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## **TEACHING THE GOOGLE TOOL SET**

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### **ABSTRACT**

Professor's usage of the Google tool set in their teaching of various technology classes. This presentation reviews the various Google tools available for professors to share with their students. A research project is needed to survey the various technology professors as to their usage of the various Google tools. One variable in such a study would be if the various professors had the ability to use each of the different Google tools available to them. Today's technology students should have an awareness of the various Google tools and how to use them. Google is a technology leader and IACIS conference participants will gain from a review of the available Google tools and realize that there are a plethora of Google tools available to them for their students to learn these important technology skills.

The basis of such a future study is as follows:

This researcher would acquire a list of various technology professors. An appropriate survey would be constructed to survey the professors as to the use of the various Google tools. This survey would be sent to the various professors. The survey data would be reviewed and the data analysis would be shared with several local technology experts. Also, a review of literature would be completed to see if any previous research has been done on this topic. The results of the research and literature review will be shared by writing a professional article.

The implications of this study are as follows:

This study may be the basis for a future textbook based on the Google Tools and future Google education programs at various universities. This study may give technology professors some new directions in technology learning. Also, this research will give the technology community some indication how widely spread is the use of the Google Tool Set at the University level.

### **CONCLUSIONS**

Many professors may not have the knowledge of the current Google Tool set. This presentation will give an overview of the Google Tool set and provide a future framework for research on the Google Tool set at a later date. Using Google to review the Google Tool set is an excellent way to begin a review of this topic. See <http://www.google.com/intl/en/about/products/>

## **DIGITAL LITERACY FOR THE DIGITAL NATIVE**

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### **ABSTRACT**

#### **Proposed Study**

Prensky (2001) has coined the term “digital native” to categorize the generation that has been exposed to technology from a very young age. Digital natives have always lived in a world of technology, ranging from mobile phones to web 2.0 tools as well as gaming. Because they have been exposed to these technologies, it is assumed that they possess an innate ability to navigate the digital world efficiently and effectively. On the other hand, “digital immigrants” are assumed to have little grasp of how to use technology efficiently and effectively, since they were born before the digital age and were, thus, not exposed to the technology during their formative years. Vodanovich, Sundaram & Myers (2010), follow on Prensky’s logic from an academic perspective. They define digital natives as “a subset of the millennial generation who have grown up immersed in a networked world with access to ubiquitous digital technologies and the ability to learn and use them in fluent and sophisticated ways”. Vodanovich et al. point out that the concept of digital nativity is “better conceptualized as a continuum”. Nonetheless, Vodanovich et al do not put forth a framework for a continuum of nativity as a possible research agenda. Therefore, the purpose of this research is to determine whether there is a more apt characterization of an individual’s technological competence in using a variety of tools, regardless of age.

#### **Basis of the Study/Research Method**

The study will use a variety of methods to answer the following research question: *What knowledge, skills and abilities should an individual possess to be considered a digital native?* The study will be conducted in phases. Phase 1 will employ qualitative methods, including participant observation of both presupposed digital natives and digital immigrants, using a variety of technologies (i.e. mobile phones, web 2.0 tools, software applications, etc). Focus groups will be conducted with digital natives and immigrants to complement the study’s observations. Phase 2 will conduct a quantitative study, using questionnaire items derived from the results of the qualitative study. Results are expected to show that there are certain levels of comfort and discomfort with technology across all age groups.

#### **Research Implications**

It appears that IS researchers have prematurely begun to accept how the media, the popular press and those who wish to sell software to the masses (i.e. Prensky) define individual capabilities with respect to technology. It is up to researchers to measure carefully and evaluate properly the impact that efficient and effective use of digital tools has on individuals. This research is aimed at developing a framework to measure the degree of digital literacy an individual possesses, as opposed to categorizing a person’s ability by age alone.

#### **Managerial/Societal Implications**

Digital literacy is of the utmost importance in order for business and society to advance in the coming decades. Those who are able to harness the power of software and hardware tools properly will 1) find themselves able to navigate an increasingly complex society and 2) be more attractive to potential employers.

### **REFERENCES**

1. Prensky, M. (2001). Digital Natives, Digital Immigrants. *On the Horizon*, 9(5).
2. Vodanovich, S., Sundaram, D., Myers, M. (2010). Digital natives and ubiquitous information systems. *Information Systems Research*, 21(4), 711-723.

## **E-COMMERCE IN SOCIAL MEDIA AGE: EXPLORING BUSINESS USE OF SOCIAL MEDIA**

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### **ABSTRACT**

Internet-based social media, such as Facebook, Flickr, LinkedIn, Twitter, and YouTube, have changed the traditional communication landscape. Social media also bring enormous challenges to companies as consumers are no longer merely passive recipients in the business transactions. Consumers are taking an increasingly active role in co-creating everything from product design to promotional messages; they want companies to listen, appropriately engage, and respond [e.g., 1, 3]. Clearly, the growing popularity of social media among consumers has fundamentally altered the marketing ecosystem that companies have less control over information to influence consumers; by contrast, the consumers' comments and ratings of products and services on social media can significantly impact a company's reputation, sales, and even survival [e.g., 3, 6].

However, when companies change their mentality from business-centered to consumer-centered thinking, social media bring great opportunities that would enable companies to engage with consumers, listen to them, and see what they would like and need. Recognizing the power of social media, many companies rushed to engage in using social media for satisfying their needs. For example, Kia Motors, Best Buy, Viacom, Cisco Systems, and Intuit corporations use Facebook, Twitter, and YouTube to engage customers in their product development, branding, pricing, and continuous improvement by analyzing customers' continuous, real-time input on the social media [4]. While the importance of using social media for business becomes obvious, no nation-wide study has been identified in the literature on how companies use social media strategically for achieving their missions and objectives. This research gap indicates a need for a nation-wide empirical research of business use of social media. We chose the *Fortune 500* largest U.S. companies for this study because these companies are the leaders of the U.S. businesses.

The purpose of this study is to assess the *Fortune 500* largest U.S. companies' strategic use of the social media for e-commerce. To address the research problem, we raised the following three research questions: (1) What social media tools are available on *Fortune 500* corporate websites? (2) How do *Fortune 500* companies use social media for marketing, branding, and advertising? And (3) how do consumers engage in *Fortune 500* marketing, branding, and advertising activities via social media?

As the related literature indicates, social media employ mobile and web-based technologies to create highly interactive platforms via which individuals and communities share, co-create, discuss, and modify user-generated content [3]. Facebook, Twitter, YouTube, Flickr, and LinkedIn are widely used social media tools by companies, schools, interest groups, professional organizations, and governments for varied purposes [5]. To assess *Fortune 500* companies' use of such social media tools, we employ Web content analysis as our research method.

Web content analysis is commonly used in assessing organizations' strategies, deliveries, and interactions to customers, employees, investor, and other stakeholders on their Web sites [e.g., 2, 7, 8]. To systematically and objectively record how *Fortune 500* corporate sites use social media strategically, we developed an instrument based on the review of related literature and social networking sites. The instrument includes four types of measurements: (a) social media for marketing, branding, and advertising, (b) social media for customer relations, (c) social media for investor relations, and (d) social media for public relations. Data are being collected and to be coded for statistical analysis. Frequency counts, percentage distributions, and weighted means will be prepared. We will present our research results at the 2012 IACIS annual conference. The results of the study will also provide the *Fortune 500* corporate executives with the information they need for continuously improving their use of social media as a way to better engage their consumers, employees, and investors in product and service development, branding, pricing, and continuous improvement.

## REFERENCES

1. Berthon, P. R., Pitt, L. F., McCarthy, I., & Kates, S. (2007). When customers et clever: Managerial approaches to dealing with creative consumers. *Business Horizons*, 50(1), 39-48. Boggs, R. A., & Walters, D. (2006). A longitudinal look at e-government in practice. *Issues in Information Systems*, 7(2), 161-164.
2. Campbell, D. & Beck, A. C. (2004). Answering Allegations: The Use of the Corporate Website for Restorative Ethical and Social Disclosure. *Business Ethics*, 13(2), 100.
3. Kietzmann, J. H., Hermkens, K., McCarthy, I. P., & Silvestre, B. S. (2011). Social media? Get serious! Understanding the functional building blocks of social media. *Business Horizons*, 54(3), 241-251.
4. King, R. (2011, March 1). Sentiment analysis gives companies insight into consumer opinion. *Business Week*. Retrieved from [http://www.businessweek.com/technology/content/feb2011/tc20110228\\_366762.htm](http://www.businessweek.com/technology/content/feb2011/tc20110228_366762.htm)
5. Porterfield, A. (2011, April 12). Nine companies doing social media right and why. *Social Media Examiner*. Retrieved from <http://www.socialmediaexaminer.com/9-companies-doing-social-media-right-and-why/>
6. Walmsley, A. (2010). New media needs new PR. Retrieved from <http://www.marketingmagazine.co.uk>
7. Wilkinson, V. O. & Cappel, J. J. (2005). Impact of economic prosperity and population on e-government involvement. *Issues in Information Systems*, (6), 204-209.
8. Zhao, J. J., Truell, A. D., & Alexander, M. W. (2006). User-interface design characteristics of *Fortune 500* B2C e-commerce sites and industry differences. *The Delta Pi Epsilon Journal*, 48(1), 43-55.

**INFORMATION SYSTEMS MANAGEMENT: A STUDY OF JOB EXPECTATION TO SUBORDINATES**

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**ABSTRACT**

A study of the Information Systems management procedures as it applies to job expectations and how they are communicated to subordinates and associates within an organizational hierarchy.

The research sample included 40 recently promoted IT supervisors; 42 IT supervisors with five or more years of supervisory experience; and 120 employees across 42 selected organizations from a Midwest-Southwest region of the United States.

Previous research revealed a need for a study of job expectations as it applies to recently promoted MIS supervisory and administrative personnel. The perception from those being supervised was twofold. First, those who were promoted to IT supervisory positions did understand the full range of IT performance expectations. Second, the newly promoted managers and supervisors were perceived as ineffective in the communication of job expectations and organizational change metrics. The communication disarray did not emanate from a lack of confidence in subordinates—it was the result of a newly promoted supervisor doing it him/herself rather than fully engaging a full team dynamic.

Research reveals how communication problems become progressively worse as the number of hierarchical levels increase. Thus, this study concentrates on the “what”, the “how”, and the “when” of job expectation communication.

Primary concentration is on “what” is commonly communicated (priorities, projections, time lines, etc.) A second area of research emphasis involved the “how” and concentrated on the preferred method for communicating the “what” (memorandums, department or division meetings, emails, company manuals, and one-on-one communication). A third and final concentration emphasized “when” the job expectations were actually relayed (daily, weekly, by-weekly, monthly, quarterly, and semi-annually).

## **ANALYZING THE IMPACT OF ENTERPRISE ARCHITECTURE FRAMEWORKS**

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### **ABSTRACT**

#### **Purpose of the Study**

Information technology architectures have become increasingly complex. The number and types of computerized applications have grown to include: large scale programs that run on mainframe computers, client-server applications that are highly decentralized and web-based applications that can be accessed via the Internet or company intranet sites. At the same time, information technology organizations are required to ensure that these systems are secure, meet the privacy needs of their customers and are in compliance with legal and corporate governance requirements. This must all be managed with an almost constant pressure to reduce expenses.

While the numbers and types of technologies that must be managed have grown, at the same time, they have taken on a much greater importance as the need to balance the ability to quickly implement change with the stability of maintaining existing applications creates a challenge for the technology unit of many large organizations. Enterprise architecture frameworks have been developed as a means to provide a structured approach for the information technology organization to manage information technology assets.

All information technology groups within the agencies of the Federal Government are required by law to use an enterprise architecture framework. Two frameworks are utilized; the Federal Enterprise Architecture Framework (FEAF) and the Department of Defense Architecture Framework (DoDAF). FEAF has been in use for 7 years and DoDAF for the past 4 years. There has been no significant research to date that has studied the effectiveness of these frameworks.

This study will analyze the factors that influence the use of these enterprise architecture frameworks. It will utilize a transcendental phenomenological research method. This will involve a series of in-depth interviews with enterprise architects who utilize these frameworks [most of the information technology organizations that support the federal government are located in the greater Washington, DC area; this is where the interviews will take place].

#### **Implications of the Study**

This project will extend the information systems research by examining the factors that influence the use of enterprise architecture frameworks. This should be of interest to the enterprise architects and CIO's of the agencies within the federal government, since they are required to use these frameworks as well as large organizations that have implemented enterprise architecture initiatives.

### **REFERENCES**

1. Bernard, S. (2004), *An Introduction to Enterprise Architecture*, AuthorHouse, Bloomington, IN.
2. Creswell, J.W. (1998). *Qualitative Inquiry and Research Design*. Thousand Oaks, CA. Sage Publications, Inc.
3. Moustakas, C. (1994). *Phenomenological Research Methods*. Thousand Oaks, CA. Sage Publications, Inc.
4. Neaga , E. and Harding, J. (2005, March), An enterprise modeling and integration framework based on knowledge discovery and data mining, *International Journal of Production Research*, 43(6), 1089-1108.
5. Schekkerman, J. (2004), *How to survive in the jungle of Enterprise Architecture Frameworks*, Trafford, Victoria, BC.
6. Zachman, J.A., (1987), A framework for information systems architecture, *IBM Systems Journal*, 26(3) 276-292.

## **STUDENT PERCEPTIONS OF CRITICAL ATTRIBUTES FOR ENTRY-LEVEL IT CONSULTANTS**

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### **ABSTRACT**

The Information Technology (IT) field is migrating from the use of internal employees to the extensive use of external consultants. With this migration, the attributes (i.e. the technical and behavioral skill sets) for a successful Information Systems (IS) graduate may have changed. At our university, our best graduating IS students are commonly hired by consulting companies. To serve that need, we offer a consulting class as an elective in our IS major. In that class, student teams work with mentors from consulting firms to learn how to develop a proposal in response to a Request for Proposal. At the end of the semester, we asked students in the class to identify the critical attributes that an entry level IT consultant should have. Most, if not all, of these students had received job offers from consulting firms during this same semester. In this study, we will present the view of these entry-level consultants on what skills are important for an entry-level consultant to have.

### **BACKGROUND AND DATA COLLECTION**

There is not much academic research on IT consulting skills in general or into the specific required entry-level skills for an IT consultant. This lack means that it is difficult to determine whether our IS programs are providing the necessary education for students seeking jobs in this industry. Joshi, et al. [2] looked at what it meant to be an excellent IT consultant which they associated with being a top performer in an IT role. They spoke with members of consulting firms at many levels and found that the stakeholders thought it of high importance that an entry-level top-performer have the ability to deliver, be committed, be cooperative, and be analytical. Some of their raters also found it to be high importance that this entry-level person be a quick learner and be able to manage relationships. In another study, students in a consulting class suggested based upon a consulting project that negotiating skills, communications skills, and teamwork were critical [3]. We will extend this literature with our study.

Our consulting class is a closed class, open only to those who apply and are accepted. Students who are accepted into the class are recommended by our faculty members. These students are senior-level students who are graduating in the academic year. In this class, thirty students worked with consultants from 10 consulting firms from the Washington DC area. At the end of the semester, we asked our students, working in teams, to identify attributes that they think are necessary for entry-level IT Consultants. We plan to analyze their responses following the methods used by Joshi, et al. [2]. We will map the students' responses to a set of attributes based upon the literature. We will extend those attributes as new concepts emerge. At least two researchers will code each response. Where new concepts emerge, we will discuss via collective review. From this, we will extract a set of attributes that IS students who will soon become newly hired consultants think an entry-level IT consultant must have.

### **IMPLICATIONS AND CONCLUSION**

Almost all of our best IS graduates are hired by consulting companies. On a regular basis, we ask those companies why they hire our students. In those discussions, they talk about graduates having client facing skills, working well in groups, and understanding business functions. When pressed, they admit that they take our students' excellent technical skills for granted. At the same time, members of these firms are mentoring, interviewing, and hiring our students for their entry-level positions. We plan to supplement existing perspectives with the perspective of the entry-level consultant using our consulting class students. The students' answers are informed by what they have learned from their consulting firm mentors, what they learned from developing their proposals, what they learned on their internships the past summer, and what they learned from being interviewed and hired by consulting firms for permanent jobs. They are also informed by watching some of their friends not receive consulting job offers. With this study we listen to the voices of these new consultants. This work is part of a multifaceted study of IT consulting where we will work with many constituents including seasoned and new consultants.

We will use the attributes extracted from the students' answers to extend the literature on what skills the entry-level IT consultant should have. Following work such as Downey, et al. [1], we will use these critical skills to make suggestions on changes to the IS curriculum to best serve the needs of our students and their future employers.

#### **REFERENCES**

1. Downey, J.P., McMurtrey, M.E., and Zeltmann, S.M. (2008). Mapping the MIS Curriculum Based on Critical Skills of New Graduates: An Empirical Examination of IT Professionals. *Journal of Information Systems Education*, 19(3), 351-363.
2. Joshi, K. D., Kuhn, K.M. and Niederman, F. (2010). Excellence in IT Consulting: Integrating Multiple Stakeholders' Perceptions of Top Performers. *IEEE Transactions on Engineering Management*, 57(4), 589-606.
3. Komarjaya, J., Huifang, L, and Bock, G.-W. (2004). Consulting from students' perspective. *Consulting to Management*, 15(2), 29-33.

## **DECISION SUPPORT SYSTEM: THE UNIFIED ENTERPRISE SOCIAL COMPUTING APPROACH**

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### **ABSTRACT**

#### **Background**

The world has shrunk to a global village, thanks to Information and Communication Technology (ICT) that has steadily developed over the past decades. Virtually all aspects of living, including business operations, have been impacted one way or the other by advancement in ICT. ICT is continually changing the way business operations are carried out. The Internet and the World Wide Web, aspects of ICT, have given businesses a leveraging source for innovative ideas and support for decision making. They both have developed and become an indispensable platform to reach clients globally. Social computing, made popular by Web 2.0 technologies, in particular, has presented business organizations with more opportunities to advance their operations and make more effective and timely decisions [2, 3]. However, to gain business value from social computing, there must be a proper coordination and presentation of social inputs from stakeholders in such a way that they will be meaningful to decision makers. We also argue that enterprise business systems and social computing monitoring systems should be unified to present decision makers with an integrated platform that supports decision making [1].

#### **Related work**

An extensive review of the social computing literature shows that significant work has been done in establishing the prospects, benefits, and business value in social computing. It also provides in-depth studies in the area of sentiment, text, and natural language analysis and metrics.

#### **Relevance (Implication)**

We believe that this study could add to the integration of social computing elements with enterprise (business) systems creating a one-stop platform that will support business decision making. We also believe that this study may lead to more research regarding this subject area, especially the aspect of technical implementation.

#### **Conclusion**

Decision makers in organizations always have time constraint. Presenting them with a system that has all aspects of decision support tools, including inputs from stakeholders (via social computing), is a great way to increase their productivity.

### **REFERENCES**

1. Dawn G. 2010. Designing for collective intelligence. *Communication of The ACM*. 53(4), 134-138.
2. Parameswaran M. and Whinston A. 2007. Research Issues in Social Computing. *Journal of The Association of Information Systems*. 8(6), 336-350.
3. Smith H. and Mckeen J. 2008. Developments in practice XXXI: Social computing: How should it be managed? *Communications of the Association for Information Systems*. 23(23), 409-418.
4. Godbole N., Srinivasaiah M., and Skiena S. 2007. Large-scale sentiment analysis for news and blogs. *Proceedings of the International Conference for Weblogs and Social Media (ICWSM 07)*.

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## A FRAMEWORK FOR USER GUIDED DOCUMENT CLUSTERING

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### ABSTRACT

A major proportion of business data being generated today is in unstructured text format. To discover valuable information from the growing text corpora, document clustering is a typical approach employed in business analytics. However, many of the document clustering methods are completely unsupervised, and hence are unable to incorporate any available domain knowledge. We present an approach for integrating user provided constraints in document clustering. Specifically, the user expresses the domain knowledge in the form of must-link and cannot-link constraints. These constraints are then utilized by the framework for guiding the clustering process.

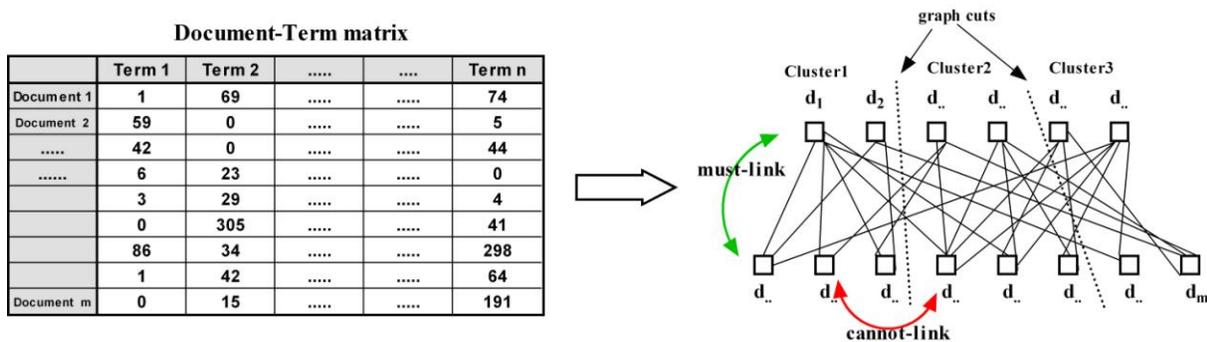
### PROPOSED FRAMEWORK

We propose a framework in which a user is able to provide pairwise constraints, viz., *must-link* and *cannot-link* constraints on documents (see Figure 1). An existence of a must-link constraint between two documents indicates that the two corresponding documents must be clustered together, irrespective of their dissimilarity. Similarly, a *cannot-link* constraint signifies that the two documents should never be clustered together, irrespective of their similarity. Although, semi-supervision in the form of constraints has been proposed before [4,5], the novelty of our work lies in the underlying clustering algorithm, viz., the Isoperimetric Graph Partitioning (IGP) algorithm [1,3], which integrates the constraints. Having IGP at the heart of the framework to compute the clusters brings us the following advantages:

- (1) **Applicability to large datasets:** IGP quickly solves a sparse system of linear equations to get the clusters, as compared to an iterative approach adopted by non-negative matrix factorization [5], or eigenvalue decomposition in spectral clustering [2]. As a result, the framework is applicable to large datasets and scales extremely well as the size of the document set grows.
- (2) **Performance in the presence of noise:** It is common to have “noise” in real-world datasets. The proportion of the noise present varies based on various factors such as the data source, cleaning methodology, or the data capturing process. It has been shown that the performance of other clustering algorithms (such as spectral clustering [2]), steadily deteriorates as the amount of noise in the data increases. On the other hand, in the presence of various kinds and amounts of noise, IGP is known to obtain stable clusters.

### EVALUATION

For evaluating the framework, we have used some of the publicly available text datasets, and conducted two sets of experimental studies. First, we have studied the clustering results as the amount of domain knowledge available to the framework increases. We have seen that as the percentage of constraints on documents gradually increase (1% to 5%), the clustering accuracy correspondingly improves as well. This shows that the framework is successfully able to integrate the available domain expertise into the clustering process. Second, we have compared the performance of IGP document clustering with spectral clustering, in the absence of any supervision. These set of experiments are primarily to demonstrate the performance if there is no constraint knowledge available. The results in both the experimental studies are extremely promising.



**Figure 1: The initial document-term matrix is converted into a document similarity graph matrix. The user provided constraints guide the graph partitioning process in obtaining document clusters.**

### CONCLUSIONS

We present a text analytics framework, where user provided domain knowledge can be integrated into the document clustering process. The *must-link* and *cannot-link* constraints provided guide the document clustering process. By representing document similarity using a weighted graph, we treat document clustering as a graph-partitioning problem. The Isoperimetric Graph Partitioning algorithm is capable of dealing with large sparse and noisy datasets leading to optimal document clusters.

### REFERENCES

1. Grady, L., & Schwartz, E. L. (2006), Isoperimetric Partitioning: A new algorithm for graph partitioning, *SIAM Journal on Scientific Computing*, 27(6), 1844-1866.
2. Chung, F. R. K. (1997). *Spectral Graph Theory*. American Mathematical Society.
3. Grady, L., & Schwartz, E. L. (2006), Isoperimetric Graph Partitioning for Image Segmentation, *IEEE Trans. on Pattern Analysis and Machine Intelligence*, 28(3), 469-475.
4. Ji, X., & Xu, W. (2006), Document clustering with prior knowledge, *Proceedings of ACM SIGIR Conference*, 405–412.
5. Chen, Y., Rege, M., Dong, M., & Hua, J.(2007), Incorporating user provided constraints into document clustering, *Proceeding of IEEE ICDM Conference*, 103 –112.

## **GAZE-CON: A GAZE-CONTROLLED APPLICATION FRAMEWORK**

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### **ABSTRACT**

The goal of this project was to create a generic application framework for eye tracker-based interaction between the user and the computer. There are existing systems designed for keyboard, mouse, and touch-screen-driven menu systems, but none are truly optimal for use with eye trackers. Unlike many other eye tracking applications, we are not seeking to improve or replace the mouse-based input system such as cursor control and selection, but rather integrate eye tracking as another mode of input alongside the existing input devices. Compared to the mouse and touch-screen methods, eye-tracking requires much more leniency in terms of accuracy and overall reliability. One reason for this is that eye tracker-driven systems require calibration to obtain precise and accurate values, and these values tend to drift over time, making it difficult to have consistently precise interactions between the user and the computer. Another important factor is that users have little to no practice using eye tracking thus completely replacing existing input methods or making eye tracking the primary method of input is a difficult step to take. Realizing this, our framework uses eye tracking to augment existing input methods rather than replacing them.

### **GAZE-CON FRAMEWORK**

Previous research has suggested that gaze and dwell time works best as focus and activation actions [1]. However, the use of fixation can be ambiguous in practice, as it can be hard to differentiate the users intent between simply reading and attempting to activate a UI element. In addition, the use of an extended dwell time for activation leads to delayed interactions that result in the program feeling sluggish and less responsive. A solution that worked well was using gaze to focus on a UI element and an extended blink to activate a UI control (closing the eyes for 0.35 to 0.75 seconds before reopening them). This is a period long enough to filter out unwanted activation by natural blinking, while short enough that closing the eyes to rest them does not trigger anything either. These are of course simply default values and can be user-defined. When using gaze, it is the general location of the users gaze that determines the users selection intent. Therefore, high frequency movements such as eye jitter is filtered out by our system.

With traditional eye-tracking systems, unless the user keeps their head perfectly still, the application slowly loses accuracy over time and must be recalibrated somewhat frequently to maintain accurate readings. To account for this, an auto-calibration feature is added that uses user-intent to offset minor inaccuracies in the devices readings and reduce the need for recalibration. When the user has focused on a UI element by gazing at it, it is generally safe to assume that they are looking at the center of the control, even if the device detects their gaze as being off-center due to imperfect calibration. The vector between the position interpreted by the device and the actual position of the UI control can then be used as a correction vector, to compensate for and correct this offset with future inputs. When the device loses track of the users gaze altogether, the framework waits for a period of time before marking the eye data as invalid (during this delay period the framework remembers the last valid input position). This helps filter out cases where the users head is moving and the eye tracker rapidly flips back and forth between valid and invalid states, to ensure the users gaze has been fully lost before the application needs to handle it. After the users gaze has been regained, there is a shorter delay before the application marks the data as valid again this ensures gaze data is regained as quickly as possible while still performing the aforementioned filtering of data.

### **RESULTS**

A gaze-controlled radial menu system was implemented as an example application built on top of the framework to demonstrate its capabilities. It runs in the background, and when a menu opening action is performed, it displays a radial menu that allows the user to run macros or launch applications. Radial menus support any number of menu options at each level of the menu hierarchy, allowing the system to work well with any menu tree. Focused items are

highlighted to let the user know where the system has detected their gaze. An extended blink would then activate that choice, running the action associated with that menu option or possibly opening a submenu. A dead zone in the center of the radial menu allows returning to a higher level of the menu tree or closing the menu. Entries in the radial menu consist of user-defined menu items, such as application launching macros and user-defined scripts.

### **CONCLUSIONS**

The Gaze-Con gaze-controlled application framework attempts to augment existing keyboard/mouse systems instead of replacing them outright. By maintaining a distinction between focus and activation events, the framework allows for more flexibility in UI and application design. Our framework can be used to improve the efficiency and intuitiveness of controlling existing applications by binding features such as play and pause of media players or games to gaze-loss and gaze reacquisition events. Hotkey-driven applications can be enhanced by binding hotkeys to our application framework giving the user another level of concurrency in terms of input. Context based actions such as underlining, bolding, changing font-color, etc. in a text editor, for example, can be bound to our application framework thus relieving the user from doing both selection and modification of text by the use of the mouse.

### **REFERENCES**

1. HUCKAUF, A., AND URBINA, M. H. 2011. Object selection in gaze controlled systems: What you don't look at is what you get. *ACM Trans. Appl. Percept.* 8 (February), 13:1–13:14.

**INFORMATION SYSTEMS ETHICS IN TURKEY AND THE UNITED STATES**

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**ABSTRACT**

Information systems (IS) are bringing organizations all over the world into ever closer contact with one another. Whether organizations are considered local, national, multinational, or global, economic and social developments fueled in large part by electronic communication technologies such as the Internet drive joint ventures or foreign direct investments that demand more knowledge-sharing than ever among workers from diverse cultures.

While much attention is often paid to the systems that enable this communication, the actual information itself is what motivates this tremendous and unprecedented coming together. Information is very sensitive stuff, and virtually everyone has opinions about its proper (and improper) uses. Thus, the ethics of information use play an important role in facilitating the transfer of business information. The fact that information ethics norms are not standard throughout all cultures—information uses regarded as ethical in one culture may not be so regarded in another—complicates this and can even halt it altogether in some cases.

In order to sustain the human progress in which transnational information systems (e.g., the Worldwide Web) play a crucial role, IS ethics from participating cultures must be reconciled to each other. Only as IS ethics are defined and followed in terms that foster the trust necessary for social exchanges and commercial transactions will necessary social and commercial information flow unimpeded among countries.

To gather data to accomplish this reconciliation, a questionnaire was developed and has been administered in a number of countries in which respondents rated the ethicality of IS usage scenarios in three spheres: use of employer IS resources for personal gain, use of employer IS resources for the gain of friends or family, and employer monitoring or regulation of employee use of employer IS resources. The same questionnaire, translated into the local language, was used in all countries.

The study proposed for presentation at IACIS 2012 will report results of the questionnaire administered in Turkey and compare them to results from the USA.

The authors note that a presentation of this data was proposed for IACIS 2011, but the data were still unavailable at conference time. Thus, preliminary data gathered from Chinese university students were presented instead. Since then the Turkish data have been gathered and are available for presentation.

**TECHNOLOGY TOOLS DEVELOP COMPUTING SKILLS THAT PROMOTE COLLEGE SUCCESS  
FOR STUDENTS WITH LEARNING**

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**ABSTRACT**

**Problem And Issues**

Alternative education has been stereotyped as the last resort for academically challenged students. It is a place where nontraditional students go when they are not successful in traditional settings. Many districts view alternative schools as necessary, but not a priority. Most alternative schools are the last ones in the district to receive extra funding for such things as technology. When considering the special needs of alternative education students, they should be top priority. Most alternative students are learning disabled, either diagnosed or undiagnosed, and the use of technology has potential advantages. The use of technology can reinvigorate educational practices, creating success for students with learning disabilities [1]. It can also engage and inspire students, increasing their learning potential [2]. For learning disabilities such as mild autism, technology can even improve computing skills. The development of these skills, including basic computer and problem solving skills, can greatly influence the student's success in college or the workplace [3]. There are various college programs, such as information systems, that require students to effectively use computing skills. Students going into these programs with the necessary skills have an advantage and therefore greater potential for success [4]. The purpose of this research is to present a critical discussion of the primary concepts that drive academic success in college for alternative students with learning disabilities. This research investigates the effective use of technology to build a solid school curriculum. From this, vital computing skills are learned or reinforced and taken to college, leading to success in various programs that benefit from these skills. This topic is important because it will explore technology in action, as it supports the special needs of students. By identifying the key success factors, this research will analyze the main steps in the students' educational foundation. It is with this strong groundwork that these students would then be able to achieve the necessary skills to be successful not only in college but also in a global society.

**Research And Analysis**

This research follows a contextualized approach to discussing the main issues involved with learning disabilities in alternative education, technology usage with effective teaching, and basic computing skills that are essential requirements for success in college. These three main points are considered in real-world context but draw on theoretical domains and published literature. This research brings value to this subject in that it makes an attempt to integrate several academic disciplines into one. This distinct perspective will be viewed in terms of a holistic view of an alternative education student successfully using technology to hone vital computing skills in order to be successful in college. This research makes an attempt at presenting a connection between multidisciplinary perspectives in alternative education. Also, it is expected that the data will show a strong relationship between technology usage to build computing skills and success, or preparedness for college, in alternative education students with disabilities.

**Implications And Conclusion**

Alternative students often lack basic skills, but in the right situation they could flourish. The use of technology and development of computing skills could be the catalyst for preparing students for college and potential careers, breaking the cycle of low self-esteem, motivation, and skills most often found in alternative schools. Overall, this would imply that promoting the use of technology in high school could help the students to become more acclimated and comfortable with it later in life. Also by using technology, it could spark enthusiasm and inspiration, leading to increased learning and development of vital computing skills. Most students will eagerly interact with their learning environment through the use of technology when it is seen as fun. This will help build confidence and assurance with using technology. This will also help students forge a connection with learning, applying computing skills to the real world. Some students, such as savants, already possess an innate ability for these skills and only need to sharpen them. Whether learning new skills or enhancing old ones, computing skills would then be used to excel in college programs that need strong computing skills. This would give students a strong foundation upon which to be successful in all facets of life.

In conclusion, academic success is driven by various components, including the students' learning abilities, knowledge base, school curriculum, and technology usage. Alternative education needs to emphasize the development of an individualized student curriculum for these components [5]. The use of technology and effective teaching will help perfect the skills that students need, especially in college programs requiring problem solving and basic computer skills [4]. This research is attempting to make a case for promoting the growth of students through the use of technology, instead of giving up on them prematurely. By thoroughly understanding students with learning disabilities, schools can help them be more successful. In the proper learning environment, these students can succeed and perfect valuable computing skills. Prensky [2] best summarized this by stating that technology had unlimited potential to prepared students for the 21<sup>st</sup> Century.

#### REFERENCES

1. Gulchak, D. J. (2008). Using a handheld computer to teach students with emotional and behavioral disorders. *Education and Treatment of Children*, 31(4), 567-581.
2. Prensky, M. (2008). The role of technology in teaching and the classroom. *British Journal of Educational Technology*, 39(6), 1004-1019.
3. National Center on Education and the Economy. (2007). *Tough choices or tough times: The report of the new commission on the skills of the American workforce*. San Francisco, CA: Jossey-Bass A Wiley Imprint.
4. Delta College (2012). *Achieving the dream summit*. Bay City, MI: Committee for Achieving College Success.
5. Kim, J., Taylor, K. (2008). Rethinking alternative education to break the cycle of educational inequality and inequity. *Journal of Educational Research*, 101(4), 207-219.

## **USING VIRTUALIZATION TO OBTAIN HANDS-ON SECURITY SKILLS**

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### **ABSTRACT**

IT Security programs must concentrate on preparing students to pass the industry-standard exams. Along with theoretical knowledge, the CompTIA Security+ exam requires students to have hands-on experience in designing and managing secure hosts and networks. Providing the students with the adequate physical network and computer hardware can be a financial burden and impossible for most programs. Information Security and IT Security are the areas that keep growing in popularity since 1990s, with the new emerging disciplines such as Cyber Security [1]. With the growing demand of certified specialists, a lot of college programs adjust their curriculum to prepare the students to taking the certification exams. COMP-TIA SECURITY+ exam is the top certification in IT security [2], assuming that a candidate did not have a substantial experience in the field (if yes, they might search for CISSP certification).

The purpose of the proposed study is to identify if the hands-on skills required to pass the exams could be obtained using a virtualized environment. Security+ includes tests in six domains: (1) network security, (2) compliance & operational security, (3) threats & vulnerabilities, (4) application, data & host security, (5) access control & identity management, and (6) cryptography [3]. First, the researchers identified all the hands-on skills required to pass each of the exam domain tests. For this, we broke each domain in a set of atomic skills. We then completed each skill using the traditional physical hardware and a virtualized environment. Sun VirtualBox and Microsoft Virtual PC were chosen as the sample virtualization software. The preliminary review has shown that with the proper configuration it is possible to obtain most of the hands-on skills required to pass the exam using virtualization. We will discuss the detailed breakdown of the skills and the possibilities/limitations of the virtualization software upon the completion of the study.

### **REFERENCES**

1. Denning, P.J. and Frailey, D.J. (June 2011). The profession of IT: Who are we – now? *Communications of the ACM*, 54(6), 25-27.
2. Eckel, E. (2008). The industry's 10 best IT certifications. Available: <http://www.techrepublic.com/blog/10things/the-industrys-10-best-it-certifications/464>.
3. "CompTIA Security+," accessed April 30, 2012, available: <http://certification.comptia.org/getcertified/certifications/security.aspx>.

## **ANALYSIS OF SMALL BUSINESS' INFORMATION NEEDS AND INFORMATION SEEKING BEHAVIOR**

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### **ABSTRACT**

#### **INTRODUCTION AND PROBLEM STATEMENT**

According to Sen and Taylor (2007) it is “essential for small businesses in today’s competitive environment to take a strategic approach to their information needs if they wish to develop and remain competitive.” Because small enterprises are not scaled-down versions of large businesses (Welsh and White, 1981) it is important to investigate their information needs and information seeking behavior to determine how best to meet these needs to ensure they develop and remain competitive. As central decision-maker the owner/managers’ “strategic position serves as ‘focal’ point, around which all business activities are centralized, including those of information search and assimilation” (Lybaert, 1998:188). It is important to understand the information needs and behavior of the owner/managers as this understanding can be used to help determine appropriate information systems to meet these needs and to develop programs to change information seeking behavior where necessary. So the question arises: what are small business owner/managers’ information needs? How do owner/managers seek information to meet their information needs? Although the definition of the concept ‘information needs’ is problematic there is consensus that information needs are “linked to specific situations and that needs arise when the present level of knowledge is limited to deal with a new situation” (Chiware, 2008:24). The purpose of this research project is to analyze the information needs and information seeking behavior of small business owner/managers using a qualitative interpretive study.

#### **RESEARCH METHODOLOGY**

Using Leckie *et al.*’s (2005) general model for information-seeking behavior of professionals as the analytical framework this paper outlines the information needs that arise out of situations pertaining to specific tasks that are associated with one or more of the work roles played by an owner/manager and the resulting information seeking behavior to satisfy these information needs (Du Preez and Fourie, 2010:69).

Data was gathered through face-to-face semi-structured interviews with the owner/managers of 6 knowledge-based small businesses selected through purposive sampling. Knowledge-based small businesses are defined as enterprises with fewer than 200 employees that have systemic, knowledge-based resources as its prime competitive tools (Duhan *et al.*, 2001). Such enterprises offer products and services based on the knowledge and experience held within individuals and systems with the competitive advantage arising from being able to leverage this knowledge and experience. Knowledge-based businesses continually gather information, develop skills and use experience to enhance their products and services (Levy and Powell, 2005:267-268). The transcriptions (where audio-recording was permitted) and interview notes were analyzed following the process outlined by Cope (2005) that was amended to also include the data collection process itself as part of the analysis because as soon as the researcher started conducting interviews the process of inductively analyzing data commenced. The second level comprised the transcription of audio-recordings and capturing of notes. Next the transcripts and notes were developed into coherent and manageable case narratives structured according to the Leckie *et al.*’s model in order to enable analysis across the six cases. The fourth level of analysis was concerned with cross-case comparisons to seek out what is common and what is particular in the cases by means of content analysis. Last, the findings were interpreted in the context of extant literature.

#### **CONCLUSION AND IMPLICATIONS**

The results confirm earlier research that found that owner/managers have expertise in their profession or industry but not necessarily in management or administration of a business and tend to focus on that which they are most familiar with from their profession (Blili and Raymond, 1993:447; Chesney, 2003:6). Furthermore, the results show that small businesses’ decision-makers, the owner/managers, have information needs similar to those reported by large organizations as it pertains to their work roles and tasks as owners and managers of their businesses. There is a marked difference, however, in the scope of the information needs and in the seeking behavior.

## REFERENCES

1. Blili, S., and Raymond, L. (1993). Information technology: threats and opportunities for small and medium-sized enterprises. *International Journal of Information Management*, 13(6), 439-448.
2. Chesney, T. (2003). *Competitive Information in Small Businesses*. Dordrecht, The Netherlands: Kluwer Academic Publishers.
3. Chiware, E.R.T. (2008). *Business information needs, seeking patterns and information services in the small medium and micro enterprises sector (SMME) in Namibia*, DPhil (Information Science) thesis, University of Pretoria, Pretoria, South Africa.
4. Cope, J. (2005). Researching Entrepreneurship through: Phenomenological Inquiry Philosophical and Methodological Issues. *International Small Business Journal*, 23(2), 163-189.
5. Du Preez, M. and Fourie, J.A. (2010). Development of a Conceptual Model for Studying Engineers' Information Behaviour, *Musaion*, 28, 1, 62-88.
6. Duhan, S, Levy, M. and Powell, P. (2001). Information systems strategies in knowledge-based SMEs: the role of core competencies. *European Journal of Information Systems*, 10(1), 25-40.
7. Levy, M. and Powell, P. (2005). *Strategies for Growth in SMEs: The Role of Information and Information Systems*. Elsevier Butterworth-Heinemann Information Systems Series. Oxford: Elsevier Butterworth-Heinemann.
8. Lybaert, N. (1998). The information use in a SME: its importance and some elements of influence. *Small Business Economics*, 10(2), 171-191.
9. Sen, B.A. and Taylor, R. (2007). Determining the information needs of small and medium-sized enterprises: a critical success factor analysis, *Information Research* [online], 12, 4, paper 329. Available: <http://informationr.net/ir/12-4/paper329.html>.
10. Welsh, John A. and White, Jerry F. (1981). A small business is not a little big business. *Harvard Business Review*, 59(4), 18-27.

## **SOCIO-TECHNICAL SYSTEM FOR COLLABORATIVE TEACHING ACROSS INSTITUTIONAL BOUNDARY**

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### **ABSTRACT**

#### **Background**

As technologies are becoming more vital for businesses, adoption of novel technologies, especially the Internet technologies, makes education more effective and approachable to a broader spectrum of learners. One of National Science Foundation's missions, as to propose cyberinfrastructures (CI) for next-generation education, is to develop a human-centered CI that is driven by science and engineering research and education [1]. This study is important to academia IT practitioners, instructors, and administrators in that it discusses the design and implementation of IT infrastructure that supports inter-institutional collaboration for teaching using cloud computing and web2.0 application tools.

#### **Literature Review**

A socio-technical system is commonly a coherent system that emphasizes the interdependencies of human factors and supporting technical infrastructure. In higher education, the technical aspects of socio-technical systems are IT and laboratory hardware and software [2]. The social aspects consist of people, policies and procedures, and teaching objects and outcomes [3]. The successful deployment of a socio-technical system is critical for business continuation and fulfillment of the requirements of 21<sup>st</sup> Century education. According to Horizon Report 2012, the official EDUCAUSE[4] study on technology trends in American education, the most eminent trend in education is everywhere anytime learning[5]. Students expect to learn without the limitation of space and time, regardless of various formats of learning media and where the resources are located. As institutions are moving their IT infrastructures into the cloud, the traditional roles of students and instructors are changing. Students are coping with a new distance or hybrid learning environment, facing overwhelmingly abundant information from the Internet, and collaborating with other fellow students and instructors in an unprecedented way. Without face-to-face interaction with students, instructors now shift their efforts toward maintaining web presences of teaching material and utilizing available web2.0 tools for remote communication.

#### **Conclusions**

The paper reviews the concepts of socio-technical system in modern society, focusing on education sector. The technological, social, and economical aspects of system design of a private institutional cloud that supports inter-institutional instructor communities for teaching are discussed. The paper discusses the implementation of a private cloud-based socio-technical system that acts as a repository for modular courses that institutions can use or build on, making it possible to reduce redundancies[6]. Outcomes from an ongoing project that utilizes cloud computing technologies to provide teaching in multiple institutions conclude that a well designed socio-technical system can greatly reduce the cost of IT and make distance education as effective as traditional face-to-face teaching.

### **REFERENCES**

1. NSF Cyberinfrastructure Council (2007). Cyberinfrastructure Vision for 21st Century Discovery. National Science Foundation, March, 2007
2. Baxter, G. & Sommerville, I. (2011). Socio-technical Systems: From Design Methods to Systems Engineering. *Interacting with Computers*, pp. 4-17, Vol. 23, Issue 1, Jan., 2011
3. Wang J., Solan, D., & Ghods, A. Distance Learning Success - a Perspective from Socio-technical Systems Theory. *Behaviour & Information Technology*. pp. 312-329, Vol 29, Issue 3, 2010
4. EDUCAUSE. [www.educause.edu](http://www.educause.edu)
5. Johnson, L., Smith, R., Willis, H., Levine, A., & Haywood, K., (2011). *The 2011 Horizon Report*.
6. Hignite, K., Katz, R., & Yanosky R. (2010). Shaping the Higher Education Cloud. *EDUCAUSE Publications*.

**INFORMATION TECHNOLOGY FOR GOOD (IT4G): MERGING INFORMATION TECHNOLOGY  
WITH SOCIAL RESPONSIBILITY**

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**ABSTRACT**

**The IT4G Initiative**

Today's economic reality has brought about a renewed focus on helping others, and the academic arena is following suit by linking individual student education with the ability to affect the greater good. In this spirit, information technology and social responsibility are merging together at Quinnipiac University's Department of Computer Information Systems (CIS) in an effort called *Information Technology for Good* (IT4G). Technology has been changing the world at a rapid pace for decades, and now a major promise of computer information systems is to improve the human condition and facilitate the progress of communities and the advancement of societies. IT4G centers on the concept of applying information technology to social causes and improving the quality of life. Indeed, one person or group of people can make a difference. IT4G draws on both the self-focused and the altruistic sides of students by presenting CIS as a cutting-edge discipline that empowers them to solve problems of personal interest as well as problems important to society at large.

**IT4G Exemplars**

In the field, computing has the ability to advance the human condition. In the classroom, IT4G has the ability to enhance the learning experiences and enrich the lives of tomorrow's technology leaders. IT4G goes well beyond a single classroom; rather, it is an emerging value system for the department around which both student projects and faculty research have coalesced. We would like all faculty and all students to consider the power they have as seasoned or emerging information systems professionals to really make changes in the lives of people who struggle to help themselves. The IT4G impact at Quinnipiac University has been immediate and real. Faculty and students throughout the department have/continue to work on class projects, extracurricular activities, and research/professional that have positively impacted the lives of others. For example:

- Professor Bruce White's *Systems Analysis and Design* class is project based, focusing on developing real solutions to problems faced by not-for-profit corporations, such as:
  - Updating a web site for a nonprofit that advocates for women and children issues;
  - Delivering technology classes and projects at a local senior center;
  - Analyzing and developing ways to use technology to increase the outreach of a local Thanksgiving food drive;
  - Assist in the analysis and design of a furniture exchange system for low income families; and
  - Develop a forum to assist students with questions they may have on alcohol and drug interactions.
- Professor Wendy Ceccucci traveled with a group of M.B.A. students to Nicaragua and Professor Richard McCarthy traveled with a group of M.B.A. students to China to provide business and technology consulting expertise to developing rural economies;
- The CIS Society (our student club) recently ran a *Facebook for Seniors* project in which society members traveled to the Hamden Senior Center to teach senior citizens how to better communicate with their families through Facebook and Skype;
- Professor Ramesh Subramanian serves as a visiting faculty fellow at the Yale Law School *Information Society Project*, an intellectual center addressing the implications of the Internet and new information technologies for law and society, guided by the values of democracy, human development, and social justice;
- Professor Bruce Saulnier, along with colleagues from Merrimack College, Penn State University, and Sam Houston State University, published a paper titled "The Greening of the Information Systems Curriculum" which addressed how the use of "green technology" might be implemented into the undergraduate information systems curriculum;
- Professor Guido Lang, who will be joining Quinnipiac University this fall, is the co-founder of MintRight, a global e-book distributor. MintRight provides publishers with comprehensive e-book conversion and distribution solutions. Its mission is to make all of the world's literature available to anyone, anywhere.

- The CIS faculty have adopted the use of iPads and have placed all course documents in the university's *Blackboard* course management system, in part to promote the decreased use of paper products consistent with Quinnipiac University's focus on sustainability;

### **Implications**

Computer Information Systems are becoming increasingly global, human-centered and focused on solving problems. IT4G combines all those elements and allows students to work for causes they really care about. The faculty and students of the department feel that IT4G has the potential to both reinvigorate the discipline as it emerges from a decade long enrollment slump and attract a new generation of students to the field.

### **Conclusions**

Many of today's incoming college students don't really know what computer professionals actually do, or how a degree in computer information systems will help them. IT4G paints a powerful picture for these students. They may arrive without a background in information systems, but when they see what an impact they can make by applying information systems to real social problems they are suddenly able to picture themselves majoring in computer information systems. Current CIS students also can benefit from approaching their work in the context of using information systems to promote social change. When students create practical solutions for socially relevant problems, they feel more enthusiastic about and committed to their work because they can actually see the impact of what they are doing. They become socially active citizens of the world through computer information systems.

## TEACHING XPATH AS A DATABASE SKILL

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### ABSTRACT

#### INTRODUCTION

The IS2010 model curriculum does not include any mention of XML, although IS2010 does include extensive coverage of database skills. Students graduating from IS programs typically have strong understanding of relational technologies and SQL, but often lack sufficient knowledge of XML structures or the use of XPath/XQuery for querying XML documents. In this presentation, I will describe the major features of XPath, discuss some pedagogical implications and methods for incorporating XPath into a database curriculum, and provide examples for possible exercises and lecture topics.

#### XML IN THE CIS CURRICULUM

XML's hierarchical data structure is more suitable than the tabular structure of relational databases for many data storage and representation purposes. Also, XML has become ubiquitous, especially as a means of exchanging information between applications over the internet. More and more database management systems incorporate XML data types and querying functionality into their engines. Therefore, it makes sense that XML coverage should get greater attention in an IS curriculum. Although there have been some reports of XML pedagogy in the IT education literature, this is a relatively new area of pedagogical discussion. A complete coverage of all aspects related to XML including style sheeting, metadata declarations, XML extension frameworks, and other advanced features could merit an entire course in itself. But, for the purposes of providing data query and analysis skills a much smaller subset of XML-related topics would suffice. A modern-day database course should be able to offer a practical understanding of the structure of XML documents along with experience with the associated query languages of XPath and XQuery. This presentation enumerates and describes a set of XML query topics, skills, and exercises for incorporating XML into a database course.

#### TEACHING XPATH FOR XML QUERIES

All markup languages (including HTML and XML) are derived from the Standard Generalized Markup Language (SGML) protocol. This standard defines the structural model and syntax for markup *documents*, which are comprised of a hierarchical arrangement of *elements*, implemented syntactically as *tags*. Elements may or may not contain *attributes*, which are name-value pairs. The hierarchical arrangement of elements in the SGML standard implies a *tree* structure in the underlying data model. In general, the tree data structure is composed of *nodes*, each of which can have a maximum of one parent node, and could contain any number of child nodes. Thus, elements in an SGML document are implemented as nodes in a tree data structure.

Because of XML's hierarchical nature, navigation through XML documents requires the use of tree-processing algorithms, and there are class libraries in Java, PHP, and .NET that could be used to facilitate teaching of XML navigation in programming classes. For a database class, however, what you want is a querying language that enables fast retrieval of relevant data. For querying XML documents, that language is *XPath*.

XPath is to XML documents as SQL is to relational databases. Whereas a SQL query produces a *result set* (i.e. a tabular structure of rows and columns), an XPath query produces a *node set* (i.e. a list of nodes, each of which could be the root of a tree). A SELECT statement in SQL is analogous to an XPath *path expression*. Students familiar with database terminology and practice will find this analogy to be a useful way of understanding how to work with XML data.

When teaching about SQL SELECT statements, it is typical to identify and describe the major clauses of the query, often expressed as SELECT...FROM...WHERE. The SELECT clause determines the order and content of the columns in the result set that returns from the query (this is sometimes called projection). The FROM clause specifies the tables and/or views that are used by the query. The WHERE clause specifies conditions under which rows from the tables in the FROM clause will be included in the final result, as well as join conditions if there are multiple tables. After students master these primary clauses, they go on to learn about GROUP BY and HAVING, both used in conjunction with aggregation, as well as ORDER BY.

Similarly, XPath path expressions provide the criteria for which to select sub-trees from the overall XML document. A path expression is composed of a series of *location steps*, each of which defines selection criteria for the corresponding level of the XML tree (the data source being queried). A location step consists of an *axis*, a *node-test*, and an optional set of *predicates* that refine the node test. The node test and predicates serve a similar function as the WHERE clause in a SELECT statement. The axis gives the option to reference a node-set *relative to* the current node (parent, sibling, child, etc.); in this way path expressions can specify criteria for node relations as well as specifying criteria for the nodes themselves.

#### **CONCLUSION**

Students who learn how to work with path expressions will gain a powerful skill for practical data retrieval. For more advanced database classes, in which SQL extensions such as PL-SQL or T-SQL are taught, XPath coverage can similarly be enhanced with XQuery. XQuery is to XPath as T-SQL is to SQL; in both cases procedural capabilities are added to the underlying nonprocedural language.

## **WHY NOT USE A WIKI? A TOOL TO PROMOTE COMMUNICATION AND COLLABORATION AMONG MBA STUDENTS**

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### **ABSTRACT**

#### **INTRODUCTION**

The role of technology and learning management systems within higher education continues to expand. The challenge for faculty and students is to appropriately utilize the technology tools at their disposal. This is especially true of MBA students that have less time on-campus and less interaction with classmates and instructors, which can lead to lower retention and graduation rates [3].

Wiki's have grown in popularity among industry and academia alike to promote collaboration and increased inter-departmental communication [5]. Wikis are collaborative websites that allow users to edit information on the page. Depending on the level of access (administrator, member, and guest) authorized users are able to manage, edit, delete, and create site content.

#### **STUDENTS IN WIKI ARE CLOSER THAN THEY APPEAR**

The wiki site can provide a virtual meeting place for students to interact and discuss topics related to course, assignments, and project deadlines. The group members are able to post attachments such as documents, spreadsheets, web links, images and videos. Wikis can also be accessed asynchronously, providing more flexibility for the MBA students' schedules. Because wikis are so simple and user-friendly, technology use and adoption is often not an issue [5]. Similar to other communication tools such as clickers, instant messaging and email, wikis may also alleviate stress and anxiety of those students that are not comfortable speaking in class, providing another avenue for the students to voice their opinions and express their concerns [4].

The primary issue with wikis is their credibility. With collaborative editing and the open nature of the wiki, how can one be assured that information on the site is correct? The stakeholders of the wiki must also be the custodians and guardians of the information on the site. In the context of a group project, the group members will be the ones to review the site for accuracy and relevance. As project stakeholders, the students will be motivated to successfully complete the project, while instructors will be motivated to ensure successful student learning outcomes [9].

#### **IMPLICATIONS**

A common benefit of most MBA programs is the diverse educational and professional backgrounds of the students [1]. The MBA students come from various fields of industry, and the success of the students' learning experience is inherently linked to the connection of the course material to their work environment [7]. The use of wikis at the graduate level may yield more positive results than the traditional undergraduate classroom. Knowles [7] explains the adult learning experience draws from the participants' experience and existing knowledge. The adult learner is active and self-motivated to pursue learning or education, while the child learner is passive and needs to be prodded to learn [6]. Wikis allow learners to be an active participant in their own construction of knowledge [2, 8].

#### **REFERENCES**

1. Bocchi, J., Eastman, J. K., and Swift, C. O. (2004). Retaining the online learner: Profile of students in an online MBA program and implications for teaching them. *Journal of Education for Business*, 79(4), 245-253.
2. Boulous, M., Maramba, I., & Wheeler, S. (2006). Wikis, blogs and podcasts: A new generation of Web-based tools for virtual collaborative clinical practice and education. *BMC Medical Education*, 6(41). Retrieved from <http://www.biomedcentral.com/content/pdf/1472-6920-6-41.pdf>.
3. Clayton, G. E. & Cate, T. (2004). Predicting MBA no-shows and graduation success with discriminate analysis. *International Advances in Economic Research* 10(3), 235-243.

4. Cowan, B., Vigentini, L., and Jack, M. A. (2008). Exploring the relationship between anxiety and usability evaluation- An online study of Internet and wiki anxiety. *Proceedings of IADIS International Conference; Interfaces and Human Computer Interaction 2008*, 69-76.
5. Ferris, S. & Wilder, H. (2006). Uses and potentials of wikis in the classroom. *Innovate* 2(5). Retrieved from <http://www.innovateonline.info/index.php?view=article&id=258>.
6. Knowles, M. S. (1970). *The modern practice of adult education: Andragogy versus pedagogy*. Englewood Cliffs, Cambridge: Prentice Hall.
7. Knowles, M. S. (1984). *Andragogy in action*. San Francisco, CA: Jossey-Bass.
8. Lamb, B. (2004). Wide open spaces: Wikis, ready or not. *Educause Review* 39 (5): 36-48.
9. Thomas, P. & Minocha, S. (2007). Using a wiki to facilitate learning on a requirements engineering course. *Proceedings of 8<sup>th</sup> Annual Conference of Higher Education Academy Subject Centre for Information and Computer Science*.

## **ARE INFORMATION SYSTEMS GRADUATES PREPARED FOR A COMPLEX SOCIETY?**

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### **ABSTRACT**

In this study we examine the extent to which U.S. programs of Information System (IS) are aligned with their university's liberal education learning goals. We suggest that learning outcomes at the course level be aligned with learning goals at the program level, which are aligned with the university liberal education learning goals. We propose a model defining how an IS curriculum could align with accepted learning outcomes developed by the Association of American Colleges and Universities (AAC&U).

### **BASIS OF STUDY**

AAC&U has been warning business colleges that a new type of graduate is needed—a graduate possessing a “wide-ranging and cross-disciplinary knowledge, higher-level skills, an active sense of personal and social responsibility, and a demonstrated ability to apply knowledge to complex problems” [7, p. 11]. Industry echoes this same warning [6]. The type of education business and society is demanding from a university graduate is commonly known as a liberal education. Although some smaller, private institutions, based on a strong liberal arts foundation, are designed to integrate such liberal education into their curriculum across all disciplines [5], most public education institutions still relegate liberal education to set of core courses that must be checked off in the freshman/sophomore years prior to engaging in the “real” discipline-based learning in the junior/senior years. A Carnegie Foundation study [4] found the result likened to the shape of a barbell, with liberal education on one side and business education on the other and slim connections between the two. A challenge facing Information Systems (IS) programs is the need to design a curriculum that meets program and college accreditation requirements while simultaneously meeting defined liberal education learning goals. IS programs generally align with either the joint Association for Computing Machinery (ACM)/Association for Computer Information Systems (AIS) curriculum guidelines [8] or the ABET accreditation requirements for Information Systems [1]. While the ACM/AIS curriculum guidelines recognize the liberal arts foundation typical of AACSB-accredited schools and colleges, the ABET program criteria for IS is focused specifically on IS.

### **METHODS**

The following procedures were used in this study:

1. Identify U.S. Information Systems programs accredited by the Association to Advance Collegiate Schools of Business [2]
2. Conduct repeated sampling with no replacement to obtain a representative sample of U.S. Information Systems programs from universities with published liberal education learning goals
3. Examine program learning goals/outcomes from IS programs identified in Step 2
4. Determine the extent to which the IS learning goals/outcomes are aligned with the liberal education learning goals/outcomes published at the program's institution
5. Define extent of alignment or gap between program learning goals/outcomes and liberal education learning goals/outcomes
6. Develop model illustrating how an IS curriculum could align with accepted AAC&U learning outcomes

### **IMPLICATIONS**

This study helps bridge the gap between discipline-specific and renaissance-type learning to provide a holistic approach to IS curriculum design. Society needs citizens prepared to address complex problems by examining situations from multiple perspectives. A discipline-specific silo approach to IS curriculum design falls short of preparing the type of graduate needed in today's industry and society. Faculty and practitioners can use the results of this study to ascertain the extent to which IS programs are moving towards preparing liberally educated IS graduates to address complex, global problems. IS faculty can use the results of this research to examine ways they can structure their curricula to meet specific learning outcomes aligned with liberal education learning goals (regardless of whether their university has formerly adopted such).

## **FINDINGS AND CONCLUSIONS**

IS programs vary considerably in their adherence to the IS 2010 curriculum guidelines [3] but generally follow a similar discipline-specific approach. Few IS programs included learning goals, and those that did utilized mostly discipline-specific goals such as modeled by the IS 2010 Curriculum Guidelines. We propose a curriculum model that integrates liberal education learning outcomes with discipline-specific learning outcomes.

## **REFERENCES**

1. ABET. (2012). Criteria for accrediting computing programs. ABET.
2. Association to Advance Collegiate Schools of Business. (2011a). *DataDirect*. Tampa, FL: Bell, C. C., Mills, R. J., & Fadel, K. J. (In Press). "An Analysis of Undergraduate Information Systems (IS) Curriculum: Adherence to IS 2010 Curriculum Guidelines". *Communications of the Association for Information Systems*.
3. Colby, A., Ehrlich, T., Sullivan, W. M., & Dolle, J. R. (2011). *Rethinking Undergraduate Business Education: Liberal Learning for the Profession*. Jossey Bass: San Francisco, CA.
4. Fleming, D. L. (2008). Building bridges to connect the disconnects: An analysis of business program design process. *American Journal of Business Education*, 1(2), 21-50.
5. Korn, M. (2012). Wealth or waste? Rethinking the value of a business major. *The Wall Street Journal*.
6. National Leadership Council for Liberal Education and America's Promise. (2007). College Learning for the New Global Century. Association of American Colleges and Universities, Washington, DC.
7. Topi, H., Valacich, J. S., Wright, R. T., Kaiser, K. M., Nunamaker, Jr., J. F., Sipior, J. C. and de Vreede, G. J. (2010). IS 2010 curriculum guidelines for undergraduate degree programs in Information Systems. Association for Computing Machinery; Association for Information Systems.

## **FOSTERING ACADEMIC INTEGRITY IN ONLINE LEARNING ENVIRONMENTS**

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### **ABSTRACT**

Maintaining academic integrity in online environments is of critical importance to educators. The two purposes of this presentation are: (1) to identify the status and some of the common methods of academic dishonesty in online learning environments and (2) to identify strategies for maintaining academic integrity in online learning environments.

### **INTRODUCTION**

“Academic dishonesty has long been a concern among educators” [3, p. 244]. Indeed, a simple search of the ERIC database delimited to the years 2000 through 2012 using the search term “academic dishonesty” returned nearly 900 citations. A more focused search of the ERIC database during this same timeframe combining the search terms “academic dishonesty” and “online” resulted in over 100 citations. As the number of online courses and programs grow, so too, will the interest in how to maintain academic integrity in online learning environments. Thus, the two purposes of this presentation are: (1) to review the status and the common methods of academic dishonesty in online learning environments and (2) to identify strategies for maintaining academic integrity in online learning environments. Let us begin with a review of the status and some of the common forms of academic dishonesty in online learning environments.

In a study involving students at a large state university, Lanier [3] reported that cheating was more widespread in online learning environments compare with traditional lecture learning environments. Specifically, Lanier [3] found that about 41% students in online learning environments admitted to cheating to some degree. By contrast, about 78% students in the study reported that they never cheated in traditional learning environments. In a related study, Watson and Sottile [5] reported that about 33% of online learning environment students admitted to cheating on an assignment, quiz, or test. The most prevalent form of cheating reported in the Watson and Sottile [5] study was receiving answers during a quiz or test with over 23% of students acknowledging this cheating behavior. Let us now identify some strategies for maintaining academic integrity in online learning environments.

As noted by Lanier [3], some have suggested using services that reference previously submitted papers against an established database a strategy to reduce academic dishonesty. These referencing services are available in some Learning Management Systems and through commercial vendors. Cluskey, Ehlen, and Raiborn [1] developed a series of eight online exam control procedures to help facilitate academic integrity in online learning environments. Their suggested online exam control procedures ranged from offering an online exam at only one set time to changing at least one-third of the objective questions each exam use cycle. Milliron and Sandoe [4] noted that remote proctoring via web cam and/or microphone has also been proposed as another solution for maintaining academic integrity in online learning environments. A number of commercially available remote proctoring options are available for use in online learning environments. Eplion and Keefe [2] offered the additional strategy of requiring multiple assignments in online learning environments. Eplion and Keefe [2] noted that online learning environment students might be able to get assistance on one or even a few activities but would likely find it difficult if not impossible on many activities assessed over an entire semester.

### **SUMMARY**

Maintaining academic integrity in online environments is of critical importance to educators. The two purposes of this presentation were (1) to identify the status and some of the common methods of academic dishonesty in online learning environments and (2) to identify strategies for maintaining academic integrity in online learning environment.

**REFERENCES**

1. Cluskey, G. R., Jr., Ehlen, C. R., & Raiborn, M. H. (n.d.). Thwarting online exam cheating without proctor supervision. *Journal of Academic and Business Ethics*. Retrieved April 10, 2012, from <http://www.aabri.com/manuscripts/11775.pdf>
2. Eplion, D. M., & Keefe, T. J. (n.d.). On-line exams: Strategies to detect cheating and minimize its impact. Retrieved April 10, 2012, from <http://frank.mtsu.edu/~itconf/proceed05/dEplion.pdf>
3. Lanier, M. M. (2006). Academic integrity and distance learning. *Journal of Criminal Justice Education*, 17(2). Retrieved April 10, 2012, from [http://www.uri.edu/online/integrity/academic\\_integrity\\_Lanier.pdf](http://www.uri.edu/online/integrity/academic_integrity_Lanier.pdf)
4. Milliron, V., & Sandoe, K. (n.d.) The net generation cheating challenge. Retrieved April 10, 2012, from [http://innovateonline.info/pdf/vol4\\_issue6/The\\_\\_Net\\_Generation\\_Cheating\\_Challenge.pdf](http://innovateonline.info/pdf/vol4_issue6/The__Net_Generation_Cheating_Challenge.pdf)
5. Watson, G., & Sottile, J. (2010). Cheating in the digital age: Do students cheat more in online courses? *Online Journal of Distance Learning Administration*, 13(1). Retrieved April 10, 2012, from <http://www.westga.edu/~distance/ojdla/spring131/watson131.html>

**INFORMATION SEEKING BEHAVIOR IN SOFTWARE DEVELOPMENT: TIME PRESSURE,  
PROBLEM COMPLEXITY, AND GENDER DIFFERENCE**

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**ABSTRACT**

**Introduction**

Most people in business are involved in continuous decision-making activities. Although it is commonly believed that useful and sufficient information is required to make a better decision, information-seeking as a pre-behavior of decision-making has received little research attention than decision-making itself in the IS field. Information seeking is important as much as decision-making because people will make a decision based on the information they can access. This study addresses how people seek the information they need under different constraints in the software development context. In short, it focuses on a software developer's information seeking strategy and behavior under different levels of time pressure and problem complexity. The moderating effect of gender difference on the information seeking behavior is also examined. We believe our topic is important and timely for this year's IACIS conference, because it aims to explore how IT supports a software developer's communication practices for problem solving.

**Methods**

A scenario experiment will be conducted to test the causal relationships between constructs in the research model. Because one main objective of this research is to evaluate a software developer's choice of channel and source across a wide range of software development situations in the real world, a scenario experiment will be a good methodological option [1]. The scenario experiment will allow quasi-experimental manipulation of the two independent variables through variation of the wording in the scenarios. It will involve a 2x2, four-cell design with two exogenous variables such as time pressure and problem complexity, thus leading to four hypothetical scenarios for the four combinations of high or low problem complexity and high or low time pressure. In addition, gender will be included as a moderator in the research model. We will empirically test if the effects of time pressure and problem complexity on the choice of channel and source will be moderated by gender. Partial Least Squares (PLS) analysis will be used as the primary analysis tool to test main causal effects in this research. PLS is an extension of the multiple linear regression model, which first estimates loadings of indicators on constructs, i.e., measurement model, and then iteratively estimates causal relationships among constructs, i.e., structural model [2]. The moderating effect of gender will be tested with the statistical procedure used by Keil et al. [3].

**Implications and Future Research**

This research would be significant to the body of knowledge in different ways. First, to my knowledge, the topic of information seeking behavior itself has not been discussed in the software development context while many studies have dealt with information seeking in terms of communication in general. Software development necessarily involves information seeking as part of problem solving. Second, this research approaches to information seeking behavior in terms of choice of two information carriers such as channel and source. Although media choice, which may be similar to channel choice in this study, has been studied in the information systems and organizational behavior literature, most studies have included only traditional channels such as phone, fax, and email. In this study, however, new Internet-based communication channels will be included and tested. Third, when compared with channel choice, source choice has little been researched. Prior research on channel choice has provided much understanding of a knowledge worker's media choice, enabled us to provide appropriate media for him or her, and finally contributed to increasing his or her performance. It is obvious that knowledge workers consider a source as well as a channel to solve problems they face. In this sense, understanding of a software developer's source choice is also expected to contribute to providing an appropriate source and finally increasing his or her performance in the software development project.

The results of this research are expected to contribute to practitioners. Information seeking has become a critical determinant of the success of organizational members and of the organization as a whole [4]. The results will explain what channels and sources are preferred by knowledge workers when they seek information for problem-solving under the different levels of time pressure and problem complexity. Based on the findings, companies may

be able to understand their knowledge workers' information seeking behaviors and provide appropriate channels and sources for them.

#### **REFERENCES**

1. Straub, D., & Karahanna, E. (1998). Knowledge worker communications and recipient availability: Toward a task closure explanation of media choice. *Organization Science*, 9(2), 160-175.
2. Fornell, C., & Bookstein, F.L. (1982). Two structural equation models: LISREL and PLS applied to consumer exit-voice theory. *Journal of Marketing Research*, 19(4), 440-452.
3. Keil M., Tan B.C.Y., Wei K.K., Saarinen T., Tuunainen V. & Wassenaar A. (2000). A crosscultural study on escalation of commitment behavior in software projects. *MIS Quarterly*, 24, 299-325.
4. Johnson, J.D. (1996). *Information Seeking: An Organizational Dilemma*, Quorum Books, Westport, Connecticut.

## **DESIGNING LEARNING-CENTERED SPACES: LESSONS FROM THE LITERATURE**

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### **ABSTRACT**

#### **Purpose of the Study**

The reality of how much the teaching world has changed in the last 20 years hit home for the author as she packed up her office in Spring 2012 for relocation and renovation. Artifacts such as transparencies, diskettes, chalk, and erasers all went in the trash. The new office space will emphasize increased opportunities for student engagement. The current move has initiated a broader departmental discussion of future directions in designing learning-centered environments. As an initial step in the process, the author began a review of literature on space planning and innovation. The purpose of this paper and presentation is to summarize the results of the investigation.

#### **Rationale for the Study**

Today's college students prefer learning experiences that are digital, connected, experiential, immediate, and social. (Lomas and Oblinger, 2009). The traditional classroom environment that faculty experienced in their youth is not sufficiently engaging for the students they now teach. Educational environments must be able to support multiple learning styles (Dugdale, 2009): *collaborative* involving active learning and group work; *blended* with support for mobile technology and anytime/anywhere interactions; *integrated* for multidisciplinary opportunities; *immersive* by connecting to real-world experiences; and, *hybrid* through the combination of online, face-to-face, and augmented-reality experiences.

The recent move by the author's department generated both a discussion of its immediate space needs as well as a longer-term vision of its space evolution. A key element in guiding the space vision was a review of literature to understand best practices and future directions in designing learning-centered environments.

The current study investigates what can be learned from the literature on best practices in innovative learning environments by answering the following questions:

- How will the teaching-learning landscape change over the next 10 years?
- How will these changes impact the types of infrastructures needed to support our educational goals and objectives?
- Who are the innovators in creating learning-centered spaces, both internally (at our own institution) and externally?
- What can we learn from the innovators that will enhance the design of our own environment?

The results of the research will be helpful to others in thinking about the future of space for their own programs and institutions.

#### **Implications and Conclusions**

The results of the investigation are one component of the space plan and vision being developed by the author. The author will describe the structure of the plan and how the "lessons learned" have been incorporated into design requirements.

### **REFERENCES**

1. Dugdale, S. (2009). "Space Strategies for the New Learning Landscape," *EDUCAUSE Review*, vol. 44, no. 2 (March/April 2009).
2. Lomos, C. and Oblinger, D. (2006). "Student Practices and Their Impact on Learning Spaces," Chapter 5 of the EDUCAUSE E-book entitled, *Learning Spaces*, retrieved from <http://net.educause.edu/ir/library/pdf/PUB7102e.pdf>.

## **A SURVEY OF THE INTENTION TO PURSUE GRADUATE STUDIES IN INFORMATION TECHNOLOGY**

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### **ABSTRACT**

#### **Proposed/completed study**

The mission of the School of Information Technology at Macon State College is to educate students in information technology in ways that lead to fulfilling managerial careers and enhance the economic vitality of Central Georgia. To accomplish the mission, the School of Information Technology is preparing a Master's degree program that can be offered within the next few years. To use limited resources efficiently, the school needs to focus on a few concentrations that are in demand by students and meet the workforce needs of the local area (Calhoun et al. 2008). Therefore, two IT concentrations were chosen (IT Security and Health IT) considering various resources. A survey was conducted to determine students' intent to pursue the proposed program. This study can provide meaningful implications to the educators in IS and IT areas, especially those who plan to prepare IT advanced degree programs. Therefore, it could be beneficial to IACIS conference participants.

#### **The basis of the study**

A set of survey questions was sent to approximately 5,600 Macon State College students. This population included students from Macon State's five academic schools (Information Technology, Nursing and Health Sciences, Education, Arts and Sciences, and Business) and a sample of 415 usable responses was collected through SurveyMonkey.com. The collected data was coded using proper numbers for dependent and independent variables and analyzed using a simple descriptive statistical analysis and a logistic regression, which is good for predicting a dependent variable that has two values such as "yes" and "no" based on one or more predictor variables (Menard 2002).

The simple descriptive statistics are expected to show how many students want to pursue a Master's degree at Macon State College and how many among them are interested in the IT Master's degree and the two specified concentrations. The logistic regression analysis is expected to show the dominant factors of pursuing the IT Master's degree and each concentration.

#### **Implications/Conclusions**

The descriptive statistics show that 79% of responses want to pursue a Master's program at Macon State College and 42% of the respondents who want to pursue a Master's degree are interested in the IT Master's degree. 88% of the respondents who want to pursue the IT Master's degree want to major in the IT Security concentration. The logistic regression analysis shows that the affiliation with the School of IT is the dominant factor that drives students toward the IT Master's program. In particular, the Master's degree in IT Security concentration is the preferred choice of the undergraduate students majoring in Information Assurance and Security and Network Technologies and Administration (undergraduate concentrations currently being offered by the School of IT). The Health IT concentration is selected by IT Management students as well as by students from the School of Nursing and Health Sciences. The students from the School of Education are not interested in any of the concentrations in the IT Master's program. Additionally, gender was found to have a significant effect on the selection of a concentration in an IT Master's program. Female students chose predominantly Health IT and male students prefer IT Security.

### **REFERENCES**

1. Menard, S. (2002). *Applied logistic regression analysis*. (2 ed). Thousand Oaks, CA: Sage Publication.
2. Calhoun, J. G., Kalpana, R., Weist, E. M., & Shortell, S.M. (2008). Development of a core competency model for the master of public health degree. *American Journal of Public Health*, 98(8), 1598-1607.

## **HOW CAN FACULTY AND UNIVERSITIES EFFECTIVELY ADDRESS ISSUES OF CHEATING AND PLAGERISM WITH CULTURALLY DIVERSE IT STUDENTS?**

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### **ABSTRACT**

#### **Problem and Issues**

Recruiting foreign students to campus has become one of the top priorities for many U.S. campuses. Many reasons exist for this strategic goal—internationalizing the campus concerned as well as an attempt to increase enrollments to counteract the decline in freshmen enrollments. However, success in international recruiting comes with its challenges. International students bring different values to campuses in the U.S. The cultural differences in values among the student community have heightened the problem of cheating and plagiarism.

Jurdi, Hage and Chow (4) found that more than 50% of their sampled students (321 participants) committed one of the following dishonest behaviors, “plagiarism on written assignments,” “cheating during examinations,” and “falsification.” They also found that students cheated more often on written assignments than tests. Their results were consistent with those of earlier researchers on this topic. Şendağ et al (5) found that more freshmen than graduate students were inclined to be involved with e-dishonesty practices. These authors also found that students in education and the social sciences were less inclined to be involved in e-dishonesty. On the other hand, students in engineering and physical sciences were more inclined to be involved in e-dishonesty. The results of this study (5) also imply that students in online courses were more likely to be influenced by peer pressure. The authors suggested that perhaps the use of peer pressure could be used to deter dishonesty among students. The trend to cheat or plagiarize in the sciences is also echoed in the study of nurses by DiBartolo and Walsh (1). Thus the literature does illustrate a challenge that must be addressed by universities.

Jenkins and Calegari(4) suggest that cultural values can prompt individuals from diverse backgrounds to behave in ways that are contrary to the values of the North American participants. Emma Gross of the University of Utah (1) argues that there is a shift in the value orientations of college students, thus causing cheating and plagiarism to dominate our classrooms. This problem also permeates the online classrooms (5). One critical challenge is to help the faculty and universities address the issue of cheating and plagiarism with culturally diverse IT students.

#### **Research and Analysis**

In one Midwestern regional university, a masters in information systems program comprises of almost 95% culturally diverse students. The author has observed both cheating and plagiarism in spite of regularly providing tutorials on these topics to her students. Her recent experiences in China and India has led her to believe that both the studies conducted by Jenkins and Calegari (3) and Gross (1) will provide preliminary insights into the challenge. The questions that must be asked include:

1. How do faculty in the U.S. apply standards that clash with the students’ values?
2. How do U.S. universities communicate required standards and policies to incoming foreign students?
3. How do U.S. universities maintain and enforce their policies regarding cheating and plagiarism?
4. What should a faculty member or university do when a foreign student is detected cheating or plagiarising?

#### **Implications and Conclusion**

The consequences of such IT students entering the workplace in the U.S. without fully understanding that cheating and plagiarism are unacceptable are huge. These potential IT professionals would be working with integrated enterprise systems, such as SAP, that cross national borders. Industrial and national espionage could be undertaken more easily, especially with the onslaught of smart phones and social media. Therefore, intervention to minimize the negative impacts of cultural values is necessary if these foreign students are to do well. Universities in the U.S. have to offer support that spans from the personal to academic areas. Faculty would have to be open to better understanding these students from different cultures. Students in IT programs would have to learn that in the U.S., applying the same collaborative values from their home countries would not be appropriate.

**REFERENCES**

1. DiBartolo, M. C. and Walsh, C. M. (2010). Desperate times call for desperate measures: where are we in addressing academic dishonesty? *Journal of Nursing Education*, 49(10), pp. 543-544.
2. Gross, E. (2011). Clashing values: contemporary views about cheating and plagiarism compared to traditional beliefs and practices. *Education*, 132(2), pp. 435-440.
3. Jenkins, E. and Calegari, M. F. (2010). Moving towards a culturally diverse accounting profession. *Academy of Educational Leadership Journal*, 14(3), pp. 121-131.
4. Jurdi, R., Hage, H.S. & Chow, H.P.H. (2011). Academic dishonesty in the Canadian classroom: behaviors of a sample of university students. *Canadian Journal of Higher Education*, 41(3), pp. 1-35.
5. Sendag, S., Duran M. and Fraser, M.R. (2012). Surveying the extent of involvement in online academic dishonesty (e-dishonesty) related practices among university students and the rationale students provide: One university's experience. *Computers in Human Behavior*, 28, pp. 849-860.

## **FACTORS INFLUENCING STUDENTS' DECISIONS TO ADOPT E-TEXTBOOKS AND READERS**

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### **INTRODUCTION**

Textbooks have evolved very little over the last 20 years despite great advancement in technology used in classrooms and other areas of student life. Most textbooks remain paper based, and could be a significant burden to students literally and financially. The proliferation of tablet PCs and other mobile computing devices creates new opportunities for e-textbooks, i.e. textbooks in digital format, to potentially take center stage in a student's classroom experience. Recent developments such as the introduction of iBook by Apple add momentum to the adoption of e-textbooks and mobile devices in classrooms. As students embrace for this new wave of technology impact, it is very important to examine their perceptions, habits and behaviors on this issue. This study is important topic to IACIS conference participants since this study is not only timely (more and more people use different technology platforms to access e-textbooks) but also closely related to discussion topics of the IACIS international conference such as assessment of learning in IS and MIS instructional issues.

### **THE STUDY**

Theory of planned behavior proposes that an individual's adoption behavior would be determined by the individual's intentions and perceived behavioral control (whether the person has any perceived control over his/her own behavior). These two factors would also be influenced by the person's attitude toward the behavior and subjective norm (i.e. peer pressure). The technology acceptance model proposes that there are two main deciding factors in a person's decision process regarding whether to use a certain technology or not, perceived usefulness and perceived ease of use. Perceived ease of use would have more influence early on, and perceived usefulness may be the deciding factor after an adopter become used to the technology. Both theories can be utilized to study a student's psychological process and attitude toward e-textbooks and mobile devices. The results would shed insights about how students view the new technology evolution in classrooms, and could be useful to administrators in higher education institutions.

Data would be collected from both experienced users and potential users through questionnaires and interviews. Quantitative data will be summarized and analyzed through structural equation modeling techniques. The instruments for designated constructs will be validated through a nomological network approach. Additional analysis can be performed on questions such as whether there is a gap between perceived savings and actual savings, or whether gender plays a role, etc. Interview data can reveal additional insights and would provide a context for the study. Contributions and limitations of the research will also be presented.

### **IMPLICATIONS**

This study expands the research of theory of planned behavior and technology acceptance model into the e-textbook adoption context, and particularly examines the roles of perceived behavioral control and subjective norm on intentions on e-textbook and various mobile platform adoptions. This study is important to service providers and higher education administrators since the results of this study could help them understand student concerns and in turn improve their service and business strategy.

### **REFERENCES**

1. Foasberg, Nancy M (2011). Adoption of E-Book readers among college students: a survey. *Information Technology and Libraries*, 30(3), 108-128.
2. Lai, Jung-Yu., & Chang, Chih-Yen (2011). User attitudes toward dedicated e-book readers for reading. *Online Information Review*, 35(4), 558-580.

## **MOBILE APPS: WHAT'S IN IT FOR THE STUDENT AND CAMPUS?**

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### **ABSTRACT**

The University Campus has three alternatives to choose from when creating a mobile app ranging from purchasing an application, finding an open-source software platform, or building it themselves. The mobile Web in higher education has been compared to the Internet of the late 1990's in that it is not yet clear which approach will be most effective [2]. As more colleges adapt to the advantages of Internet-enabled phones, the ability of transferring information to a campus full of students becomes a reality. In 2011, a survey indicated an increase in campuses deploying mobile apps [3]. These gains appear across all types of institutions. More than half of public universities have activated mobile apps or plan to do so in the near future. While the numbers are less, community colleges are not far behind. The cause of such gains is relative to student expectations in this mobile computing era.

Universities in North Dakota are on the mobile app bandwagon. The University of North Dakota (UND) offers a mobile app available on the iPhone and Android for students to access email and online classes, course schedules, campus maps, athletic schedules, UND YouTube videos, news, and community events. A unique feature of this app is the cab crawler, which provides students with discounted taxi rides to provide safe and affordable transportation or UND students. This service is provided via a partnership with a local taxi business and UND Student Government. The North Dakota State University (NDSU) iPhone and Android app was created on campus by the distance and continuing education department along with student input. This award winning app is designed for students taking distance and continuing education classes and includes interactive campus maps. The campus also has Bison mobile, an app tailored around NDSU athletics. The North Dakota State College of Science (NDSCS) has an app for iPhone, Android, and Blackberry. This app is targeted to students, visitors, and alumni and features news, events, maps, and videos.

Minot State University (MSU) is new to the mobile app scene. The dynamic environment, cost of development, and limited campus resources contribute to the slow deployment of a mobile app on the MSU campus. However, such obstacles are no match ambitious university students. Management Information System (MIS) majors recently took on the challenge to create a mobile app catering to student needs. The MIS students conducted a survey of MSU students to gauge interest and purpose. The results of the survey indicated an overwhelming desire for a mobile app and students cited usefulness in terms of degree requirements, course syllabus, emergency, RSS feed, weather, maps, social media, campus news, faculty information, and links to their student accounts including campus connection, blackboard, and online [1]. The MSU app is designed on the Android platform because of the open source nature and student device preference. While still in its infancy, this free app promises features for both the student and campus. From the campus perspective this app could be used for recruitment, retention, and marketing. For students this app would enable instant access to information ranging from financial aid to class schedules to campus news along with access to vital campus resources. So, what's in it for the student and the campus? The research, development, and implementation of a mobile app can lead to a successful learning opportunity for students and recruitment, retention, and marketing opportunities for the campus.

### **REFERENCES**

1. Elm, J., Gilbert, S., Hammond, C., Nelson, J., and Patel, N. (2012, May). *Developing an MSU mobile application*. Paper presented at the meeting of the MSU College of Business, Minot, ND.
2. Keller, J. (n.d.). *Colleges search for their place in the booming mobile web*. *The Chronicle of Higher Education*. Retrieved April 7, 2012 from <http://chronicle.com/article/Colleges-Search-for-Their/126016>
3. The Campus Computing Project. (1990-2011). *The 2011 Campus Computing Survey*. Retrieved July 28, 2012 from <http://www.campuscomputing.net/sites/www.campuscomputing.net/files/Green-CampusComputing2011.pdf>

## COMPARISON STUDY OF THE PERFORMANCE BETWEEN HYBRID AND REGULAR CLASSES

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### ABSTRACT

#### Introduction

E-Learning refers to learning through the use of telecommunication technology, such as Internet [1]. One great advantage e-learning compared to in-class learning is liberation from limitations of time and space through asynchronous and synchronous learning programs [2]. Such an advantage helps online and hybrid classes gain popularity nowadays in higher education. In online classes, students and an instructor meet only a few times in a semester or quarter while in hybrid classes, students and an instructor meet typically every week but fewer than pure campus-based classes. Despite the perceived advantages of e-learning, research indicates that a high rate of failure among students who take e-learning courses [3], which coincides the authors' experiences. In this paper, we study the students in a hybrid class, in which they meet with an instructor in a regular classroom once a week. Their counterparts in a regular class meet with an instructor twice a week. We explore the characteristics of students who do well in hybrid classes by comparing students in regular classes with those in hybrid classes.

#### Method

Students who major in business at Dalton State College (DSC) must take BUSA 3050 Business Statistics, which requires MATH 2181 Calculus as a prerequisite. The data for the study will be collected from 99 DSC students who took BUSA 3050 in either spring or fall 2011. In each semester, there were one regular section and one hybrid section. Letter grades for BUSA 3050 (STAT) is the dependent variable of this study. As performance measures of students prior to taking BUSA 3050, letter grade for MATH 2181 (CAL), lower division GPA (LGPA), and institutional GPA before taking BUSA 3050 (IGPA) are collected from the students. Two demographic variables are also included: gender (GEN), age (AGE). To compare the performances of students in two different types of classes (i.e., regular vs. hybrid), a dummy variable TYPE is included and its interactions with other variables. The model for the study is shown below, and a general linear model (GLM) will be run to test the model.

$$\text{STAT} = \beta_0 + \beta_1\text{GEN} + \beta_2\text{AGE} + \beta_3\text{CAL} + \beta_4\text{LGPA} + \beta_5\text{IGPA} + \beta_6\text{TYPE} + \beta_7\text{TYPE*GEN} + \beta_8\text{TYPE*AGE} + \beta_9\text{TYPE*CAL} + \beta_{10}\text{TYPE*LGPA} + \beta_{11}\text{TYPE*IGPA} + \varepsilon.$$

#### Implications and Future Research

This paper aims to find the contributing or distinguishing factors of higher performance in hybrid classes. Such findings can have many implications in the body of e-learning research and in policy making in colleges and university. For example, if the effects of the lower division GPA on the performance is stronger in a positive direction in hybrid classes than in regular classes, colleges may discourage students whose GPA is low or below a certain threshold from taking hybrid classes. Additionally, instructors may be able to find students who may struggle in hybrid classes early and by paying more attention, for example, can help such students do better in a business school. The hybrid class that is studied in this paper used the video to deliver instructions. As one possible future research, one may study whether the findings of this paper hold for hybrid classes utilizing different instruction media. Further, studying whether or not the findings of this paper holds for different courses may be of interest.

### REFERENCES

1. Sun, Pei-Chen, Ray J. Tsai, Glenn Finger, Yueh-Yang Chen, and Downing Yeh. "What Drives a Successful e-Learning? An Empirical Investigation of the Critical Factors Influencing Learner Satisfaction." *Computers & Education* 50, no. 4 (May 2008): 1183–1202.
2. Katz, Y. J. "Attitudes Affecting College Students' Preferences for Distance Learning." *Journal of Computer Assisted Learning* 18 (2002): 2–9.
3. Dutton, J, and J Perry. "How Do Online Students Differ from Lecture Students?" *Journal of Management Information Systems* 18, no. 4 (2002): 169–190.

**DATA LOSS PREVENTION: A GUIDE TO SIMULATED LAB SCENARIOS USING VIRTUAL MACHINES**

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**ABSTRACT**

**Project Description**

Several recent and very high profile incidents of corporate network intrusions have resulted in the theft of sensitive information including source code, user account information, and other proprietary data. The use of software and hardware products to perform data loss prevention, or DLP, can be an effective means of preventing data leaks and in identifying when sensitive data is being ex-filtrated from a network. Currently, a discussion of DLP products and hands-on activities using them is absent in information systems education literature. The author is not aware of many instructors presenting the topic in information assurance or security courses either. The author will present a guide to implementing an inexpensive DLP solution using realistic business scenarios in order to assist other educators with integrating DLP into existing or new information assurance courses.

**Review of Literature**

A review of literature regarding data loss prevention applications, software, or other associated products yields few useful resources. The topic of DLP is in desperate need of research and students interested in information assurance should be familiarized with the concepts surrounding DLP as well as business cases where DLP may be useful. In general, a very broad discussion of DLP is available in academic literature. Industry and trade publications tend to cover specific DLP products, but no comprehensive examination exists for instructional use.

**Implications of Project**

The author will present a framework and guide for implementing a DLP solution using inexpensive hardware, software, and virtualization technologies. The goal is to encourage information systems instructors to include the topic of DLP in applicable courses and to provide a tested and easily implemented set of lab exercises for hands-on activities involving DLP. The author will share course materials and business scenarios used in advanced undergraduate networking and security courses to teach DLP as a tool useful in corporate information technology departments.

**GUIDE TO THE EVOLVING ENTERPRISE ARCHITECTURE BODY OF KNOWLEDGE (EABOK)**

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**PANEL**

MITRE developed and copyrighted the Draft Guide to the (Evolving) Enterprise Architecture Body of Knowledge (EABOK) in 2004. The EABOK™ is consistently on lists of the most referenced and widely read Enterprise Architecture documents. In the 8 years since its initial publication, there have been continual requests for updates from the EA community.

The panel will provide an overview of MITRE's plans and progress in updating the EABOK, which is now envisioned as an international collaboration between MITRE, academia, government, and industry, hosted by MITRE on our public website. Working in the public interest, MITRE is uniquely positioned to host this collaboration.

The overall goals of the EABOK update are to provide a sustainable process and vehicle to update and continually refresh the EABOK; and to increase the availability of assessed, digested EA information.

A successful EABOK will have a full body of relevant content, populated by the professional community with expertise in Enterprise Architecture (EA), where the results are available and accessible to all. MITRE is working on a community-based governance structure to this end.