

INFORMATION SYSTEMS EDUCATION JOURNAL

In this issue:

4. **Student Characteristics and E-textbook Experiences: The Direct and Moderating Effects of Technology Savvy and Gender**
Jun Sun, University of Texas - Pan American
Javier Flores, University of Texas - Pan American
15. **A Comprehensive Survey on Cyberbullying Perceptions at a Major Metropolitan University – Faculty Perspectives**
John C. Molluzzo, Pace University
James Lawler, Pace University
Jerry Manneh, Pace University
35. **Fostering Entrepreneurship in the CIS Sandbox**
Mark Frydenberg, Bentley University
42. **Collaborative learning in online courses: Exploring students’ perceptions**
Silvana Faja, University of Central Missouri
52. **Cyberbullying Presence, Extent, & Forms in a Midwestern Post-secondary Institution**
J. A. Smith, University of Minnesota
J. Yoon, University of Texas Arlington
79. **Reassessing the Skills Required of Graduates of an Information Systems Program: An Updated Analysis**
John Legier, Southern Illinois University
Belle Woodward, Southern Illinois University
Nancy Martin, Southern Illinois University
90. **Effects of Social Networking on Adolescent Education**
Muhammed Miah, Southern University at New Orleans
Adnan Omar, Southern University at New Orleans
Monique Allison Golding, Southern University at New Orleans
101. **A Systematic Approach to Faculty Development - Capability Improvement for Blended Learning**
Ashraf Badawood, Taif University
Annette Lerine Steenkamp, Lawrence Technological University
Daw Al-Werfalli, Lawrence Technology University

The **Information Systems Education Journal** (ISEDJ) is a double-blind peer-reviewed academic journal published by **EDSIG**, the Education Special Interest Group of AITP, the Association of Information Technology Professionals (Chicago, Illinois). Publishing frequency is six times per year. The first year of publication is 2003.

ISEDJ is published online (<http://isedj.org>) in connection with ISECON, the Information Systems Education Conference, which is also double-blind peer reviewed. Our sister publication, the Proceedings of ISECON (<http://isecon.org>) features all papers, panels, workshops, and presentations from the conference.

The journal acceptance review process involves a minimum of three double-blind peer reviews, where both the reviewer is not aware of the identities of the authors and the authors are not aware of the identities of the reviewers. The initial reviews happen before the conference. At that point papers are divided into award papers (top 15%), other journal papers (top 30%), unsettled papers, and non-journal papers. The unsettled papers are subjected to a second round of blind peer review to establish whether they will be accepted to the journal or not. Those papers that are deemed of sufficient quality are accepted for publication in the ISEDJ journal. Currently the target acceptance rate for the journal is about 45%.

Information Systems Education Journal is pleased to be listed in the 1st Edition of Cabell's Directory of Publishing Opportunities in Educational Technology and Library Science, in both the electronic and printed editions. Questions should be addressed to the editor at editor@isedj.org or the publisher at publisher@isedj.org.

2013 AITP Education Special Interest Group (EDSIG) Board of Directors

Wendy Ceccucci
Quinnipiac University
President - 2013

Leslie J. Waguespack Jr
Bentley University
Vice President

Alan Peslak
Penn State University
President 2011-2012

Jeffry Babb
West Texas A&M
Membership

Michael Smith
Georgia Institute of Technology
Secretary

George Nezek
Treasurer

Eric Bremier
Siena College
Director

Nita Brooks
Middle Tennessee State Univ
Director

Scott Hunsinger
Appalachian State University
Membership Director

Muhammed Miah
Southern Univ New Orleans
Director

Peter Wu
Robert Morris University
Director

S. E. Kruck
James Madison University
JISE Editor

Nita Adams
State of Illinois (retired)
FITE Liaison

Copyright © 2013 by the Education Special Interest Group (EDSIG) of the Association of Information Technology Professionals (AITP). Permission to make digital or hard copies of all or part of this journal for personal or classroom use is granted without fee provided that the copies are not made or distributed for profit or commercial use. All copies must bear this notice and full citation. Permission from the Editor is required to post to servers, redistribute to lists, or utilize in a for-profit or commercial use. Permission requests should be sent to Nita Brooks, Editor, editor@isedj.org.

INFORMATION SYSTEMS EDUCATION JOURNAL

Editors

Nita Brooks
Senior Editor
Middle Tennessee
State University

Thomas Janicki
Publisher
University of North Carolina
Wilmington

Donald Colton
Emeritus Editor
Brigham Young University
Hawaii

Jeffrey Babb
Associate Editor
West Texas A&M
University

Wendy Ceccucci
Associate Editor
Quinnipiac University

Melinda Korzaan
Associate Editor
Middle Tennessee
State University

George Nezek
Associate Editor

Samuel Sambasivam
Associate Editor
Azusa Pacific University

ISEDJ Editorial Board

Samuel Abraham
Siena Heights University

Cynthia Martincic
Saint Vincent College

Michael Smith
Georgia Institute of Technology

Ken Corley
Appalachian State University

Fortune Mhlanga
Lipscomb University

Karthikeyan Umapathy
University of North Florida

Gerald DeHondt II

Muhammed Miah
Southern Univ at New Orleans

Stuart Varden
Pace University

Janet Helwig
Dominican University

Alan Peslak
Penn State University

Leslie Waguespack
Bentley University

Scott Hunsinger
Appalachian State University

Bruce Saulnier
Quinnipiac University

Laurie Werner
Miami University

Mark Jones
Lock Haven University

Mark Segall
Metropolitan State University of
Denver

Bruce White
Quinnipiac University

James Lawler
Pace University

Anthony Serapiglia
St. Vincent College

Peter Y. Wu
Robert Morris University.

Terri Lenox
Westminster College

Li-Jen Shannon
Sam Houston State University

Ulku Yaylacicegi
Univ North Carolina Wilmington

Michelle Louch
Robert Morris University

Fostering Entrepreneurship in the CIS Sandbox

Mark Frydenberg
mfrydenberg@bentley.edu
Computer Information Systems Department
Bentley University
Waltham, MA 02452

Abstract

A fresh coat of paint and new furniture were the obvious external changes to an eleven-year-old computer lab at Bentley University when it was renovated in 2011. More difficult than changing the outward appearance of the room was changing the perceptions of what happens inside. The facility had a reputation of being a place where only students who needed help would go, and the role of assistants who worked there was limited to tutoring and maintaining equipment. This case study describes the transformation of a Computer Information Systems (CIS) department tutoring laboratory into a Learning and Technology Sandbox where student lab assistants are employed as staff of a startup company, whose responsibilities include not only tutoring, but managing the technology and business infrastructure, publicity, and day-to-day operations of the facility. Students who frequent the facility go for tutoring as well as to independently explore new technology. This study, which included both surveys and personal interviews of student workers and student attendees, suggests that through the use of web-based collaborative applications, social media, and a work environment that encourages exploration, the Sandbox has provided student workers with an opportunity to build skills as entrepreneurs, and changes the nature of what a computer lab can be for the students who frequent it.

Keywords: entrepreneurship, computer lab, social media, learning spaces

1. INTRODUCTION

Many students no longer look to the university computer lab as a place to go to use desktop computers. At universities where students have their own their laptops, the need to go to a particular place to use computer equipment or connect online is less of a priority. Specialized services, software, or equipment must draw students to these facilities. Providing customer service to patrons or tutoring to students enrolled in CIS courses remains the major responsibility of student workers who staff campus computing labs, but this alone may not attract students of varying abilities, skills, and interests.

The CIS Lab at Bentley University had not been modernized for over a decade; with the

renovation came the opportunity to change not only the physical space but also the culture among the tutors and the students who use it.

Previous research describes the results of transforming this physical space into a collaborative learning environment (Frydenberg, Creating a Collaborative Learning Community in the CIS Sandbox, 2012) that is aligned with a virtual presence based on the use of social media tools. (Frydenberg, Aligning Open, Physical, and Virtual Spaces in the CIS Sandbox, 2012) This paper explores the enhanced role and learning experience of student workers, also referred to as tutors, in such a facility. Applying "start-up" values to the day-to-day operation of the lab, student workers now take on responsibilities of providing a service (tutoring), as well as administrative responsibilities of

managing, promoting, planning for, and maintaining the facility. In the process, they gain expertise using real-world web-based social media and collaboration tools.

Implementing such an environment in a university computer lab inspires these research questions:

- Will a "start-up" management approach help create a culture of engagement among both patrons and student workers?
- Will student workers seize the opportunity to develop entrepreneurial skills?
- Can working in informal learning environment promote the development of entrepreneurial skills?

2. CREATING A SPACE FOR LEARNING AND ENTREPRENEURSHIP IN THE CIS SANDBOX

Senges, Seely Brown, and Rheingold (2008) define entrepreneurship as "the practice of identifying and creating all kinds of opportunities and then taking action aimed at realizing them." (p. 126)

A first step in providing new opportunities in a computer lab setting was creating an inviting physical space where students would want to go. Figure 1 in Appendix I shows the former CIS Lab before renovations. The space, located then the basement of a classroom building, is approximately 900 square feet. It housed tables with 36 desktop computers around the perimeter, and a long work table at the center of the room. Networking equipment was mounted on the back wall.

Relaunched as the CIS Learning and Technology Sandbox, the renovated facility promotes collaboration and informal learning at group tables or in a lounge setting. Figure 2 in Appendix I shows the renovated facility. As the number of students who own laptops, tablets, and other mobile devices increases, (Smith, 2010) the remodeled space provides more desk space and fewer desktop computers. At the entry of the new facility are comfortable and easily-movable chairs and a 42" Google TV mounted on the wall, creating an informal living room setting. This area sets the business casual tone for the rest of the space.

One way to improve an entrepreneurial environment is to "reorganiz[e] work into fun,"

(Faltin, 2001, p. 22), and both the new layout and its name promote a sense of playfulness and discovery. Colorful stripes painted on the walls identify each work area. Learning stations with large, uncluttered tables containing a computer and a 42" monitor, and a wall-mounted SMART board facilitate group collaboration; 12 desktop computers running Linux, Windows 7, and Windows 8 pre-released software encourage discovery and are available for general use. A Mac desktop and a Windows 8 touch-screen computer are also available. An Xbox and Kinect provide a source of relaxation for both student workers and patrons when the lab is not busy, and an alternative platform for developing software applications through the use of standard software development kits. Sandbox workers are general need to know how to use all of these.

Lobler (2006) describes the role that informality plays in learning, and how entrepreneurs must enjoy what they are doing in order to be successful.

"Learning is a precondition for fun. ... It seems that we totally underestimate the value of playing and having fun for the purpose of learning, especially in learning entrepreneurial skills and competencies or characteristics. In general, if you are really interested in something you do not perceive your endeavors as work or learning but as fun! Achievement and fun is no contradiction, as typically can be seen in the field of successful entrepreneurs." (Lobler, 2006, p. 31)

The term "Sandbox" has a start-up connotation that encourages tech-savvy exploration, learning, and creativity, all entrepreneurial skills required in a business context. (UK Centre for Bioscience) In engineering, "a sandbox environment consists of a controlled set of resources for trying ... new app[lication]s without the risk of damaging critical parts of the system." (Malizia & Olsen, 2011, p. 210) Acadia University used the term to describe its institute for teaching technology, the primary on-campus resource for supporting computer-enhanced learning efforts. It has become "a place where all disciplines can meet and share ideas." (MacDougall, 1998, p. 33) Indiana State University also named their Instructional and Research Technology Services (IRTS) facility a Digital Sandbox, acknowledging that their "sandbox allows faculty to experiment with new

technologies with the help and guidance of IRTS staff.” (Janz & Owen, 2004, p. 206)

The CIS Sandbox is more than an informal learning space; itself, it is managed as businesses where student workers take pride and responsibility in its day-to-day operations, as such, develop skills in industry-standard software tools, learn the importance of establishing good relationships with customers (students who frequent the lab), and claim ownership of the work they do.

Staffed by eight graduate students and 12 undergraduates, the facility is open seven days a week, for 14 hours per day during the week, 6 hours on Saturday, and 10 hours on Sunday. One graduate assistant is designated as the Administrative Manager, responsible for overseeing student worker schedules, maintaining the lab’s calendar on Google calendar, and other administrative tasks. Another graduate student is designated the Technology Manager, responsible for training staff on the use of the equipment, installing software upgrades, and documenting procedures for use.

In addition to providing tutoring services to students in need of assistance, lab workers have planned special activities and programs on extracurricular IT topics to take place in the CIS Sandbox. These were designed to be of interest to advanced students. In the fall, they worked with the university’s Microsoft representative to offer a workshop on xBox game development. In the spring, a university alumnus now employed at Mashery presented on mobile app development, APIs, and his role in the company. CIS Sandbox workers created the publicity for these events, flyers for which are shown in Figure 1.

These activities extend the reach of a computer lab and help create a community of learners in an informal setting. Such events were an unintended consequence precipitated by the ownership that several student workers took on when asked to consider what services the CIS Sandbox might provide beyond tutoring to attract a variety of students.

To enable student workers to take on these creative projects, and following an employment model at Google, (Mediratta & Bick, 2007) those who take on expanded roles are given one hour per week apart from their scheduled tutoring

responsibilities to work on planning specialized activities in the CIS Sandbox.

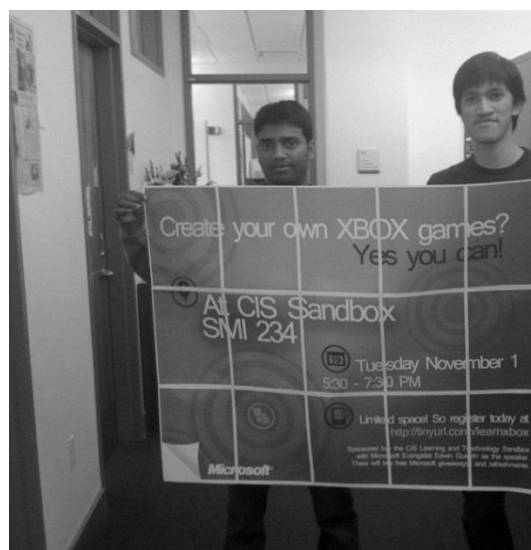


Figure 1. Students create posters and flyers for special events in the CIS Sandbox.

3. TECHNOLOGIES FOR SOCIAL ENTREPRENEURSHIP

“Social entrepreneurship allows business professors to offer an experiential learning environment” (Wessel & Godshalk, 2004, p. 25). Student workers learn to use social media and other tools to promote the CIS Sandbox and its activities. The public face of the CIS Sandbox is its Wordpress blog, to which student workers post approximately twice per month. Some blog posts reflect frequently-asked-questions that come up during tutoring sessions, others are on new technologies, tech-related events,

interesting articles students read, or career-related posts. Facebook status updates and Twitter posts occasionally report new blog posts or special happenings in the CIS Sandbox, and add a social dimension, as students like or follow the facility. Students plan special workshops on extracurricular tech topics, and use EventBrite so participants can sign up for these events. One student worker is responsible for creating and digital signage using Prezi to draw students into the lab space.

Extending their tutoring skills beyond the physical lab, some tutors have created instructional screen cast demonstrations on how to software applications used in CIS courses, and post them on YouTube. Other tutors offer live chat tutoring via Meebo or Skype, and soon, Google+ hangouts. This provides virtual support to off-campus students and those who are unable to visit the lab's on-campus location.

Each of these activities provides an opportunity for students to develop skills in social entrepreneurship using current technologies which will provide good experiences as they prepare for their future careers. They enable "students to perceive the world (and especially social technology) as a learning opportunity ... that allows them to develop as humans and as professionals" (Senges, Seely Brown, & Rheingold, 2008, p. 126).

4. SURVEY AND INTERVIEW RESULTS

A survey was given to the CIS Sandbox staff at the end of the fall 2011 and spring 2012 semester. A total of 15 student workers completed the survey. Several were interviewed about their work experiences in the CIS Sandbox.

The UK Centre for Bioscience, the Canadian Foundation for Economic Education, and, Bilén, Kisenwether, Rzasa, & Wise (2005) identified several entrepreneurial skills. Student workers identified those which they felt were necessary to succeed in business, and those which they felt their work in the CIS Sandbox helped them develop, as shown in Figure 2.

Critical thinking, collaboration, creativity, and hard-working were the most popular skills that student workers felt were necessary to succeed; collaboration, resourcefulness, creativity, and tech savviness were the four most popular skills

that they said they developed through their work in the CIS Sandbox.

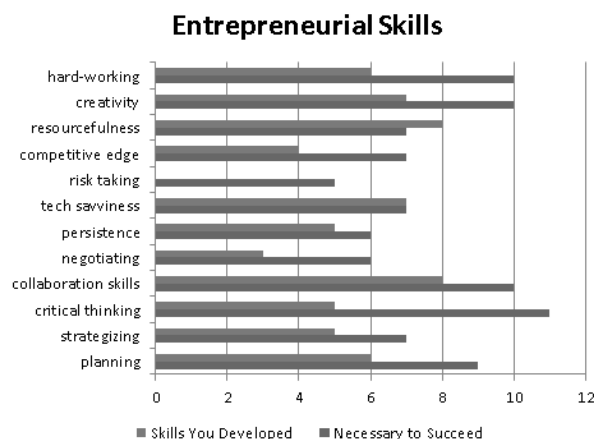


Figure 2. Entrepreneurial Skills developed by CIS Sandbox Workers.

Several workers commented on how their work assignments in the CIS Sandbox helped them to develop various entrepreneurial skills:

On risk-taking, one said: "I'm overall shy and have problem talking to native speakers. But in order to succeed in my job, I have to communicate not only with the students I tutored, but also with my coworkers. I am now more confident with my communication and skills to convey my idea precisely and concisely."

On critical thinking and resourcefulness: "Working with students on some of their assignments required critical thinking, creativity, and resourcefulness, especially when trying to help them complete the project in the way they wanted to do it. If they were completely wrong it sometimes took a bit of negotiating and convincing to show them better ways to solve their problems."

One lab assistant felt there was a bit of strategizing going on when planning "events and workshops [to make sure they] were well thought and addressed interesting topics" so they would be well attended.

Another claimed that "creativity and persistence are a must when working with a particularly technologically challenged individual. I remember helping one student with a Java program who was literally typing my words into Eclipse. I'd lead her into it and say, 'so how can you get the value at position *i* in that array?'

She'd type in 'array at $i =$ ' and run the program wondering why it doesn't work... I needed to rethink my method of communication and get my point across in a way that she'd understand."

Said one lab assistant, "Since I came in right at the very beginning, I've felt like [helping to shape the CIS Sandbox] has been a project of mine from the get go. I wasn't sure how much authority I'd have, or how I'd be able to influence that way things were done, but I and all the tutors were really able to ... take the wheel when it comes to making decisions."

Patrons of the CIS Sandbox recognized some of these skills in their tutors. Several commented on how they would help them outside of their scheduled work hours.

5. FUTURE ACTIVITIES

To provide an opportunity to develop proficiency in cloud-based CRM solutions, some student workers are currently investigating the use of Salesforce.com as a tool for managing help desk / tutoring requests and usage. Salesforce is the premier cloud-based Customer Relationship Management (CRM) software as a service provider, and provides grants for non-profit organizations to use the software at no cost. Involving students in this project gives them an opportunity to develop valuable skills using this software that they can use in their own organizations.

Another goal is to involve student workers in developing an improved social media plan to market the CIS Sandbox on Facebook and Twitter, and to encourage students who frequent the lab to take on a more active role in contributing to the Sandbox online presence by responding to blog posts, posting to the Sandbox Facebook page, and tweeting about their experiences or events at the CIS Sandbox.

Following the successful presentation with Mashery, the CIS Sandbox is partnering with the university's Career Services office to invite companies to offer information and recruiting sessions in the CIS Sandbox. This will attract CIS majors and minors to learn about career opportunities in an informal setting.

6. CONCLUSIONS

The CIS Sandbox presents a start-up approach to a university tutoring lab and the

responsibilities of the workers who staff it. Lab assistants have the flexibility to explore their technology interests, which results in extracurricular programming for students and the community. Taking on extended roles beyond tutoring enables student workers to interact with their peers, as well as with social media tools and collaborative technologies. Working in the CIS Sandbox provides an opportunity to learn about IT trends and concepts beyond what is covered in their classes, explore technology interests, and develop valuable entrepreneurial skills that will be helpful in their future careers.

7. REFERENCES

- Abedin, B. (2011). Investigating the Trend of Non-Task Social Interactions in Online Collaborative Learning Environments. *Proceedings of the 44th Hawaii International Conference on System Sciences*, (p. 108).
- Bilen, S., Kisenwether, E., Rzasa, S., & Wise, J. (2005, April). Developing and Assessing Students' Entrepreneurial Skills and Mind-Set. *Journal of Engineering Education*, 233-243.
- Canadian Foundation for Economic Education. (n.d.). *Assess Your Entrepreneurial Skills*. Retrieved June 1, 2011, from Mentors, Ventures, & Plans: <http://www.mvp.cfee.org/en/selfassessskills.html>
- Clayton-Pederson, A., & O'Neill, N. (2005). Curricula Designed to Meet 21st Century Expectations. In D. G. Oblinger, & J. L. Oblinger, *Educating the Net Generation*. Boulder, CO: Educause.
- Faltin, G. (2001). Creating a culture of innovative entrepreneurship. *Journal of International Business and Economy*, 2, 123.
- Frydenberg, M. (2012, to be published). Aligning Open, Physical, and Virtual Spaces in the CIS Sandbox. In M. Laanpere, T. Ley, & M. Ruohonen, *Open and Social Technologies for Networked Learning*. New York: Springer.

- Frydenberg, M. (2012). Creating a Collaborative Learning Community in the CIS Sandbox. In P. Isias (Ed.), *Proceedings of the IADIS Multi-Conference on Computer Science and Information Systems* (p. 7). Lisbon: IADIS.
- Fu, X., Doboli, S., & Impagliazzo, J. (2010). Work-in-Progress: A Sandbox Model for Teaching Entrepreneurship. *Proceedings of the 40th ASEE/IEEE Frontiers in Education Conference* (pp. TIA-1-2). Washington, DC: IEEE.
- Janz, K., & Owen, S. (2004). Organizationally Supporting Innovation in Technology Enhanced Instruction and Research. *Proceedings of SIGUCCS '04* (pp. 202-208). Baltimore: Association for Computing Machinery.
- Lobler, H. (2006, February). Learning Entrepreneurship from a Constructivist Perspective. *Technology Analysis & Strategic Management*, 18(1), 19-38.
- MacDougall, G. (1998, January). Acadia University's Sandbox. *Communications of the ACM*, 41(1), 32-33.
- Malizia, A. O. (2011, September). Has Everything Been Invented? On Software Development and the Future of Apps. *Computer*, pp. 112;110-111.
- Malizia, A., & Olsen, K. A. (2011, September 12). Has Everything Been Invented? On Software Development and the Future of Apps. *Computer*, 44(9), 112-111.
- Mediratta, B., & Bick, J. (2007, October 21). *The Google Way: Give Engineers Room*. Retrieved June 1, 2012, from The New York Times:
<http://www.nytimes.com/2007/10/21/jobs/21pre.html>
- Senges, M., Seely Brown, J., & Rheingold, H. (2008, December). Entrepreneurial learning in the networked age: How new learning environments foster entrepreneurship and innovation. *Paradigms Journal of the Catalan Ministry of Innovation, Universities and Enterprise*, 1(1), 125-140.
- Smith, A. (2010). *Americans and their Gadgets*. Washington, DC: Pew Internet and American Life Project.
- UK Centre for Bioscience. (n.d.). *What are regarded as entrepreneurial skills?* Retrieved June 1, 2012, from UK Centre for Bioscience:
<http://www.bioscience.heacademy.ac.uk/resources/entrepreneurship/skills.aspx>
- Wessel, S., & Godshalk, V. (2004). Why Teach Social Entrepreneurship: Enhance Learning and University-Community Relations through Service Learning Outreach. *Journal of Higher Education Outreach and Engagement*, 9(1), 25.
- Wessel, S., & Godshalk, V. (2004). Why Teach Social Entrepreneurship: Enhance Learning and University-Community Relations through Service Learning Outreach. *Journal of Higher Education Outreach and Engagement*, 9(1), 25.

Editor's Note:

This paper was selected for inclusion in the journal as a ISECON 2012 Meritorious Paper. The acceptance rate is typically 15% for this category of paper based on blind reviews from six or more peers including three or more former best papers authors who did not submit a paper in 2012.

Appendix I



Figure 1. The CIS Lab, prior to renovation.



Figure 2. The renovated CIS Learning and Technology Sandbox.