the Director of Client Services for Information Technology and Services at the University of South Carolina Upstate. Luke started working in higher education IT in 2005 and began his role at USC Upstate in the summer of 2011. Luke has served in several capacities ranging from Project Management to Functional Management.

Workshop 3
Creating Interactive eBooks with iBooks Author
Date: Wednesday, June 11
Time: 3:00pm - 4:30pm
Instructor: Tom Marcais, Sweet Briar College

Do you have a book you'd like to publish but can't find a publisher? Would your concept benefit from rich-media content such as movies, interactive diagrams, 3D models, review questions and web links?

Create an iBook using iBook Author, a free app for Apple Computers! It's a perfect fit for designing a highly engaging textbook! Businesses can use iBooks to design handbooks, manuals and brochures. Individuals can create family recipes, travel journals or even their own novel. Export your book to share with others… or publish it directly to the iBooks store for sale! Anyone with an iPad or Apple computer (running the OSX Mavericks operating system) can experience your content. There are some things you'll need to prepare for this workshop: 1) Register for the workshop! 2) Watch these videos before coming to our conference: http://www.youtube.com/playlist?list=PL5F5025728444BBA5&feature=plcp 3) When finished, complete this assessment so we can determine the best activities for you to participate in during the workshop: https://docs.google.com/forms/d/1ko_CuXqKltfM1mkzwgKc9M47L8C8UAPqPvQ4CzPqZJc/viewform 4) Bring your own Apple laptop with iBooks Author installed. 5) Prepare any of your own content that you'd like to work with during the workshop (text, pictures, movies, diagrams and other content you'd like to piece together into an iBook). Upon demonstrating mastery of the basic iBook Author concepts, we'll help get you started on putting your book together! (Don't have any content yet? No worries!… we have sample files you can work with instead!)

About the Presenter

Tom Marcais is the Academic Technology Trainer & Consultant at Sweet Briar College. He is responsible for developing and delivering classes, presentations, workshops and consulting for students, faculty and staff in computer applications and technology supported at Sweet Briar College.

Organization for the Proceedings

ASCUE initiated a refereed track for paper submissions to the conference in 2008. In fact, at the 2008 business meeting, the membership approved three different presentation tracks: refereed with 3 blind reviews for each paper, session with paper where the author submits a paper but it is not reviewed, and session without paper where no paper is submitted and only the abstract is included in the proceedings. To reflect this division, we will divide the proceedings into three sections. The first section, up to page 64, will contain the refereed papers, the second section, from 65 to 101, will hold the papers from the sessions with paper, and the last section will list the abstracts for the other sessions.

ASCUE BOARD OF DIRECTORS FROM 1967 to 2012

At this conference we celebrate the 46th anniversary of the founding of ASCUE at a meeting in July, 1968, at Tarkio College in Missouri of representatives from schools which had received IBM 1130 computers to help them automate their business functions and teach students how to use computers. They decided to form a continuing organization and name it CUETUG, which stood for College and University Eleven-Thirty Users Group. By 1975, many of the member schools were no longer using the IBM 1130, and were requesting to be dropped from the membership lists. At the same time, other small schools were looking for an organization that could allow them to share knowledge and expertise with others in similar situations. The name was changed from CUETUG to ASCUE at the 1975 business meeting and we opened membership to all institutions that agreed with our statement of purpose. Our

historian, Jack Cundiff, has collected the names and schools of the officers for ASCUE and its predecessor CUETUG for the last forty-five years and we have printed these names on the following pages.

ASCUE BOARD OF DIRCTORS FROM 1967 to 1972

	1967-68	1969-70	1970-71	1971-72
President	Ken Zawodny St. Joseph's College	Howard Buer Principia College	Jack Cundiff Muskingum College	Wally Roth Taylor University.
Program Chair	Wally Roth Taylor University	Jack Cundiff Muskingum College	Wally Roth Taylor University	James McDonald Morningside College
Past President	Al Malveaux Xavier, New Orleans	Ken Zawodny St. Joseph's College	Howard Buer Principia College	Jack Cundiff Muskingum College
Treasurer	Howard Buer Principia College	Al Malveaux Xavier University	Al Malveaux Xavier University	Al Malveaux Xavier University
Secretary	John Robinson	Dorothy Brown South Carolina State	Dorothy Brown South Carolina State	Dick Wood Gettysburg College
Board Members	James Folt Dennison University	James Folt Dennison University	James Foit Dennison University	John Orahood U. of Arkansas, LR
At Large	Don Glaser Christian Brothers C.	Don Glaser Christian Brothers	Don Glaser Christian Brothers	N. Vosburg Principia College
Public Relations				Dan Kinnard Arizona Western
Librarian				Jack Cundiff Muskingum College
Equip. Coordinator				
Web Coordinator				
Sponsor Relations Coordinator				

Location: Tarkio College Principia College Muskingum College Christian Brothers

ASCUE BOARD OF DIRCTORS FROM 1972 to 1976

	1972-73	1973-74	1974-75	1975-76
President	James McDonald Morningside College	Dan Kinnard Arizona Western	T. Ray Nanney Furman University	Larry Henson Berea College
Program Chair	Dan Kinnard Arizona Western	T. Ray Nanney Furman University	Larry Henson Berea College	Jack McElroy Oklahoma Christian
Past President	Wally Roth Taylor University	James McDonald Morningside College	Dan Kinnard Arizona Western	T. Ray Nanney Furman University
Treasurer	J. Westmoreland U. Tenn Martin	J. Westmoreland U. Tenn Martin	Jim Brandl Central College	Jim Brandl Central College
Secretary	Ron Anton Swathmore College	Ron Anton Swathmore College	Harry Humphries Albright College	Harry Humphries Albright College
Board Members	John Orahood U. of Arkansas, LR	Al Malveaux Xavier, New Orleans	Sister Keller Clarke College	Sister Keller Clarke College
At Large	N. Vosburg Principia College	Wally Roth Taylor University	Wally Roth Taylor University	Mike O'Heeron
Public Relations	Dan Kinnard Arizona Western	Dan Kinnard Arizona Western	Dan Kinnard Arizona Western	Dan Kinnard Arizona Western
Librarian	Jack Cundiff Muskingum College	Jack Cundiff Muskingum College	Jack Cundiff Muskingum College	Jack Cundiff Muskingum College
Equip. Coordinator				
Web Coordinator				
Sponsor Relations Coordinator				
Location:	Georgia Tech	Morningside	Furman	Berea

ASCUE BOARD OF DIRCTORS FROM 1976 to 1980

	1976-77	1977-78	1978-79	1979-80
President	Jack McElroy Oklahoma Christian	Harry Humphries Albright College	Fred Wenn Caspar College	Doug Hughes Dennison University
Program Chair	Harry Humphries Albright College	Fred Wenn Caspar College	Doug Hughes Dennison University	J. Westmoreland U. Tenn Martin
Past President	Larry Henson Berea College	Jack McElroy Oklahoma Christian	Harry Humphries Albright College	Fred Wenn Caspar College
Treasurer	William Roeske Houghton College	William Roeske Houghton College	James Foit Central Ohio Tech	James Foit Central Ohio Tech
Secretary	Doug Hughes Dennison University	Doug Hughes Dennison University	Dave Dayton Grove City College	John Jackobs Coe College
Board Members	Dave Dayton Grove City College	Dave Dayton Grove City College	Jan C. King Chatham College	Wally Roth Taylor University
At Large	Fred Wenn Casper College	John Jackobs Coe College	John Jackobs Coe College	Jan C. King Chatham College
Public Relations	Dan Kinnard Arizona Western	Sister Keller Clarke College	Sister Keller Clarke College	Sister Keller Clarke College
Librarian	Jack Cundiff Muskingum College	Jack Cundiff Muskingum College	Jack Cundiff Muskingum College	Jack Cundiff Muskingum College
Equip. Coordinator				
Web Coordinator				
Sponsor Relations Coordinator				

Location: OK Christian Albright College Casper College Dennison University

ASCUE BOARD OF DIRCTORS FROM 1980 to 1984

	1980-81	1981-82	1982-83	1983-84
President				
	J. Westmoreland	John Jackobs	Jan Carver	Wally Roth
	U. Tenn Martin	Coe College	Chatham College	Taylor University
Program Chair				
	John Jackobs	Jan Carver	Wally Roth	Dudley Bryant
	Coe College	Chatham College	Taylor University	Western Kentucky
Past President				
	Doug Hughes	J. Westmoreland	John Jackobs	Jan Carver
	Dennison University	U. Tenn Martin	Coe College	Chatham College
Treasurer				
	Ron Klausewitz	Ron Klausewitz	Harry Lykens	Harry Lykens
	W. Virginia Weslyan	W. Virginia Weslyan	Mary Institute, St L.	Mary Institute, St. L.
Secretary				
	Jan Carver	Ken Mendenhall	Ken Mendenhall	John Jackobs
	Chatham College	Hutchinson CC, KS	Hutchinson CC, KS	Coe College
Board Members				
	Dudley Bryant	Dudley Bryant	William Roeske	William Roeske
	Western Kentucky	Western Kentucky	Houghton University	Houghton University
At Large				
	Wally Roth	Chuck Mcintyre	Chuck Mcintyre	Bob Renners
	Taylor University	Berea College	Berea College	Kenyon College
Public Relations				
	Sister Keller	Sister Keller	Sister Keller	Sister Keller
	Clarke College	Clarke College	Clarke College	Clarke College
Librarian				
	Jack Cundiff	Jack Cundiff	Jack Cundiff	Jack Cundiff
	Muskingum College	Muskingum College	Muskingum College	Muskingum College
Equip. Coordinator				
Web Coordinator				
Sponsor Relations Coordinator				
Location:	U. Tenn Martin	Coe College	Chatham College	Taylor University

ASCUE BOARD OF DIRCTORS FROM 1984 to 1988

	1984-85	1985-86	1986-87	1987-88
President	Dudley Bryant Western Kentucky	Paul Pascoe Vincennes University	Jack Cundiff Horry-Georgetown	Keith Pothoven Central College
Program Chair	Paul Pascoe Vincennes University	Jack Cundiff Horry-Georgetown	Keith Pothoven Central College	David Cossey Union College
Past President	Wally Roth Taylor University	Dudley Bryant Western Kentucky	Paul Pascoe Vincennes University	Jack Cundiff Horry-Georgetown
Treasurer	Harry Lykens Mary Institute, St. L	Harry Lykens Mary Institute, St. L	Maureen Eddins Hadley School Blind	Maureen Eddins Hadley School Blind
Secretary	John Jackobs Coe College	John Jackobs Coe College	John Jackobs Coe College	Dudley Bryant Western Kentucky
Board Members	Keith Pothoven Central College	Keith Pothoven Central College	Robert Hodge Taylor University	Robert Hodge Taylor University
At Large	Bob Renners Kenyon College	Carol Paris Goshen College	Carol Paris Goshen College	Ann Roskow Ister CC
Public Relations	Dough Hughes Dennison University	Wally Roth Taylor University	Wally Roth Taylor University	Wally Roth Taylor University
Librarian	Jack Cundiff Muskingum College	Jack Cundiff Muskingum College	Jack Cundiff Horry-Georgetown	Jack Cundiff Horry-Georgetown
Equip. Coordinator				
Web Coordinator				
Location:	W. Kentucky	Vincennet	Myrtle Beach	Myrtle Beach

ASCUE BOARD OF DIRCTORS FROM 1988 to 1992

	1988-89	1989-90	1990-91	1991-92
President				
	David Cossey Union College	Tom Warger Bryn Mawr College	David Redlawsk Rudgers University	Bill Wilson Gettysburg College
Program Chair				
	Tom Warger Bryn Mawr College	David Redlawsk Rudgers University	Bill Wilson Gettysburg College	Carl Singer DePauw University
Past President				
	Keith Pothoven Central College	David Cossey Union College	Tom Warger Bryn Mawr College	David Redlawsk Rudgers University
Treasurer				
	Maureen Eddins Hadley School Blind	Maureen Eddins Hadley School Blind	Tom Pollack Duquesne University	Tom Pollack Duquesne University
Secretary				
	Dudley Bryant Western Kentucky	Kathy Decker Clarke College	Kathy Decker Clarke College	Dagrun Bennett Franklin College
Board Members				
	Kathy Decker Clarke College	Dagrun Bennett Franklin College	Dagrun Bennett Franklin College	Mary Connolly Saint Mary's College
At Large				
	Ann Roskow Ister CC	Rick Huston South Caolina/Aiken	Rick Huston South Caolina/Aiken	Rick Huston South Caolina/Aiken
Public Relations				
	Wally Roth Taylor University	Wally Roth Taylor University	Wally Roth Taylor University	Wally Roth Taylor University
Librarian				
	Jack Cundiff Horry-Georgetown	Jack Cundiff Horry-Georgetown	Jack Cundiff Horry-Georgetown	Jack Cundiff Horry-Georgetown
Equip. Coordinator				
Web Coordinator				
Sponsor Relations Coordinator				
Location:	Myrtle Beach	Myrtle Beach	Myrtle Beach	Myrtle Beach

ASCUE BOARD OF DIRCTORS FROM 1992 to 1996

	1992-93	1993-94	1994-95	1995-96
President	Carl Singer DePauw University	Rick Huston South Carolina/Aiken	Mary Connolly Saint Mary's College	Paul Tabor Clarke College
Program Chair	Rick Huston South Carolina/Aiken	Mary Connolly Saint Mary's College	Paul Tabor Clarke College	Carl Singer DePauw University
Past President	Bill Wilson Gettysburg College	Carl Singer DePauw University	Rick Huston South Carolina/Aiken	Mary Connolly Saint Mary's College
Treasurer	Tom Pollack Duquesne University	Tom Pollack Duquesne University	Tom Pollack Duquesne University	Tom Pollack Duquesne University
Secretary	Dagrun Bennett Franklin College	Dagrun Bennett Franklin College	Dagrun Bennett Franklin College	Dagrun Bennett Franklin College
Board Members	Mary Connolly Saint Mary's College	Gerald Ball Mars Hill College	Gerald Ball Mars Hill College	Rick Huston South Carolina/Aiken
At Large	Tom Gusler Clarion University	Tom Gusler Clarion University	Tom Gusler Clarion University	Tom Gusler Clarion University
Public Relations	Don Armel Eastern Illinois U.	Don Armel Eastern Illinois U.	Don Armel Eastern Illinois U.	Peter Smith Saint Mary's College
Librarian	Jack Cundiff Horry-Georgetown	Jack Cundiff Horry-Georgetown	Jack Cundiff Horry-Georgetown	Jack Cundiff Horry-Georgetown
Equip. Coordinator				
Web Coordinator				
Sponsor Relations Coordinator				

Location:	Myrtle Beach	Myrtle Beach	Myrtle Beach	Myrtle Beach

ASCUE BOARD OF DIRCTORS FROM 1996 to 2000

	1996-97	1997-98	1998-99	1999-2000
President	Carl Singer DePauw University	Carl Singer(acting) DePauw University	Bill Wilson Gettysburg College	Dagrun Bennett Franklin College
Program Chair	Chris Schwartz Ursuline College	Bill Wilson Gettysburg College	Dagrun Bennett Franklin College	Carol Smith DePauw University
Past President	Mary Connolly Saint Mary's College	Mary Connolly Saint Mary's College	Carl Singer DePauw University	Bill Wilson Gettysburg College
Treasurer	Tom Pollack Duquesne University	Tom Pollack Duquesne University	Tom Pollack Duquesne University	Tom Pollack Duquesne University
Secretary	Dagrun Bennett Franklin College	Dagrun Bennett Franklin college	Tom Gusler Clarion University	Nancy Thibeault Sinclair CC
Board Members	Richard Stewart Lutheran Theological	Richard Stewart Lutheran Theological	Nancy Thibeault Sinclair CC	Fred Jenny Grove City College
At Large	Rick Huston South Carolina/Aiken	Rick Rodger Horry-Georgetown	Rick Rodger Horry-Georgetown	George Pyo Saint Francis College
Public Relations	Peter Smith Saint Mary's College	Peter Smith Saint Mary's College	Peter Smith Saint Mary's College	Peter Smith Saint Mary's College
Librarian	Jack Cundiff Horry-Georgetown	Jack Cundiff Horry-Georgetown	Jack Cundiff Horry-Georgetown	Jack Cundiff Horry-Georgetown
Equip. Coordinator				Rick Huston South Carolina/Aiken
Web Coordinator				
Sponsor Relations Coordinator				
Location:	Myrtle Beach	Myrtle Beach	Myrtle Beach	Myrtle Beach

ASCUE BOARD OF DIRCTORS FROM 2000 to 2004

	2000-01	2001-02	2002-03	2003-04
President				
	Carol Smith DePauw University	Fred Jenny Grove City College	Nancy Thibeault Sinclair CC	Barry Smith Baptist Bible College
Program Chair				
	Fred Jenny Grove City College	Nancy Thibeault Sinclair CC	Barry Smith Baptist Bible College	George Pyo Saint Francis College
Past President				
	Dagrun Bennett Franklin College	Carol Smith DePauw University	Fred Jenny Grove City College	Nancy Thibeault Sinclair CC
Treasurer				
	Tom Pollack Duquesne University	Tom Pollack Duquesne University	Tom Pollack Duquesne University	Tom Pollack Duquesne University
Secretary				
	Nancy Thibeault Sinclair CC	Kim Breighner Gettysburg College	Kim Breighner Gettysburg College	Kim Breighner Gettysburg College
Board Members				
	Barry Smith Baptist Bible College	Barry Smith Baptist Bible College	David Frace CC Baltimore County	David Frace CC Baltimore County
At Large				
	George Pyo Saint Francis College	George Pyo Saint Francis College	George Pyo Saint Francis College	Jim Workman Pikeville College
Public Relations				
	Peter Smith Saint Mary's College	Peter Smith Saint Mary's College	Peter Smith Saint Mary's College	Peter Smith Saint Mary's College
Librarian				
	Jack Cundiff Horry-Georgetown	Jack Cundiff Horry-Georgetown	Jack Cundiff Horry-Georgetown	Jack Cundiff Horry-Georgetown
Equip. Coordinator				
	Rick Huston South Carolina/Aiken	Hollis Townsend Young Harris College	Hollis Townsend Young Harris College	Hollis Townsend Young Harris College
Web Coordinator				
			Carol Smith DePauw University	Carol Smith DePauw University
Sponsor Relations Coordinator				

Location: Myrtle Beach Myrtle Beach Myrtle Beach Myrtle Beach

ASCUE BOARD OF DIRCTORS FROM 2004 to 2008

	2004-05	2005-06	2006-07	2007-08
President	George Pyo Saint Francis College	Jim Workman Pikeville College	Lisa Fears Franklin College	George Pyo Saint Francis College
Program Chair	Jim Workman Pikeville College	Lisa Fears Franklin College	George Pyo Saint Francis College	Fred Jenny Grove City College
Past President	Barry Smith Baptist Bible College	George Pyo Saint Francis College	Jim Workman Pikeville College	Lisa Fears Franklin College
Treasurer	Tom Pollack Duquesne University	Tom Pollack Duquesne University	Tom Pollack Duquesne University	Tom Pollack Duquesne University
Secretary	Kim Breighner Gettysburg College	Kim Breighner Gettysburg College	Kim Breighner Gettysburg College	Kim Breighner Gettysburg College
Board Members	Lisa Fears Franklin College	Blair Benjamin Philadelphia Bible	Blair Benjamin Philadelphia Bible	Janet Hurn Miami U. Middleton
At Large	David Frace CC Baltimore County	David Frace CC Baltimore County	David Fusco Juniata College	David Fusco Juniata College
Public Relations	Peter Smith Saint Mary's College	Peter Smith Saint Mary's College	Peter Smith Saint Mary's College	Peter Smith Saint Mary's College
Librarian	Jack Cundiff Horry-Georgetown	Jack Cundiff Horry-Georgetown	Jack Cundiff Horry-Georgetown	Jack Cundiff Horry-Georgetown
Equip. Coordinator	Hollis Townsend Young Harris	Hollis Townsend Young Harris	Hollis Townsend Young Harris	Hollis Townsend Young Harris
Web Coordinator	Carol Smith DePauw University	David Diedreich DePauw University	David Diedriech DePauw University	Blair Benjamin Philadelphia Bible
Sponsor Relations Coordinator				
Location:	Myrtle Beach	Myrtle Beach	Myrtle Beach	Myrtle Beach

ASCUE BOARD OF DIRCTORS FROM 2008 to 2012

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Recruiting Women into Computer Science and Information Systems

Steven Broad[1]
Assistant Professor of Mathematics and Computer Science
sbroad@saintmarys.edu

Meredith McGee[2]
mmcgee01@saintmarys.edu

Saint Mary's College
Notre Dame, IN 46556
574-284-4497

Abstract

While many technical disciplines have reached or are moving toward gender parity in the number of bachelors degrees in those fields, the percentage of women graduating in computer science remains stubbornly low. Many recent efforts to address this situation have focused on retention of undergraduate majors or graduate students, recruiting undergraduate women into graduate programs, or appealing to girls through K12-focused experiences. Our approach focuses more specifically on recruiting women to take their first "major-track" computer science course (CS1) and strategically redeveloping that course to spur interest in computing. Our strategy for so doing is to better understand how women view computer science prior to any direct experience in college-level study, developing a woman-centered first programming course that focuses on fundamentally-sound curriculum, addressing the retention recommendations offered in other studies, and face-to-face recruiting to encourage students to register for their first course.

Introduction

In 2010, only 18% of computer science bachelor's degrees were awarded to women, despite the fact that 37% of such degrees were awarded to women in 1985. [1] This worrisome trend was noted by many computer scientists and was systematically studied in an attempt to reverse it. The Computing Research Association's Committee on the Status of Women in Computing Research produced a report aimed at summarizing much of this work. This report presented a list of 20 recommendations for recruitment and retention of women in graduate computer science programs. It also presented many findings intended to help guide the understanding of college and university educators as to some general - although not universal - factors in how, when, and why women become interested in computing.

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2 This work was supported by the Maryjeanne R. Burke SISTAR grant during summer 2013.

> "Men are more likely than women to become interested in computing at an early age—often describing "epiphany moments" that occurred even before the age of 10—and they are more likely to be interested in computing for its own sake, whereas women tend to become interested in CS as an "acquired taste" that emerges over time. Frequently, women are interested in computing for its potential applications to societal concerns or other areas of interest such as education, medicine, art, and music. As a result, they may come to computing at a later stage in their education, perhaps after having majored in some other discipline." [2]

There are many possible reasons that women students nationwide do not complete a program of study in computer science. Many of the reasons that appear in the literature pertain to social dynamics between men and women or the need to mitigate cultural norms in computer science and information systems that are not particularly friendly to women. Indeed, of the recommendations of the Status of Women in Computing Research report, about half of the recommendations were specifically aimed at dealing with such issues.[3] Understanding why women do not complete programs in computing is certainly of great importance. This approach improves the percentage of women who complete a major, assuming that they began the major.

It is important to note that the women considered above eventually expressed a strong interest in computing by majoring in it or deciding to study it at the graduate level. Many others with the necessary skills and ability do not take this step. Indeed, although it is not entirely clear why it is so, it is certainly true that many skilled and capable college and university students - men and women - never take a single course in computer science or information systems.

The approach of this study is to improve the number of students who begin to study computing. Keeping in mind lessons learned in the literature, we focus on four specific areas: students self-evaluation of their attitudes toward and preparedness for studying computer science, the development of a woman-centered introductory course, addressing the retention recommendations provided by the literature, and face-to-face recruiting.

Attitudes and Preparedness

Many studies have focused on how to improve the attitudes and preparedness of K-12 aged girls with respect to computer science (and STEM studies in general). This area of study (and the outreach that often accompanies it) is crucially important, given that students generally have less formal experience with computing in the K-12 curriculum than they do in many other fields. Moreover, girls and young women make up a proportionately small number of computing students. Indeed, among Computer Science Advanced Placement test takers, only 18.7% (5,807 out of 31,117) were women in 2013. [3] Meanwhile, roughly 178,000 women took the the Calculus AB or BC AP exams. [3]

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3 Of the 20 recommendations in the report, recommendations 9, 10, 12, 13, 14, and 19 pertained to social dynamics while 7, 11, 15, 16, 17, and 20 pertained to cultural norms. [2]

This suggests that most institutions have many students capable of studying computer science who - for whatever reason - have not done so. For example, at Saint Mary's College we typically have approximately 150 women studying at least one calculus course each year[4], but typically only 35 to 50 women per year study computer programming[5]. Certainly there are many more skilled and able women aside from those who take our calculus courses, but there are also many calculus students who never take CS1.[6] Other talented and interested students who are not studying Calculus simply add weight to this argument.

To understand how to address these students, we developed a short survey[7] to investigate women students' attitudes toward studying computing. This will be called the Attitudes Survey for brevity. The survey instrument was administered on paper and in person to students in randomly - but representatively - selected course sections in mathematics at Saint Mary's College during Fall 2013. All such courses were general education courses aimed at first year students. All students participating in the survey were women. No identifying information was recorded. The survey was aimed at understanding the degree to which students are comfortable with common technologies in an academic setting (comfort), interested in computing and computing devices (interest), and aware of the applications of computing to their areas of academic interest (relevance). The survey also investigates how students perceive the difficulty of scheduling a programming course into their schedules (logistics). The survey then investigated how students perceive careers in computing. A total of 112 students responded to this survey.

4 This is the average yearly enrollment in our entry Calculus courses over the past six years. Some students enter directly into Calculus II or above, and are not included. Data obtained from our Banner student information system.

5 This is the average yearly enrollment in our CS1 course combined with the average yearly enrollment in our engineering program which is hosted at the University of Notre Dame. The Intro to Engineering course counts in replacement of the CS1 course for certain major requirements at Saint Mary's.

6 Students at Saint Mary's are generally given a math registration recommendation based on the results of high school math grade, entrance tests (SAT/ACT) and a placement examination. Generally speaking, these calculus courses are populated with students who are well-prepared for calculus.

7 This survey instrument was approved for research purposes by Saint Mary's College Institutional Review Board in October 2013.

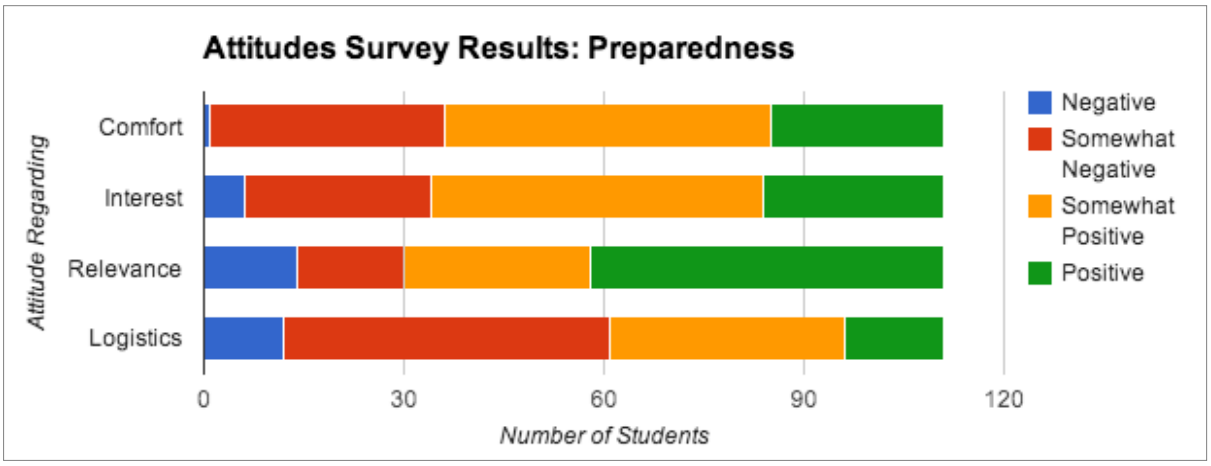

Figure 1: Attitudes Survey Results regarding student preparedness to study computing

The results of this survey pertaining to the first four "attitudes" (comfort, interest, relevance, and logistics) are displayed in Figure 1. It is clear that these women widely regard computing as relevant to their career choices, since 81 out of 112 (72.3%) rate the relevance of computing in their field of study as at least somewhat positive. At the same time, fewer than half (50 out of 112) are even mildly optimistic about the logistics of actually taking our CS1 course. Those who respond negatively on this item were primarily concerned about needing to significantly rebalance their academic workload (49 out of 61), although some (12 out of 61) feel that their grades would suffer. The results for comfort and interest level appear similar. In each case, about two-thirds of students reply at least somewhat positively, 67.6% and 69.3% respectively. This will be investigated in somewhat greater detail in the discussion of Figure 3. Overall, the results of Figure 1 seem encouraging.

The Attitudes Survey also addresses the question of how students perceive careers in computing. Figure 2 presents these results. The percentage of positive responses ranges from a high of 69% for Social Impact to a low of 57% for Dynamic (meaning whether or not such careers are dynamic and interesting). We note especially that 68% of respondents believe that careers in computing are Good for Women which seems positive, but which also suggests that 32% of respondents currently feel that careers in computing are not good for women, suggesting that the "burden of proof" is still on the technology sector to demonstrate otherwise. Moreover, although careers involving computing are among the most lucrative in the United States for college graduates and regularly feature in popular media about top careers for college graduates, students are less aware of this than they are of many other aspects of careers in computing. On the other hand, many of the clichés that are popularly ascribed to technology workers, such as that they are detached from "real life," only for geeks, or that they work in isolation do not seem to be as firmly entrenched as one might fear. The most curious of these perceptions is the one titled "Normal" which asks students if a career in computing is "compatible with a normal life." There certainly is no canonical interpretation of what a normal life is. Students may be responding to another cliché about technology workers, namely that they are always working. It is hard to tell for certain what this particular number means, except by interpreting it as an feeling of personal relatability. It does not deviate much from the other six perception scores, but it may "take their temperature." Overall, the results of Figure 2 seem encouraging.

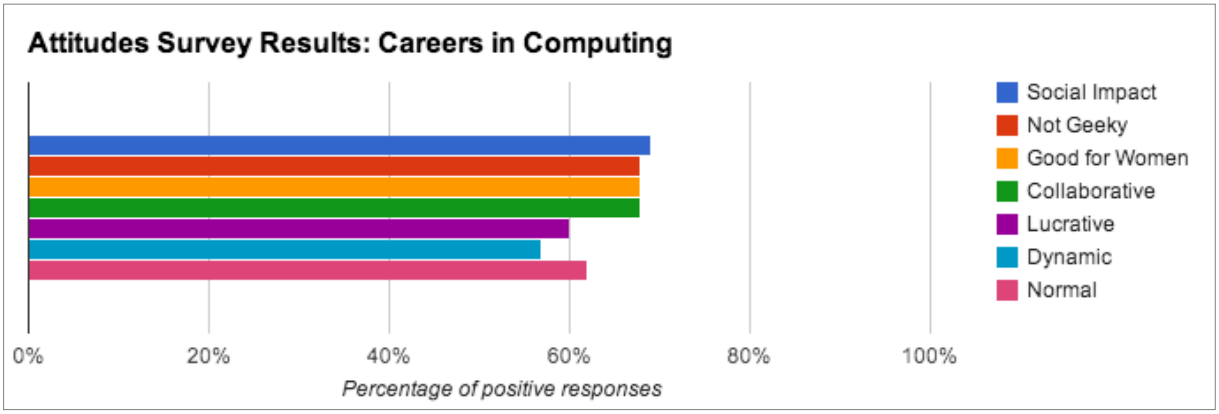

Figure 2: Attitudes regarding careers in computing

The difficulty in understanding the results from Figures 1 and 2 is that while there may be some correlation between these variables (i.e., the various attitude scores), the relationship is somewhat loose. For instance, in the case of students' comfort level and interest in computing, it is certainly possible that a student might self-evaluate as very interested but not terribly comfortable with computing. One may suspect that these two aspects of "preparedness" to take a CS1 course may be the most influential in determining whether or not a student registers for the course in the first place. If she's either not comfortable with computing or not interested, it seems considerably less likely that she would actively seek to undertake the course without active mitigation of one or the other (or both) of these worries.

Figure 3 explores the interaction between these two variables. This figure demonstrates that a large proportion of students who are interested in computing (High or Medium for interest) are nervous about using it in an academic context or actively avoid it. It also demonstrates that many students who self-evaluate as Experienced or Confident technology users are not especially interested in discovering anything new within that sphere. Fewer than two-fifths (39.7%) of respondents rated themselves as both reasonably interested and comfortable with regard to computing. Add to that students' logistical concerns and it is easy to see how a well prepared, intellectually vigorous student might reach the end of her undergraduate career without ever taking a computer science course.

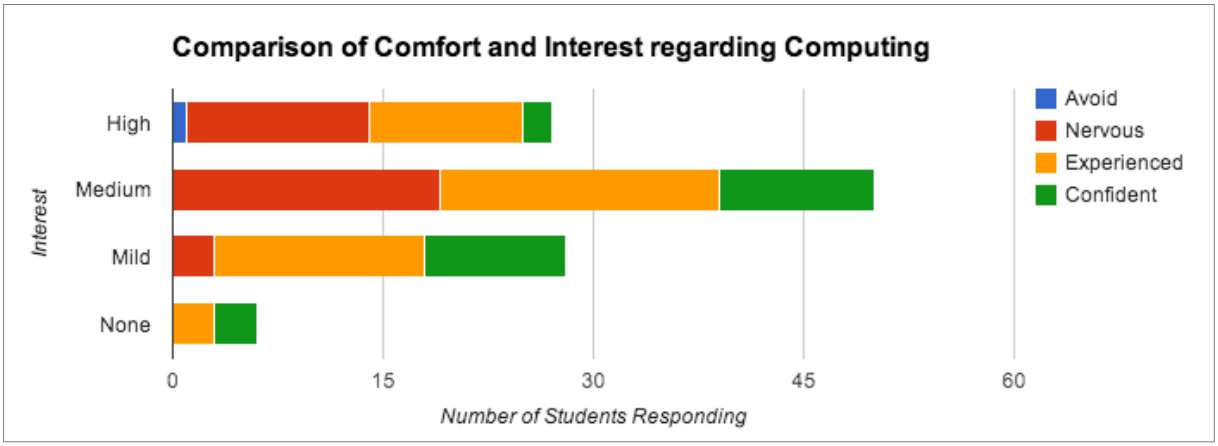

Figure 3: Attitudes Survey Results comparing student interest level and comfort level

Overall, we interpret the message of this data in the context of Saint Mary's College as offering opportunities and insights about how to improve the number of students taking CS1. In particular, we don't need to spend as much time worrying about whether or not students think computing is a relevant skill. Instead, we need to develop and market a course that leverages the perceived relevance of computing, emphasizes the power of computing in combination with other technologies to improve students' interest, and provides an inclusive, welcoming, and nurturing environment in which to gain access to critically important ideas and skills.

A Woman-centered Course

Issues pertaining to social dynamics and woman-unfriendly cultural norms are less immediate at Saint Mary's College because we are a women's College. This gives us an opportunity to develop, implement and conduct an entirely woman-centered computer science and information systems curriculum. This should - in principle - remedy many of the issues related to cultural norms that arise in programs nationwide. Additionally, at Saint Mary's it is almost exclusively[8] women students who define the social dynamics and cultural norms in the classroom. Certainly, a male professor might have a significant impact on those dynamics and norms, but faculty are certainly encouraged to be open to their students' needs and preferences.

Supposing that such cultural issues were fully resolved, one inevitably arrives at the following questions: "Is that enough? Can we now continue doing what we have always done?" These questions are a bit disingenuous in the sense that it would be very difficult to fully disentangle the curriculum from the institutional culture. However, we assert that it is difficult to address these cultural issues without first addressing the curriculum and that beginning an iterative process of curricular revision may be a necessary precondition for cultural transformation.

Curricular revision should proceed in such a way as to reduce those factors that are perceived to discourage women in computing and improve those factors that encourage women and promote retention in computing majors. We present a collection of observations and suggestions from the literature pertinent to those factors. We group them into several categories: dispositional, institutional, cultural, and pedagogical, recognizing that some of these could reasonably fall into more than one category. In the discussion that follows, the text will refer to these observations by number e.g., Obs 1 meaning Observation 1 in this list.

The dispositional factors are those that relate to a woman student's general point of view. An individual woman may relate to all, some, or none of these, but the literature identifies them as being more often associated with women students than men.

1. "Women, even though they perform at the same levels, have less confidence in their abilities and individual accomplishments than men." [2]
2. "Women are often less aggressive than male students in promoting themselves, attempting new or challenging activities, and pursuing awards or fellowships." [2]

8 Occasionally, men from other nearby institutions take our CS1 course.

3. "Females come to computing as only one interest among many." [2]
4. Women are often "less single-minded than their male counterparts." [2]
5. "Women are interested in computing for its potential applications to societal concerns." [2]
6. Women have "other areas of interest such as education, medicine, art, and music." [2]
7. Women "may be more sensitive than men to social feedback." [2]
8. Women may be "more responsive to encouragement, personal recognition, and individual invitations from faculty." [2]
9. Women often report struggling with "'impostor syndrome,' an internalized feeling that women simply don't belong in tech." [5] (This factor, in particular, belongs in multiple categories.)

The cultural factors are those pertaining to the overarching culture of computing and the societal expectations of those professionals and academics associated with computing. These are values that students may be acquainted with through pre-college experiences.

10. Computing is a "male-dominated, hacker culture." [2]
11. Women "may come to computing at a later stage in their education." [2]
12. Women are "more likely to interrupt their education for family reasons." [2]
13. Women benefit from knowing that "many different kinds of careers that can be launched from this education." [2]
14. "The culture that develops around computer science departments is often unattractive to women." [4]
15. "When girls think of computer science, they think of the gamers and sitting in a cubicle to program." [1]

Institutional factors pertain mostly to attitudes, actions, and initiatives that institutions can take at the program level to make computer science and information systems amenable to a greater diversity of students.

16. "Department literature and departmental visitors [should] include women whose lives and careers do not reinforce the standard clichés." [2]
17. Focus on "increasing the number of women enrolled in computer science, [not] the percentage." [4]
18. "Develop a community of women in computer science." [5]
19. Offer "early exposure to research projects during the first year of college." [1]
20. Offer "opportunities for undergraduates to interact with women who have enjoyed successful careers in technology." [1]
21. "Facilitate mentoring." [2, 6]
22. "Make timetables flexible." [6]
23. "Arrange for [current] women ... students to meet with prospective women students." [6]
24. "Incorporate research into the standard undergraduate curriculum." [2]

Pedagogical factors are those that can be addressed in individual courses to improve the likelihood that each individual woman will view computing coursework as a good fit for her aspirations.

25. Emphasize the "professional contributions of women ... in classrooms and lectures." [2]
26. "Support the formation of short-term peer support groups, for example, for cooperative classroom activities." [2]
27. Make the introductory courses "accessible to a much wider audience." [4]

28. "The level of [pre-college] computing experience ... differs markedly with gender." [4]
29. "The course is designed to encourage all students rather than to select the best." [4]
30. "Women bring a different perspective to solving problems." [5]
31. Cultivate "a classroom atmosphere where passing judgment is avoided, all questions are treated with respect, students' ideas and thoughts are explored, and learning is collaborative." [7]
32. Incorporate "more-diverse programming activities" to appeal to a range of students. [1]

Our approach to the development of a woman-centered CS1 course incorporates responses to many of these observations. In particular, the CS1 course at Saint Mary's College is a part of the general education curriculum, assumes no prior computing experience, provides a supportive environment for active, collaborative learning in lab experiences, emphasizes personalization of projects, values clarity over brevity in code writing, and emphasizes the applicability and power of computing by leveraging web services. A CS1 course with this construction directly addresses all of the pedagogical factors listed above at least in part, and indirectly addresses many of the dispositional, cultural, and institutional factors as well.

Include CS1 in General Education

The general education program at Saint Mary's has recently (2012) been restructured in such a way that CS1 can be part of the general education curriculum. When it comes to recruiting students, courses that participate in general education have a clear advantage. Indeed, considering the logistical difficulty noted above, this could be construed as addressing the accessibility of the course by allowing it to satisfy requirements in the general education rather than just as elective credit, thus reducing logistical barriers (Obs 27). The curriculum of the course was revised somewhat to include some discussion of the ethics of computing and a modest writing component (Obs 31). The curriculum revisions necessary to add the course to the general education curriculum also required the course to have relatively little presumed background knowledge (Obs 28). A position in the general education curriculum also arguably sends a different message to students about the nature of the course, namely that it is a course for everyone not just a special category of people (Obs 27, 29). We feel that offering CS1 as part of the general education curriculum makes sense, aligns with the needs of men and women students, and makes a positive contribution to the character of the course.

Do not assume any prior experience

First courses in computer programming almost never require prerequisite courses. This would suggest that students with no background should not feel at a competitive disadvantage. Women do, however, report feeling relatively unprepared for the early coursework in some settings [e.g., 8]. At Saint Mary's, we actively frame computer programming as a novel undertaking (Obs 27, 28). There is no assumption of any particular mathematical background, familiarity with process diagramming, propositional logic, or any significant computing skills beyond web browsing and word processing. Students are actively informed of the absence of such assumptions and that the course is motivated by a desire to avoid competition and develop a framework in which all students can be successful (Obs 29). The CS1 course at Saint Mary's has a very low rate of students attrition (less than 5% over the past three years).

Develop a supportive and collaborative environment

Students in the first programming course at Saint Mary's are encouraged to work together in laboratory and homework assignments (Obs 26, 31). Students are actively encouraged to make their work unique and to add their own personal touches to their assignments (which also helps mitigate concerns that students will not do individual work individually). During lecture hours, students are often asked to begin the class with a group warm-up exercise. For example, when discussing inheritance students are asked to identify the similarities and differences between a collection of loosely related types of objects like animals or ice cream flavors. Students' responses are then used to motivate examples of class hierarchies (Obs 31). Each individual student typically makes contributions to such exercises, which means that rather than bringing a categorical woman's perspective to bear, the problem solving strategies of a diverse collection of individual women are on display with no need to generalize to the category of women (Obs 30). Past students who are working in computing fields are often invited to visit classes and present their own experiences (Obs 25). Students become very comfortable expressing their thoughts, concerns, questions, apprehensions, and so forth in an environment that invites ideas and values them.

Allow students to personalize projects

It is not uncommon for CS1 courses or programming courses in general to require the output of student programs to match some specific structure or interface. There are certainly good reasons to specify such requirements, such as ease of grading, simulating a commercial environment, or appreciating the rigidity of input/output transactions. At Saint Mary's, we choose a more student-driven strategy, although it is inefficient and does not scale well. Students work at the project level and develop their own understanding of the assignment whether in lab, homework sets, or formal programming assignments. This is meant to better value individual student's perspectives (Obs 30) and improve students' engagement in their programming projects (Obs 32). Very often students incorporate ideas or data from other areas of interest into their programming projects (Obs 5, 6, 32). This strategy seems successful at least anecdotally, as many students clearly remember the details of their projects after several semesters.

Emphasize clarity as well as (or in preference to) brevity

One cultural aspect of computer science that undermines the implementation of responses to Obs 27 through 31 is a pronounced preference for the most succinct code to accomplish a particular task (what one might call a brevity metric). In some cases, this preference for brevity is undermined by pure performance considerations. The brevity metric also encourages students to devise programming solutions that are not easily understood, which is not very helpful in a commercial environment since terse code is often easily broken. Most importantly in our context, it develops a culture of exclusivity (you get it or you don't) which is not open for interpretation (Obs 29). The course at Saint Mary's emphasizes a preference for clarity over brevity which is much more likely to allow the perspectives of individual students to be expressed and valued (Obs 31). This means that there are many "best" solutions, and thus students are more likely to feel their work is valuable.

Integrate web services into the introductory course

The great value of introducing web services in CS1 courses is to "make them more interesting and more importantly, make the students better prepared for upper division classes and for the industry

upon graduation" [9]. Motivated by the observation that women tend to be drawn to CS by its application to other interests (Obs 3, 5, 6), and moreover that implementing a diverse set of programming assignments is one of our goals (Obs 32), web services offer an excellent opportunity to introduce a rich data experience in introductory programming. The course has a web service Java library which allows students to program web services without the need to open web resources or parse XML or JSON responses. The library has packages that wrap Google's Geocoding and Directions APIs, Ziptastic API, National Oceanic and Atmospheric Administration's weather API, the US Census Bureau API, Rotten Tomatoes movie reviews API, Chicago Transit Authority API, Wolfram Alpha API, Wordnik API and the xISBN API. The course also uses the Twitter4J Twitter package. This provides many opportunities for students to build programs that realize their personal interests.

These strategies have wide-ranging anecdotal support. The next stage of this project is to measure the impact of these strategies both at Saint Mary's College and elsewhere. At present, the above is a summary of our approach which is heavily influenced by recommendations and best practices in the recruitment and retention of women in computer science.

Face-to-face Recruiting

Another important facet of our strategy for recruitment into the CS1 course is face-to-face recruiting sessions. Faculty from computer science conduct face-to-face recruiting in introductory mathematics courses. The faculty give a five-minute introduction to computer programming including some information about the range of careers impacted by computing, the general nature of the first course, some hypothetical examples of potential student projects, and an overview of the philosophy of the course and its goal of inclusiveness. Indeed, in Fall 2013, this recruiting talk was given immediately following the administration of the survey instrument described above. Students heard a five-minute talk explaining the learning outcomes of the CS1 course. This presentation could possibly be given via streaming video, but we recall that Obs 8 above indicates that the personal approach may be more effective in making the kind of connections that could overcome many of the negative impressions students may have of computing.

The small class sizes and collegiality of the faculty at Saint Mary's College make it possible to engage students at this level. A useful alternative to this strategy in a larger institution could include having advanced students in computer science or information systems visit small group recitations or tutoring sessions. In any case, the face-to-face interaction between "insiders" and students who have not yet had any computing experience is a critical piece of the strategy.

Conclusions and Future Directions

The core curriculum of CS1 contains many opportunities for addressing the needs and preferences of women and other diverse groups of students who are otherwise uninitiated in computer science and information systems. At Saint Mary's, we have discovered that our women students are generally well-disposed to toward computer science and careers in computing. However, many students are concerned about the logistics of actually taking that first course. To encourage women to begin, the computer science faculty at Saint Mary's have actively endeavoured to develop a woman-centered course which addresses many of the observations, recommendations, and best practices developed to recruit and

retain women in computer science. These passive measures are supplemented by active, face-to-face recruiting with possible students.

The next stage in this work is to explore attitudes toward computing at a range of institutions, among men and women, and to begin the process of measuring the impact of the steps we have taken to address the fit between a first course in computer science and the many women who may not yet imagine that computing can provide an interesting, satisfying and fulfilling career.

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Library Databases as Unexamined Classroom Technologies

Allison Faix
Coastal Carolina University
Conway, SC 29528
843-349-2511
afaix@coastal.**edu**

"…teachers cannot be content to understand the maps of computer interfaces as simple, uncomplicated spaces." (Selfe and Selfe 82)

Abstract

In their 1994 article, "The Politics of the Interface: Power and its Exercise in Electronic Contact Zones", compositionists Cynthia Selfe and Richard Selfe give examples of how certain features of word processing software and other programs used in writing classrooms (including their icons, clip art, interfaces, and file structures) can invisibly privilege cultural values that not all of the program's potential users share, creating disadvantages. Selfe and Selfe call for teachers to help students examine these technologies and develop their critical awareness of their influences. In this paper I consider that library databases and other online search engines can also be seen as classroom technologies that are commonly used but often unexamined by librarians, teachers, and students. In particular, the ways that online database interfaces—the search options and results screens that stand between researchers and the information that they seek—can have a dramatic influence over these researchers, affecting the ways that they think about searching as well as how they actually conduct their searches, while other invisible features of these databases can also affect results. Library databases and other online search engines are not a neutral classroom technology any more than word processing software is, and students and teachers need to be aware of the larger implications of their use of this technology. Developing a critical awareness of all of the information sources they are using can only benefit students and help them become more experienced academic writers and researchers as well.

Introduction

Learning to locate articles from online library databases is an important part of learning to conduct academic research for most college students. Both librarians and faculty help students learn strategies for successful online research. However, not surprisingly, most library database searchers (including librarians and faculty) pay much more attention to the information found through online databases than they do to the actual databases themselves. Finding useful books, articles and other sources of information is, after all, the main reason for searching these databases. But this can be problematic because if searchers do not pay enough attention to the technology they are using to locate information, they will not be aware of the many ways that these search technologies can influence them. In particular, the ways that online database interfaces—the search options and results screens that stand between researchers and the information that they seek—can have a dramatic influence over these online researchers, affecting the ways that they think about searching as well as how they actually conduct their searches. Other characteristics of online databases, which are often not apparent from their interfaces, can also have a dramatic effect on the results that users receive—or don't receive—in response to their

searches. Because of this, learning to look critically at library databases and other online methods of searching should also be an important part of learning to conduct academic research.

Background

Writing instructors have long been concerned about using technologies in the classroom without critically examining their potential effects. In their 1994 article, "The Politics of the Interface: Power and its Exercise in Electronic Contact Zones", compositionists Cynthia Selfe and Richard Selfe examined the ways that the design of computer programs, including word processing software, commonly used in writing classrooms made assumptions about the backgrounds of the programs' users. These assumptions, which usually went unnoticed by users, could cause students who were not from the same types of backgrounds to be at a distinct disadvantage when learning to use these programs. Their article gives examples of the ways that a program's icons, clip art, or even file structures can almost invisibly privilege cultural values that all of the program's potential users may not necessarily share. Writers using these programs are often unaware of how these unnoticed features affect them and ultimately their writing. Selfe and Selfe call for writing instructors to "teach [students] to be technology *critics* as well as technology users" (68) so that they will become more aware of the influence that technology can have over its users.

Other compositionists following Selfe and Selfe have also looked at how the interfaces between people and technology can affect writers. In their 2004 article Anne Frances Wysocki and Julia I. Jasken reviewed the work of many of these and found that most compositionists who examined interfaces have "argued that we have to see interfaces as not just what is on screen but also what is beyond and around the screen if we want to understand how interfaces fit into and supported the varied and entwined sets of practices that shape us" (36). However, their study also examined writing handbooks and looked at the ways that these textbooks instructed students to create their own interfaces. Through this analysis, they found that in most of the handbooks used by writing teachers the "technical particularities of interfaces tend[ed] to be given more weight than how production takes place or what the production might imply for those involved" (39-40). So even when writing instructors are teaching students to design their own online interfaces as part of writing classes, unless these instructors push their students to look beyond what is outlined in their textbooks their students may still be missing out on a larger critical awareness of how these interfaces function. Teaching students to analyze the interfaces they are using every day can be seen as an even more important first step.

Academic librarians, who often collaborate with writing instructors to teach research, have also done work analyzing interfaces, although they often focus on usability and user outcomes rather than the social and political factors also considered by Selfe and Selfe. One recent analysis of search technologies (specifically Google Scholar) by librarian Charlie Potter, however, also argues that librarians "should not be fooled into thinking that the technology used by Google (or any search technology, really) is a neutral force in the information seeking process" (10) and that "libraries *must* accept the challenge of educating users to think rhetorically about the technologies they use" (21).

While word processing software may be the most obvious form of writing technology, library databases are also technologies commonly used by writers which need to be critically examined. Using library databases or other search technologies without this critical examination can lead to similar kinds of difficulties to the ones that Selfe and Selfe describe. Databases help writers conduct the research

that informs their work by providing access to books, articles, and other materials and student writers are often encouraged or even required by their instructors to consult databases when collecting sources for their writing assignments. However, even though library databases are commonly used in writing classrooms just like word processing software and other computer programs, they are possibly even less likely to be critically analyzed by students and teachers. Library databases are often held up to students by both librarians and faculty as the standard for research, and using library databases to find information is often highly recommended or even required by faculty. Other alternative paths to finding sources, like using internet search engines, are often discouraged or not even allowed. And while most writing teachers probably would not specify which of the many commonly available word-processing programs their students must use to write papers, they do often give students very specific instructions about which library databases they must use when finding sources. Even writing instructors who have responded to Selfe and Selfe's call for critical awareness of technology are seldom as critical of library databases.

In his article about improving the research habits of first-year writing students, writing instructor Patrick Corbett points out an important "disconnect between the obligation we place on students to begin using sophisticated digital library tools for our classes and their ability and willingness to successfully use these tools to find the information that will serve them best" (265). At the same time, however, composition researchers Helms-Park and Stapleton note that "the general consensus [among faculty] seems to be that it is not only the dubious sources…but also the Internet's user-friendliness that is undermining the research process, privileging a less rigorous and expedient approach to writing research papers" (451), showing how widespread this same disconnect could possibly be.

As recently as 2012, compositionist James Purdy conducted a survey of 523 undergraduate students, asking them to name their "favorite research resources" ("Why First-year College Students…"). In this survey, the "students selected Google as their favorite 312 times, over three times as often as the next favorite resource, Google Scholar, [which is] still a Google product." (Purdy, "Why First-year College Students..."). One of the biggest differences between internet search engines and library databases is, however—just like in the software that Selfe and Selfe examined—their nearly unnoticed search interfaces. These interfaces, if examined more closely, by students, librarians, and faculty, would help searchers come to a better understanding of how this technology might affect them as well. Two library databases that are commonly used by and recommended to first year students, JSTOR and EBSCO's Academic Search Complete, are a good starting point for this type of analysis.

The JSTOR Interface

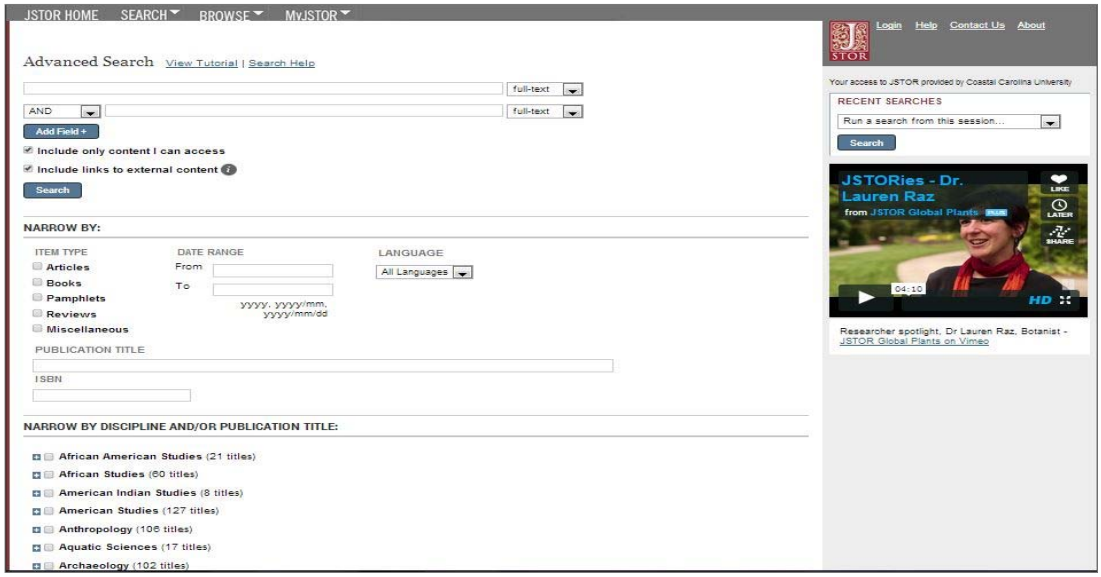
The library database JSTOR (www.jstor.org) is often used in writing classrooms or recommended to first-year writing students, but even the name of this database can be seen as possibly misleading to users. JSTOR is actually an acronym for "journal storage" and was originally created in 1995 as a way for libraries to archive older issues of journals electronically instead of continuing to store these often lower use items on already overcrowded shelves. Many users of JSTOR are not aware that because of this archival mission, JSTOR does not normally include any articles from the most recent five years for any of the titles it includes. Journal publishers agree to let JSTOR provide access to their back issues but continue selling their current issues outside of JSTOR because it is more profitable. Searching JSTOR for any current events or other time-sensitive topics is unlikely to return any results no matter what keywords are used in the search. Searching JSTOR for medical, scientific, or other topics where

currency is essential will return outdated research of historical but not contemporary interest. If searchers are not aware of JSTOR's mission, they may come to believe that either they are not good at searching or there are not any journal articles available on their topic, or both.

Another feature of JSTOR that many users are not aware of is that it is run as a non-profit organization. This is not a bad thing, but is important to note because this influences the content that JSTOR chooses to include. Most of the journal titles included in JSTOR are published by university presses and other non-profit or small-scale publishers who are willing to enter into agreements that allow JSTOR to archive and provide access to their contents through its subscriptions. While this seems only beneficial to users and to the many libraries who are able to purchase access to JSTOR because of its relatively low cost, searchers need to be aware that in many fields a large number of the top journals are published for-profit and cannot be found through JSTOR. Larger publishers usually create their own searchable databases of content that they then sell subscriptions to for libraries and individual users. While faculty will know they need to look in more than one database if important journals in their field are not included in JSTOR, students may not be aware, especially if they are happy with what they are finding in JSTOR. While you can browse a list of included journals through the JSTOR interface, expert knowledge of the field being researched is needed to know what is missing from this list.

The advanced search screen of JSTOR, which most libraries link to directly to save their patrons from clicking multiple times, does not indicate anything about the mission of the database and how this might impact searchers. A closer reading of the search interface itself, however, does offer some clues about what this database values and the kinds of searching it expects users to conduct. One immediately noticeable feature is a long list of disciplines that first-time searchers may find overwhelming; it isn't necessary to select any of them but the rows of checkboxes almost make the interface look like a form to be filled out. Because of this, some searchers will select many (or all) of these. If searchers know that the database was started as a way to help libraries archive information, this giant list may make more sense to them, because most academic libraries would shelve their bound journals in call number order using Library of Congress classification numbers, which would correspond very loosely to the broad categories given on the JSTOR screen. However, for users unfamiliar with library organization schemes (and even for those who are familiar) this could seem like a randomly chosen and somewhat exclusionary list. For example, some disciplines, like Composition Studies, do not even have their own category, even though several important journals to that field are included in JSTOR. Even the larger field of English does not have its own category. To find English journals, searchers must know to look under the category “Language and Literature”, the subject heading used by the Library of Congress. Alphabetically, this category is so far down the screen that it can’t even be seen without scrolling. Another potential problem is that the disciplines listed do not match up with lists of majors at most colleges, which may make it more challenging for first-year students or other new users to figure out which category they need (although really they don’t need to choose any at all since the default is to search all of the categories at once).

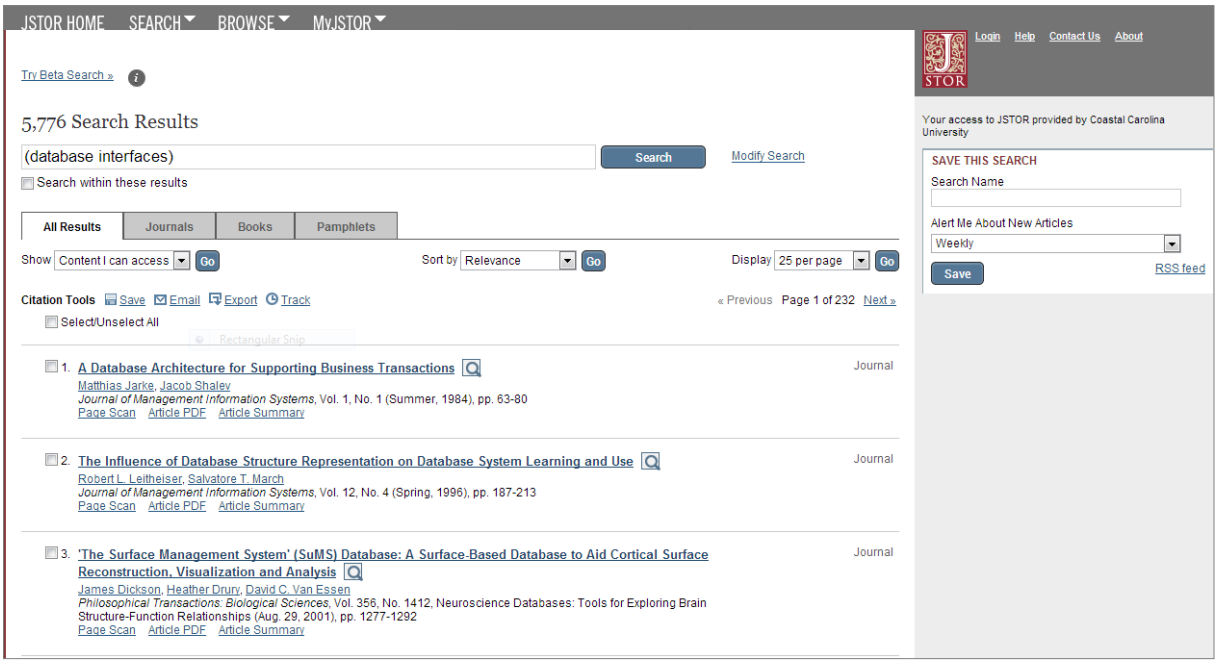
The search interface of the JSTOR advanced search screen (see below) gives users many options for limiting searches. While librarian Charlie Potter would argue that this complexity is one advantage that library databases have over Google Scholar, because it shows that “these databases acknowledge that there is not a ‘typical’ kind of researcher and accordingly attempt to provide results in varying formats” (20), this complexity itself could easily overwhelm new users, especially those new to the world of academic writing and research. Teachers and librarians need to help students navigate these complex in-



terfaces, but if they do not also explain why these databases are worth taking the time to learn, students may not see the benefits.

Other features of the JSTOR interface that may confuse new users include the fact that while JSTOR contains many articles in languages other than English, the interface itself cannot be changed to search with directions in any other language. It is also interesting to note that the categories of articles that searches can be limited to are vague (articles instead of journals or magazines, and the completely unhelpful "miscellaneous" category). Even though JSTOR is a non-profit company, their self-advertising still figures prominently on this page, in the large "J" logo as well as the video off to the side of the screen which is advertising for the database rather than instructions for using it. The search screen also includes the option to search by ISBN number, without explaining what ISBN numbers are. Searchers who know that ISBNs are serial numbers assigned to books may still be confused—will this search box return book reviews or actual books?—especially if their library has not subscribed to any of the electronic book subscriptions available in JSTOR.

After searching for their keywords, JSTOR users will see a search screen that looks like this:



This list shows how many results were received and lists them in order of "relevance", meaning those items in which the search terms appeared most often at the top of the list, not how likely the articles are to the searcher's actual research question. Citation tools do not, as students or even faculty might expect, give you a citation for the article in MLA or APA style. The citation tools feature in JSTOR simply allows users to email or otherwise export citation information (not the full text of articles) to themselves. Users can also make a free account to login to "My JSTOR" and save citation information there. Although compositionist James Purdy has argued that database features including "My JSTOR", "allow students to create a personalized research space" ("The Changing Space of Research…" 52) as they would in the web 2.0 sites they are already comfortable using, it can also present disadvantages.

Most library databases, including JSTOR, allow users to create accounts and save citations, but few of them allow users to import citations from other databases. By limiting users to only saving citations for articles in JSTOR, users are encouraged to not use any other databases when searching, because they would not be able to organize and store any additional citations in the same place. Another problem is that students would lose access to these personalized spaces upon graduation, because subscription databases like JSTOR are usually not available to alumni unless special and often expensive arrangements have been made by the institution. Encouraging students to use tools which they may not be able to continue to use after graduation does not help encourage the life-long learning that writing instructors and librarians generally hope to inspire. Web 2.0 citation management web databases like Zotero (http://www.zotero.org/) and Mendeley (http://www.mendeley.com/), which allow users to create their own freely-accessible databases of citations from any source, might be a better alternative for teaching students to organize their research than "My JSTOR" or similar database services, because they are available to everyone who has access to the internet and do not charge subscription fees for their use.

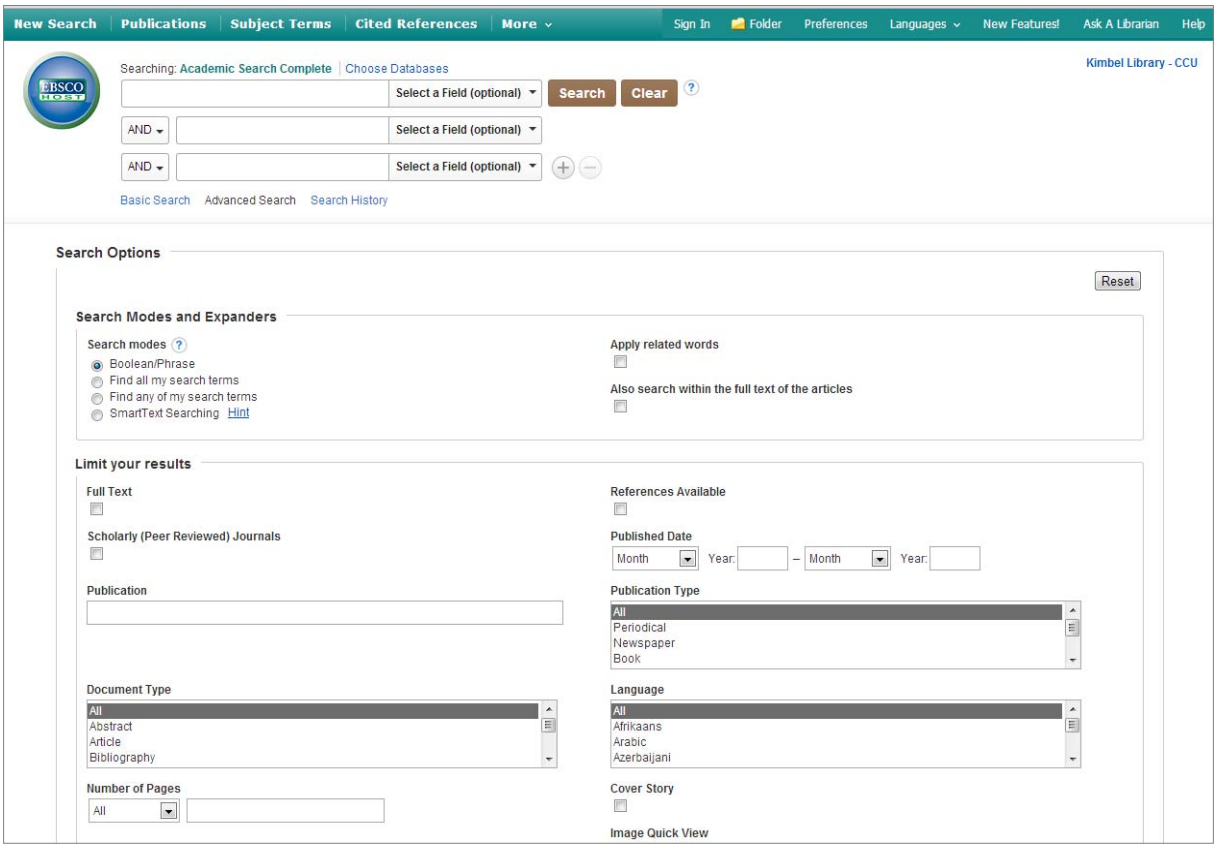
The EBSCO / Academic Search Complete Interface

Another commonly used database interface in classrooms is from the company EBSCO. While hundreds of databases are available from EBSCO and all would be searched with basically the same interface (called a "platform" in library terminology), for the purposes of this analysis Academic Search Complete, a general database often promoted by librarians and writing instructors to first year students, will be used.

The name of this library database can also be misleading to students, because the word "complete" might logically imply that this database includes everything students would ever need. From a marketing standpoint, this name helps the company sell the database, but students need to know that the only thing actually "complete" about it is that it includes all of a selection of the content available through the publisher EBSCO, not all possible publications. Because this is a commercial database, it does include a much wider range of content than JSTOR, including resources from a variety of publishers both large and small. This is also not immediately apparent from the search interface. Another invisible but important feature of EBSCO's Academic Search Complete is that, unlike other EBSCO databases, it was created by EBSCO as a way of aggregating content owned or licensed for use by the company.

Many other databases hosted on the EBSCO platform are actually online versions of traditional print indexes created and maintained by scholarly societies. These indexes have been translated by EBSCO to a web environment rather than created by EBSCO (one example of this is PsychInfo, a database created by the American Psychological Association that has been published since well before the internet). Academic Search Complete, like a few other EBSCO products (usually general interest databases) are not web versions of traditional indexes and do not have the same level of subject indexing available to users that these databases have. Aggregated databases can also change their content without warning, as agreements between publishers and EBSCO are not usually permanent and the journals and the full-text availability of articles frequently shifts. An article that was available last week is not guaranteed by EBSCO to still be available tomorrow or next semester.

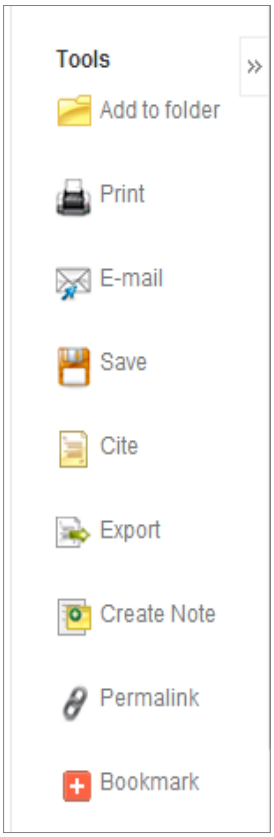
The advanced search screen of Academic Search Complete appears similar to that of JSTOR:



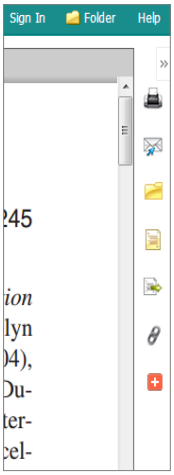
There are several search boxes available, as well as a large amount of search limiters. Like JSTOR, however, the branding of the company's name, EBSCO, is the most prominent feature of this screen. Users may not even be aware of which database they are searching (which is not really an issue in JSTOR), but EBSCO sells hundreds of different databases. If users don't take note of which database they are searching, they might not be using one that is the best for their needs. Since the search interfaces look nearly identical for all EBSCO products, users may not even realize they are not searching the database they want. The interface also uses technical terminology like Boolean searching, which novice users will most likely not recognize, as well as made-up terminology like "smart-text searching" which is unique to the EBSCO platform.

One feature of EBSCO databases not available in JSTOR is the ability to change the search interface to multiple different languages (see below for a list)—but certain things are not translated out of English no matter which language is chosen, a problem also noted in early word processors by Selfe and Selfe (71) that still continues today.

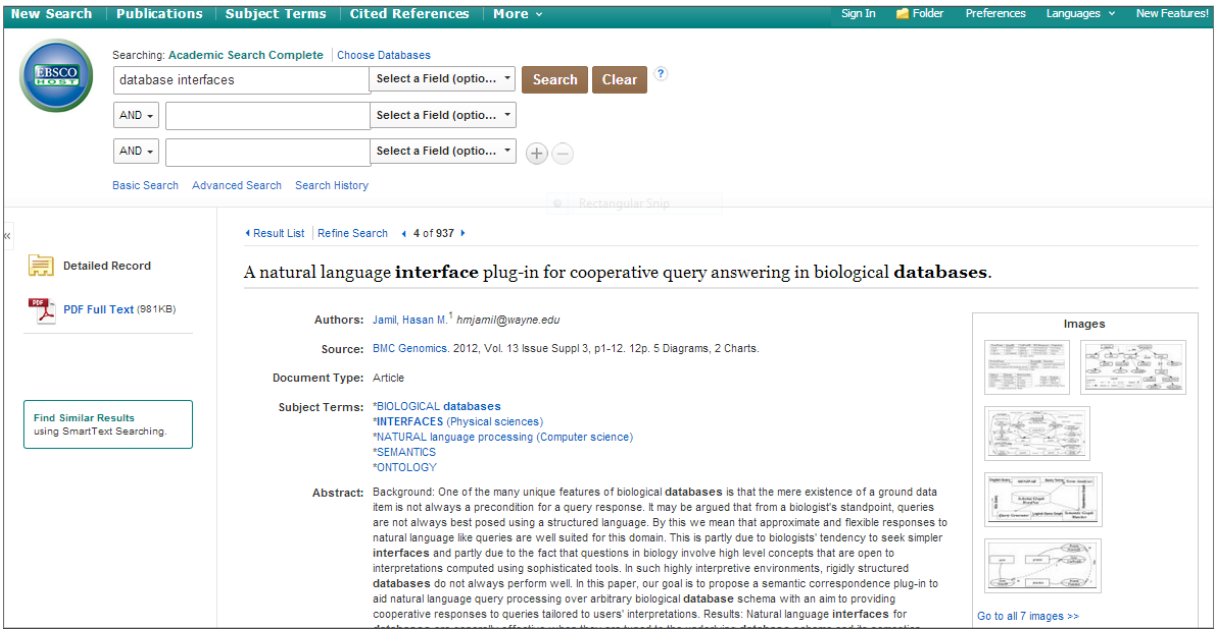
Unlike JSTOR, EBSCO databases do use icons to indicate certain functions, which can be problematic. EBSCO databases still use many of the same types of office metaphors that Selfe and Selfe found problematic because they can exclude users not familiar with or comfortable navigating "corporate culture and the values of professionalism" (69). Icons used in EBSCO also include a somewhat obsolete picture of a traditional, snail-mail envelope to stand for email and a completely obsolete picture of a computer diskette for saving documents. On some pages these icons are accompanied by text that may help users navigate them, but other times they are alone on the page without explanation. The following is an example of some of the icons used in EBSCO databases:



In this particular screen, the icons are less problematic because they are explained with text (although some of the text, like "permalink", an invented word, may not be effective enough descriptions). However, these icons do appear without their explanations in other places, like when the pdf format of articles are being viewed:



Since not every article in EBSCO is full-text, this can present its own challenges for users. Clicking on an article brings users to a screen like this one:



Users who are more familiar with JSTOR or even Google may be confused by this screen, which does not jump right to the full-text of the article. Instead, it provides an abstract for the article and a link to the full-text in the left-hand corner (where many users don't look, because they are accustomed to ignoring advertisements in this screen space on the websites they visit). Users may also not be aware of the "My EBSCO" function, which is similar to "My JSTOR", because it is not prominently featured on the screen.

JSTOR, EBSCO, and most other library databases are organized in a hierarchical way that would also concern Selfe and Selfe, because the methods of searching that are most successful privilege logic over "alternative approaches to constructing meaning" (75). While some library databases, like EBSCO, have experimented with alternative ways of searching like a visual search, none of these have been successful enough to date. And even though both JSTOR and EBSCO databases allow users to browse articles instead of search them, these functions are not immediately evident on the main interface screen and probably won't be found by most new database users.

Implications for Teachers and Librarians

Both writing teachers and librarians want students to locate the most appropriate sources for their research topics, and searching in the right place can often be the key to this. But it is also true that library database interfaces are not often intuitive to uninitiated users because they do not, as librarian Charlie Potter points out, "make [the] totalizing assumptions about how people look for information" that internet search engines do when they offer only a single search box with no further options or instructions (20). To convince students to use library databases instead of internet search engines, if that is what is desired, librarians and faculty need to work together to help students learn the ways that database interfaces can be read and how their interfaces might affect the searching that students do, as well as the advantages these technologies have over the open internet. This could be as simple as having librarians and teachers talk to students about their own research methods—how they choose which databases to search, which functions seem the most helpful, etc. Demonstrating for students how to find

out more information about a database and the materials it contains can also be a useful skill to impart, so that students can get in the habit of questioning all of the sites they come across in their research. Being aware of the limitations of database interfaces can also help librarians and teachers point out possible pitfalls to students before they come across problems using databases. Students can also be encouraged by careful assignment design to explore and test the limits of databases and not be content with the first five articles they find on the first screen of any search they conduct. Writing instructors and librarians can also ask students to evaluate and compare different databases, so that they will develop a larger awareness of how search technologies work and how the different ways of searching can affect the results they receive.

The danger of not understanding or being misled by database interfaces is not simply the danger of not being able to find information quickly and efficiently, however. As Selfe and Selfe point out, teachers "need to learn to recognize—and teach students to recognize—the interface as an interested and partial map of our culture…that reveals power differentials" (77). Library databases are not a neutral classroom technology any more than word processing software is, and students and teachers need to realize the larger implications of their use of this technology. The motives behind the design of database interfaces and the motives behind library databases themselves should be questioned by both students and teachers. As librarian James Elmborg points out, in order for true information literacy to take place, "libraries [and by extension, their databases] can no longer be seen as value-neutral cultural space", either (198). Having a critical awareness of all of the information sources they are using can only benefit students and help them become more experienced academic writers.

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Losing the Red Pen: Video Grading Feedback in Distance and Blended Learning Writing Courses

Lisa Ann Jones
Director of Educational Technology
Berea College
100 Campus Way, CPO 2208
Berea, Kentucky 40403
859-985-3209
Lisa_Jones@berea.edu

Abstract

This paper will give a step-by-step demonstration on how to create MP4 files to video-grade undergraduate writing assignments. The process of using prepared rubrics to guide video and audio feedback will be presented and examples shown. This assessment method provides students with personalized video-feedback as a re-usable learning object.

The hands-on session and instructions will guide participants on how to use free Web 2.0 tools to provide students with highly effective feedback on writing assignments using a novel and easy-to- learn process of screen-casting student feedback. The video grading process recreates the face-to-face consultation that usually occurs only in tutoring or office consultations. Video-grading allows students to see and hear feedback on written assignments and to store and reuse video learning objects as a future resource. All video sources can be played and stored on all digital and mobile devices in use by students. This original process has been used for more than 3 years in undergraduate community college writing courses with great success.

Introduction

In distance and blended learning classrooms, the issue of student feedback is an important one. Even in the traditional face-to-face classroom, timely feedback that is appropriate and constructive for all students often consists of pop quizzes or other rote memorization assessments. Online and blended learning classrooms are more challenging with many subjective formative assessments such as writing samples and drafts that have to be manually graded. Online students often perceive instructors as being distant and even unapproachable due to the asynchronous nature of the experience. For these reasons, first year online writing classes require quality feedback. This paper describes a novel way of grading writing assignments using video feedback for students in blended and distance learning environments.

Video feedback in writing assessments should be seen as part of an effective feedback loop for students, especially when the instructor is known only at a distance. Student persistence relies on the principle that assigned work is understood and that feedback is constructively directing the student towards a successful outcome. Feedback loops involving interactive and visually constructive assessment support student persistence in an online or blended learning environment ("Instructional Interaction," 2004). Goetz (2011) describes the feedback loop in education as consisting of, "Provid[ing] people with information about their actions in real time (or something close to it), then give them an oppor-

tunity to change those actions, pushing them toward better behaviors. Action, information, reaction" (p. 1). Providing students with video feedback on writing assignments in an asynchronous class is a positive solution for this real time action.

According to Goetz (2011), feedback loops require four aspects: Evidence, Relevance, Consequence and Action (p. 3). Evidence for an English 101 community college writing course consists of the paper assignment itself, as an object for assessment. Relevance is guided for the paper according to the curriculum and the goals and objectives for the class. Consequence is demonstrated through quality feedback and most important for students in a writing class. Looking at the feedback model that describes consequence as "information that ties [to a] larger goal or purpose" it is evident that instructor comments on a first draft writing assignment and revisions are essential to providing quality information for students in order to provide them with feedback information for the next step (Goetz, 2011).

The last step in the formal framework of feedback loops is Action. Action can be described as the closing of a loop involving the person's reaction to the previous feedback. In a writing course, this reaction comes about when the student realizes through personalized feedback what areas need corrective action to bring the assessment object up to the required level. Using video feedback on student writing assignments improves this level of real time constructivist scaffolding and provides personalized information to the student while acting as a guide towards appropriate action, thus resulting in a quality learning experience.

Further, using video grading for writing assignments supports a main tenet of Vygotsky's constructivist model through scaffolding and facilitating with the instructor actively involved as a guide and coach (Vygotsky, 1978; Murphy, 1997; Wiggins, 2004; Honebein, 1996).

Grounded in the principles of constructivism and feedback loops with an effort towards closing the loop for writing assessment, video grading has been effectively used in a community college environment for the past 3 years. This idea was born out of the need for better communication and support for struggling writing students in a first year college distance learning writing course. It has also been introduced to faculty of Berea College as part of a blended learning classroom support for writing and teacher certification programs.

Video Grading Methods

The free Web 2.0 tool, Screencast-O-Matic has been used for the last 3 years to provide this visual feedback on writing assignments. Screencast-O-Matic is available as a downloaded program or online through a web browser and compatible with PC or Mac and found at: http://screencast-o-matic.com/. Screencast-O-Matic is based on point and click technology and does not require extensive technology expertise.

Once Screencast-O-Matic is open the "Start Recording" button should be clicked.

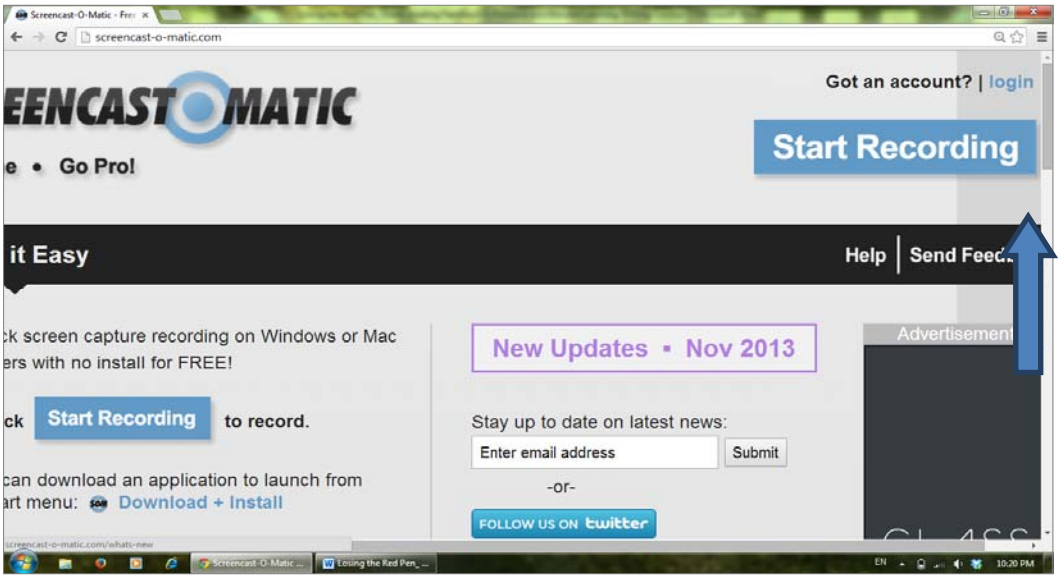
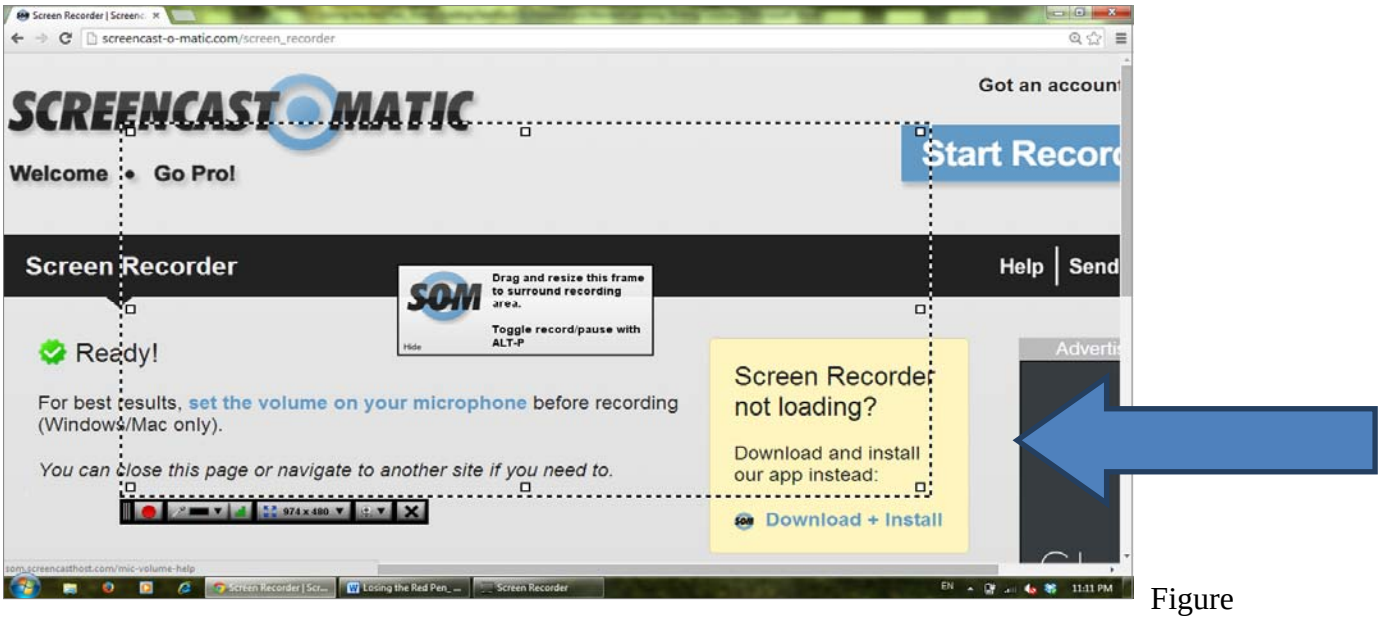


Figure Begin a recording

Instructors should simultaneously open the college's Learning Management System to the appropriate section where student papers are uploaded. Ideally, students should be using Word to submit their writing assignments. However, the video grading does allow for various attached methods such as Google docs or other alternative document processors.

Once a student paper is downloaded and displayed on your screen, adjust the dotted window highlighter on Screencast-O-Matic to cover the student's paper submission.



Figure

Resize dotted line to cover desired area

Switch your screen to the opened student paper and drag the dotted record screen to cover the paper and the Word tool bar.

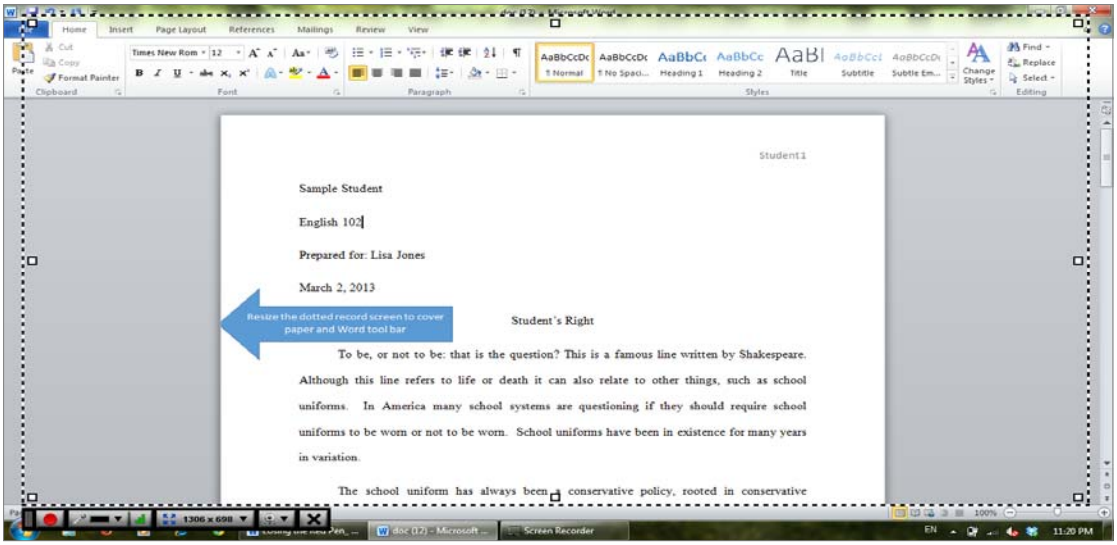


Figure Resize dotted screen for screen capture

It is good practice to scan the student submission first to see or highlight any major errors in advance of the recording. Using a prepared rubric is also recommended. The rubric should be included on the original assignment's paper requirements and then copied and pasted over to the end of the student submission assignment.

Next, click the red recording button and begin grading the paper. In the experience of the last three years, it has been noted that instructors should grade the paper as if the student is sitting in a face-to-face office consultation. Speak normally and positively as the paper is graded using the real time highlighter on Screencast-O-Matic to highlight problem areas and make voice comments. Highlight the prepared rubric pasted and speak to the student on the rationale for the grade finally given.

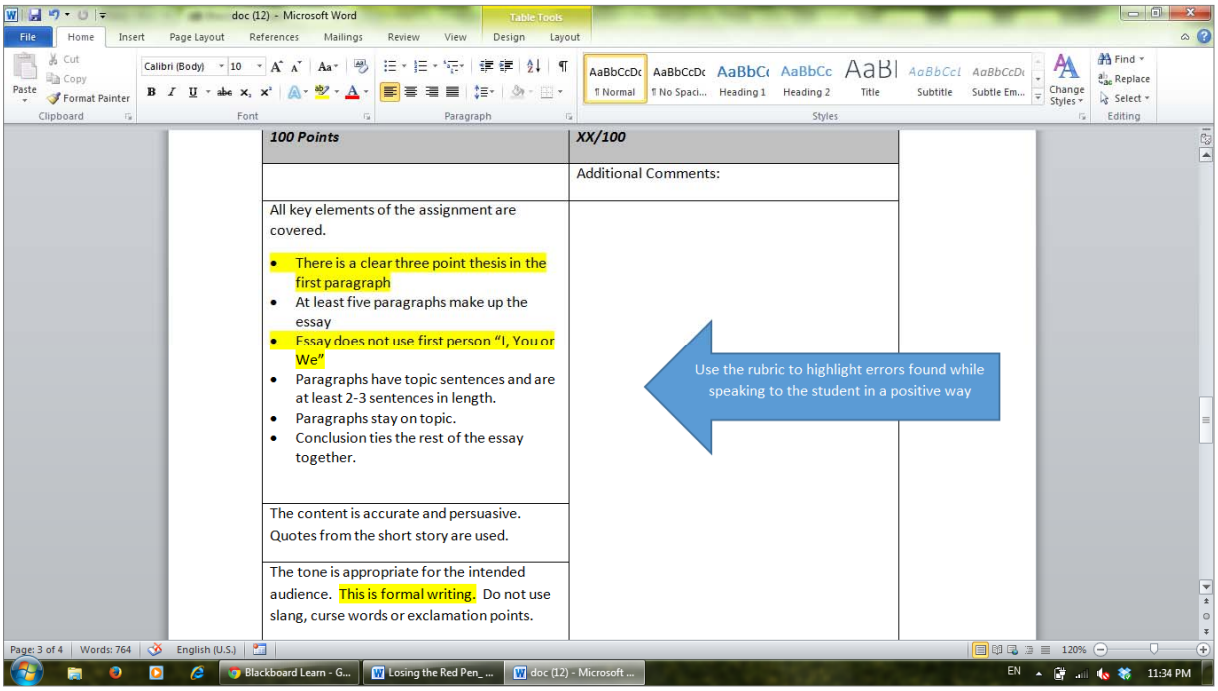


Fig-

Figure Paste rubric to end of submission

In most cases, do not be concerned about errors in speaking. Treat the video grading as if the student is sitting at an office session where the atmosphere is informal and open to regular conversation. No script is needed.

Finally, once the recording is finished and does not exceed the 15 minute free amount, click the done button.

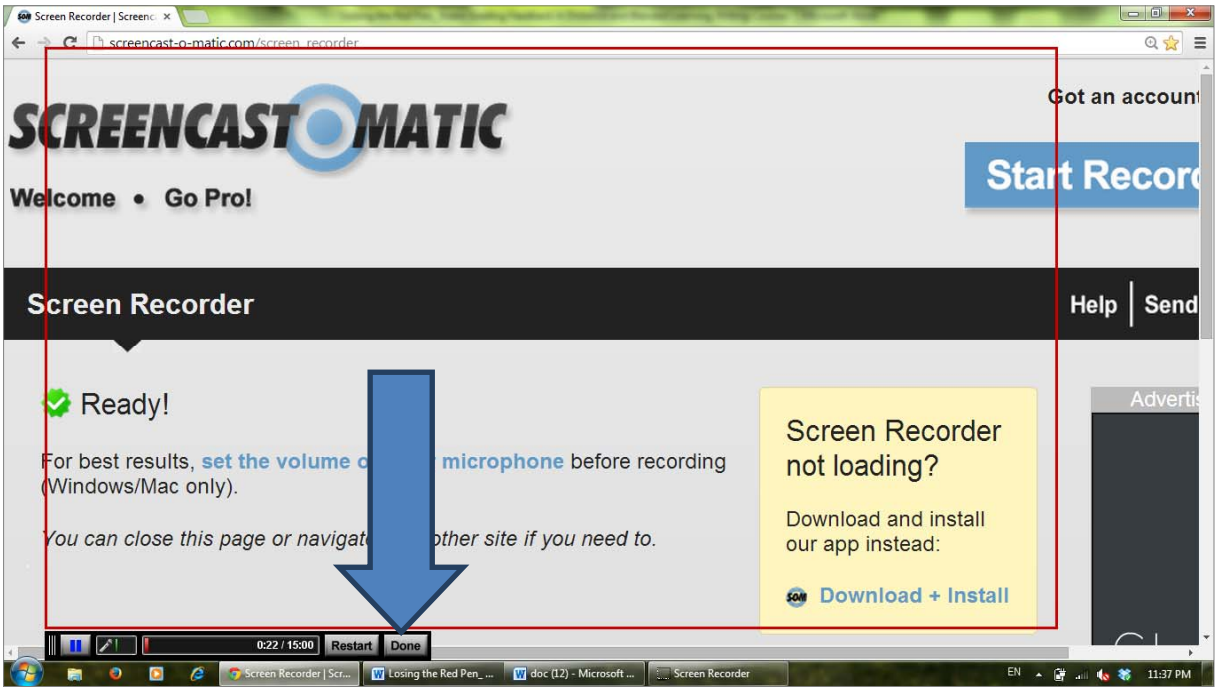


Figure Click done to save recording

An option to save the video will appear. From three years of research and trial and error, it has been found that saving as an MP4 video works best when using an LMS system such as Blackboard. The recorded video can then be uploaded in the feedback section for the paper submission. Alternatively, videos can be automatically saved to your own private Youtube channel and private links can be sent to the student or posted to the feedback section on Blackboard, any learning management site or via email.

Lessons Learned

It is not necessary to try to be formal or perfect in the video grade. Treat the recording as if an informal face-to-face feedback session is taking place with the student sitting in your office. Students seem to find this aspect appealing and it provides an entirely different aspect to constructive criticism as opposed to the red pen or Word markups, normally seen as impersonal and harsh.

Longer papers can also be video graded, but may run over the 15 minute time limit. Pro accounts for Screencast-O-Matic can be purchased for 15.00 per year for unlimited recording. A word of caution however, is that most students will not watch videos that are too long. A good practice for longer papers may be to pre-grade the paper using Word tools to highlight specific areas so you can quickly go through the main points.

Technology access could be a problem for a minority of students who do not have high speed internet available to them to watch the videos. This is less and less likely as most students will be able to access free WiFi from alternative areas such as public libraries, public places or restaurants. Access can also be a negative experience for an instructor trying to upload videos from a slow connection at home.

Video grading and viewing is best done using a high speed internet connection that will easily play back streaming videos without stalling.

Conclusions

As an experienced first year college writing instructor, I have found video grading to be a superior method to providing quality and timely feedback to students in a face-to face setting and especially to students in a distance learning setting. The era of leaving short comments in red pen or Word markup highlighting may be nearing an end. In many cases, students do not comprehend what an instructor's red-penned comments actually mean in terms of supportive feedback. There is much room for misunderstanding when corrective comments are not clear. Further, students can visually see errors as they are found by the instructor and audibly hear the instructor's positive reinforcement along with the recommended revisions. Once students have the MP4 video feedback they can watch it as many times as needed, creating a virtual learning object that can be used as a resource for later papers.

In the three years since this practice has been used, student evaluations of this method have been overwhelmingly positive. A few anonymous student comments are:

- *I just wanted to take a moment and let you know that I appreciate the fact that you made a video response to my paper. It has really helped me grow as a writer.*
- *I have never learned so much in an online class. It is so helpful that you provide videos in grading and teaching. I think this makes learning so much easier. I can't believe how many teacher[sic] never tell you what to do to correct your mistakes. Without correction, I feel we leave with the same knowledge we came with.*

Many students have stated that they use the videos even after the class ends as a resource for other paper assignments. Using video grading has proven to be a positive feedback method that utilizes constructivist principles while providing three-dimensional, real-time information for struggling writing students both face-to-face and online.

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Phishing E-Mails – Six Month Investigation into What People Click

Michael R. Lehrfeld
Department of Computing
East Tennessee State University
Johnson City, TN 37614
423-539-6952
Lehrfeld@etsu.edu

Abstract

Phishing and SPAM emails have been used by marketers and hackers alike since the inception of email and the Internet. Phishing messages have become so common that many legitimate emails often get flagged and placed in a user's spam bucket. No one is denying that these messages are at a minimum a nuisance, and in many cases malicious. But what is known about the success rates of these phishing campaigns? What are users most likely to fall victim too? Why do victims fall prey to these types of messages? This research attempts to shed some light on these questions.

During a six month period, over 33,500 phishing emails were sent. Each of these emails was tagged with characteristics from a developed phishing matrix do determine which phishing messages are more likely to be clicked. The phishing matrix categorized messages into 4 dimensions; time, deception, geography, and group affiliation. What was discovered is that the most successful dimensions were time and deception. Phishing emails that exploited current events received high click rates as well as those with colorful figures and backgrounds. It was found that 15% of users clicked on more than one phishing campaign leading to an addicted clicker syndrome; a situation where a user will click on almost any message that enters their inbox.

Introduction

Some of the most prolific and damaging data breaches have been attributed to targeted phishing campaigns against employees and companies[1] [2]. The crown jewels of technology companies have been pilfered from the most secure systems; and in the case of the RSA data breach, the very companies whose business is the protection of secure systems. Despite the massive outlay of capital to protect computing systems hackers are still able to find weaknesses in the defenses and gain access to sensitive information.

The root at some of these high profile breaches has been phishing emails. Phishing emails are defined by the unsolicited receipt of emails that attempt to coerce the victim into purchasing a good or service, clicking on a link that directs a user to a malware serving website, download and run a harmful attachment, or have the victim respond to the email with their user credentials or banking information. In all cases, the victim must act for the phishing campaign to be successful. The simple receipt of the message is not enough to cause harm.
This research seeks to discover the most effective types of phishing emails so that targeted training can be developed to help prevent users from falling victim. To facilitate this goal, phishing emails have been divided into four main dimensions; each of which contain three scoring levels as to the phishing email sophistication within that particular dimension. Over a six month period, 33,500 phishing emails

were sent to employees of a large company. Twelve phishing campaigns were successfully delivered while four were rejected because of technical issues with the organizations spam filters. Over the testing period, 1396 phishing emails were clicked by the users.

To protect the identity of our population, all email addresses and identifying information has been obfuscated. The remainder of the paper is composed of a summary of the current state of phishing detection and prevention techniques, the methodology that was used in the development of the phishing dimensions and the Phishing Matrix, an overview of the phishing architecture used to send the phishing emails, a discussion of the results of the 12 phishing campaigns, and finally a conclusions and future works section.

Literature Review

Phishing and SPAM emails have been a by-product of the Internet age since its inception. Unsolicited emails selling discount medical cures, promises of wealth, and scare tactics have been some of the strategies that spammers employ to get unsuspecting users to click on their emails. The proliferation of email in both the business and personal environment as a primary vehicle for communication just enlarges the victim pool for spammers. Some accounts place the global internet email address pool at over 3 billion with an anticipated additional 1 billion new accounts by 2017 [3].

The global email numbers continue with staggering volume. On average, over 120 billion email messages are sent daily [4]. Radicati [3] estimates that each email account is responsible for over 100 emails per day. This amount of communication demonstrates the reliance of the medium in modern life. It also represents an easy medium to exploit by hackers.

Many attempts have been made to prevent phishing emails from ever reaching the inbox of users. The spam botnet research [5] examined the characteristics of over 50 million spam messages to ascertain campaign duration and depth. This research discovered a sophisticated relationship between phishing campaigns and the botnet workloads. This complex interworking leads to more intricate spam blocking infrastructure to protect the end users. The work of Chang et al. continues the investigation to defending against web based attacks; including phishing [6]. In their work, the researchers utilize honeypot techniques and web site blacklisting and analyze their effectiveness in disrupting internet attacks. What can be drawn from these studies, and others like it [7], is that blocking 100% of phishing emails is currently an impossible task.

The following section discusses the development of the phishing matrix that is used to categorize phishing campaigns and their content.

Methodology

Assuming that some phishing emails make it to their destination, this research sought to examine what, if any, characteristics made particular phishing emails more or less likely to be clicked on. Relying on the user base to give an accurate account of why they have fallen victim to phishing emails gave some insight into the problem. A 2010 study by the Messaging Anti-Abuse Working Group (MAAWG) [8] surveyed 3700 people about how they determined if an email was legitimate or a phishing attempt. The top indicators were 1) sender's address (73%), 2) subject (67%), unusual language (53%), content of

the message (53%), salutation (46%), spelling and grammar (43%), and visual cues in the message (30%). The MAAWG study also discovered that over 11% of the respondents had clicked on phishing emails in the past. It was these self-reported triggers that the phishing matrix was built from and elaborated upon.

Using the MAAWG study as a starting point, the phishing matrix was developed. It included four general dimensions (or categories) of phishing emails. Each dimension contains three attributes that measure the severity of the applied dimension. The reminder of this section discusses the four phishing dimensions and their associative attributes.

Group Affiliation Dimension

The first phishing dimension that is examined is group affiliation. This dimension targets a victim's identity with a particular sub-group. The purpose of this measure is to determine if targeted phishing campaigns that associate with common groups need further investigation. Group affiliation content is focused on broad, well established populations. Types of group affiliation phishing campaigns would be "all retirees", "all parents", or "healthcare recipients".

Within this dimension, there are three attribute levels employed; low, medium, and high. In order for a message to be classified as 'high' the content of the message must explicitly reference a group type (e.g. all .EDU users, all Medicare recipients). Medium classification implies an association with the target group while low removes all group markers. This classification may limit the potential users that would click on the spam but yield a higher click rate within the classification.

Deception Dimension

Phishing, by its nature, is a deceptive practice. However, this dimension is focused strictly on the technical sophistication of the phishing campaign. The majority of email users self-identify with being 'somewhat', 'very experienced', or 'expert' when asked about their knowledge of Internet security [8]. This dimension seeks to challenge those findings by using simple HTML tables in phishing messages.

The deception dimension was divided into three attributes of low, medium, and high. Low represented no deception at all. The *From* address was not obfuscated and no graphics or coloring were used. The medium attribute incorporated some color or figures and minor changes to the URL were used but remained primarily unchanged from the low attributed message. The high attribute attempted to trick the user by presenting the *From* address as legitimate, using more complex figures and coloring, or altering the URL in a more complex manner. The salutation and closing of the message may also have been more familiar to the user rather than a generic one.

Geographic Dimension

Classifying phishing campaigns with the geographic dimension utilized the victim's affinity with a geographic area. This dimension examined if a user received a phishing email that referenced a location that they were familiar with, would they be more likely to fall for it? This research utilized the fact that the target population of this study was mostly isolated to 30 mile radius.

A three point scale is again used with the low, medium, and high attributes. The low attribute refers to the absence of any mention of a geographic element in the message. The next level of the geographic attribute is medium. This attribute is defined by a larger area than the high attribute and encompasses language such as USA, England or France. The high attribute refers to a highly recognizable geographic location by the recipient of the phishing message. This type of message contains language such as "the best car dealership in the North East" or "everyone living in East Tennessee should be aware of this". The geographic attribute is bound by regional elements as the most specific area in this study. It was determined that using a city was too close to spear phishing and thus not included.

Time Dimension

The Time dimension examined click rates of messages that incorporated current events. Time is the primary motivator for action in this phishing messages. This dimension is categorized by either 'countdown' events like "you have 3 days until your email is deleted" or current events such as "Payton Manning set to retire" being sent just after the 2014 Super Bowl.
Attributes of the Time dimension are in the three point scale of low, medium, and high. The low attribute is applied when the phishing email is devoid of any reference to time. An example of this is a message asking the user to click on a link to see pictures of cute kittens. The medium level time attribute includes an indirect reference to time as a motivator. Time is not explicitly stated but the context of the message relays a time component. An example of this type of spam would be a spam message about textbook leasing at the beginning of a term. The high attribute occurs when there is an overt and direct reference to time as a motivator for clicking. Examples of these include countdown content like password resets within 7 days, or messages about Christmas or other holidays.

Phishing Architecture

This section discusses the anatomy of the emails that are sent to the targets, how the emails are tracked, and how reporting is generated using the email architecture established in this section. The emails are constructed in a way to ensure the most effective reporting and tracking possible.

The email architecture consists of a combination of XML and HTML. The XML is used to create embedded tags that allow each campaign to be tracked individually. Each email is given either a low, medium, or high XML tag to help distinguish it from the other urgency levels within the phishing matrix. The emails are individually named as well using a convention like: fc11g01. This denotes which campaign it is and which urgency level as well. For example, campaign 11 would consist of 3 different emails with the following naming convention: fc11g00, fc11g01, fc11g02. The incremental value, within the name, denotes the urgency level or complexity of the email (fc11g01, would be campaign 11 with urgency level medium). The campaign attributes are also included within the email to track emails based on which dimension they fit in. See section 3 for a discussion of the phishing dimensions.

To protect the identity of the phishing email recipients, all email addresses are uniquely hashed prior to the message being sent. This allows for the insertion of a unique ID (GUID) for every user, for every campaign, in the emails. The format for the link phishing victims' click takes the form in Figure 1. Using the unique GUID ensures that if the emails are coopted or the web server is compromised, no identifiable information can be obtained.

http://retirement.albybum.org/fc21g01/?b580015f20674154a09b81b063438460		
Unique GUID	Campaign Identifier	URL

Figure 1. Phishing link construct.

The HTML portion of the email is used to house the content that is being sent to a target. This includes: subject, content, inline CSS, and various HTML tags. When the email is created, depending on the level of urgency, subject lines can be modified for each email within each campaign. This allows for the raising and lowering of suspicion within the email itself. Content and visual styling can also be modified for each email within a campaign to make it more attractive to targets.

For each campaign, 3 phishing emails are created that are divided up into low, medium, and high urgency levels. This allows for 3 modified versions of the same email to track different responses based on style or wording within the email itself. As the email increases in urgency the complexity increases as well. The victims are divided up into 3 equal bin. This allows for two important measures; 1) specific modifications to a base phishing email to test only one dimension and, 2) decreases the probability that people in close physical proximity don't receive the exact same phish. For each campaign the emails are shuffled amongst the targets to ensure that the same group did not get the same level each time.

When an email is sent, the content of the email, including the XML file itself, is stored in a database. This database maintains a record of when the emails were sent, and the content within each email. This database resides on the web server and does not contain any identifying information about the recipients of the phish.

The reporting of the data captured from the spam clickers is broken up into a csv file using a Python script. Once the data has been captured, the script is run against the captured database. Using the XML tags mentioned above a csv file is produced that breaks each click into components. An example of different components would be time of day, browser type used, and the user's email address. At the moment when the report is created using the Python script, the target's GUID merges with the target's actual email address. Prior to this engagement, the target's name and email address are kept separate from each other by residing on two separate servers.

The implementation and testing of the spam matrix falls into three subsystems. These are discussed in further detail in the following subsections; 1) storage and tagging phishing messages, 2) sending and tracking phishing messages, and 3) reporting.

Phish Message Categorization Recording Method

The phishing message creation processes begins by storing the messages in an XML schema that contains the tags and overall structure of the email. This XML document encompasses HTML and inline CSS for styling. For each XML document there exists only one email, so one file equals one email. This allows for multiple messages to be developed in parallel as well keeping a history log of every email that is sent out. This architecture reduces the overall amount of code required to interact with the email, since each email is similar. Only the email content and tags need modification.

To document the schema and to gain better recording of the data, the XML schema is broken down into metadata tags. The first metadata tag is the Title; this simply describes the nature of the email so it can be differentiated from the other emails. The second metadata tag is the Author; this exists to track the person responsible for creating the actual email. The third metadata tag is the Date; this describes the date in which the email was created by the previously mention author. Last is the Matrix tags; this encompasses various tags that are used to actually track the clicks in a campaign.

The next schema that is defined is the email data schema. The email data schema defines the actual email itself and is broken down into its appropriate categories. The first category is the Subject; this is simply the subject of the email. The second category is the Body; this is where the message content resides. The Body tag also holds the links in which the target would click. The third category is the From Address; this is the address in which we want the email to appear to come from. The From Address would ideally relate to the content of the body. Last is the Fake SMTP server; this is the server in which we use to show where the actual email came from. Once again, this can be anything but ideally it should relate to the topic of the email.

The XML document modification process can be quite complex at times. Therefore, certain fail safes have been put into place to accommodate for human error. In terms of the XML document, a separate Python script has been created to validate the layout to ensure that it meets the predefined schema. If the schema is not validated, the sending script is stopped, and the email is not sent to ensure data integrity.

Sending Phishes

The emails are sent via a python script that queries the target database. It sends the emails to the appropriate target groups (group 0, group 1, group 2), defined by the user, when the user executes the python script. There is a collection of Python scripts responsible for taking an XML spam message and sending it to a group of targets. There are three main scripts:

33. Script for creating the admin database. All data is stored in a SQLite database. A database represents a collection of spam campaigns. This Python script creates all database tables needed for sending spam campaigns.

34. Script for loading targets into the database, as well as grouping them for campaigns. The number of groups is specified when the database is created. New targets can be added at any point in time—this will not break reporting. Additional information may be included about targets for reporting purposes.

35. Script for sending the emails. This script takes an XML phishing message and sends it to a specified group. The email's subject, from field, and body are templates, and may contain placeholders that pull information from the target's information. For each email sent, a GUID is generated to uniquely couple the target and email sent.

Tracking Phishes

The phishing email is built to be tracked using the XML schema described above. Within this XML document, XML tags are used to allow for the campaign to be linked back to the target who clicked it. The XML tags are also used to track the amount of clicks, the campaign, the content sent, metadata, and the GUID. The GUID provides a way to link the email back to the target who clicked the link.

The modular approach to the phishing system has allowed the transmission of some sophisticated emails. As privacy is a top concern in this research, the ability to physically separate the user's email addresses from the web server is paramount to this project moving forward. Even if the public facing web server is compromised, the identities of the recipients is still not in jeopardy. The following section will discuss the results of the phishing campaigns followed by a conclusions section.

Results

Over 33,500 phishing emails were sent during a six month period that saw 1,396 of those messages clicked. The 33,500 phishing emails were broken into 12 different campaigns across the phishing dimensions. Table 1 and Figures 2 and 3 presents the general breakdown of clickers by campaign.

Campaigns	Deception	Geographic	Group	Time	Grand Total
fc01			113		113
fc03				122	122
fc04				169	169
fc06				166	166
fc08		50			50
fc09	221				221
fc10				315	315
fc11	239				239
fc12				340	340
fc13				106	106
fc20		188			188
fc21			31		31
Grand Total	**399**	**229**	**139**	**1080**	**1396**

Table 1. General statistics about phishing campaigns and click rates.

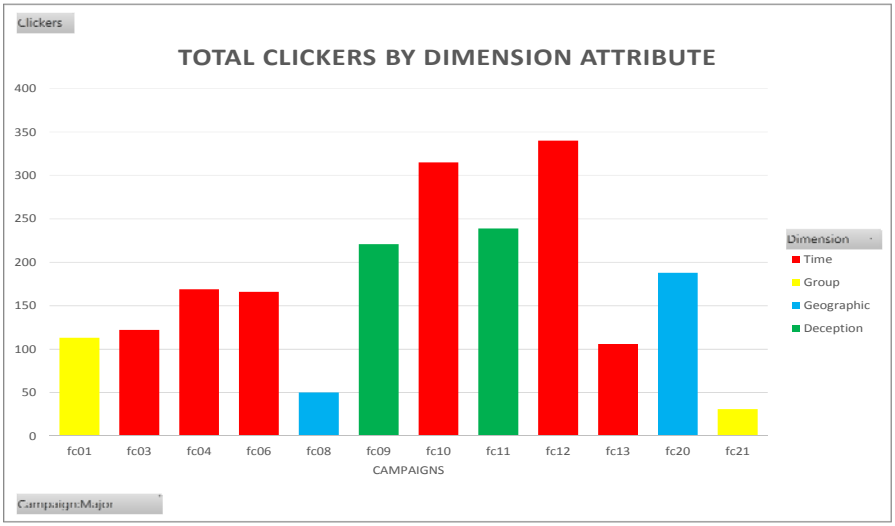

Figure 2. General statistics about phishing campaigns and click rates.

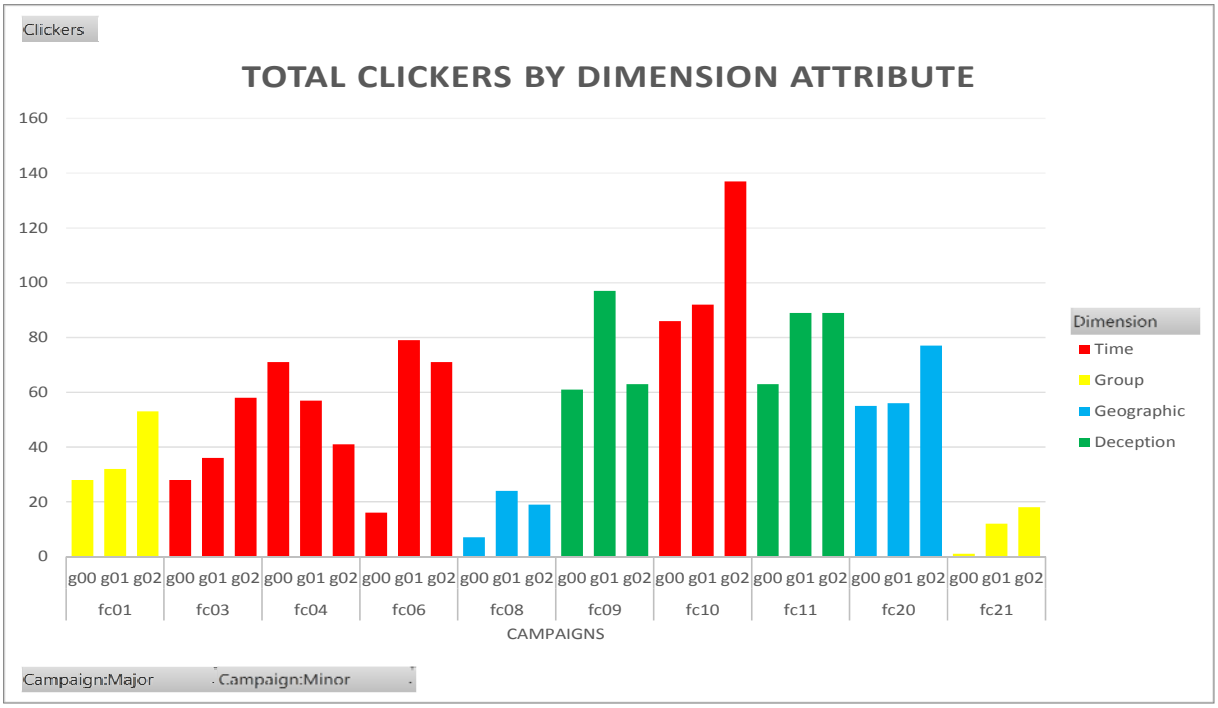

Figure 3. Click rates by dimension attribute. Note, campaigns fc12 and fc13 did not have capture attribute information.

An evaluation of people that clicked on multiple campaigns was also performed. This group was dubbed 'Addicted Clickers' and is represented in Figure 4.

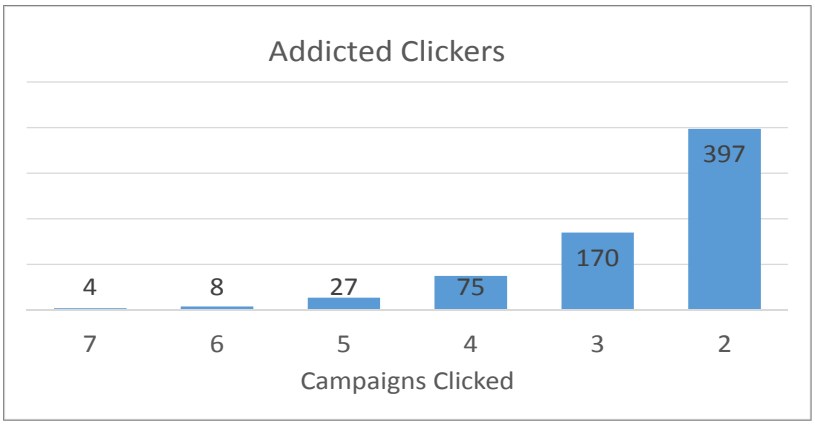

Figure 4. Number of people that clicked on multiple campaigns.

The following section discusses conclusions drawn from the phishing matrix data, some lessons learned from the project, and future works.

Conclusions and Future Work

People love to click on phishing emails. At the inception of the project, a baseline email was sent out that just said 'Click Here'. 183 people did. 15% of the target population clicked on two or more phishing emails. The most effective dimension was Time followed closely by Deception. Of all the campaigns, the one campaign that generated the most clicks was a phishing email sent at the end of a month stating that a system upgrade has caused issues with their direct deposit. Not only did this set the record for clicks, but as our landing page for our clickers was a 404 error, many concerned people called the payroll department in a panic because the website was 'down'.

As seen in Figure 3, many of the campaigns did not show much of a clicker variation between the medium and high attribute messages, and in campaign 4 the low message had the highest click rate. More phishing needs to be conducted within each of the 4 dimensions to get a better understanding of why this is.

Future areas that will be evaluated include the addition of a Greed dimension. This dimension will accompany the current 4 other dimensions and focus on campaigns around winning a prize, super sales occurring, or others attributing factors where the victim perceives some type of financial reward from clicking. Another area that will be researched is the enrichment of the current dataset with user demographic data. The ability to categorize clickers by age, gender, race, employment position, and salary will give greater insight into the data and what groups are clicking the phishing messages. Finally, starting in the fall, the project will expand to include 65,000 student email accounts.

The phishing architecture will be overhauled to enable a larger set of phishing emails to be sent. Data on campaigns that ask the users for their userID and password need to be investigated. The system will also be enhanced to monitor phishing email that has been forwarded to others. For example, if there is a phish about breaking news, do people forward those messages to others.

Lastly, all of this data collected will be used to feed the development of a training program. This program will seek to keep people safe at home and at work and will target the areas of the phishing matrix that have produced the most clicks by users.

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The Academic and Social Life Styles of Students and Teachers of Higher Education Institutions in Bangladesh as Consequences of using Social Network Sites

Che Kum Clement
Professor and Head of Department of Technical and Vocational Education
Islamic University of Technology
Board Bazar, Gazipur-1704, Bangladesh
+88-01790277620
ieres2001@yahoo.com

Abstract

With the emergence of social network sites (SNS), students and teachers of higher education institutions all over the world have been making efforts to meet up with the demands of these information and communication technology (ICT) tools. This paper presents the findings of a study conducted at four private universities in Bangladesh with the aim of exploring the consequences of SNS to the academic and social life styles of students and teachers of these institutions. Random sampling of students and teachers from these institutions was done to get data of the research study. Qualitative and quantitative research methods were used for the study. The findings of the study indicated that the academic and social life styles of students and teachers had several consequences due to their integration with social network sites. However, the positive consequences overweighed the negative consequences. The findings further confirmed that students easily made social interactions with friends and formulated group discussions to exchange academic ideas, and teachers also shared course related materials and assignments with their students. It may be concluded that, even though with few drawbacks, SNS has positive consequences in teaching-learning and on the social life styles of students and teachers of Bangladesh higher education institutions. The findings of the research suggested that students and teachers should continue to use SNS so as to exploit more benefits associated with them. Again as the sample of the study was so small, findings of the study may not be generalized to all Bangladesh higher education institutions.

Keywords: *Academic and Social Lifestyles, Higher Educational Institutions, Social Networking Sites*

Introduction

Social networking among students and teachers has become more and more popular today in higher education institutions all over the world. Social network sites have become a way to make connections, not only on campus of higher education institutions, but with friends outside of school. Social networking has made it a way that helps many people feel as though they belong to a community. Due to the increased popularity of these sites, academic administrators are questioning whether grades of students are being affected by how much time is being spent on these sites.

For the purpose of this study, social networking is defined as the use of Facebook, YouTube, blogs, Twitter, MySpace, or LinkedIn. With smart phones being able to access the internet and have applications of social networking, many are concerned about how smart phones with social networking applications will affect students' grades [1]. Information technology as a new and emerging technology is carrying much weight as a new medium for students to build social connections and grow as members

of their institutions [2]. The emergence of Social Network sites has come to play a significant role of interaction between students and teachers and reinforcing the quality of teaching-learning process in higher education institutions. This simply explains that Social Network Sites (SNS) augments quality to the learning community rather than providing an alternative to it resulting in overall enhancement of the learning environment [3]. Social Networking Sites allow individuals to (i) construct a public or semi-public profile within a bounded system, (ii) articulate a list of other users with whom they share a connection, and (iii) view and traverse their list of connections with those made by others within the system. The nature of these connections may vary from site to site [4].

Every technological innovation has been a topic of debate and center of researchers' attention and same is the case with the development of SNSs. Various researchers have conducted studies to pinpoint the several impacts of these sites on their users and findings suggested both bright and dark aspects. It has been found that excessive usage causes many psychological, physical, interpersonal and educational problems to users [5]. Numerous studies have also been conducted to delineate the impact of SNSs on young generation and students [6]. This current study specifically aims at exploring the effects of SNSs on the lifestyles of teachers and students in higher educational institutions so would be a value addition to this research area.

Academic and Social Benefits of SNS

Social networking sites have become increasingly integrated into the way many people today act, think, and relate to each other. Social networking has a multitude of implications in the field of education and these impacts on students, educators, administrators, and parents are similar [7]. The communication patterns enabled by social networking technologies mirrors the exact process many educators seek to support in self-directed learning based on constructivist, connectivist, and constructionist [8] learning theories. These communication mechanisms are empowering and engaging to learners, and contribute to the ongoing evolution of human society. It is important to acknowledge that credibility and expertise in social networking comes from the extent of involvement in the network, including the amount of participation, frequency, and the usefulness of the information provided. Teachers and students in virtual worlds must gain benefits [9] through ongoing participation in networks to develop their credibility as a network member.

According to their reiteration [10] it is evident that Facebook's online community meets the requirements set forth by [11] for an environment that promotes student development by providing regular interaction between students and opportunities for collaboration with people from diverse backgrounds and that serves as a social reference group. These affordances for collaborative networking and persistent interactions present Facebook as a vantage point for unraveling lecturer-student power relations, if academics support was rendered via this site [12].

SNSs platforms allows the extension of learning discussion outside the formal classroom setting, thereby promoting deeper learning as young people not only engage with the material for longer but are more likely to relate to it and incorporate it into their everyday lives [13]. Another studies conducted on the use of handheld devices to deliver workplace learning demonstrated that regular accessibility means young people can access resources in a way that is both convenient and relevant to them. This in turn translates into increased levels of implementation into work practice [14]. Many researchers found a positive association between the use of SNSs and academic performance of the student users. Students who used SNSs scored higher on

reading skills test and had higher grades as well. Also it has been found that Face book usage is helpful for cure in case of some psychological problems including low life-satisfaction and low self-esteem [15]. SNSs also provide a rich mean of interaction between teachers and students [16].

As per the arguments of [17], the learning experience of most participants on SNSs is associated with social learning. As a consequence, social learning outcomes constitute the majority of learning outcomes. Cognitively, they learn how to creatively solve problems via information searching and online friends' help. Affectively, they feel free to express and present themselves, share feeling with others, and gain more confidence from champions. Finally, they improve their social skill and collaborative skill, and also more willing to share their own knowledge with peers. He continues that these are beneficial for their well-being development such as self-esteem and satisfaction with life. Although the students do not explicate the academic learning outcomes from online social networking, it cannot deny the impact of online social networking on academic learning outcomes [18]. For junior students, they might first experience social learning and social integration into the university (e.g., learning the culture or subculture of the university and interacting with peers), and then feel more comfortable interacting with faculty to reach a higher level of academic integration and learning outcomes. Thus, students' academic learning outcomes could increase when their social learning outcomes were heightened.

Debates on SNS in Education

It is pointed out that teachers ought to exploit their pupils' existing ICT knowledge and use the tools to which pupils already accustomed [17]. However, some researchers like [18] suggested that certain affordances of ICT, such as SNSs, can be a potential hazard for teachers as some applications allow users to communicate contents that can lead to discrediting or defamatory messages. It has also been pointed out by some researchers that SNSs can be used for plagiarism, cheating, harassment and other types of academic and social misconduct [19]. In all, a situation of risk and danger emerges. In is noted that SNSs can place children at risk of harming themselves and others [20].

SNS discourages Face-to-Face Communication. Some educators are concerned that while real-time digital stream may create a safe harbor for students who are uncomfortable expressing themselves, students are missing valuable lessons in real-life social skills. Students may find themselves at a disadvantage during college admission or job interviews when they need to command attention and deliver a coherent message. At social gatherings and in personal relationships, they need to be able to effectively express themselves and connect with others [21].

Spending much time on SNSs causes an effect on health of individuals. This is because the more time spent while browsing these social network sites can affect the way the genes operate within the human body, and weakens the immune and hormone levels, and function of arteries. In addition, it also has an impact on mental health. Moreover, the use of SNSs in education can cause lack of motivation towards learning and can be boring sitting in front of computer for a long time, especially if the scientific material presented is free of audio and visual effects that will attract learner towards learning.

Social and Academic Lifestyle of Students and teachers as they use SNS

SNSs were integrated thoroughly into teacher and student life because of high technology adoption rate and availability of computers, network etc., but more importantly, they were integrated because teacher

and student life lends itself to non-orderly social behavior. Teachers and students need reminders for events, incentives for social gatherings and facilitators for ad-hoc meetings, particularly very sporadic ones. Despite being busy, they are also highly social and SNSs helps them to achieve that [22].

SNSs are used to support offline ties and connections. According to the previous studies, it was found that SNS can be used to leverage other means of communication when lightweight interaction is preferred. Similarly to the way in which text messages were often used in cases where phone calls would not necessarily have been placed before [23]. This does not mean that the communication is insignificant as Nathan also describes in his research experience [24].

University students are at a stage in life where their social life is pivotal to their quality of life. It is also a time where friendships are made, maintained, broken and perhaps revived. Interestingly, students use SNSs to not only plan socialization with friends but also to overcome their shyness over contacting peripheral friends directly [22]. As Nathan also describes, students often have a set of five or six close friends, but these friends also had similar sets of close friends that did not necessarily overlap, making friends of friend's acquaintances or peripheral [24]. In connection with other online social networks, it has previously been pointed out that friendship is a flexible notion and peripheral friendships can grow into closer friendships and Facebook, in this sense was a practical facilitator for precisely this process [4].

Methodology

This study was conducted with the objective of exploring the consequences of social networking sites on the academic and social lifestyles of teachers and students in higher educational institutions of Bangladesh. Students are viewed as the highest customer segment and the most vivid users of SNSs. A sample of one hundred teachers and one hundred students was selected from four different private universities in Bangladesh. The universities selected were: Islamic University of Technology (IUT), Asian University, Ahsanullah University of Science & Technology and International Islamic University of Chittagong (IIUC). Therefore, data was supposed to be collected from 200 respondents from these four selected private universities. Random sampling was used in selecting the teachers and students from these universities.

Of the 100 distributed questionnaires to the teachers, 84% fully completed questionnaires were returned. On the other hand, a 100% response was received from the 100 distributed questionnaires to the students. Two structured questionnaires were developed in order to collect the data from the teachers and students respectively. These questionnaires involved both restricted and open ended questions with each questionnaire having three sections. Both qualitative and quantitative methods were applied during data analysis. Furthermore, weighted average was used to analyze the collected data.

Qualitative Analysis and Findings

We present here the findings on several factors related to the use of internet and SNSs. When students were asked where they accessed the internet, majority of them (52%) responded that they accessed the internet from their hostels, 43% from computer laboratory, 8% from their classes and 3% from the library. Some students said they accessed the internet from more than one place such as classes and hostels, hostels and computer laboratory of their institutions. When the same respondents were asked

which SNSs they used, majority (90%) of them said they used Facebook, (15%) of them said they used Twitter, (9%) said they used Google Plus, whereas (6%) indicated that they used other SNSs. It is seen from the analysis and findings that students used different devices to access the internet. This study also shows that 87% used computers, 22% used their mobile phones and 2% used other devices. When respondents were asked about the time they spent on SNSs, majority (47%) of the students indicated that they logged in once in a day, 36% spent said 2-5times a day, 10% said they spent a couple of hours and only 7% said they were always logged on SNSs.

When the teachers were asked which SNSs they used, majority (82.1%) of them used Face book, a great amount of them, (28.6%) responded that they used Twitter, (21.4%) Google Plus and (9.5%) indicated that they used other SNSs whereas the least number (1.2%) used Flickr. Teachers used different devices to access the internet. The study also showed that 96.4% used computers, 36.9% used their mobile phones and 1.4% used other devices. When the same respondents were asked of the time they spend on SNSs, majority (57.1%) of the them indicated that they logged in once in a day, 16.7% said they logged in 2-5 times daily, 15.5% responded they spent a couple of hours a day and only 7.1% said they were always logged on.

The findings regarding the positive consequences show that teachers utilize the opportunity of social networking sites to share information and other course related materials with their students. The teachers said that online learning communities give teachers and students the ability to personalize and share their content. Majority of the teachers also indicated that they managed to learn how to incorporate SNSs into teaching.

Quantitative Analysis and Findings

Fig 1: Students' experience with social networking sites and internet usage.
Responses from students regarding the consequences of using social network sites are depicted in table 1.

Table 1: Consequences of students using social network sites

Statement	**WA**
Positive Consequences	
Sharing homework, information of study materials, projects, resources or ideas	3.87
Communicating to teachers	3.55
General group discussion and exchanging ideas	3.51
Assignment preparation and argument	3.58
Communication among students and their instructors, following announcements about classes and courses	3.53
Negative Consequences	
Paying more attention towards SNS than utilizing this time for their studies	3.85
Poor performance (lower grades)	3.17
Failure to meet study targets	2.94
Missing classes due to SNS	2.66
Reduction in face to face human contact	3.36

Table 1 indicates that, majority of the students agreed that social networking sites helped them receive information about homework, materials, projects, resources etc. These findings continue to show that students used SNSs for communicating with their teachers outside school hours. While responding to the question whether they used SNSs to communicate with each other and to their instructors, follow announcements about classes and courses, majority of the students admitted that they used SNSs for the purposes as clearly indicated by the weighted average. This means the responses on all the statements are statistically significant.

Regarding the negative consequences of using Social Networking sites, research findings indicated that students get lesser time for their study when they use SNSs so much. Based on the findings of the study, majority of the students agreed that they paid more attention towards SNS than utilizing this time for their studies. They went ahead to show that as a result of this, they scored lower grades. Students affirmed that the use of SNSs reduces their opportunities of face-to-face contact with their teachers. Furthermore, the students were unable to give opinions on the claim whether their frequent use of SNSs made them fail to meet their study targets as well as missing their classes. These are seen by their weighted values. In most of the cases, weighted values were less for 'missing classes due to SNS' which indicates the significance on most of the statements.

Table 2: Consequences of teachers using social networking sites

Positive Consequences	
Statement	**W A**
Teacher shares information and resources with students	3.76
Teacher learns how social networking can be incorporated into teaching	3.40
Teacher creates student groups to collaborate on projects	3.56
SNS increases teachers availability to students outside school hours	3.25
SNS enables research through the exchange of different materials	3.52
Negative Consequences	
Teacher devotes little time to attend to students class related problems	3.09
There is reduction in face-to-face human contact due to SNS	3.53
SNS reduces the time of doing research to improve on your profession	2.79
SNS affects professional reputation and career	2.19
SNS causes stress and affects your health	2.86

According to the present findings, majority of the teachers showed that they used SNSs to create student groups so as to collaborate in projects and to send messages to students about their marks or work. Teacher's opportunities of conducting their research work are improved since SNSs permit the exchange of different materials and ideas. The responses in all the cases are statistically significant based on the weighted values. On the contrary, it was found that teachers devoted little time to attend to students' class related problems. The study continued to show that teachers were unable to give their opinions whether SNSs reduce their time of doing research so as to improve on their professions and careers, causes stress and affects their brain etc. Teachers furthermore disagreed with the claim that their usage of SNSs affects their profession and carrier. This indicated that their profession and career is affected

by other factors and not SNSs. It is seen in all the cases that, the weighted values are less. Therefore, it may be concluded that the responses on all the statements were statistically significant.

Conclusion

Social networking sites are gaining a lot of popularity these days with almost all the educators and educated youth using one or the other such site. These have played a crucial role in bridging boundaries, crossing the seas and enabling them to communicate on a common platform [25]. The aim of this study was to investigate the consequences that social networking sites have to the academic and social lifestyles of teachers and students in Bangladesh higher educational institutions. The findings show that most of the students usually spend little time on their SNSs by logging in once a day. Majority of them use Facebook as their favorite SNS and mostly access it on their computers while in their hostels. It can be clearly seen that students devote little time to these SNSs. The findings continue to show that students use SNSs for academic and non-academic purposes but with academic purposes outweighing the non-academic. Students can formulate group discussions so as to exchange their ideas, share course related materials with their colleagues communicate to their teachers, appeal to their friends about assignments etc. However, there are some drawbacks that SNSs come with. Such drawbacks include spending a lot of valuable time on SNSs which results into poor performance, paying more attention towards SNSs than utilizing this time for their studies, reduction in face to face contact with their teachers, failure to meet their study targets etc. Their responses indicate that SNSs have a lot of positive influence on their lifestyle as compared to its negative side.

However, educators are also among the vivid users of SNSs. According to the research findings, majority of the teachers prefer to use Facebook than any other SNSs. They mostly login once a day and they get access to the internet while using their computers. Teachers have integrated social networking sites into their teaching methods. They use SNSs to share course related materials with their students, communicate with students regarding their coursework's, assignments or any upcoming event, communicate with their fellow teachers from other universities something that has enabled them to improve on their research hence, improving their careers. Much as social networking sites have been so beneficial to the teachers, to a lesser extent, they have also caused some drawbacks. The findings of this study shows that, teachers spend a lot of valuable time on SNSs while reading and answering unnecessary postings thereby devoting little time to attend to student class related problems, reduction in face to face contact with their students, causes stress and affects their health etc. It is suggested that the findings of this study may not be generalized to all Bangladesh universities due to the limited number of universities considered in the research due to unavailability of time.

Recommendation

Due to the time constraints, the researcher could not conduct in-depth study on this subject. To this regard he proposes that further in-depth research be conducted on the academic and social consequences of SNSs to the teachers and students lifestyles in higher educational institutions. The study has provided some information on how the social networking sites benefit the students and teachers as well as the drawbacks it causes to them. Further investigations on whether social networking sites positively or negatively affect teachers and students should be done in the following areas: *(a)* How to fully

integrate social networking sites into teaching-learning, *(b)* How to minimize or eliminate the problems caused by social networking sites to students and teachers, *(c)* Identify measures on how to control students and teachers over usage of social networking sites and *(d)* How to motivate the teachers who are still resistant to this new technology (social networking sites). However, based on this research study it may be suggested that students and teachers should continue using SNSs so as to exploit more benefits that are associated with them.

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Power monitoring using the Raspberry Pi

Robin M Snyder
RobinSnyder.com
robin@robinsnyder.com
http://www.robinsnyder.com

Abstract

The Raspberry Pi is a credit card size low powered compute board with Ethernet connection, HDMI video output, audio, full Linux operating system run from an SD card, and more, all for $45. With cables, SD card, etc., the cost is about $70. Originally designed to help teach computer science principles to low income children and students, the Pi has taken on a life of its own, with many online resources and projects that cover most everything one would want to do with a small low monetary cost and low battery power computer. This paper/session will present the Raspberry Pi and provide ideas of what it can do and how one can get started using it. The author has used Pi's for Internet data acquisition/monitoring, cluster processing using more than one Pi, email notifications, and power monitoring. The particular focus example will be on UPS power monitoring and status using off the shelf Open Source software. The main software for the purpose of power monitoring is NUT, Network UPS Tools, whose goal is "to provide support for Power Devices, such as Uninterruptible Power Supplies, Power Distribution Units and Solar Controllers." Some background in the theory and practice of electrical power, surge protection, uninterruptible powers supplies, etc., will be provided.

Introduction

The Raspberry Pi is a credit card size low powered compute board with Ethernet connection, HDMI video output, audio, full Linux operating system run from an SD card, and more, all for $45. With cables, SD card, etc., the cost is about $70.

The Raspberry part comes from the name of a fruit not yet used so that the name could be trademarked. For example, Apple is already taken. The Pi part is the Greek letter pi as used in the ratio of circumference to diameter. Originally developed to promote computer science among lower income students, the Pi has taken on a life of its own with a community of users that have and continue to provide support a large number of areas.

By default, the Pi runs a version of Debian Linux called Raspian. In some cases, such as the Firefox web browser, technical/legal limitations/restrictions of the open source Firefox web browser have caused it to be renamed IceWeasel, but is otherwise the same.

One can run the Pi in GUI mode are in headless mode. That is, without a monitor/screen, being accessed via, say, SSH (Secure Shell Protocol). That is the primary way in which it will be used in this paper. There are many good intro books and/or online web sites dealing with getting started with the Raspberry Pi. This paper will only touch on some of the aspects related to the main topic of this paper - power monitoring and management using the Raspberry Pi.

Raspberry Pi alternatives

Here are some common alternatives to the Raspberry Pi.

Brick Pi

The Brick Pi is a KickStarter project that provides a board that can interface the Pi to Lego bricks and Lego sensor devices as found in the Lego MindStorms system.

Arduino

There are many add-on boards that can be used to interface the Raspberry Pi to Arduino boards.

The Arduino is a low cost open source hardware and software system designed to interface to the real would using an extensive collection of sensor (i.e., input) and actuator (i.e., output) devices. The Arduino, however, has a limited amount of memory and input/output capacity.

Thus, an Arduino combined with the Raspberry Pi can provide a useful system to interface sensors and actuators to the real world.

Raspberry Pi alternatives

There are many alternatives to the Raspberry Pi. Some of those used and/or investigated by the author include the following.

BeagleBone

The BeagleBone is faster, with more memory, no composite video (but with HDMI), and flash memory for the resident ARM Linux based system.

The author found it useful to use a SD card boot with Ubuntu rather than the suggested Linux OS.

Yun

The Yun is an Arduino system combined with a OpenWRT-based Linux system (as used in some routers). The Yun comes with a network connection and a wireless hotspot device.

3.3 Intel Galileo

The Intel Galileo is a more expensive and, in the authors opinion, not as well designed/realized system, that has an on-board Linux system and Arduino-like interface for connection to sensors and actuators.

Panda Board

The Panda Board is a dual ARM processor system, about $190, that has been used in a number of larger custom applications.

Power management

Every electronic device requires some type of power. Some devices require more power than other devices. Intel traditionally assumed that the processor would be always running. The ARM architecture, on the other hand, allows the process to almost stop completely - which helps a lot when a longer battery life is required. Intel's response to the demand for the competitor ARM's processors has been to develop an Atom (and Sandy Bridge, etc.) series of microprocessors to help with reducing power consumption and thereby increasing battery life.

Typical electrical power supply systems have fluctuations in the quality of power provided. Surges can increase the nominal voltage supplied. Sags can decrease the nominal voltage supplied. A brownout is a reduction in the voltage/current supplied. A blackout is a total decrease of voltage/current supplied. Spikes can pass though and induce currents in devices that can burn them out or otherwise cause the devices to malfunction. In the extreme case, such spikes are called EMP (Electromagnetic Pulses) that can be created by atomic/nuclear devices and can burn out (or cause to not function properly) sensitive electronic equipment such as microprocessors and associated memory, etc.

One solution to reasonable surges, sags, and/or spikes (i.e., not EMP) is to use a UPS (Uninterruptible Power Supply) which will help with sags, surges, and spikes, and can even be delivered by UPS (United Parcel Service)!

It is common to have computers, servers, etc., connected to UPS systems. But what if the power goes out for an extended period of time such that the connected servers, etc., will lose power. APC makes UPS systems that can use their PowerChute software to monitor and take actions if power is lost for an extended period of time. And even if power is not lost, one might want to know how the power systems have been functioning, the load on each, when they lose power, etc., and then shut down and restart the servers at an appropriate time.

The rest of this paper will look at how the Raspberry Pi can be used to monitor and manage UPS power in a network setting.

Security

The default user is user **`pi`** with default password **`raspberry`**. It is strongly suggested that the default password be changed. It is also suggested, if external access from the Internet is to be used, that the user **`pi`** have a very secure password and that another user be created to do the same things that would be done with the user **`pi`**.

Pi clusters

Multiprocessing using multiple Raspberry Pi boards, a Pi cluster, requires careful configuration to allow each Pi to be accessed while allowing each Pi in the cluster to be managed.

The Pi boots from an SD card. As one changes the configuration of the Raspian Linux, it is convenient to have a way to duplicate SD cards.

The hardware part of the copying can be done by a dedicated device. The author uses a $99 USB 2.0 flash drive copier, using USB 2.0 SD card adapters. Some SD cards will not be recognized but most are. One can copy one source SD card to two target SD cards simultaneously and then have them automatically verified by the copy device.

Each network device has a MAC (Media Access Control) address and an IP (Internet Protocol) address assigned by the local router. Using the static DHCP (Dynamic Host Control Protocol) of the router, each device (e.g., a Pi) can be assigned a specific IP address. For example, the author's Raspberry Pi's are assigned the IP addresses 192.168.100.161 for PX1, 192.168.100.162 for PX2, etc.

The software side of the copying is handled by a Bash/Python script combination that does the following using a hard-coded database of hardware MAC addresses and assigned IP addresses. If the Pi, as identified by the MAC address, does not match the desired IP address, the relevant files (e.g., the hosts file, hostname file, etc.) are modified and the message is displayed that the device needs to be rebooted, at which time, the Pi has been reset with all the desired configuration updates from the desired SD card and the software part has been appropriately modified.

External access

In order to do remote management of, for example, power monitoring, it is necessary to access the Pi from a remote location (i.e., from the Internet outside of the local network to which the Pi as connected). If the Pi is to be accessed from the Internet, it is suggested that another port, rather than standard SSH port of **22**, be used.

Provided the ISP (Internet Service Provider), such as ComCast, does not forbid it, the general method for accessing the Pi from the Internet is as follows.

The local setup is assumed to be as follows, using ComCast as an example.

- The Internet is provided via a Cable Modem using, for example, DOCS v3.
- A local router allows local sharing of the connection between machines.
- Assume the router has an IP address of 74.12.34.56, assigned by the ISP.
- The Pi is connected to the local router at IP address 192.168.100.161.

The general configuration is as follows.

- Assume the external SSH port is 2244.
- Set the port forwarding of the local router to take requests to IP 74.12.34.56 on port 2244 and redirect them to the local Pi at 192.168.100.161 on port 2244.
- Set up the Pi SSH Server to accept SSH requests on port 2244.
- Insure that local firewalls allow the desired traffic.

Power management

One use of a Raspberry Pi is the monitor and manage the power for the local network as provided by one or mare UPS (Uninterruptible Power Supply) systems that support the NUT (Network UPS Tools) collection of open source software tools.

The author uses APC (American Power Corporation) UPS systems, most of which support the NUT protocol for power monitoring. The NUT web site can be used to help determine if a given UPS is supported by NUT.

The setup of such monitoring can be a useful project that students in the computer science department could help develop for use by the IT (Information Technology) group at an academic institution.

Since the Pi is a complete Linux system running on the local network, email can be sent, SMS text messages can be sent, drives can be accessed, logs can be created, etc., just like any other computer/machine but with a small price (in case the device fails or is destroyed, for example, by a lightning strike) and small power usage (which can otherwise add up to a significant amount over time).

Power monitoring

"**:nut monitor ups device**"

An Internet search term for more information is "**Raspberry Pi NUT**". The author took some of the configuration and setup ideas from http://abakalidis.blogspot.com/2013/04/using-raspberry-pi-as-ups-server-with.html, which is one of the top results in a Google search of the topic.

One can check the NUT web site to see if a UPS is supported. Most APC UPS devices are supported and those are the only UPS devices used by the author.

The UPS is assumed to have a USB serial interface and not an older serial port interface. APC UPS systems that support NUT come with a special USB to serial cable for that particular UPS device.

Some Raspberry Pi Linux commands that are relevant to power monitoring are now covered. These are commands typed at the command line that can later be scripted to run automatically, if desired. The commands will serve as a gentile introduction to the Linux command line. Most commands here start with **sudo** which stands for "**Super User Do**" and for which there is no password to use this command on the Pi.

Note that the Linux way is to use text files for configuration so that only text editors are needed to configure, though important systems will have someone write a GUI to do the configuration. The alternative is the Windows way to make everything somewhat secret and proprietary and, in most respects, more difficult to change.

The USB utilities should be installed to get status on UPS devices.

```
sudo apt-get install usbutils
```

The USB utilities include the **lsusb** command. The command **lsusb** lists the known USB devices connected to the system. Here is part of a typical output.

```
Bus 001 Device 002: ID 0424:9514 Standard Microsystems Corp.
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 001 Device 003: ID 0424:ec00 Standard Microsystems Corp.
Bus 001 Device 005: ID 051d:0002 American Power Conversion Uninterruptible Pow-
er Supply
Bus 001 Device 004: ID 051d:0002 American Power Conversion Uninterruptible Pow-
er Supply
```

Each connected device has a bus (e.g., **001**), a device designation (e.g., **004**, **005**, etc.) and a 32-bit identifier (e.g., **051d:0002**, **051d:0002**) that identifies a specific type of device. That is, the identifier is like a UPC bar code that identifies a type of device and not an RFID tag that identifies a unique instance of a device.

To find the available/used USB devices, use the following command.

```
find /dev/bus/
```

The author had originally desired to connect more than one UPS device to a Pi. However, from the NUT web site:: *The driver ignores the "port" value in ups.conf. Unlike previous versions of this driver, it is now possible to control multiple UPS units simultaneously with this driver, provided they can be distinguished by setting some combination of the "vendor", "product", "serial", "vendorid", and "productid" options*. Since the author's UPS devices have the same information with respect to this limitation, the rest of this paper will use just one UPS device. Using one Pi per UPS device, however, would allow overcoming this restriction as a client machine (i.e., not the Pi connected to the UPS) could monitor the Pi machines that are each monitoring one UPS device.

```
lsusb -t

/: Bus 01.Port 1: Dev 1, Class=root_hub, Driver=dwc_otg/1p, 480M
    |__ Port 1: Dev 2, If 0, Class=hub, Driver=hub/5p, 480M
        |__ Port 1: Dev 3, If 0, Class=vend., Driver=smsc95xx, 480M
        |__ Port 2: Dev 6, If 0, Class=HID, Driver=usbhid, 12M
        |__ Port 3: Dev 5, If 0, Class=HID, Driver=usbfs, 12M
```

The NUT server

This section describes the NUT server setup, configuration, and usage.

Install the server

The following command can be used to install NUT, the NUT server, and the NUT client.

```
sudo apt-get -y install nut nut-client nut-server
```

Relevant files

Here are some relevant configuration files in the **/etc/ups** folder.

- **ups.conf** contains settings for UPS-specific drivers.

- **upsd.conf** contains settings for the main UPS daemon **upsd**.
- **upsd.users** contains user and access control for the UPS daemon **upsd**.
- **upsmon.conf** contains settings for the UPS monitoring daemon **upsmon**.
- **upssched.conf** contains settings for the **upssched** daemon.

Configure the server

Use the following command to edit the server configuration file **/etc/nut/ups.conf** using the nano editor.

```
sudo nano /etc/nut/ups.conf
```

Add the following at the end of this file. In this case, the author has two UPS devices to be added. The NUT web site has suggested drivers for known UPS devices.

```
[apc1200]
   driver = usbhid-ups
   port = auto
   desc = "APC Back UPS Pro 1200VA a"
```

A folder is needed for server operation. Here are some commands to do this.

```
sudo mkdir /var/run/nut
sudo chown root.nut /var/run/nut/
sudo chmod 770 /var/run/nut/
```

Start the server

The following command attempts to start the server and shows the resulting status. Any errors in the configuration file will be noted here.

```
sudo upsdrvctl start
```

Here is the output.

```
Network UPS Tools - UPS driver controller 2.6.4
Network UPS Tools - Generic HID driver 0.37 (2.6.4)
USB communication driver 0.32
Using subdriver: APC HID 0.95
Network UPS Tools - Generic HID driver 0.37 (2.6.4)
USB communication driver 0.32
Using subdriver: APC HID 0.95
```

Next some connections need to be made so that the client and server and UPS listen on the appropriate ports. Here is the command to edit the appropriate file.

```
sudo nano /etc/nut/upsd.conf
```

Add the following **LISTEN** directives, where **192.168.100.160** is the IP address of the Pi on the local network and the IP port being used is **3493**. Port **127.0.0.1** is the **localhost** port.

```
LISTEN 127.0.0.1 3493
LISTEN 192.168.100.160 3493
```

The **ifconfig** command can be used to determine the IP address of the Pi, although one will want to use static DHCP from the router so that the Pi always has the same local IP address. Note that the Windows command to see the IP address is **ipconfig** (starts with "**ip**") while the Linux command is **ifconfig** (starts with "**if**").

Edit the **upsd.users** file with the following command.

```
sudo nano /etc/nut/upsd.users
```

Here is the header of the file.

```
# Network UPS Tools: Example upsd.users
#
# This file sets the permissions for upsd - the UPS network daemon.
# Users are defined here, are given passwords, and their privileges are
# controlled here too. Since this file will contain passwords, keep it
# secure, with only enough permissions for upsd to read it.
```

The following should be already set but the users and passwords should be changed as desired for security, etc.

```
[admin]
   password = apcupc1
   actions = SET
   instcmds = ALL

[testuser]
   password = pass
   instcmds = test.battery.start
   instcmds = test.battery.stop

[upsmon_local]
   password = local_pass
   upsmon master

[upsmon_remote]
   password = remote_pass
   upsmon slave
```

Here, **local_pass** and **remote_pass** are used as the passwords, but one should use a secure password for such purposes. If only local access is desired, do not include the remote user.

Add commands such as the following in the **MONITOR** section.

```
MONITOR apc1200@PX0 upsmon_local local_pass master
```

In this case, **PX0** is the domain name set in the **hosts** file and assigned to **localhost** - **237.0.0.1**.

```
#MODE=none
MODE=netserver
```

The following command can be used to start the NUT server.

```
sudo service nut-server start
```

Here is a typical output when the server failed to start.

```
[ ok ] Starting NUT - power devices information server and drivers: driver(s).
(upsd failed).
```

Here is a typical output when the server starts successfully.

```
[ ok ] Starting NUT - power devices information server and drivers: driver(s).
upsd.
```

The following command can be used to insure that the services just configured will start when the system is started.

```
ps -ef | grep ups
```

The **ps** command lists all of the running processes while **grep** filters out all but those that contain the text "**ups**".

```
nut 2567 1 0 20:35 ? 00:00:00 /lib/nut/usbhid-ups -a apc1200a
nut 2569 1 0 20:35 ? 00:00:00 /lib/nut/usbhid-ups -a apc1200b
nut 2572 1 0 20:35 ? 00:00:00 /sbin/upsd
pi 2592 2412 0 20:37 pts/0 00:00:00 grep ups
```

NUT statistics

Once the server is running, statistics can be obtained using the **upsc** command as follows.

```
upsc apc1200@192.168.100.160
```

A typical output is as follows.

```
battery.charge: 100
battery.charge.low: 10
battery.charge.warning: 50
battery.date: 2001/09/25
battery.mfr.date: 2012/04/29
battery.runtime: 17676
battery.runtime.low: 120
battery.type: PbAc
battery.voltage: 27.2
battery.voltage.nominal: 24.0
device.mfr: American Power Conversion
device.model: Back-UPS RS 1500G
device.serial: 3B1217X31574
device.type: ups
driver.name: usbhid-ups
driver.parameter.pollfreq: 30
driver.parameter.pollinterval: 2
driver.parameter.port: auto
driver.version: 2.6.4
driver.version.data: APC HID 0.95
driver.version.internal: 0.37
input.sensitivity: medium
input.transfer.high: 147
input.transfer.low: 88
input.voltage: 121.0
input.voltage.nominal: 120
ups.beeper.status: enabled
ups.delay.shutdown: 20
ups.firmware: 865.L3 .D
ups.firmware.aux: L3
ups.load: 8
ups.mfr: American Power Conversion
ups.mfr.date: 2012/04/29
ups.model: Back-UPS RS 1500G
ups.productid: 0002
ups.realpower.nominal: 865
ups.serial: 3B1217X31574
ups.status: OL
```

```
ups.test.result: No test initiated
ups.timer.reboot: 0
ups.timer.shutdown: -
```

But the following similar commands can also be issued from any computer on the network, not just the Raspberry Pi's.

```
upsc apc1200b@192.168.100.160
upsc apc1200b@192.168.100.162
upsc apc1200b@192.168.100.163
upsc apc1200b@192.168.100.164
```

In this case, the following Raspberry Pi's were set up on the network.

- **PX0**, at **192.168.100.160**
- **PX2**, at **192.168.100.162**
- **PX3**, at **192.168.100.163**
- **PX4**, at **192.168.100.164**

Note: The author was/is using **PX1**, at **192.168.100.161**, for other purposes (which is why the pattern is not uniform and contiguous)

Since all of the above information can now be obtained, parsed, processed, saved, etc., for each UPS on the network, or even from outside the network if the routers and port forwarding and firewalls are appropriately set, a larger power monitoring and management system can be created.

Obviously, some additional programming is needed to make use of this data (e.g, parse and store for later use), but the data is now available.

Starting at boot

To start NUT at boot time, edit the NUT configuration file using the nano editor with the following command.

```
sudo nano /etc/default/nut
```

Add the following to this file, which is normally empty after a new install.

```
# /etc/default/nut
START_UPSD=yes
START_UPSMON=yes
```

NUT client

The Raspberry Pi is being used as the NUT server. A client can be installed on some other machine (e.g., Linux client, Windows client, etc.) which can then access the Pi to get information about the power state. This access can be local or remote (provided the routers, firewalls, etc., are properly configured).

Additional configuration involves making decisions about what to do when the power fails.

There are GUI programs available to monitor and manage power. These programs automate and add a GUI interface to the commands presented above.

Ideas

Some ideas of usage are as follows.

- Monitor and report power usage.
- Determine if the load is too much for a given UPS.
- Determine when the battery should be replaced, or warn of the battery getting old.
- Send an email, or SMS message, when appropriate conditions are encountered.
- Send messages to have a server, which is monitoring the conditions, shut down, and then, when power is returned, start again. (This is non-trivial and requires careful planning and setup for everything to work).

Summary

This paper/session has discussed and/or demonstrated the Raspberry Pi with an emphasis on power monitoring and management. Some operational details were covered and some future ideas presented.

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An overview of the past, present, and future of 3D printing technology with an emphasis on the present

Robin M Snyder
RobinSnyder.com
robin@robinsnyder.com
http://www.robinsnyder.com

Abstract

Just as the cost of high quality laser printing started in the tens of thousands of dollar and can now be purchased for under $100, so too has 3D printing technology started in the tens of thousands of dollars and is now in the thousand dollar range. Current 3D printing technology takes 2D printing into a third dimension. Many 3D printers are somewhat similar to ink jet printers in that that rolls flexible plastic is melted (instead of ink) and built up layer on layer to create a 3D artifact. A more expensive technology takes away from a black of material to so that the artifact produces is what remains. Each method has advantages and disadvantages. A related technology, laser cutting, is yet more expensive but, like the other technologies, is becoming less expensive each year. While information deals in intangible bits, 3D printing deals in tangible atoms. Soon the phrase "make it" may be as common as the phrase "print it". This paper/session will discuss the past, present, and future of 3D printing technology, concentrating on what can be done today with an actual demo of 3D printing in action. The general software language used to program 3D printers, CNC machines, for Computer Numerical Control, is g-code. One can do 3D printing, however, using available software packages, many Open Source. Software, hardware, and accessories necessary to get started will be covered.

Introduction

In 1985, Apple and Steve Jobs introduced the world to, among other things, low cost desktop publishing in the form of the Apple LaserWriter. This high quality laser printing (via PostScript, a language designed for high quality printing) started at over $5,000 but this technology can now be purchased for under $100. It is to the point that, like razer blades, film cameras, game consoles, and ink jet printers, one can in a short time spend more for the day-to-day usage supplies than for the original device.

Current 3D printing technology takes 2D printing into a third dimension. Many 3D printers are somewhat similar to ink jet printers in that that rolls of flexible plastic threads are melted (instead of ink in an ink jet printer) and built up layer on layer to create a 3D artifact.

The lower end 3D printing machines are additive devices that build up layer upon layer of material to create a 3D object. A more expensive technology uses a subtractive process takes away from a black of material to so that the artifact produced is what remains. Each method has advantages and disadvantages. A related technology, laser cutting, pretty much a 2D technology that cuts away from a thin material, is yet more expensive but, like the other technologies, is becoming less expensive each year.

While the field of information deals in intangible bits, 3D printing deals in tangible atoms. Soon the phrase "**make it**" may be as common as the phrase "**print it**". This paper/session will discuss the past,

present, and future of 3D printing technology, concentrating on what can be done today with an actual demo of 3D printing in action.

History

Humans have always made things - things that are sometimes called technology. For example, language is not a technology, but writing is a technology. Humans spoke languages long before they actually wrote things down using symbols in what we would call a language. Before the industrial revolution of the 18th Century, things were manually made one at a time, each one a custom instance of that thing. The industrial revolution facilitated the creation of things on a large scale, but things that were pretty much the same, such as guns with interchangeable parts, the Model-T Ford (any color as long as it was black), etc. Economies of scale allowed diversification of what was produced, but only to the extent that enough people wanted what was being produced in the form it was being produced.

An earlier revolution, the printing (information) revolution introduced by Gutenberg in the 15th Century, facilitated the mass production of information in the form of books of 2D paper containing information. Through the 20th Century, printing technologies developed on vast economies of scale. But yet, there needed to be enough demand for the book to be produced/published to justify printing it typical runs of 1,000 or more copies for each run. The information revolution of the Internet and the web has allow publishing to move to be on-demand. For example, the author has an interest in reading and understanding classical Greek (in the Greek language). an interest that is, by all accounts, not huge. But yet, on Amazon.com, there are a number of self-published authors of credible classical Greek texts with annotations, etc., that are quite interesting. These books are self-published and printed when ordered (thus, limited binding options, etc.). In a print-on-demand environment, custom books can be printed for an audience of one, a few, or many.

This same concept is approaching, and in some cases, here already, in the form of 3D printing. 2D printing prints information on paper. 3D printing makes things. Simple 3D printers use plastic, but more expensive 3D printers use metal, cake icing (e.g., customized cupcakes), body parts, etc. For example, a custom finger (for someone who has lost a finger) might have cost more than $10,000, once all the medical and domain experts are used. But, someone could put together a custom 3D printed finger replacement for much less. To find examples, use an Internet search such as "**3D printed finger**".

In 3D printing, the cost of a customized instance of one is no more costly than producing more than one. 3D printing may never replace the factory line dedicated to producing many of the same type of thing at lower cost, but the fewer and more customized the thing, the better suited is 3D printing to the task.

This concept has been labeled the long tail versus short tail. The short tail consists of common items in high demand that are worth being produced - but every item is the same. This could be the blockbuster movie, the book everyone wants to read, the most common size clothing in the some colors and styles, etc. The long tail are the unique items that have a very small demand - the specialized movie, book, piece of clothing, etc. In the case of DVD rentals, NetFlix took the long tail of sales (and some of the short tail) while Redbox took the short tail (common high demand DVD's), and Blockbuster, with expensive brick and mortar stores disappeared. 3D printers create a new market for specialized good in

the long tail of things - customized and individualized doll house parts, customized and individualized Lego parts, customized and individualized war gaming parts, etc.

Makers

At one time, a computer was a term to describe a person whose job was doing computations - typically on an adding machine. Many human computers were used to do calculations during the Second World War. As electronic digital computers developed (as contrasted, for example, with mechanical analog computers), and prices decreased, jobs for human computers disappeared and the term computer now refers to an electronic digital computer. So too, a printer did, and still does to some extent, refer to a company and/or a person whose job it is to facilitate printing - which has changed slowly since the time of Gutenberg. However, many people today use the term printer to refer to a device on the desk next to the computer that produces hard copy output. A maker is someone who makes things. Terms often start out describing what they do in terms of what already exists, and then changes to another term. Examples are horseless carriage (automobile), iron horse (locomotive), lift or vertical railway (elevator), cellular phone (cell phone), talking telegraph (telephone), talking pictures (movies), etc. Today, a maker is someone who makes something, and what better way to make something than by using a 3D printer. Might a 3D printer eventually be called a maker? And whereas today we may say "**print it**", we may soon say "**make it**".

PrintrBot Simple

The cost of getting into 3D printing has been dropping over time. The author started using the PrintrBot simple, which costs about $300 as a kit (with wooden parts) or $700 pre-assembled (with metal parts). Since the field of 3D printing is in a state of fast change, the prices and many of the details will change over time but the concepts will remain about the same. And the cutting edge can be the bleeding edge. The author's first attempt at a 3D printer resulted in some shipping damage and a delay in actually getting 3D printed objects realized.

The PrintrBot simple web site is at http://printrbot.com and the instructions, videos, software links, etc., for the PrintrBot Simple are at http://printrbot.com/simple.

As with a traditional 2D printer, the following are needed.

- printer hardware (which changes over time)
- printer firmware (hardware-embedded software which can be updated)
- host software drivers (Windows, Mac, etc.)
- host application software (Windows, Mac, etc.)
- printer filament (the consumable that can eventually have a total cost more than the printer)

Printer filiment

The most common printer material used by the PrintrBot Simple is PLA filament with a thickness of 1.75 mm. A 1 kg roll of PLA filament costs about $30. This filament is melted to spread and then dries to a solid plastic, in analogy to an ink jet printer spraying ink that then dries on the paper. Feeding the

filament corresponds to the 4th dimension in 3D printing, which is in addition to the three spatial dimensions.

The filament needs to be heated to the correct temperature, and then applied in a consistent manner. Typically, the firmware running the 3D printer controls this with a user interface on the host computer to set and monitor such aspects of the 3D printer.

Drivers

As is typical, Windows requires an extra step to install the required drivers. It is reported that Microsoft may soon host and ship drivers that would then be automatically recognized by Windows when the printer is connected to a USB port.

Repetier

The Repetier 3D printing software can be downloaded at http://www.repetier.com. It includes Slic3r, Skeinforge, Python and Pypy and requires the .NET 4 framework. There are versions for Linux and Mac although the Linux version requires WINE which is a Windows emulator, so it appears to be more Windows-based than Linux-based.

Once started, one must configure the printer via the "**Printer Settings**" icon in the upper right of the Repetier program window. The "**Port:**" setting needs to be set to the port assigned by Windows when the USB cable is attached, and after installing the Windows serial drivers.

Following the installation instructions, the PrinterBot simple web site has a recommended G-Code file with which to start.

SketchUp

SketchUp is 3D software for designing and creating 3D objects. The web site is at http://www.sketchup.com/products/sketchup-make. From their web site:

> *Hobbyists, kids and backyard spaceship builders all agree that SketchUp Make is the easiest, most fun, entirely free 3D drawing tool in the world. We think you will, too.*

They offer a free version and a SketchUp Pro version - $590 as of May, 2014. It is available for Windows and Mac. The author primarily worked with Repetier in getting started with 3D printing.

CNC Machines

A CNC (Computer Numerical Control) machine uses a computer program to control a "**machine**". In 3D printing terms, a CNC machine can be used to "**take awake**" from what is there - a subtractive technology. Common examples of CNC machines are lathes, laser cutters, routers, mills, etc. Obviously anything more than the most simple CNC machine can get expensive, although, like most technologies, the cost decreases over time as demand spurs the automation and creation of more supply.

In some home improvement stores, keys such as traditional house keys (e.g., to open pin cylinder locks), traditionally replicated by following an analog pattern and replicating the key, are now made as follows using a CNC machine.

- The key is place and lined up on a small dedicated scanner bed.
- A photo (or scan) of the key is made.
- A CNC machine then removes the part of the key metal not needed from a blank key.

Yes, photos and scans can be used to create the G-Code necessary to run a CNC machine dedicated to creating keys. The company Diebold, which creates many of the touch screen voting machines used in the United States, became infamous for publishing an innocuous photo of the voting machine machine and key on their website. For some reason, each voting machine used the same key. Replicas of the keys were made from the published photos that then compromised the asserted security of the vowing machines.

Steps

The basic steps in creating and realizing a 3D model are as follows.

- Create the 3D model using some software system.
- Use software (e.g., Slic3r) to slice the model into slices for the 3D printer.
- Convert the slices, and associated control, into a low level code for the 3D printer (e.g., G-Code).
- Use software to send the G-Code to the 3D printer while monitoring the progress of the print.

Creation

Creating a 3D model can be a tedious and time-consuming task.

A 3D scanner is a device to help automate the process. Such scanners can be quite expensive. Some projects use the Microsoft XBox Kinect, with associated software and the Microsoft Kinect SDK (Software Development Kit) to obtain a 3D model of an object.

STL

A common 3D printer model file format is STL (Standard Tessellation Language). Here is an example ASCII (i.e., text, human friendly) STL segment from the **`FirstCube.stl`** file that is recommended for the PrintrBot Simple.

```
solid model
facet normal 1.0 0.0 0.0
outer loop
vertex 19.0726873012066 20.1520966447257 0.0
vertex 19.0726873012066 0.152096644725744 10.0
vertex 19.0726873012066 0.152096644725744 0.0
endloop
endfacet
...
endsolid model
```

In practice, for compactness, the binary STL format (i.e., not human friendly) is used rather than the larger text file format. There are extensions and additions to the format to support color, etc.

G-code

The low level NC (Numerical Control) code used by 3D printers is G-Code. A program such as Slic3r, built into Repetier, can be used to slice the 3D model into thin slices that can then be printed by the 3D printer. These slices can be expressed in G-Code. Here is an example G-Code segment from the **`FirstCube.g`** file that is recommended for the PrintrBot Simple.

```
G21 ; set units to millimeters
M104 S200 ; set temperature
G28 X0 Y0 ; home
G29
M109 S200 ; wait for temperature to be reached
G90 ; use absolute coordinates
G92 E0
M82 ; use absolute distances for extrusion
G1 F1800.000 E-1.00000
G92 E0
G1 Z0.300 F7800.000
G1 X59.580 Y59.580 F7800.000
G1 E1.00000 F1800.000
```

The semicolon is used as a comment symbol whereby the text to the end of the line is ignored.

- The "**G**" command is used to provide some value, such as motion, etc.
- The "**M**" command is used to provide miscellaneous commands.

Typically one would not write G-Code but would, instead, generate from some higher level model.

Thingiverse

Since 3D printer models can be tedious and time-consuming to create, it would be nice if there were a web site where people could share their 3D designs. There is, Thingiverse at http://www.thingiverse.com. Need a case for your Raspberry Pi? There are so many available, one does not need to make it. Need a case for your Intel Galileo? This is more uncommon. Once can download and make such a case. Need custom Lego parts? Need custom and inexpensive doll furniture for your daughter - furniture that matches the furniture in your house? Welcome to 3D printing.

Got an idea? Someone may have already done work on it and published it on Thingiverse. In that case, perhaps you can build on that idea without starting from scratch.

Maker spaces

Many cities have started maker spaces, sometimes called hacker spaces, to allow makers to come together, brainstorm, create, and make things. Such "**things**" can become tomorrows inventions and create jobs making and using them. It all starts with ideas and ideas are stimulated by communication and working together of like-minded individuals.

Future

The future of 3D printing is that it will become less expensive, better quality, and more purposive and ubiquities. Soon the phrase "make it" may be as common as the phrase "print it".

Karl Marx said, "*Each country has its own ruling class. In capitalist countries, the rulers own the means of production and employ workers. The capitalist class is also called the bourgeoisie. Means of production are what it takes to produce goods. Raw materials, satellite networks, machinery, ships and factories are examples. Workers own nothing but their ability to sell their labor for a wage.*". What happens when the means of production is lowered, as is the case with the declining price of 3D printers, such that almost anyone can own the "**means of production**".

Summary

This paper/session has discussed and/or demonstrated 3D printing, past, present, and future, with an emphasis on the present.

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Using Live Projects in the Classroom

Dewey A. Swanson
Associate Professor, C&IT
Purdue University
College of Technology at Columbus
dswanson@purdue.edu
(812) 348-2039

Abstract

As instructors we are always trying to improve the classroom experience, making it more interesting and meaningful to the student. Typically, I like to have team projects in our classes. In the past many of these projects were from the text or projects I have worked on in industry and have modified to fit in the context of the class. I've always wanted to use live projects in class but have been reluctant because of the issues it can present not only for myself as an instructor but also the students and project stakeholders. This past year I offered a senior level Computer and Information Technology (CIT) class that involved live projects, one internal to our campus and a second project with a local company. In this paper I will discuss how we developed and delivered the class. I will review the structure of the class along with what worked and what we would change, I will also review feedback from the students that participated in the class and the stakeholders from the two projects we chose.

Introduction

As an instructor, one of my goals is to make the classroom experience meaningful and interesting for the students. One where they can maximize their learning. Over the years I've noticed the students' interest level tends to increase whenever I'm able to bring a real life component into the classroom. In the spring 2013 semester we had several students nearing graduation needing an upper level class. It turned out most of the students had taken a variety of classes and none of the regular courses would work for all the students. We have a course CNIT 390 Supervised Practicum in the curriculum. Generally, this class is used as a service learning course, which was the original intention. The CNIT 390 is an instructor directed practicum designed to combine university study with work experience related to the Computer and Information Technology (CIT) plan of study. We had not offered the CNIT 390 course in Columbus before.

Eight students enrolled in the course. All of the students were CIT majors and either juniors or seniors. In terms of student experience it was across the spectrum. Several students had a great deal of experience having interned at a local company as programmers. Two students even had their own IT consulting company. On the other end of the spectrum several of the juniors had no experience outside the classroom.

Over the semester we had two clients volunteer to work with the CNIT 390 students. The first client was internal to Purdue. The Mechanical Engineering and Technology (MET) Department had recently set up a metrology lab on campus. The department wanted to make the lab available to local businesses. They also wanted to have a presence on the web to supply information to the public about the service they planned to provide.

The second client was the primary client for the students over the semester. The company Insul-Coustic is a company in northern Indiana that designs and manufactures custom noise and thermal products for farm, construction and industrial equipment. The company has annual revenue of five to ten million dollars and has experienced large growth over the past few years. Several of the company's processes were a combination of manual and automated operations using Microsoft Excel. Although the system worked, it had several issues and with the company experiencing strong growth they were interested in exploring options that would make the process more efficient.

Purdue Polytechnic

Purdue President Mitch Daniels introduced a plan called Purdue Moves which is a range of initiatives to enhance educational opportunities for its students among other things. Part of that Purdue Moves is a funded effort of the College of Technology called the Purdue Polytechnic Institute (PPI). PPI is aimed at transforming the college through renewed undergraduate programs, a state of the art approach to how learning occurs, applied research, and a renewed focus on workforce development. The approach taken in the CNIT 390 course falls directly in line with the values and beliefs articulated about the PPI. Among the more important points, PPI values student autonomy with their learning and believes that learning is a personal act of discovery with faculty playing the role of supporting rather than driving the students' learning. PPI also values open ended inquiries that have inherit risks and are one of the keys to learning and creativity. The PPI values intrinsically motivated students and just in time approach (learning when needed to solve a problem) as opposed to just in case (in case it might come up on a test). Finally, the PPI believes that although individual mastery is important students need to learn to collaborate as it improves individual learning. CNIT 390 aligns well the goals of the Purdue Polytechnic Institute.

Planning the Course

Delivery Format

We had several options for delivering the course, traditional, hybrid or online. I wanted to reserve a time that I could ensure that students would be available so I chose a modified hybrid class format. For scheduling, the class was set up as a traditional 3 credit hour class with time reserved on Monday and Wednesday afternoons. I did this for several reasons. First, I wasn't sure going into the class how much instruction time I would need and I wanted to be flexible. Second, I wanted to make sure students had a common time they would all be available to meet and if I went with an online class I wouldn't be able to guarantee that. Finally, I wanted to have time set aside for the clients to have meetings with students. My plan was to be flexible with my schedule and allow students and clients to control the direction of the meetings.

The basic class organization was to meet in a traditional format the first two weeks for class management that will be elaborated on later. The class would then be handled as a project with regular updates and deliverables based on a rough schedule I had developed.

Originally, we planned to have one project with Insul-Coustic and the MET project was a backup that would be utilized if there were issues with Insul-Coustic or time left over at the end of the semester. With this plan the schedule for the class was to meet the first two weeks (4 class sessions) to cover the

introduction to the class. This was everyone's first time in a class with this format, including myself. Topics such as team skills assessment, assigning team member roles, introduction to the client's company were necessary. The client wasn't present; however, I had students research the industry and company on the internet and had some preliminary information for the students from an interview I conducted before the class began. Also, about half the students had not been through our project management course so I wanted to spend some time discussing project management. Upon finishing up the introductory content my plan was for the students to work on the project as they would in industry. They would go through the System Development Life Cycle (SDLC) using a methodology of choice such as waterfall, incremental, agile, or rapid prototyping.

For the rest of the semester I outlined a basic schedule that included:

Week	**Topic**
Week 3-4	Client interviews and work on CONOPS
Week 5	Deadline Concept of Operations (CONOPS) document
Week 6-13	Scheduled updates with project manager and project work
Week 14	Project due
Week 15	Project reports and documentation due
Week 16	Project lessons learned

Role of the student, client, and instructor

After determining the class organization and basic template for the schedule it was important to determine the roles for everyone. The parties involved included the clients, students and the instructor. For the class we had two clients, Insul-Coustic and Mechanical Engineering and Technology Department. In soliciting clients I tried to find companies that would be willing to spend time with the students in their role of client on an IT project. For Insul-Coustic, one of the owners agreed to work with the students. He made space in his schedule to work as a client on a regular basis. Because the company was based in Fort Wayne (3 hours away) and the owner lives in the Indianapolis area (1 hour away), I offered to do most of the meetings electronically, via Skype, conference call, etc. However, he was very interested in participating and wanted to be physically present as often as possible and committed to tentatively be available approximately every other week and available for email contact on a regular basis. As owner he was also responsible for working with clients developing the estimates and scheduling projects which was the major component of the system that was to be developed. He was able to give the students access to others in the company that would be useful in developing the system like the Insul-Coustic (IC) IT specialist. The Insul-Coustic IT specialist is responsible for supporting the network and a host of purchased applications along with some homegrown applications and is not responsible for new development. The second client was the Site Director for Columbus and also MET professor in charge of the metrology lab. He also agreed to spend time with the students and was the person with the most knowledge of the system requirements.

Next, as instructor I had a dual role. This was my first time in a project based class. My role as instructor was to be responsible for evaluating the students for the purpose of determining a grade. In terms of the project I wanted to take a more "hands off" approach, and assume more of a guidance role. In order to do this I chose to have a role as more the person in charge of application development instead of a project manager. At first I thought I would be the project manager. However, I wanted the students to

have someone they perceive as a peer to take that role. I felt this role would allow me to guide development without getting too much into the day to day development. If I was project manager it might inadvertently discourage students from participating or expressing their opinions.

The student's role was set up as the IT group. The goal was to cover all of the functions that would be required to run through the Systems Development Life Cycle. The original thought was the course would have 4 or 5 students and that would work well with the project, big enough to perform all of the necessary functions but small enough that students had functions that they could perform. However, we ended up with eight students enrolling. This unexpected head count caused the initial plan to need modifications. There were several options as to how to handle that. First, we could have had the two teams work on the two projects separately, the Insul-Coustic project and the MET project. Having met with both clients before the start of the semester in order to get a general idea of the scope of the project I decided the IC project was much larger in scope and would require many more resources than the MET project. The MET project would require designing and building a basic webpage for the metrology lab and probably could have been handled easily by one or two students in a few weeks. The Insul-Coustic project scope would require more resources and abilities than we had available to accomplish it in a semester. What I decided to do was to create two teams initially and have them create the separate Concept of Operations Document (CONOPS). A concept of operations is a document describing the characteristics of a proposed system from the viewpoint of an individual who will use that system. It is used to communicate the quantitative and qualitative system characteristics to all stakeholders. After both CONOPS were created and reviewed by the client and instructor we would decide on the approach to the project. Based on the CONOPS that we chose to follow the class would then combine and continue with the project. My reasoning for this approach was to give everyone a chance to get a strong knowledge base for the larger Insul-Coustic project from the beginning of the semester, rather than having several students work on the MET project at the beginning of the semester and then have to catch on the primary project later. The plan for determining student roles on the project was to select two students to be project managers and then with the assistance of the instructor and students filling out a skills matrix determine appropriate roles. When the two teams combined one project manager would continue to act as project manager and the other would be the assistant project manager.

Evaluate student performance

Planning to evaluate student performance created a challenge. I wanted to make sure that everyone would be evaluated individually and since I would not be part of the day to day activities it was more difficult to ensure that occurring. What I decided to do was a combination of activities that involved not only me but the students and clients in the evaluation process. Following are items that I chose to evaluate students on:

Evaluation	**Notes**
Writing assignments	Two assignments, one due around midterm and the second at the end of the semester focusing on reflection on the project
Project update memos	One for the team delivered by the project manager, all students on the team received credit
Class assignments, homework	Activities related to the project given as assignments, such as having each student fill out project time sheets weekly
Client evaluations	Clients would provide input as to student performance

Peer evaluations	Students would provide input as to student performance
CONOPS	Evaluated by instructor and the client
Application including software and documentation	Evaluated mainly by the instructor for quality with input from the client

All of the items were given equal weight with the exception of the client and peer evaluations. They were awarded about ½ the value of the other items.

Client student interaction

It was important for the students to have access to the clients to successfully complete the project. Prior to class I interviewed both clients and specifically asked about their availability. Both Insul-Coustic and MET were very receptive to meeting with the students. Students would not be able work on site with Insul-Coustic so every effort would need to be made to maximize the time when the client was available. For MET the site director was on campus and had no semester long conflicts with the day/time that the CNIT 390 class was scheduled. The original plan was that I would schedule the Insul-Coustic client with specific dates on the calendar and then let the pace of the project dictate additional meetings. Those dates would be set up with the client as needed.

Manage Expectations

This type of class was new to the students, the clients and me, as the instructor. Managing expectations would be a necessity. First and foremost, I wanted to manage the expectations of the clients involved. To that end I met with each client before the start of class and reinforced the purpose of the project which was to give students a real project to work on. I wanted the clients to understand that the students were competent but that this was a learning experience and it might not go as expected, emphasizing we were hopeful that we would produce a product that would meet their needs but making sure they were aware that it may not live up to their expectations as well. This went over well and there didn't seem to be any issues before the start of the class. Student expectations were managed throughout the course and began with a written assignment pertaining to expectations within a project based class. In the class introduction I tried to emphasize that this was different from other classes. We were working for a client and producing a product for that client and their effort reflected not only upon themselves but on Purdue and if they weren't up to that task they should consider taking another class.

What happened – the delivery of the course

Insul-Coustic Quoting System Project

The owner of Insul-Coustic was very accessible for the students throughout the project. Early on in the project he would visit campus for meetings weekly and throughout the project came at least every other week as requested. Only a few times did he have to reschedule because of pressing issues and this might have been good for the students since this can often be an issue while working on projects in industry as well. Because of the distance the students didn't work at the IC site and met at the Purdue campus.

The scope of the project was very large and with the limited time and capabilities they had to be narrowed to develop a system to handle the quoting process. I started out having students work on the CONOPS document in two teams of four so everyone would get a feel for the company and project. The plan was for the students then to work through the Systems Development Life Cycle to accomplish the planning, analysis, design, and implementation. After the CONOPS was finished and the students were combined into one project team with the two project managers reassigned to positions of project manager and assistant project manager. The approach the students wanted to take was a similar to the Agile or a System Prototyping where the goal was to work in short cycles to get something to the user to test, use and give feedback. Based on the project, user availability and length of the class they chose to work in two week cycles, which was acceptable to the client. The student and client agreed on the scope and determined that if there was additional time at the end they could add features to the project. Based on the user requirements, the students chose to develop a web based application written in PHP, JavaScript and HTML and using MySQL for the database. As mentioned, there were eight students in class and at the beginning all eight worked on this project. The roles the students played were: one student acted as the project manager, one student as assistant project manager, two students as programmers, one student as database designer and developer and three students working on documentation and testing. In reality the two programmers ended up doing quite a bit of the design not only in the program but also with the database. As the semester progressed it was apparent that some students were being over utilized (the programmers) and others being underutilized (documentation and testing). At this point two students were pulled from this project and placed on the MET webpage project. The project was finished about one week late but I had built in a two week cushion in the semester schedule, so they were able to complete the system, documentation and training by the end of the semester.

Mechanical Engineering Technology Webpage Project

I had one potential client back out of the class project at the last minute and I wanted to make sure we had a backup plan with an additional project in case the Insul-Coustic project was complete or there were issues. Our site director in Columbus was interested in developing a website for the new metrology lab on our campus. It became apparent that students were being underutilized on the project after midterm. After confirming with the student project manager I pulled two students from the Insul-Coustic project to work on the MET webpage project. The two students chosen were the two with less experience and had been relegated strictly to testing and documentation. I was hoping to give both a little live experience as both a systems analyst and programmer. Students were in charge of determining the client's requirements and then developing the webpage while still working with myself and the original project manager. Although this was the students' first live project they were able to complete the project and documentation by the end of the semester.

Reflecting on the experience

Instructor's reflections

This has been a very eye opening experience from my perspective as an instructor. Going into each semester I try to go into the class very prepared and structured as to the learning experience. The nature of the class allowed me to prepare but obviously not be prepared for all possibilities that would arise. The class moved me to more as the phrase goes "guide on the side" approach to the class. This was especially true since I decided not to take the role of the project manager and was basically the role

of the IT manager coordinating activities. The part of the class I liked was to give the students a live project, with real goals and expectations, not just for a grade. For some students it seemed to add some excitement and heightened the activity level. The attitude was noticeably different than working on a "canned" project. Most students always try to do a good job but there seemed to be an added ownership as they were creating something that was going to be used in industry and they were not only trying to work for a grade in class but satisfy a client's requirements for a live system. Having said that not all of the students had that feeling. Some seemed to disappear in the group and even though I tried to stay on top of that, I think for some students it was a less than satisfying experience. While some of the students melted into the background others took on a strong presence and in some cases dominating so much as to not let others make meaningful contributions. As an instructor it was interesting watching the students experience some aspects of the job that normally I might have mentioned in class but they got to experience live. For instance in a class project students tend to be hand fed items they need to proceed, and IT professionals know it doesn't happen like that. They had to determine requirements and experience the unavailability of a client or cancelling a meeting at a point when they needed information to proceed. These are things that until you experience it yourself you aren't able to appreciate. Even though I try to include a few in my regular projects I don't think it has quite the same feeling. One thing I noticed students doing more of was searching the internet for online tutorials, documentation, etc. on how to accomplish certain tasks that were critical to the project. The students understood this was an unstructured assignment and realized they were not going to be spoon fed.

One area that was difficult in the class was trying to evaluate student performance and to give them a grade. With the day/time and classroom reserved the students did a lot of work in that timeframe and generally met with the client then. I attended most of those activities, but tried to give the students some space and thus I didn't feel I was able to do an adequate evaluation based on that time in the room. The client worked mainly with four students so it was impossible for him to give feedback on the students working on the project. The students did give feedback on other students and for the most part it was positive, although there were a few instances when feelings toward certain students affected an evaluation. In a similar situation with a project and scope I might be more likely to play the role of project manager to have a little better feel and control over student activities.

In both projects I was very pleased with the student client interaction. As I mentioned the clients made time for adequate interaction and to provide feedback. The students realized that clients also have their full time jobs and had to work around clients schedule and occasionally cancellations. The students handled themselves professionally. Neither client had an IT background so students got a good feel for working with non-technical clients.

Managing the expectations over the course of the project was obviously different than normal projects in class. Most have a scope that works well in the time frame of the course. In meetings prior to the start of the semester I tried to reinforce to the clients that these were students and even though they were talented for most this was their first experience and they might not get everything they wanted. Both clients were very understanding of this, especially the owner at Insul-Coustic. I suspected going into the Insul-Coustic project the scope was too large for our semester and he was very willing to do the project in phases with this semester acting as the first phase. For the students managing expectations varied widely. One student (one of the original project managers) felt the team would only be able to determine the process and develop the infrastructure (design and build the database) and sever-

al thought the team could accomplish several phases during the semester. I do think working in two week cycles seemed to help in setting realistic expectations.

Client's reflections

Prior to, during, and after the project I tried to stay in close contact with the main client the owner of the Insul-Coustic. IC did not implement the system. One of their goals of the project was to evaluate a new concept. Following the semester the client filled out a survey about the experience. Overall, the client was very pleased.

Summarizing the client's evaluation he felt the reviewed the positives of the project. Students were very interested and inquisitive in the information and project details and eager to perform tasks. The cost was minimal and gave IC a chance to evaluate a new concept without investing many resources or much time. Finally, students were dependable, skilled and worked well with staff. From a standpoint of things that could be improved, the main thing he mentioned was giving students more opportunities to work with "real" clients to have a better feel for questions to ask. Also, possibly a survey filled out by both client and students to get a better understanding of the project from the beginning. Overall, the client was very please and expressed an interest in being involved again and possibly continuing this project into a later phase.

Student's reflections

Students were polled about their experience on the project. All students that responded were pleased with their role on the project. They believed they were prepared to work on the project. Students overall felt they were utilized about the right amount of time, although there were some who felt they were over utilized and they commented some students were underutilized (I didn't get a response from those mentioned). The live project led to a lot of real world experience that would have been hard to capture in a normal assignment, this was the most commonly made comment from the students. The project gave students experience at working on various aspects of IT instead of, like in most classes where it is programming or systems analysis. Students were pleased with the setup of a student as project manager and the instructor as a guide. Students were pleased with the size of the team and didn't think it was too large. Finally, students felt both clients were easy to work with on the projects.

There were a few negative comments or suggestions about the project. On the Insul-Coustic project it would have been nice if the students could have visited the company. For members who weren't contributing, the lack of structure could be frustrating. Some students were working on parts of the project that made them feel secluded from the rest of the project. One student was disappointed the product wasn't used by the company (they were told that the project was a way for the client to evaluate a new concept).

Evaluating the course

To evaluate the course I reviewed the reflections of all participants – students, clients and instructor and the goal of the class which was to combine university study with work experience in the Computer and Information Technology (CIT) area. Comments of all participants confirmed the students were able to get work experience in IT area. Was it of equal value to all students? No, but in a traditional class-

room that would be true as well. One student put it aptly, this is not like the programming class where our first assignment is the "Hello World" program. One of the shortcomings of many of our classes is that they are focused on one aspect of the IT world such as the network, programming, system analysis, or database and even though they make mention of the other components they can't do them justice. One student specifically mentioned he thought that was the big advantage of this class. The enthusiasm of the students was evident to not only me but the client as well.

It was extremely helpful to have the clients we had. Their expectations were realistic and the time they devoted to the project was generous. I could see having some real issues if the clients had unrealistic expectations. One of the implications is that client and project selection will be important to success of the class. As an instructor I would say the class was a success. There are items that I think need to be addressed, such as the class size (or more importantly the project team size). I still believe this contributed to some students being underutilized. Also, from a class perspective I think we need to work on a way to adequately evaluate the students. Having said that I could see the class organized so that the students put time in at the client's site where the clients could also give more meaningful feedback on all of the team participants. This was not possible with the client's facility almost two hundred miles away. Another issue from a instructor's standpoint is that I don't believe I was able to guide the students as well in all facets of the project (especially the web programming component) and it might be helpful to have the class handled in a team teaching format or at least have instructors act as advisors. Overall, the class was a great success not only for the student but also for the client and will definitely be offered again on our campus.

Conclusions

The CNIT 390 Supervised Practicum was a success by all measures and all participants including students, clients and instructor. This format was a learning experience for not only the student but also the instructor. It also proved to be a positive experience for the client and one in which we can encourage more participation in the local community in the future. This would not only prove to be positive for our students and Purdue. With careful selection of clients and project scope I think we can also bring that into some of our traditional classes and capture that same enthusiasm.

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Utilization of Social Networks in Teaching and Learning Process

Terri Austin
Director of Client Services
540-375-2395
austin@roanoke.edu

Rebecca Sandlin
Chief Information Officer
540-375-2585
sandlin@roanoke.edu

Roanoke College
221 College Lane
Salem, VA 24153

Abstract:

During the 2014 academic year, Roanoke College is reinventing helpdesk services to be what faculty and students really want in the future. Starting from a student-staffed helpdesk and extremely limited resources, Roanoke now has funding to establish professional staff positions and go back to the drawing board. The CIO & Director of Client Service are researching what faculty and staff want from an IT help desk in 2015 and the future. Unlike many help desks that started mostly supporting staff, then adding faculty and student services over time, our current help desk services and client expectations are extremely scaled down with no professional staff. Because we are in this unique position, we have the "bandwidth" to provide new services that are targeting the future needs of faculty and students. Come hear Roanoke's ideas and share your ideas of what the 2015 IT helpdesk should look like.

Presenter Bio:

Terri Austin is the Director of Client Services at Roanoke College. In addition to supervising the Client Services Team, her major duties are student assistant coordination, Help Desk functions, one card system, campus user groups, and user account management. Terri has been at Roanoke College for 31 years where she also majored in Computer Science/Statistics. She recently received her Project Management Certification. She enjoys exercise & works for the Red Sox single A-team.

3 in 30

Jean Bennett
Instructional Technology Specialist
jbennet1@coastal.edu
843-349-2481

Tracy Gaskin
Center for Teaching Excellence
tgaskin@coastal.edu
843-349-2790

Coastal Carolina University
P.O. Box 261954
Conway, SC 29528

Abstract:

Join us as we demonstrate our 3 in 30 session. These sessions were developed to inform and excite faculty about various topics and tools that they could use in their practice. The premise is to have faculty attend a 30 minute session that demonstrates 3 tools (most are free) and after the session ask to have a hands-on workshop on a particular tool. We will demo a session and provide the ins and outs of how these sessions have been successful in professional development for faculty.

Presenter Bio:

Jean Bennett has a combined 26 years experience in education as a teacher, director of technology, instructional designer and multimedia instructional technologist. She is a Pennsylvania certified Instructional Technology Specialist and a Quality Matters (QM) Peer Reviewer. In her position at Coastal Carolina University, she is working with faculty providing consultations for design of instructional strategies in distance learning and developing quality courses and teaches an online course. Jean enjoys attending and presenting at ASCUE.

Tracy Gaskin is the training coordinator in the Center for Teaching Excellence (CeTEAL) at Coastal Carolina University. In addition to organizing the training schedule and resources for CeTEAL, she provides training and support for faculty on instructional technology and instructional design topics. Tracy is a certified Quality Matters Peer Reviewer and teaches at CCU part-time in the biology department. She is a second generation ASCUE attendee.

Let's Hangout!

Jean Bennett
Instructional Technology Specialist
Coastal Carolina University
P.O. Box 261954
Conway, SC 29528
jbennet1@coastal.edu
843-349-2481

Abstract:

Let's hangout. I am sure that you have heard students say this to each other. Now it is your turn to hangout in Google Hangouts. This past January we implemented a series of faculty development sessions using Google Hangouts, called Friday Hangouts. During these hangouts faculty were introduced to using Hangouts, creating circles, and learning about many tools, apps, and ideas that they could use in their courses. Join this session and learn the pros and cons of implementing hangouts as a faculty development tool and learn about some features that might be useful.

Presenter Bio:

Jean Bennett has a combined 26 years experience in education as a teacher, director of technology, instructional designer and multimedia instructional technologist. She is a Pennsylvania certified Instructional Technology Specialist and a Quality Matters (QM) Peer Reviewer. In her new position at Coastal Carolina University, she is working with faculty providing consultations for design of instructional strategies in distance learning and developing quality courses. Jean enjoys attending and presenting at ASCUE.

Leveraging the 3D Printing Revolution for Higher Education

Frances E. Bosch
Biology Department
bosch@roanoke.edu
540-375-4903

Michael Kluge
Desktop Integration Specialist
kluge@roanoke.edu

Roanoke College
221 College Lane
Salem, VA 24153

Abstract:

3D printing has the potential to revolutionize the classroom environment in both digital and manipulative realms and has the potential to individualize hands-on learning in a variety of classroom formats and academic majors. Through an internal technology innovation grant, Roanoke College purchased a 3D printer to produce objects for use in the classroom. We have established a 3D printing Users Group, and are investigating the parameters and requirements of creating a bank of 3D printers for campus-wide access. This presentation will summarize our experiences with overviews of 3D printing, print and material properties, object design access and creation, and academic uses of 3D printed object.

Presenter Bio:

Frances E. Bosch, M.Sc. is a Teaching Associate in the Biology Department at Roanoke College, Salem, VA. Academic course responsibilities include Human Evolution, Human Biology, Human Anatomy and Physiology; personal interests include painting portraits of dragons, clay and pastillage sculpture, and digital art.

Michael V. Kluge is the Desktop Integration Specialist at Roanoke College. His major duties include managing student technicians, office and lab computer support and replacement, 3D printing, iPad training and support, and managing virtual desktop lab pools for use by the college. Michael has been with Roanoke College for 2 years where he also majored in Mathematics. He also enjoys sports, remote controlled vehicles, and playing baseball.

Navigating the Challenges of The Installation and Operation of the SMART LightRaise 60wi Projector

MJ Clark
Academic Technology Coordinator
mjclark@sbc.edu
434-381-6233

Tom Marcais
Academic Technology Trainer & Consultant
tmarcais@sbc.edu
434-381-6542

Sweet Briar College
134 Chapel Road
Sweet Briar, VA 24595

Abstract:

SMART's LightRaise 60wi projector is the first product to turn any flat surface into a natural finger-touch controlled interactive whiteboard. We've installed over a dozen of these at our institution, and have found some useful tips to share. Whether you have questions about selecting the best surface to project on, mounting the projector, or using it after it's installed… we have answers! We've even dealt with the challenge of installing multiple SMART projectors in the same room. If you're looking at this technology for your institution, save yourself hours of headaches by learning from our experience first!

Presenters' Bios:

MJ Clark is the Academic Technology Coordinator at Sweet Briar College. She is responsible for maintaining the AV equipment, hardware and software in all the classrooms and computer labs on campus.

Tom Marcais is the Academic Technology Trainer & Consultant at Sweet Briar College. He is responsible for developing and delivering classes, presentations, workshops and consulting for students, faculty and staff in computer applications and technology supported at Sweet Briar College.

The Ins and Outs of Flipped Learning

Christine Davis
Walden University
www.waldenu.edu
cdavisgc@gmail.**com**

Abstract:

University face-to-face and hybrid courses have increased the number of courses implementing blended learning models including flipped or inverted learning. The success of Inverted learning is the effective use of well-designed multimedia and background activities used to support instruction before class reserving class time for problem solving, real world applications, discussion and reflection. The purpose of this presentation is to review the theoretical basis and current research on blended learning, and to explore the cognitive and metacognitive benefits found in multimedia that promote active learning, long term recall, and effective application. Best practices in instructional design and technical considerations related to how multimedia tools can be utilized to support instruction will also also addressed. Objectives related to this presentation focus on the development of effective strategies in a blended learning course. Participants will: a. Explore the need for more effective learning models in higher education; b. Reflect on the frameworks for effective teaching in higher education; c. Review the theoretical foundations and current research on the benefits of multimedia that serve as the basis for blended learning; d. Understand how constructivism promotes learner engagement in inverted learning; e. Understand the components, design process, and technical considerations used in developing an inverted course; and f. Review key recommendations for an effective blended learning course.

Presenter Bio:

Christine Davis has an Ed.D. in Instructional Technology and Distance Learning. A former school administrator, she is affiliated with both Georgian Court and Walden Universities teaching graduate courses in technology, education, administration and leadership. She has conducted numerous conference presentations and research publications on the use of multimedia based learning systems, 21st century instructional design, Flipped Learning, as well as effective methods for teaching and learning online.

The Hybrid Classroom: Staging for the Future with an Eye on the Now

Craig Gray
CIO/IT Director
Guilford College
5800 West Friendly Avenue
Greensboro NC 27410
336-316-2426
graycr@guilford.edu

Abstract:

Online enrollment has tripled over the last 10 years to 33%, and in 2014 20% of all college students will attend at least 1 online course. The Hybrid Classroom answers the challenge to meet digital natives at their point of expectation, while retaining the particular value of the sponsoring institution. It can be the gateway to better undergraduate preparation, extending the reach to students in remote locations with live presentations by actual professors, and help students prepare for college life and stay prepared. Learn how Guilford College has implemented a fully live classroom, available via the internet; complete with interactive capability between students and the professor.

Presenter Bio:

Craig Gray is an experienced technology strategist with 12 years in HE as CIO/Director at Lee University and Guilford College, and as a consultant many other institutions. He holds a Master's Degree in Organizational Leadership, and licensure as Certified Information Systems Auditor. Over the last decade his focus has been marrying innovation and process and distilling project management to a set of Guiding Principles, with the goal of creating higher functioning IT organizations.

Cool Tools: Here we go again!

Janet Hurn
Coordinator of E-Learning Initiatives
513-727-3341
hurnje@muohio.edu

Julie Straub
Educational Technology Coordinator
513-217-4001
straubjm@muohio.edu

Miami University Middletown
4200 E. University Blvd
Middletown, OH 45042

Abstract:

How to do you stay on top of new and emerging tools to be relevant in your instructional and professional roles? The evolution of technology tools and information moves at an increasing rapid pace, join us to explore the COOLEST technology tools that we have found and are using to allow us to work smarter not harder. Bring your device and we will provide tools and takeaways that you can start using TODAY to enhance your instruction, productivity, and professional life.

Presenters' Bios:

Janet E. Hurn is Coordinator of E-Learning Initiatives for Miami University's regional locations and a Senior Instructor of Physics. Janet leads a team of educational designer/technologists and oversees the development of online and hybrid courses that helps faculty integrate technology into their classrooms and staff incorporate technology to improve workflow. She puts her 20 plus years of classroom experience and her love for learning together into a passion for emerging best practices in education.

Julie Straub is the Educational Technology Coordinator for Miami University regional locations and has had the opportunity to serve in instructional and administrative leadership roles in the educational technology field within the K-12 and higher education environments. She has taught traditional (face-to-face), hybrid and online courses for the last fifteen plus years while serving as a licensed administrator to launch technology integration projects.

Teaching my First Technology in Physical Education Course

Seth Jenny
Department of Physical Education
Winthrop University
701 Oakland Avenue
Rock Hill, SC 29733
jennys@winthrop.**edu**
803-323–4828

Abstract:

A new faculty member presents his experience of creating and implementing a new course in the physical education teacher education program at Winthrop University entitled, "Technology in Physical Education." Course design, content, assignments, and evaluation rubrics will be presented and discussed. Example forms of technology that will be discussed include: heart rate monitors, pedometers, online fitness data and nutrition logs, GPS Geocaching, iPad uses in physical education, digital video motion-analysis (utilizing the free iPad app "Ubersense"), and motion-based video gaming (i.e., exergaming). This session will appeal to instructors and fitness enthusiasts alike.

Presenters' Bios:

Dr. Seth Jenny is a second generation ASCUE presenter. He is the son of Dr. Frederick Jenny, two-time ASCUE past president, and has attended the conference as a family member since the mid-1980's. Dr. Jenny is a former primary and secondary health and physical education teacher as well as a U.S. Air Force exercise physiologist. Currently, he is an assistant professor in the Department of Physical Education, Sport and Human Performance at Winthrop University.

Photographer's Software and Hardware for the iPhone and iPad

Fred Jenny
Professor of Computer Science
Grove City College
100 Campus Drive
Grove City, PA 16127
724-458-2071
fjenny@gcc.edu

Abstract

Someone said, "The best camera you have is the one you have with you." In many cases for me, that's my iPhone. This session will demonstrate and describe software (apps) and hardware (Photojojo, for example) that are used by me, a serious amateur photographer. Some are for picture taking on the iPhone; some assist use of the DSLR.

Presenter Bio:

Fred Jenny has been participating in ASCUE since the 80's. In fact, he has been a repeat 'offender' as Program Chair and President. Having been at Grove City College as a professor of Computer Science and Instructional Technologist for 30 years, he presents today following his last semester at GCC before retirement, serving 44 years as an educator.

Flip your Hangout: Using Google+ to blend and flip your classroom

Lisa Ann Jones
Director of Educational Technology
859-985-3209
Lisa_Jones@berea.edu

Anthony Basham
Educational Technology Specialist
anthony_basham@berea.edu

Berea College
100 Campus Way
Berea, Kentucky 40403

Abstract:

Flipping the classroom is a hot topic in classrooms today. For many it remains a topic of high interest but is deemed too difficult to learn. While many faculty want to design their classes based on the flipped model of lecture as homework, Google Hangouts allows faculty to flip lecture, and also record, archive and stream class discussions. This session will focus on a pilot Google Hangout between a classroom in Berea Kentucky and a synchronous live international classroom. Students and professors co-teach and co-learn through synchronous and asynchronous Google Hangouts and then archive and stream the results. Blended learning, flipped methodology and creative uses of free applications will be discussed and demonstrated. Creative ideas for introducing diverse classroom interactions, dual credit, Moodle/Blackboard integration and other creative pedagogies will be presented for discussion.

Presenters' Bios:

Dr. Lisa Ann Jones is Director of Educational Technology at Berea College in Berea, Kentucky. Dr. Jones has 8 years experience in undergraduate teaching using technology in online and blended classrooms and as an instructional designer. Dr. Jones leads an Educational Technology department that supports faculty innovation through educational technology in the 21st Century classroom.

Anthony Basham is the Educational Technology Specialist at Berea College. Anthony has many years' experience working with faculty using cutting edge educational technology in the classroom. Recently, he has been part of a project to use Google Hangouts as part of an international classroom experience for Berea faculty and students.

Become a Master of Disaster

Mark Jordan
Presales Advisor
Unitrends
7 Technology Circle, Suite 100
Columbia, SC 29203
866.359.5411
sales@unitrends.com

Abstract:

You need to be at the top of your game when it comes to backup and disaster recovery. Unitrends will show you how to become a Master of Disaster by creating an airtight DR plan and pulling together the key components you need to make it happen.

Presenter Bio:

Mark Jordan has been with Unitrends for 12 years, currently serving as Advisor in the presales organization. Mark focuses on partner training, complex deals, MSP and Cloud initiatives. Before joining Unitrends, Mark spent a decade in storage sales and value added reseller management.

Establishing a Distance Learning Framework for the Institution

Sali Kaceli
Director of Educational Technology and Distance Learning
Cairn University
200 Manor Ave
Langhorne Manor, PA 19047
215.702.4554
skaceli@cairn.edu

Abstract

As Online Education is becoming a critical component of the long-term strategy of the institution, establishing a Distance Learning Framework is key to ensuring quality online education and at the same time meet federal and accreditation requirements. This session covers the key components of the framework, the formalized course development process and the various components of an online course that we established for our Online Initiative. The session also goes into detail on the best practices and findings at our institution. The session will benefit Distance Learning leaders in formalizing the process, and particularly the faculty in getting a better understanding of what is involved in developing hybrid and online courses. Lastly, it also benefits IT leaders in coordinating the various technologies and meeting the needs of the faculty accordingly.

Presenter Bio:

Sali has been serving as Director of Educational Technology and Distance Learning at Cairn University since February 2012. Prior to this position, he served as Manager of Academic Computing for 14 years for the University. His responsibilities included system management, implementation, and support. He loves what he calls "working with wires" and getting systems interconnected and seeing users utilize technology.

Data Analytics coming of age

Steve Knode
University of Maryland University College
3501 University Blvd. East
Adelphi, MD 20783
sknode@gmail.com

Abstract:

Data analytics is becoming one of the most important new capabilities for organizational effectiveness. Organizations are increasingly adopting analytical approaches to problems or initiatives, including: 1) improving customer relations; 2) attracting new customers; 3) determining marketing proposals or offers; 4) deciding on loans or credit pricing; 5) predicting the likelihood of equipment failures. Models are being created that can uncover key relationships much more accurately and quickly than human intervention. Machine learning techniques and predictive algorithms are becoming more commonly used in business. The shortage of trained and educated personnel capable of designing, developing, explaining and deploying these sophisticated quantitative models is growing. In order to meet the need for data scientists, innovative approaches will be needed. The University of Maryland University College (UMUC) has developed an online Master's Degree in Data Analytics, unique in its approach. Combining decision making with the use of analytical tools, the program fosters the development of data scientists and end users who are capable of not only using software to build models, but also of 'framing' problems appropriately, presenting the results in business oriented terms (i.e., "operationalizing results"), and assisting in implementation of findings. This presentation will outline the UMUC program and demonstrate some of the "end user" tools being used in the first six credit course in the program.

Presenter Bio:

Dr. Steve Knode has an extensive background in artificial intelligence, emerging technologies, intelligent agents, virtual reality, decision support systems, quantitative methods and decision making. He has published and presented papers in several areas, relating emerging technologies to decision making and problem solving. He maintains a website,www.steveknode.com where he tracks emerging technologies. His current position is as a faculty member teaching graduate courses in emerging technologies at the University of Maryland University College (UMUC).

"Bring Your Own Device" Techniques for the Classroom or the Campus Roundtable

Amanda Kraft
Electronic Resources Librarian
Horry Georgetown Technical College
2050 Highway 501
East Conway, SC 29528
843-477-2100
amanda.kraft@hgtc.edu

Abstract:

As tablets, smartphones, and laptops become more and more affordable – and mobile tech consumers become younger and younger – BYOD (Bring Your Own Device) becomes harder for educators to ignore. Parallel to the business world, leaders in education must determine best practices and standards in response to the current push for handheld technology in the classroom. We must also decide on BYOD policies that will promote active, constructivist learning for all of our students as well as how quickly to implement such policies. While it seems that free or relatively inexpensive educational apps are developed every minute, the instructional technology often found in "smart" classrooms is still extremely expensive. It is also highly desirable. How will the BYOD technique benefit our students and advance learning? How will mobile tech save time and money in the classroom? How will both IT administrators and teachers/professors make use of personal devices in the classroom as seamless as possible? These essential questions and related issues will be discussed in the BYOD Roundtable session.

Presenter Bio:

Amanda Kraft is the Electronic Resources Librarian at Horry Georgetown Technical College. In addition to ERM and mobile tech troubleshooting, she is in charge of reference and instructional services at HGTC's Grand Strand Camus Library and coordinates social media for all three library branches. This is Amanda's first time attending ASCUE.

Implementing Google Apps for Education

Christopher Laird
User Support
Moravian College
1200 Main St
Bethlehem, PA 18018
610-861-7760
lairdc@moravian.**edu**

Abstract

Beginning with the planning in spring 2013 and implementation through the summer of 2013 and ending in early 2014, Moravian College transitioned all faculty, staff, and students from Microsoft Exchange to Google Apps for Education. Campus leaders, led by new president Bryon Grigsby, initiated this transition for the educational benefits it would bring to our institution, including how students communicate and complete assignments and how faculty can use the various tools to create more interactive and robust learning teaching environments. The change, however, did not come without concerns and difficulties in regard to technological hurdles, necessary behavioral changes, privacy concerns, and more. Intent of this presentation is to discuss the successes and challenges of the transition that were met by Moravian CIT, the positive and negative feedback received from students and community members, solutions to various problems, and ways that the change has promoted positive growth in the educational environment.

Presenter's Bio:

Chris Laird is a 2012 graduate of Moravian College and a native of nearby Phillipsburg, New Jersey. He holds a bachelor's degree in History, as well as a certification to teach elementary education in Pennsylvania. After four years of working for Moravian's IT department as a student technician, he was hired full-time as a member of the User Support team upon graduating.

Spectrum Industries - Innovative Furniture for Learning Environments

Jim Lloyd
Senior Executive Sales Manager
Spectrum Industries
925 First Ave
Chippewa Falls, WI 54729
800-235-1262
jlloyd@spectrumfurniture.com

Abstract:

SPECTRUM sells and services INNOVATIVE FURNITURE that connects you with technology. We are leaders in lectern, presentation solutions, desk and table solutions for active and collaboration learning environments. All proudly designed and manufactured in the U.S.A.

Presenter Bio:

Jim Lloyd is the SR. EXEC. Sales Manager at Spectrum Industries. He has been working with Education and Government Technology persona over twenty years, to help improve the teaching and learning environment by helping solve your needs with solutions custom tailored for you.

Eliminating Sneakernet: Low-cost and Free Solutions for Software Deployment and Remote Support/Administration

Matt Manous
Client Support Specialist
Young Harris College
P.O. Box 160
Young Harris, GA 30582
706-379-3111
mmanous@yhc.**edu**

Abstract:

This session will explore various options for software deployment and remote support/administration in a primarily Windows based environment on a tight budget. Learn how Young Harris College is combating the need to physically visit each computer when software needs to be installed or when a user needs support. Some of the tools discussed will include: PDQ Deploy, PDQ Inventory, MDT 2013, Group Policy and UltraVNC.

Presenter Bio:

Matt Manous has worked in the Young Harris College IT department for over 10 years. He began a faculty/staff trainer and moved into his current position as Client Support Specialist after a few years where he focuses primarily on bettering the user experience. This is the 11th consecutive ASCUE conference that he has attended.

Designing Differentiated Technology Training Utilizing Flipped Classroom and Tiered Instructional Strategies

Tom Marcais
Academic Technology Trainer & Consultant
tmarcais@sbc.edu
434-381-6542

Holly Gould
Chair of the Education Department
hgould@sbc.edu
434-381-6546

Sweet Briar College
134 Chapel Road
Sweet Briar, VA 24595

Abstract:

Training end-users on technology can be a challenge, especially when you're trying to cover a complex topic. Either you spend an entire day (or multiple days) in training sessions, or you run out of time to cover your material effectively. Your end-users either get bored from having content presented at too slow a pace, or become overwhelmed by too much information. Taking some proven methods from K-12 education and morphing them for the differing levels of knowledge, understanding, and skill levels of college age students, faculty, and staff, we've created a method to overcome that challenge. Our approach also gives our end-users an opportunity to actively work with the technology, rather than just having them watch a demonstration. This process provides end-users of different skill levels with appropriately paced and scaffolded learning in an effort to maintain engagement and subsequently increase retention. This year's ASCUE workshop Creating Interactive eBooks with iBooks Author, being offered by Tom Marcais, was designed using these strategies.

Presenters' Bios:

Tom Marcais is the Academic Technology Trainer & Consultant at Sweet Briar College. He is responsible for developing and delivering classes, presentations, workshops and consulting for students, faculty and staff in computer applications and technology supported at Sweet Briar College.

Holly Gould's professional experience includes eight years of teaching in Alaska. She currently is Director of Graduate Education and Chair of the Education Department at Sweet Briar College, where she has been teaching for 12 years. Her primary research interests include high potential, culturally diverse learners, differentiated instruction for all learners, gifted education and the professional development of novice teachers

Painting on a New Canvas – Instructure Canvas! (A different kind of LMS)

Carmen Morrison
IT Program Coordinator
North Central State College
2441 Kenwood Circle
Mansfield, OH 44906
419-755-4865
cmorrison@ncstatecollege.edu

Abstract:

With the increase in hybrid and online class offerings, many college students spend as much time (or maybe more!) interacting with the Learning Management System (LMS) than they do in the physical classroom or in-person with their professor. With this understanding, the LMS serves a crucial role to both faculty and students. Just into their fourth year, Instructure Canvas is considered by some as the next generation of Learning Management Systems and has a rapidly growing adoption rate. What's driving this growth? From the students' perspective, it gives them tools to manage their time, easily integrates with their social media accounts, and works on their mobile devices. For instructors, it has powerful integration, eliminating the need for repeated data entries just to create one item, such as an assignment. (Post the assignment, add it to the calendar, include it on the syllabus, and add a column in the gradebook – all in one step!) Probably the most favored feature, though, is the SpeedGrader tool. Named correctly, it exponentially increases faculty's productivity rate! If you are like most faculty members, weekends and late nights are often consumed with the daunting task of downloading, annotating and uploading assignment files. Speedgrader gives faculty just that – a tool to speed up the grading process. And if you are considering MOOCs, they've added Canvas Network, which is a free platform for both faculty and students! It's a different kind of LMS – you'll want to see it!

Presenters' Bios:

Carmen Morrison enjoys a variety of roles at NCSC which keeps the job interesting and challenging. She has served as a faculty member of the IT program for 20 years and developed the college's first online courses in 2001. She later pursued Quality Matters certification supporting her role as Distance Learning Faculty Mentor. Most recently she serves as the IT Program Coordinator, but her true passion is serving students in the classroom, virtual or face-to-face!

Blackboard and Moodlerooms – Championing Learner Centricity

Brett Perlman
Strategic Account Executive
Brett.Perlman@blackboard.com

Ryan Francus
Moodlerooms Platform Sales Specialist
rfrancus@moodlerooms.com

Blackboard, Inc,
650 Massachusetts Avenue N.W. 6th Floor
Washington, DC 20001

Abstract:

As new education delivery options emerge, students have an ever-expanding array of choices in how, when, and from whom they receive their education. As a result, student expectations are rising, particularly in the areas of convenience, personalization, and support. Institutions that don't meet these changing needs risk loss of enrollment income, accreditation, and even financial aid funding. As choice expands and enrollments flatten, emphasis is turning to student retention. Moodlerooms and Blackboard are working together to drive student retention by focusing on the learner's experience. It's no longer sufficient to simply deliver course materials. Institutions need to deliver a consistent, institution-wide, high quality student experience across all student-facing departments. Motivating students to complete their education requires that students understand the outcomes they will be assessed on in a course. Administrators must analyze the performance of their organization as a whole against the outcomes they have set for their students in order to make change to improve their students' success rates. Moodlerooms is working to implement Blackboard's vision of learner centricity as part of our enhancements to Moodle. Moodlerooms' upcoming 2.6 release augments a learner's and educator's experience with consistent navigation and quick access to the courses they want to access across the devices they want to use. Learners will quickly understand the outcomes the educator assesses them on when completing the activities within a course. And, administrators can assess the performance of their educators and learners in a cohesive report.

Presenters' Bios:

Brett Perlman is a Strategic Account Executive at Blackboard. He has been at Blackboard for over 6 years. Before coming to Blackboard, Brett spent 6 years at SAS as an Account Executive in the Higher Education Practice. Brett graduated from The University of North Carolina at Wilmington with a Bachelor of Science Degree in Business Management. He currently resides in Roswell, Ga with his wife and two kids.

Ryan Francus is a Moodlerooms Platform Sales Specialist at Blackboard. He has a diverse background that includes conducting background investigations for the federal government and managing client services for an identity theft restoration and risk management company. Ryan graduated from Drew

University with a Bachelor of Arts Degree in Behavioral Science and Political Science. He currently resides in Timonium, MD with his wife.

High Tech Vs Low Tech Classroom - A Mathematician's Experiences

Jack Pope
Mathematics and Computer Science Department
University of San Diego
5998 Alcala Park
San Diego, CA 92110
619-260-4841
pope@sandiego.edu

Abstract:

This presentation will detail the challenges in implementing a flipped classroom model for a lower division Survey of Calculus course at the University of San Diego. Numerous technological as well as pedagogical issues are associated with such a transition. The 'inverted' or 'flipped' classroom uses new technology tools to engage the student in relevant course material prior to coming to class, and uses that as a springboard for in-class activities centered around that material. The goal is have more actively engaged students but this involves the development of video or print teaching modules that the instructor must develop for student review in such an environment. In addition, the physical classroom itself must easily lend itself to student group activities. This last requirement is not as easily accomplished as it may seem. As a former IT director, I am aware of the technology available in most of the classrooms; Internet access, easy access to course management services, and projection capability are fairly standard these days but less attention is paid to the design of the learning environment itself. In this faculty member's experience, it is just as difficult to find (and secure!) the proper classroom for an "inverted or flipped" course as it is to develop the necessary audio-visual components for the class. For multiple sections of a course, this is even more difficult. This presentation will detail the challenges, successes, and failures in implementing this new teaching style within fairly reasonably equipped classrooms.

Presenter Bio:

Jack Pope is a faculty member in the Mathematics and Computer Science department at the University of San Diego. He was Director of Academic Technology Services for 25 years at the university before returning to full time teaching in 2007. He received his PhD from the University of North Carolina at Chapel Hill. He is an active user of technology in the classroom and current technology interests include maximizing learning potential in the classroom.

ElearnReady: A Free Assessment Tool for Determining Student Online Readiness

Jenn Shinaberger
Center for Teaching Excellence to Advance Learning
jshinabe@coastal.edu
843-349-2737

Lee Shinaberger
College of Business
lshinabe@coastal.edu

Coastal Carolina University
P.O. Box 261954
Conway, SC 29528

Abstract:

ELearnReady (http://elearnready.com) is a free assessment tool to determine the online readiness of students for a distance learning course. The tool measures factors of student persistence and learning preferences across the nine dimensions of self-motivation, self-management, feedback, interaction, reading: visual text, reading: visual graphics, listening and technology. Pre-pilot and pilot studies were conducted in 2013 (Lee, C., Shinaberger, J.M. & Shinaberger, L., 2013). In addition, an anticipated performance and satisfaction instrument was administered by the conclusion of the semester. A factor analysis was performed to determine the validity of the instrument and regression analysis was performed to identify predictors of student success in online classes and implications for student satisfaction, readiness, and faculty development. This presentation will share recent results from the assessment and a demonstration of the website. Faculty will be invited to use the tool to create and account for a class and view aggregate profile of their students. Students can use the tool to analyze their readiness and receive a report with easy-to-understand graphics and study tips.

Presenters' Bios:

Jennifer Shinaberger is the assistant director of the Center for Teaching Excellence to Advance Learning, the faculty development center, at Coastal Carolina University. She works with faculty as an instructional coach and consultant to bring innovative and proven pedagogical practices to the classroom, the development of distance learning courses and the integration of technology into courses. Shinaberger is also a teaching associate in CCU's Spadoni College of Education and an aspiring storyteller.

Lee Shinaberger is a lecturer in the Wall College of Business at Coastal Carolina University. He teaches decision analysis and business statistics. Lee is also the assessment coordinator for the Wall College of Business, new faculty liaison and a faculty senator. Prior to CCU, he was a principal engineer at AVX Corporation in Myrtle Beach. He holds an MBA from University of South Carolina.

28% - What's Your Number

Pamela Silver
Chairperson of Computer Department
Asheville-Buncombe Technical Community College
340 Victoria Rd
Asheville, NC 28801
psilver@abtech.edu
828-398-7249

Abstract:

Women receive 28 percent of degrees and certificates in STEM disciplines. Although women represent over 50 percent the country's labor force, in STEM-related fields only 24 percent of employees are women. Asheville-Buncombe Technical Community College (A-B Tech) is in the second year of an NSF ATE Grant entitled "Skilled Workers Get Jobs: Recruiting Women and Retaining ALL Students." In identified STEM programs at Asheville-Buncombe Technical Community College (A-B Tech) the number of female student increased from 39 to 75 students in two years. This session will share strategies A-B Tech implemented for recruiting females and retaining students (both male and female). The session will allow time for discussion on attendees' ideas.

Presenter Bio:

Pamela Silvers is Chairperson of the Computer Department at Asheville-Buncombe Technical Community College. The department offers 6 degrees, 1 diploma and 13 certificates. There are 16 full-time instructors and 25+ adjunct instructors. Pamela has received numerous recognitions for her contributions to education including: A-B Tech Faculty Member of the Year, North Carolina Excellence in Teaching Award Finalist, Southern Association of Community College Trustees Faculty Member of the Year, and Asheville Chamber of Commerce Innovative Educator.

Online Program Assessment Rubric and Process

Katherine Spradley
Director of Campbell University Online
spradleyk@campbell.edu

Jason Bennett
Instructional Design and Training Coordinator
jbennett@campbell.edu

Campbell University
PO Box 567
Buies Creek, NC 27506

Abstract:

Like all colleges and universities entering the online degree arena, the question of how to undertake assessment for fully online degrees at Campbell University had to be addressed prior to offering those degrees. Although, Campbell has been in higher education for over 125 years and offering online courses since 1999, online degree offerings did not begin until August 2013. Assessment techniques for ensuring comparability in the classroom and online can vary, but most are based upon best practices. Several assessment techniques employed by Campbell University Online include: The DECIDE (Development Evaluation for Course Integrity and Design Elements) Quality Rubric (c), Course Minimum Reviews (c), and formal student, self, and director evaluations. The DECIDE Quality Rubric will be outlined and discussed including the standards that Campbell University uses to assess online courses at a minimum level and at a quality level as well as the process by which this rubric is used by Campbell University Online. This session will benefit colleagues teaching online or hybrid programs as the process and rubric highlight many of the best practices in course design. Colleagues seeking to start or increase online offerings at their college or University will additionally benefit from the assessment viewpoint.

Presenters' Bios:

Katherine Spradley is the Director of Campbell University Online in Buies Creek, North Carolina. She has served with Campbell University for six years. During this time Katherine has worked to create a comprehensive online strategy for the University including assessment related procedures. Katherine has taught business/finance courses for over seven years now and is a huge advocate for online classroom engagement.

Jason Bennett is one of the Instructional Design and Training Coordinators with Campbell University Online. He is currently pursuing his Masters of Educational Technology with East Carolina University. He is responsible for delivering training to faculty through workshops, online courses, and consulting, assisting in developing courses with faculty, and evaluating courses for final approval for online instruction.

Writing In Action: Using Technology to Emphasize the Activity and Process of Writing in a Hybrid Composition Course

Krista Stonerock
Writing Program Administrator and Director of the OCU Writing Center
Ohio Christian University
1476 Lancaster Pike
Circleville, Ohio 43113
kstonerock@ohiochristian.edu

Abstract:

Writing is an activity. It is something we do. It is a process. Most college composition instructors today would say that they teach writing with a "process approach," meaning they emphasize the processes of creating, composing, reflecting, reviewing, and revising texts in their classes. Yet, walk into most composition classrooms, and rarely will you see writing as the primary activity. Rather, class time is spent introducing writing assignments, reading and discussing samples, and reviewing peer drafts. Palmquist's (2000) study of the differences between traditional and computer-supported writing classrooms highlighted the irony of the typical writing class, in which "the primary focus of instruction is the discussion of writing that students do outside of class." Still today, rarely do students write during a writing class. This presentation will examine the ways a university-wide shift from traditional to hybrid composition courses—classes that meet bi-weekly with an online component and a face-to-face component—has changed the teaching of writing, allowing the creation of active and collaborative composing spaces. I will share various ways emerging technologies have extended the writing classroom experience. Some examples include the following: use of electronic environments and course management software for planning, composing, reviewing, sharing, and revising written texts within online learning communities; searching, evaluating, and using research from electronic sources and library databases; use of software for mastery of various research documentation styles; and use of an adaptive software that provides students individualized practice and tutorials for their specific needs as a writer.

Presenter Bio:

Krista Stonerock has been teaching writing for over twenty years at Ohio Christian University, where she also serves as the Writing Program Administrator and Director of the OCU Writing Center. Krista has always been interested in the changing face of writing classrooms, and two years ago, she led a university-wide initiative to move all writing composition courses to a hybrid format.

Using MS Link to Replace the PBX

Tina Stutchell
Director of Information Technology
Mount Union University
1972 Clark Ave
Alliance, OH 44601
STUCHETM@mountunion.edu
330-823-2844

Abstract:

Using MS Link to Replace the PBX

Breaking down Microsoft SharePoint - A practical guide to getting started and winning?

Luke VanWingerden
Director of Client Services for Information Technology and Services
University of South Carolina Upstate
Spartanburg, SC 29303
lvanwingerden@uscupstate.edu
864-503-5863

Abstract:

Microsoft SharePoint gives an institution the flexibility to deploy custom solutions which transforms inefficient processes into data-driven solutions. In this session, USC Upstate will show how IT garnered organizational buy-in, showcase high-impact, low-cost solutions as well as offer attendees tips and advice for getting started with Microsoft SharePoint and winning. Institutions look to IT to provide quick and easy solutions to meet the demands of ever changing administrative needs. Unfortunately, with dwindling budgets coupled with increased demand for technology solutions, IT departments struggle to find the balance between meeting clients' unique needs with keeping central technologies up and running. Microsoft SharePoint enables IT departments to create customized solutions that meet organizational needs without overburdening IT resources. Sometimes knowing where to begin with SharePoint and understanding the capabilities is the most difficult barrier to an effective SharePoint implementation. This presentation will help you understand SharePoint from contextual examples and guide you through steps that will help kick-start your implementation. This session will provide a springboard for the workshop titled "NO CODING REQUIRED - Creating your custom solution using Microsoft SharePoint" where attendees will be guided through a step by step process to create a custom solution of their own using Microsoft SharePoint.

Presenter Bio:

Luke VanWingerden is the Director of Client Services for Information Technology and Services at the University of South Carolina Upstate. Luke started working in higher education IT in 2005 and began his role at USC Upstate in the summer of 2011. Luke has served in several capacities ranging from Project Management to Functional Management.

Social Media Strategy in 3 Words

Steve Weir
Website Coordinator and Board Member for ASCUE
Association Supporting Computer Users in Education
Myrtle Beach, SC 29572
sweir@ascue.**org**
215-867-9347

Abstract:

This session will review a previous session - (creating a culture with Social Media) and then reflect on how to do that by developing a social media strategy in just three words. Impossible, you say? Never! Learn how at this session.

Presenter Bio:

Steve has worked in Educational Technology for 14 years and currently serves as Director of Technology & Communication for a non-profit organization in Newtown, PA. He is also the Website Coordinator and Board Member for ASCUE, and led the rebranding process.

Using Facebook to Engage Stakeholders

Steve Weir
Website Coordinator and Board Member for ASCUE
Association Supporting Computer Users in Education
Myrtle Beach, SC 29572
sweir@ascue.**org**
215-867-9347

Amanda Kraft
Electronic Resources Librarian
Horry Georgetown Technical College
2050 Highway 501
East Conway, SC 29528
843-477-2100
amanda.kraft@hgtc.edu

Abstract:

This panel will discuss their experiences and successes in using Facebook to engage stakeholders. There will be plenty of time for questions and answers along with additional comments from attendees. Come hear and learn how to engage stakeholders using this social media platform.

Presenter Bio:

Steve has worked in Educational Technology for 14 years and currently serves as Director of Technology & Communication for a non-profit organization in Newtown, PA. He is also the Website Coordinator and Board Member for ASCUE, and led the rebranding process.

Amanda Kraft is the Electronic Resources Librarian at Horry Georgetown Technical College. In addition to ERM and mobile tech troubleshooting, she is in charge of reference and instructional services at HGTC's Grand Strand Camus Library and coordinates social media for all three library branches. This is Amanda's first time attending ASCUE.

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