Proceedings of the International Association for Computer Information Systems,
55th Annual Conference, Clearwater Beach, Florida, October 2015

TEACHING MBA BUSINESS ANALYTICS COURSES USING MICROSOFT POWER BI TOOLS

Stevan Mrdalj, Eastern Michigan University, smrdalj@emich.edu

Keywords: Business analytics, teaching, MBA, tools, Power BI, Microsoft

Rapid proliferation of commercial tools in the area of Business Analytics poses the question of which tools are appropriate for teaching MBA level Business Analytics courses. Some of the suggestions are previously discussed by Mrdalj [1, 2], and Yang and Liu [3]. Although there is no simple and definitive answer to this question, this paper presents a scenario of using a self-serving Microsoft Excel with Power BI tools for such a task. We'll start by presenting a typical goals and learning objectives for the MBA Business Analytics (BA) courses.

A typical MBA Business Analytics course is designed to equip students with the knowledge and skills to help organizations (large and small, for profit and non-profit) determine the best course of action to achieve their financial, operational and strategic goals and remain competitive. The goal of such courses is to introduce the student with a practical use of BA tools and techniques, and to provide some insight into how these tools may be used to analyze complex business problems and arrive at a rational solution. The following are a subset of typical objectives that are relevant to this paper:

- Access and store data from a variety of sources including traditional relational databases, NOSQL data stores, and other web-based sources.
- Apply quantitative modeling and data analysis techniques to the solution of real world business problems.
- Use data mining algorithms to solve real-world problems.
- Communicate findings, and effectively present results using data visualization techniques.
- Demonstrate use of team work, leadership skills, decision making theory.

Given that Excel is a common tool used in many MBA courses, we recommend to use Excel as a main platform for BA courses. Excel provides rich data connections, transformations and visual analytics in a unified, seamless experience while enjoying the familiarity of Excel and features that MBA students already love such as pivot tables, slicers, charts and formulas. The Microsoft Power BI tools are: Power Query, Power Pivot, Power View, Data Mining Client, Power Map, and Power BI Sites. Some of these BI features in Excel have been available before, some are new, but all are now integrated into Excel. Next we'll explain and demonstrate how each of the above listed goals and objectives can be achieved using Power BI tools.

Access Data - Data gathering is an often tedious and laborious job that is almost always overlooked in many courses. Power Query brings all existing corporate data sources like Excel spreadsheets, on-premises data sources, Hadoop datasets, streaming data, and cloud services together so students can start analyzing them in seconds.

Discover and Combine Data – Students can easily discover and connect to data from public sources with Power Query using the new data search capabilities. Power Query also provides the ability to easily transform and merge data from multiple data sources so that you can analyze it in Excel.

Transform and Clean Data - Once gathered, data typically includes mistakes, omissions, and inconsistencies that need to be dealt with before it can be used. There are significant issues that arise when similar data are acquired from different sources. The Microsoft SQL Server Data Mining Add-Ins for Office package provides data preparation tools to cleanse the data, check for and remove outliers, impute missing values, re-label data, and analyzes patterns in a table of data and finds rows and values that don't fit the pattern. Students can also perform different kinds of sampling, profile the data, and create statistical summaries. These tools are the easiest way to prepare data for analysis without complex scripts or ETL processes.

Model - With Power Pivot students can continue to create sophisticated data models with previously acquired data by creating relationships, custom calculated fields, hierarchies, and KPIs. Such modeling is powered by the increased performance of in-memory technology.

Analyze - The Microsoft SQL Server Data Mining Add-ins for Office package includes the Table Analysis Tools and Data Mining Client. Students can use either easy-to-use tasks or the full development life cycle for the data mining models to derive patterns and trends that exist in complex data, visualize those patterns in charts and interactive viewers, and generate rich, colorful summaries for presentation and for business analytics.

Visualize – Data visualization capitalizes on human abilities for processing visual information and thereby improves comprehension, memory, inference, and decision making. Students can create reports and analytical views in Power View with interactive charts and graphs to explore and present their findings visually in Excel. They can also explore and navigate geospatial data on a 3D map experience with Power Map.

Share and Collaborate - Students can quickly create Power BI sites for their teams to upload their Excel reports and share them with anyone on their team. The report readers get the same dashboard interactivity in the browser, making it easier to consume data and unlock insights. Teams can customize their Power BI sites gallery to feature and highlight specific reports and visualizations created in Excel.

This presentation will conclude with some of our experiences and observations in implementing and teaching MBA level BA courses using Microsoft Power BI tools.

References

1. Mrdalj, S. (2007). Teaching an applied business intelligence course. *Issues in Information Systems*, *8*(1), 134-138.
2. Mrdalj, S. (2011). Would cloud computing revolutionize teaching business intelligence courses? *Issues in Informing Science and Information Technology*, *8*, 209-217.
3. Yang, L., & Liu, X. (2013, October). Teaching business analytics. In *Frontiers in Education Conference, 2013 IEEE* (pp. 1516-1518). IEEE.

LEARNING ANALYTICS: FACULTY PERCEPTIONS AND USE IN INFORMATION SYSTEMS EDUCATION

Pamela A. Dupin-Bryant, Ph.D., Utah State University, pam.dupin-bryant@usu.edu

ABSTRACT

Learning Analytics (LA) is a growing field of study that aims to use analytic techniques, similar to those pervasive in business environments, to help educators interpret and utilize educational 'big data.' The widespread adoption of learning management systems (LMS) and networked learning has produced vast sets of student-related data that can potentially inform instructional practice and ultimately improve student learning and performance [6, 7, 9]. Recent reports predict widespread adoption of LA in higher education within the coming years [6, 7, 8, 9, 10]. Many studies highlight the value and use of academic analytics at the curriculum, institutional, and national level; these studies often focus on using data-driven decision making to improve retention [5, 7, 9]. Recent work has showcased the benefits of data analytics at the course level and provide individual examples of case studies, working models, and tools currently employed in higher education [1, 4, 8].

Over the past two decades, business intelligence and analytics (BI&A) has become increasingly important in business communities and academia. BI&A initiatives have been incorporated into Information Systems (IS) curricula and data analytics skill sets are commonly taught in business schools today [2, 3, 11, 12]. Yet, ironically, there is little data published on how IS educators are leveraging data analytics in their own courses. IS faculty teach students about data analytics, but do they use Learning Analytics to harness and interpret the immense data available to them to improve learning environments? Do IS faculty actually 'practice what they preach?'

This paper outlines research in progress that explores the role of Learning Analytics in Information Systems instruction. This exploratory study seeks to describe faculty perceptions and use of educational data analytics. Research questions include: (a) To what extent do IS faculty currently use Learning Analytics to facilitate learning? (b) What are faculty perceptions of the pedagogical benefits of Learning Analytics? (c) What types of data and tools are currently accessible? and (d) What training opportunities, related to LA, are available for faculty?

This study promises to make several important contributions. This study seeks to promote discussion amongst educators on whether or how Learning Analytics can influence the way future IS professionals are educated. Results will be useful in identifying the extent to which faculty utilize data about students to improve the learning process. Since the paper will classify the types of data analytics currently available and identify common tools/models/techniques employed, results may prove immediately helpful to educators seeking to implement LA at the course level and to help prepare students to utilize similar analytics in business settings.

Keywords: Learning Analytics, Big Data, Learning Management Systems, Academic Analytics, Business Intelligence, and Data Analytics

REFERENCES

1. Ali, L., Hatala, M., Gasevic, D., & Jovanovic, J. (2012). A qualitative evaluation of evolution of a learning analytics tool. *Computers & Education, 58*(1), 470-489.

2. Chen, H., Chiang, R. H. L., & Storey, V. C. (2012). Business intelligence and analytics: From big data to big impact. *MIS Quarterly, 36*(4), 1165-1188.

3. Chiang, R. H. L., Goes, P., & Stohr, E. A. (2012). Business intelligence and analytics education and program development: A unique opportunity for the information systems discipline. *ACM Transactions on Management Information Systems, 3*(3), 1-30.

4. Dietz-Uhler, B., & Hurn, J. E. (2013). Using learning analytics to predict (and improve) student success: A faculty perspective. *Journal of Interactive Online Learning, 12*(1), 17-26.

5. Dziuban, C., Moskal, P., Cavanaugh, T., & Watts, A. (2012). Analytics that inform the university: Using data you already have. *Journal of Asynchronous Learning Networks, 16*(3), 21-38.

6. Johnson, L., Adams Becker, S., Cummins, M., Estrada, V., Freeman, A., & Ludgate, H. (2013). *NMC Horizon Report: 2013 Higher Education Edition*. Austin, Texas: The New Media Consortium.

7. Long, P. D., & Siemens, G. (2011). Penetrating the fog: Analytics in learning and education. *EDUCAUSE Review, 46*(5), 31-40.

8. Mattingly, K. D., Rice, M. C., & Berg, Z. L. (2012). Learning analytics as a tool for closing the assessment loop in higher education. *Knowledge Management & E-Learning: An International Journal, 4*(3), 236-247.

9. Picciano, A. G. (2012). The evolution of big data and learning analytics in American higher education. *Journal of Asynchronous Learning Networks, 16*(3), 9-20.

10. *Siemens, G. (2013). Learning analytics: The emergence of a discipline. American Behavioral Scientist, 57*(10), 1380-1400.

11. Topi, H., Valacich, J., Wright, R., Kaiser, K., Nunamaker, J., Sipior, J., & de Vreede, G. (2010). IS 2010: Curriculum guidelines for undergraduate degree programs in information systems. *Communications of the Association for Information Systems, 26*(18), 359-428.

12. Wixom, B., Ariyachandra, T., Douglas, D., Goul, M., Gupta, B., Iyer, L., Kulkarni, U., Mooney, J. G., Phillips-Wren, G., & Turetken, O. (2014). The current state of business intelligence in academia: The arrival of big data. *Communications of the Association for Information Systems, 34*(1). Available: http://aisel.aisnet.org/cais/vol34/iss1/1

USING GOOGLE'S DEVELOPMENT TOOLS AND CLOUD PLATFORM: THE CREATION OF THE INVITATIONAL ONLINE TEACHING ASSESSMENT SYSTEM

Rhonda G. Chicone, Kaplan University, rchicone@kaplan.edu
Robert Lockwood, Kaplan University, rlockwood@kaplan.edu
Tina Allen, Kaplan University, drtgallen@gmail.com

MOTIVATION

Invitational educational approaches teaching from a humanistic point of view. Instructors that practice invitational educational theory are inviters as opposed to managers, motivators, shapers, or guides [4]. In 1985, Lundee W. Amos, with the support of William Purkey, created the Invitational Teaching Survey (ITS). Classroom teachers used the survey to assess their professional and personal invitational teaching practices. The ITS was carefully developed and validated. However, the ITS was designed for use in the traditional face-to-face classroom [2]. Online instructors had to translate known inviting behaviors, extracted from the ITS for the traditional classroom, into the online classroom. The presenting problem was to identify invitational online teaching behaviors and then use information technology to allow online instructors to administer an invitational assessment to their students via the Web. The Web based assessment would explore how an online instructor communicates and how an online instructor treats students in an effort to create conditions where online students can learn.

SOLUTION APPROACH

Advances in technology, including greater access to increased bandwidth, allowed colleges and universities to begin offering degree programs that could be completed all online. In the period 2002 – 2010, online colleges and universities saw a tremendous increase in enrollment. By 2013, 7.1 million students were taking at least one online course. In addition, in 2012, 66% of chief academic leaders said that online learning was critical to their long-term strategy, and only 9.7% of institutions indicated that online education was not critical to their long-term strategy. Finally, 33.5% of all higher education students were taking at least one online course in 2014 [1]. Continued improvement and innovation in technology will enable growth in online education in the foreseeable future.

A field test was conducted with 448 online students. The field test was administered using a paper-based survey that had statements about the online instructor, based on the ITS foundation. Negatively worded statements (to preclude response position bias) were reverse coded and 15 subscales were reported as the sum of the values for each statement in the subscale. Each statement was evaluated on a scale of 1 – 5, with the higher score indicating more inviting teaching behavior. As a result of the field test, the researchers realized a Web-based software system was needed. The Invitational Online Teaching Assessment (IOTA) was designed so that it can be administered to students via the Internet. The IOTA system automatically scores the assessment results and sends a Portable Document Format (PDF) report to the instructor via e-mail. The report includes the quartiles for each subscale derived from the paper-based field test so instructors can compare results. The Web-based IOTA system is free for use by any instructor. The IOTA system was architected and developed using the Google Apps Script programming language, Google Forms, Google Docs, Google Sheets, free third party plug-ins and Google's cloud platform. These free Google technologies allow automation of virtually any workflow [3].

IMPLICATIONS

This study has two implications. First, instructors that have a programming background do not need to pay for a survey tool, data analysis software or reporting software. Instead, they can use the Google's Apps Script programming language along with Google Forms, Good Docs and Google Sheets. Using these tools could be quite valuable when conducting a study that requires a quantitative online survey where data collected is processed in some manner. Second, how an online instructor communicates and how an online instructor treats students can create the conditions where online students can and will learn is explored/assessed. The IOTA system provides one tool for online instructors to use to evaluate their inviting teaching behaviors and make changes as needed. The feedback from students is completely anonymous and only the requesting

instructor receives the IOTA report. How the results are used is entirely up to the instructor; however, the researchers hope that the IOTA system will lead to many more inviting online classrooms.

CONCLUSION

The IOTA system is a result of an academic study that was conducted to help online instructors evaluate their invitational teaching practices. In addition, the IOTA system is an example of a software development project where instructors can benefit using free Google technologies to create tools/systems to use inside and outside of the classroom as Google offers free and reliable cloud-based development tools and platform.

REFERENCES

1. Allen, I. E., & Seaman, J. (2014). *Grade change: Tracking online education in the United States*. Babson Park, MA: Babson Survey Research Group.

2. Amos, L. W. (1985). *Professionally and personally inviting teacher practices as related to affect and course outcomes reported by dental hygiene students* (Doctoral Dissertation). Retrieved from ProQuest Dissertations and Theses. (UMI No.8701318)

3. Google, Inc. (2015). Overview of Google Apps Script. Retrieved from https://developers.google.com/apps-script/overview

4. Purkey, W. W. and Novak, J.M. (1978). *Inviting school success: A self-concept approach to teaching and learning (2nd Ed)*. Belmont, CA: Wadsworth.

Organizational Culture: Importance and Impact for the Modern Organization

Dennis L. Mott, Oklahoma State University-Tulsa, dennis.mott@okstate.edu

ABSTRACT

Organizational culture denotes a set of values, beliefs, perceptions and ways of thinking. A system occurs when organizational members possess a common understanding of main value features that an organization endorses. Thus, pre-dominant aspects of culture are specifically taught or generally evolved and are essential for ultimate success within that particular organization.

Organizational culture evolves from established norms, values, customs, and procedures that have proven to be useful as an organization advances and matures. Because of the innate process in which organizational culture evolves, each organization's culture possesses a full array of strengths and weaknesses that are challenged by the passage of time. The rapidly advancing modern technology profoundly impacts current and future metrics of organizational culture. Daily activity and the corresponding decision-making constructs that remain unchanged over time will render an organization less competitive and will seriously challenge longevity over time.

Questionnaire results were from a group of 38 business leaders and managers representing 27 organizations in the south-western quadrant of the United States. The research base group was 62% male and 38% female. The reported average age of IT managers and leaders who responded was 37.5 years of age.

Research results: The nature of organizational culture; Characteristics of organizational culture; Stages of change in organizational culture; Interorganizational influences on culture

Key words: Culture, Corporate Culture, Cultural Change, Stages of cultural change,

REFERENCE

Daft, R. L. (2013). Organization Theory and Design 11th Edition, South-Western, pp. 390-419. Hamilton, Cheryl (2014), Communication for Results, 10th Edition, Wadsworth, pp. 78-82.

Molinsky, Andrew, "Code Switching between Cultures," Harvard Business Review, Jan-Feb, 2012, pp. 140-41.

Noe, Raymond, et al. (2016). Fundamentals of Human Resource Management, 6th edition, McGraw-Hill, pp. 499-508

Rawls, John (2009). A Theory of Justice. In Steven M. Cahn (ed.), Philosophy and Rhetoric. Oxford University Press. 133-135.

Stone, D. L., & Stone-Romero, E. F. (2004). The Influence of Culture on Role-Taking in Culturally Diverse organizations. The psychology and management of workplace diversity (pp.78-99). Malden, MA: Blackwell Publishing

USING OPEN SOURCE TEXT ANALYTIC LIBRARIES

Mike Mitri, James Madison University, mitrimx@jmu.edu

Keywords: Text analytics, natural language processing, information retrieval, sentiment analysis, open source, API

Text analytics is a BI-related discipline for working with unstructured data. It involves several types of tasks including natural language processing, information retrieval, document management and search, and sentiment analysis. These different tasks are implemented by various existing open source APIs. This presentation presents the key elements of text analytics, and describes how these are implemented in open-source libraries such as Apache's Java-based openNLP (https://opennlp.apache.org/) and Lucene (https://lucene.apache.org/), Princeton's Java-based WordNet (http://wordnet.princeton.edu/), and a variety of REST/JSON/XML web services. These tools can be used to develop custom text analytic software applications.

Natural Language Processing

Natural language processing (NLP) involves both grammatical and semantic processes. Grammatically, NLP starts with the capacity to break a body of text into meaningful sentences. This is harder than it seems; a period does not necessarily mean the end of a sentence. Once sentences are recognized, the next step is to tokenize, which means breaking the sentences into individual words. Again, this is not as easy as it seems. Words are not identified only by spaces, but also by contractions. For example, the word "isn't" is actually two words: "is" and "n't" (or "not"). After tokenizing a sentence into individual words, the next step is to recognize parts-of-speech (POS). POS analysis breaks sentences into their grammatical constituents (nouns, verbs, adjectives, adverbs, prepositions, etc.). Again, there are complexities; some words could be a nouns in one context and verbs in another. From there comes parsing the sentence into meaningful linguistic groupings. This is done at a surface level via chunking, which breaks a sentence into phrases. Then comes deep parsing, a process that produces a parse tree showing internal structure of each phrase as well as its relationship to the sentence as a whole. A related task is to recognize names of objects (people, places, events, etc.). Apache's openNLP library performs all these tasks. My presentation shows uses, capabilities, and limitations of this library.

From a semantic perspective, natural language processing involves the capacity to recognize the meanings of words and also identify synonyms, antonyms, and other relationships for these words. Representation of these relationships forms a semantic network (Quillian 1967), such as the one implemented in Princeton's WordNet lexical database and accessible via a Java API such as MIT's Java WordNet Interface (JWI) (http://projects.csail.mit.edu/jwi/). In my presentation I will show the use of JWI for navigating through the WordNet dictionary.

Information Retrieval

Information retrieval (IR) involves "finding material (usually documents) of an unstructured nature (usually text) that satisfies an information need from within large collections (usually stored on computers)." (Manning et al. 2008)

Information retrieval (IR) databases such as Apache's Lucene can be indexed for search, which is the sort of thing upon which search engines like Google are based. Unlike relational databases, document-based querying involves searches based on phrases, wildcards, proximities and similarities. Because of the huge amount of possible indexing terms, a key element of these engines involve the capacity to reduce the dimensionality to the most important terms for search engine optimization. This is often accomplished through the data mining techniques of classification and clustering. In this presentation I will show the use of the Lucene for information retrieval, document database management, and IR querying.

Sentiment Analysis

Sentiment analysis (SA) involves recognizing emotive and judgmental elements of a body of text in order to establish whether a comment is positive or negative. Another element of sentiment analysis is to establish whether a comment is objective or subjective. Therefore, sentiment analysis tends to cluster text according to two polarities: P-N and S-O (Sharda et al 2014, p236). Another key task in sentiment analysis is to identify the target of the judgment. Who or what are we being positive or negative about? To complicate things further, there may be more than one target being judged, and they may be being judged relative to each other. All these are problems related to sentiment analysis.

There are a variety of web services that provide REST/JSON/XML APIs for sentiment analysis (e.g. http://www.datumbox.com/, http://www.meaningcloud.com/). Some algorithms use lexical dictionaries for determining the P-N and S-O scales, whereas others use machine learning approaches with training documents. And, just as opinions vary between people, opinions may also vary between the results from these different web services. In this presentation I will show the use of these web services in an application, and also compare their responses to various comments from surveys and focus group transcripts.

Conclusion

By making use of a variety of free text-analytic APIs, a developer can create customized intelligent applications with the capability to perform NLP, IR, and SA tasks. Applications with these capabilities provide significant value in an environment where the growth of unstructured data is growing exponentially. This presents design challenges and opportunities, and tools are available to experiment and learn. During the presentation I will discuss some projects I am undertaking with this technology.

REFERENCES

Manning, C., Raghavan P, Schutze H. (2008) Introduction to Information Retrieval. Cambridge University Press. http://www-nlp.stanford.edu/IR-book/

Quillian, M. R. (1967). Word concepts: A theory and simulation of some basic semantic capabilities. Behavioral Science, 12(5), 410-430.

Sharda, R., Delen, D., Truban E. (2014), Business Intelligence: A Managerial Perspective on Analytics 3ed., Pearson Prentice Hall, Upper Saddle, NJ.

Proceedings of the International Association for Computer Information Systems,
55th Annual Conference, Clearwater Beach, Florida, October 2015

INCREASING STUDENT ENGAGEMENT AND LEARNING OUTCOMES: LESSONS LEARNED FROM TEACHING IN AN ACTIVE-LEARNING CLASSROOM

Jean A. Pratt, University of Wisconsin—Eau Claire, prattja@uwec.edu
Donald Gaber, University of Wisconsin—Eau Claire, gaberdh@uwec.edu
Thomas Sulzer, University of Wisconsin—Eau Claire, sulzertj@uwec.edu

ABSTRACT

The purpose of this study is to explore the integrated roles of classroom space, technology, and flipped learning leading to increased student learning outcomes. Both anecdotal and assessment data indicates that the combination of factors—rather than one factor alone, leads to increased student performance.

Keywords: Student Engagement, Active-Learning Classroom, Flipped Classroom, Instructional Technology

INTRODUCTION

Active-learning classrooms and "flipped" classrooms are terms which are sometimes used interchangeably, since faculty teaching in an active-learning classroom tend to "flip" their instructional approach. In this paper we define both terms, describe ways that flipping learning in an active-learning classroom increases student engagement, and provide assessment data.

LITERATURE REVIEW

Active-learning classrooms differ from traditional classrooms primarily in layout. Beicher et al (2007) published some of the seminal work on redesigning a classroom for increased student-student and student-faculty engagement. The SCALE-UP project initially designed to accommodate large-enrollment physics classes (Beicher et al, 2007) at North Carolina State has been replicated and modified at other institutions (e.g., MIT and UM at Rochester) and for other subjects, such as chemistry, biology, mathematics, engineering (Cotner et al, 2013; Gaffney et al, 2008; Muthyala and Wei, 2012). Round tables to encourage restaurant-style engaged discussion are the single most visible difference in active-learning classrooms. Placement of the teaching station in the center of the room is another significant difference—both for the faculty and the students (Petersen and Gorman, 2014). An active-learning classroom encourages a faculty transition from lecturing in one location to interacting around the classroom. Technology, although sometimes not as visible, is also a critical component. Most active-learning classrooms include at least one computer per table (or connections for student laptops), large projector screens at opposite ends of the room, and multiple smaller screens along the walls. Research results from traditional versus active-learning classrooms (Beicher et al, 2007; Cotner et al, 2013) have demonstrated significant increases in conceptual understanding and performance on learning outcomes. Failure rates in physics by women, students of a minority ethnicity, and at-risks students dropped by 20% to 50%, with their success continuing on through later classes (Gaffney et al, 2008). Research results comparing different implementations of active-learning classroom layout indicated no significant differences (Muthyala and Wei, 2013). Active-learning classrooms support active-learning strategies such as problem-based learning and "flipped" learning.

The idea of "flipped" learning is that students complete assignments *before* coming to class so that class time can be used for engaged interaction with each other and the content. The faculty role transitions from disseminator of knowledge to facilitator of learning: "from sage on the stage to guide on the side" (King, 1993). Moveable furniture supports the engaged interaction encouraged by flipped learning. Students assume a greater responsibility for their own learning; faculty give up some of the classroom control. Learning materials must be revised to support both independent, out-of-class learning as well as

collaborative, in-class activities. Educators must be comfortable with a somewhat noisy and chaotic atmosphere, able to sense when to redirect attention from group to full class and then back to group, and comfortable with technology.

Neither teaching in an active-learning classroom nor flipping the learning guarantees increased student performance (Hamdan et al, 2013). Following is a description of how Information Systems faculty at one Midwest university are teaching in active-learning classrooms using flipped learning to increase student engagement and increase performance on learning outcomes. All three authors meet regularly with other active-learning classroom educators to discuss effective strategies.

Classroom DESCRIPTION

The 6-person tables in the active learning classrooms have one flat end butted up against a wall. A flat-screen monitor is mounted on the wall at the end of each table. A wireless mouse and keyboard on each table access a wall-mounted computer. Each table includes a power strip as well as both Ethernet and HDMI connectors. The entire classroom supports wireless networking. Students can view and collaborate on a single file hosted on the built-in computer or on one of their laptops. Alternatively, four students can split the wall-mounted screen into quad view and each display their laptop in one quadrant. A whiteboard with markers is next to each table. In some rooms, two opposite-facing projectors display to large screens at either end of the classroom as well as to each pod (table configuration). The teaching station includes a master control panel to control all the technology in the room, including each pod. Each pod has a control panel to control the different audio and video sources for that pod. The instructor can project the teaching display or a selected pod screen to all pods and the overhead projectors. The teaching station also includes a doc cam with sufficient zoom capability to display to all pods the student work on a whiteboard on the opposite side of the classroom. The teaching computer also includes Smart technology for writing on the adjustable monitor (either in the Smart notebook or in one of the *Microsoft* applications). Two flat-screen monitors on the teaching station are mounted on adjustable arms that extend beyond the teaching-station surface.

Instructional Ideas

Following are some effective approaches to increasing student engagement in an active-learning classroom. The authors will expound upon the ideas and provide best-practice recommendations during the conference presentation.

- Team based problems solving. The instructor poses relevant problems for teams to solve using whatever technologies they choose. The active-learning classrooms allow student to choose the way they express their thoughts and ideas.
- Pre-class homework followed by online quiz. Students review reading material and complete exercises on their own outside of class to grasp core concepts. Prior to class, students take a self-assessment online quiz to gauge their understanding of the material. Time in class is used to extend their online learning.
- Pre-class homework followed by peer comparison. Homework that would normally be assigned after covering the content in class is due in a group locker prior to class. Students in groups of four display their individual work in quad view on the pod screen and then select one person's work to display and explain. The instructor selects two to three examples to display to the entire class based on a) accuracy or b) typical errors. This activity is also effective using the whiteboard next to each pod. The instructor uses the doc cam to display group work.
- Peer instruction. Groups experiment and discover the various uses and properties of a programming application component being taught. Following a specified time, each group's pod screen is displayed class-wide and they demonstrate and explain their findings to the class.
- Rotating groups through user-requirements specification, technical-requirements specification, development, and assessment. Each group generates a requirements document from a customer's perspective. Each group rotates to the next pod, and using the requirements generated by the previous group, adds the "pseudocode" the programmer will need to build the application. Each group once again rotates pods and builds the application to the specifications given by the first two groups. The groups return to their original pods, display the documentation and application to all pod screens, and review/assess the programming application.
- Group, class, group. Students work collaboratively in their groups to solve a problem. Groups tend to vary in ability; therefore, the instructor modifies each activity in real time to increase the challenge for some groups. The instructor

interacts with each group to assess typical errors and provide feedback. The instructor brings the class together for a mini-lecture (with display of student work) and then presents the next challenge exercise.

Assessment of Learning Outcomes

Student engagement and performance on learning outcomes increased in the active-learning classroom when combined with flipped learning. The authors will provide descriptive assessment data.

CONCLUSION and contributions

Active-learning classrooms facilitate student engagement. Flipped learning facilitates independent learning and enables class time to be used for richer, immersive experiences. Faculty can use the above ideas to increase student engagement in their classes.

REFERENCES

Due to space limitations here, the full list of references is available directly from the authors.

Information Systems Students' Oral and Written Communication: A Continuous Improvement Process

Allen Truell, Ball State University, atruell@bsu.edu
Jensen Zhao, Ball State University, jzhao@bsu.edu
Melody Alexander, Ball State University

Abstract

The frequently noted workplace skills of oral and written communication are essential to the future success of all our information systems students. Thus, the purposes of this presentation are: (1) to describe the oral and written communication skills being developed by information systems students in our program and (2) to describe the processes involved with improving the oral and written communication skills of our information systems students. To ensure consistent oral and written communication skills are being developed, faculty have developed a common rubric for use with students throughout our information systems program. In addition, the process for improving the oral and written communication skills of our information systems students is systematic. Successes and failures as we developed our systematic process for improving our information systems students' oral and written communication skills will be noted throughout the presentation.

Keywords: Systematic improvement; oral communication; written communication; information systems students

PLAY BALL: BRINGING SCRUM INTO THE CLASSROOM

Jeffrey May, James Madison University, mayjl@jmu.edu
Jim York, FoxHedge LTD., Jim@FoxHedgeLtd.com
Diane Lending, James Madison University, lendindc@jmu.edu

Keywords: Scrum, Systems Analysis and Design, Agile, Adaptive Learning, Collaboration

Brief Description

Scrum is an iterative and incremental framework containing simple roles, events, artifacts and rules founded on empirical process control theory. It has become a widely accepted agile framework that has taken hold in the workplace. For example, Capital One started an initiative in 2013 that called for a move to 80% Scrum, 20% Waterfall. The "8th Annual Survey of Agile Development" (Version One, 2014) found that 73% of respondents used Scrum or a Scrum variant in their organization. As a result, Information Systems recruiters and executives have recently been placing a focus on students with Scrum knowledge. Unfortunately, current System Analysis and Design textbooks provide cursory attention to Scrum. Thus, the purpose of this research is to thoroughly examine the Scrum framework and to determine its value from a pedagogical perspective. Additionally, this research will describe a Scrum exercise that was conducted in the classroom and discuss the lessons learned. Ultimately, we view this research as a starting point for a larger Scrum pedagogical research agenda and look forward to collaborating with other IACIS colleagues who might help to provide further direction.

Research Basis

The basis of this research will be grounded via the experience of Scrum professionals along with a literature review that links employee needs to what Scrum ultimately teaches. For example, Schwaber and Sutherland (2013) define Scrum as, "A framework within which people can address complex adaptive problems while productively and creatively delivering products of the highest possible value." Thus the attributes of creative problem solving and adaption to change and how Scrum may serve to enhance these important student skillsets will be further explored. Additionally, employers consider collaboration or the ability to work in a team extremely important for graduating IS students. Part of what makes Scrum work is reliance on an empowered, self-organizing team to discover, implement and evolve the best process that works for them to accomplish a shared goal. In essence, The Scrum Team acts as a complex, adaptive system changing from state to state. Thus, enhanced collaborative skillsets are developed in Scrum environments (Pope-Ruark, 2012).

After an initial literature review and analysis are conducted, this research will then describe a Scrum exercise (referred to as Ball Game) that was conducted at our university directed by a leading professional Scrum coach and trainer, Jim York. The exercise focused on adaptive learning and showed how teams can operate as one and learn via iteration. A survey was then administered and the results of this survey will be analyzed to further understand what was learned and how we might improve upon further exercises that seek to convey Scrum principles.

Implications and Conclusions

This research addresses the call of industry to bring Scrum into the classroom. Rather than simply read from a textbook, several professors from James Madison University went out and earned Scrum Master and Scrum Product Owner certificates. Through this pursuit, we developed a relationship with our trainer Jim York and have discovered that teaching Scrum in the classroom should not be viewed as a rote exercise. Rather, it should be viewed as a means for developing important skillsets such as enhanced collaboration, adaptive learning and creative problem solving skills. This research is in the beginning phases and we look forward to collaborating with IASIS colleagues to better develop our future research agenda on Scrum in the classroom. At the end of the day, we certainly wish to develop our student's knowledge of Scrum, but we believe there is much more to be gained from this pursuit that transcends memorizing a popular methodology.

References

Pope-Ruark, R. (2012). We scrum every day: Using scrum project management framework for group projects. *College Teaching*, *60*(4), 164-169.

Schwaber, K., and Sutherland, J. (2013). "The Definitive Guide to Scrum: The Rules of the Game." Scrum.Org and ScrumInc.

Version One, (2014). "8th Annual State of Agile Survey," Conducted by Analysis Net Research.

EXPLORING SAP HANA FOR SUPPORT OF MATHEMATICAL OPTIMIZATION

Karl Kurbel, European University Viadrina, kurbel.bi@europa-uni.de
Dawid Nowak, European University Viadrina, danowak@europa-uni.de

MOTIVATION

Many business planning problems, such as those which arise in supply chain management and job scheduling, can be solved using mathematical optimization. However, optimization models representing real-life situations tend to be very large, requiring a significant amount of computing power and efficient algorithms.

SAP HANA is an in-memory database that offers very good performance where data access and data processing are concerned. HANA's ability to outperform conventional databases by orders of magnitude [3] [4] can be attributed to its parallel processing and column-oriented data storage capabilities. In this presentation, we pose the following question: Can HANA's processing power also be exploited in cases where it is applied to optimization problems?

Since HANA performs best when "everything" occurs inside it, it appears reasonable to make use of the means that are available within HANA, rather than using external optimization packages (such as Cplex). These means include: (a) Genios (Generic integer optimization system), (b) lpSolve, an R based optimization library, (c) programming, i.e. developing one's own solution algorithms.

Genios is a part of the AFL (Application Function Libraries) [7, p. 6], which extend HANA's functionality by predefined functions. These functions can be called from stored procedures defined by the user. They are native to the data engine underlying SAP HANA's index server, thus offering the best possible performance for data access and data processing [6, p. 14]. Genios provides solvers for continuous and mixed-integer linear programming (MILP).

lpSolve is an optimization library running on an R server. R is a programming language primarily used for statistical computing, and is one of the few languages that are available within HANA. Although the R server is external to HANA, R is internal, thus enabling the direct invocation of lpSolve functions from inside HANA.

Means for *programming* inside HANA are rather limited. At the time of our study, the only languages providing algorithmic features were SQLScript, R, and JavaScript. None of these languages could be considered appropriate for intensive numerical computations.

OPTIMIZATION ARCHITECTURE AND PERFORMANCE MEASURING APPROACH

As SAP HANA does not provide features for reading common optimization data formats (e.g. MPS), it was necessary to develop tools for importing the data and parsing it to the solvers' requirements. The parsing procedure transforms the optimization model into a table based schema. This schema is used as input to the various solvers (Genios, lpSolve, custom algorithms). It contains five tables, as can be seen in figure 1 (T means table). The input data is imported by the solver procedure at the moment of its invocation. Next, the optimization problem is solved, and finally, the objective function value and the performance parameters being sent to the output table.

The solvers' performance and the accuracy of the test results were measured with the help of various indicators, including the function runtime (the time taken to calculate the optimal solution only) and the execution time (the length of time from the point of procedure invocation to the procedure's end, including access to the data and the output of the results.)

For the test runs, collections of optimization problems suggested in the literature were used. A set of 80 real-life problems of varying size and complexity were taken from the NetLib library [2]. This library is an Internet-based collection of linear programming examples, that are often used for benchmarking LP solvers. The hardware configurations used for the tests were a HANA server in the cloud with 32 virtual cores (2 GHz) and 1 TB RAM, and an R server with 4 virtual cores (2 GHz), 16 GB RAM.

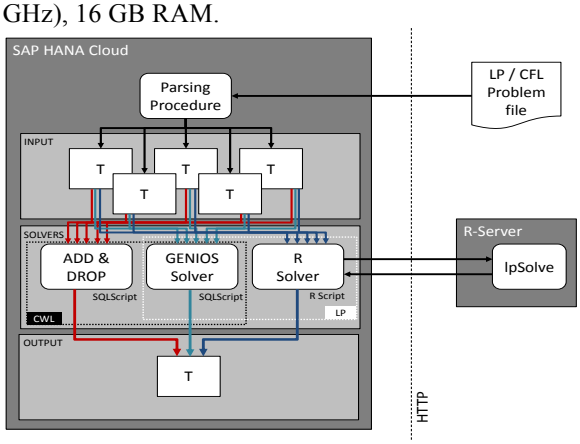

Figure 1. Solution architecture

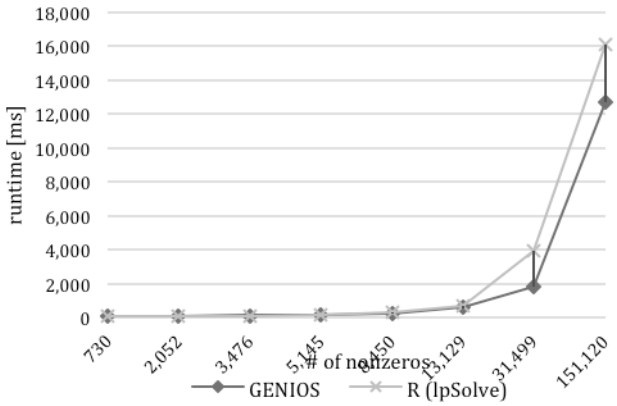

Figure 2. Function runtime in relation to LP problem size

TEST RESULTS

Tests for continuous linear programming problems were run with the intention of comparing the performance of the Genios and lpSolve solvers. (Another set of test runs, for mixed-integer programming, has been reported in [1].)

Execution times for Genios are significantly shorter than those registered for lpSolve (on the R server). The most likely explanation is that Genious is tightly integrated with the database [5, p. 14] and is thus able to access the problem data very quickly. On the other hand, in order to solve a problem on the R server, the problem data must first be sent via a network to this server.

Regarding function runtimes, the dominance of Genios is not as clear. Genios still outperformed lpSolve, but only in 61 test cases. In 19 cases, lpSolve was faster, despite the additional time required to initially load the data. Figure 2 offers a summary of some of the results.

SUMMARY AND OUTLOOK

The test runs demonstrated that Genios offers significantly better performance than the R based lpSolve package, with the performance gap explained by the differences in data transfer between the database and the solver. In the case of Genios, tight integration with the index server results in very fast data access.

The main limitation of our study is the shared infrastructure in the cloud the calculations were performed on. Hence, performance results may be biased by differing numbers of resources allocated to a particular test run. In further research, we plan to exclude this bias by using a dedicated infrastructure, and also compare the performance of solvers from external optimization packages (such as Cplex, Gurobi or Lingo) with the performance of Genios and lpSolve.

REFERENCES

[1] Kurbel, K., & Nowak, D. (2015). Solving of LP and CWLP Problems Using SAP HANA. *Proceedings of the Spring 2015 Future SOC Lab Day, Technische Berichte des Hasso-Plattner-Instituts für Softwaresystemtechnik an der*

Universität Potsdam, Potsdam, Germany (to appear).
[2] Netlib.org. *The NETLIB LP Test Problem Set* [online]. Available: http://www.netlib.org/lp/data.
[3] Plattner, H., & Zeier, A. (2012). *In-Memory Data Management - Technology and Applications*. Berlin:Springer.
[4] Plattner, H. (2009). A common database approach for OLTP and OLAP using an in-memory column database. *Proceedings of the 2009 ACM SIGMOD,* Providence, Rhode Island, USA, 1-7.
[5] SAP AG (2014). *OFL AFL* (SAP internal documentation).
[6] SAP AG (2014). *SAP HANA Developer Guide - SAP HANA Platform SPS 08* [online]. Available: http://help.sap.com/hana/SAP_HANA_Developer_Guide_en.pdf.
[7] SAP AG (2015). *SAP HANA Predictive Analysis Library (PAL)* [online]. Available: http://help.sap.com/hana/SAP_HANA_Predictive_Analysis_Library_PAL_en.pdf

Proceedings of the International Association for Computer Information Systems,
55th Annual Conference, Clearwater Beach, Florida, October 2015

AN EXPERIMENTAL COMPARISON BETWEEN DISCRETE WAVELET TRANSFORMS WITH THE *1*-NN CLASSIFIER

Cecil Schmidt, Washburn University, cecil.schmidt@washburn.edu
Rob Roy Rutherford, Washburn University, robroy.rutherford@washburn.edu
Jared Ready, Washburn University, jared.ready@washburn.edu

PROPOSAL

Studies have shown that non-parametric machine-learning algorithms can be applied with success on preprocessed datasets that are time or event oriented. In the preprocessing step a filtering algorithm such as a discrete wavelet transform can iteratively be applied to reduce the dimensionality of the data. Various resolution levels are available depending upon the number of iterations. Machine learning algorithms can then be used to perform their learning task with the reduced file. In this research, we investigate the performance of the *1*-Nearest-Neighbor (*1-NN*) classifier on datasets that have been preprocessed using two unique discrete wavelet transform algorithms.

Keywords: Data Mining, Dimensionality Reduction, Preprocessing

BASIS OF STUDY

The discussion of this study has significant relevance to data mining and data warehousing. Preprocessing of data in order to reduce storage, memory, and processing requirements is a serious consideration in any database implementation.

RESEARCH METHODOLOGY

To determine the viability of our method across a wide variety of problem domains we will use time series datasets from UCR's Time Series Classification repository [6]. We intend to implement both the Haar and Daubechies 4 discrete wavelet transforms [2,7] via lifting [3] in Java. Where necessary, boundary conditions will be handled via periodization. Coefficients will be extracted after the third iteration. These extracted coefficients will be used as the basis for our dimensionally reduced series. We will use the original and extended (mirrored) series as controls when examining classification accuracy [5] via Weka's *1*-NN classifier [4].

Our research hypotheses to be tested are as follows:

H_1: There is no significant difference in the classification accuracy of a *1*-NN classifier when applied to a Haar-reduced dataset versus a non-reduced dataset when both datasets are mirrored.

H_2: There is no significant difference in the classification accuracy of a *1*-NN classifier when applied to a Daubechies-reduced dataset versus a non-reduced dataset when both datasets are mirrored.

To test our hypothesis, we will perform both a one-way ANOVA and Kruskal-Wallis Rank Sum comparing the mean *1*-NN testing accuracy of the original, extended, Haar-reduced, and Daubechies-reduced series.

IMPLICATIONS

Assuming there is no significant difference in classification accuracy, i.e. H_1 or H_2 holds, the wavelet transform coefficients may be used as indexes into sequenced datasets that exist in relational databases, data marts, or data warehouses. A *1*-NN classifier may then be employed to perform a classification search using these indexes.

CONCLUSIONS

A reduction in the dimensionality provides immediate resource relief and support for database query processing. Suggestions for future research include an investigation of the limitations of resolution levels, the impacts of varying values of *k* in a *k*-NN *classifier*, and the application of alternative classification algorithms such as decision tree based classifiers.

REFERENCES

1. D. Aha, D. Kibler (1991). Instance-based learning algorithms. *Machine Learning*. 6:37-66.
2. Daubechies, I., 1992. Ten Lectures on Wavelets, 1st Ed., S.I.A.M., Philadelphia, ISBN:0-89871-274-2, pp. 1-52.
3. Daubechies, I., Sweldens, W., 1998. Factoring wavelet transforms into lifting steps, *Journal of Fourier Analysis and Applications*, Vol. 4, 1998, pp. 247-269.
4. Mark Hall, Eibe Frank, Geoffrey Holmes, Bernhard Pfahringer, Peter Reutemann, Ian H. Witten (2009); The WEKA Data Mining Software: An Update; *SIGKDD Explorations*, Volume 11, Issue 1
5. Han, Jiawei Han & Kamber, Micheline (2006). Data mining: Concepts and Techniques, 2ed. Morgan Kaufmann
6. Keogh, E., Zhu, Q., Hu, B., Hao. Y., Xi, X., Wei, L. & Ratanamahatana, C. A. (2011). The UCR Time Series Classification/Clustering Homepage: [online] www.cs.ucr.edu/~eamonn/time_series_data/http://www.cs.ucr.edu/%7Eeamonn/time_series_data/
7. Mitsa, Theophano (2010). Temporal Data Mining, Chapman and Hall/CRC, Boca Raton, FL.

Proceedings of the International Association for Computer Information Systems,
55th Annual Conference, Clearwater Beach, Florida, October 2015

ONLINE DEGREE PROGRAMS – HOW COLLEGES OF BUSINESS EXTEND "COMMUNITY LEARNING" BEYOND THE INDIVIDUAL COURSE

Sherry Rodrigue, Nicholls State University, sherry.rodrigue@nicholls.edu
Ronnie Fanguy, Nicholls State University, Ronnie.fanguy@nicholls.edu
Lori Soule, Nicholls State University, lori.soule@nicholls.edu
Betty Kleen, Nicholls State University, betty.kleen@nicholls.edu

KEYWORDS: online learning, online bachelor's degrees, community learning, online advising

INTRODUCTION AND PROBLEM STATEMENT

The authors' mid-sized, public university in the south is a fairly recent entrant into the totally online bachelor's degree program structure, and a fully online business degree has only been implemented within the last 12 months. Although extensive research was conducted to help determine structure and operational procedures for the school's online programs in general, there are lessons still to be learned in administering programs effectively and efficiently. In fact, the successful start of the program and the rapid increase in the number of students in some programs has caused the university to reevaluate whether the initial structure and operational procedures can withstand the growth. The authors' college recently restructured departments, assigning the Department of Business Administration and Computer Information Systems the responsibility of online students and course schedules, and a CIS faculty to function as the academic advisor for all students in the online business program. While the university currently offers eight fully online bachelor's degrees, the online business degree accounts for almost a third of the of the school's online enrollment. The concern is that the university has not yet identified the most effective means to convey information to students regarding issues such as advising, registration, and other activities expected of students beyond individual course work. While answers to many student questions about such issues are often handled informally by other students in a face-to-face class environment, this advantage is not automatic in an online class. Although course management system tools such as discussion boards are commonly used for course-specific content-based community learning, they do not adequately handle such aspects as those listed above. Since online business degree programs are growing rapidly nationwide, best practices need to be identified for those schools struggling to serve their online students effectively.

BASIS OF THE STUDY

The National Center for Education Statistics reports more bachelor's degrees have been awarded in business than in any other discipline in recent years [9]. As online education continues to expand, business programs will continue to grow in the number of students enrolled. Despite the growth in numbers of students and in the number of institutions offering online business degrees, issues remain concerning effective advising strategies that can promote student retention and successful communication with online students [3, 6]. A small selection from the wealth of literature related to building online collaboration and learning communities reveals that challenges remain when it comes to engaging students in sharing through channels such as discussion boards, forums, or other social networking tools instructors might require for a course [1, 2, 4, 5, 7]. A review of literature related to online learning communities also shows a focus on increasing meaning and understanding of content or topics within individual courses; little—if anything—is found regarding utilization of community learning for "outside the classroom" information students need to progress to graduation.

The researchers are developing a spreadsheet containing numerous comparison factors for online bachelor's degree programs, including categorizing information available on other schools' online degree program websites, as well as other communication channels beyond their websites to determine best practices in developing community learning for overall degree progress. Over the summer, the researchers will gather information from those schools ranked in the top group of online schools by thebestschools.org [8]. The researchers will also investigate online business programs of those schools around the country identified internally as "peer" schools. While this current study will not address academic excellence or return on investment of the schools reviewed, the authors perceive that some best practices concerning conveyance of information normally considered community learning about pursuing a degree can be identified from the research. Wherever

possible, the researchers will drill down from the general online degree webpages of each institution to additional information provided by colleges of business and identify what channels are used to disseminate that information.

IMPLICATIONS AND CONCLUSIONS

As online programs continue to grow in colleges of business, schools will choose different approaches to administering and advising online students. In an era of shrinking state budgets to support higher education, the number of faculty available to help with this important task is often shrinking as well, especially since faculty are being asked to do more than ever before in many cases; therefore, it is important that faculty administering online programs be able to work smarter. Initial investigation of the websites of online business programs suggests some of the best practices in design and layout of online program websites, questions to be addressed in "Q and A" sections, and different social media to use for different types of information.

REFERENCES

1. Arvaja, M. (2012). Personal and shared experiences as resources for meaning making in a philosophy of science course. *International Journal of Computer-Supported Collaborative Learning, 7(2)*, 85-108.
2. Garrison, D. R. (2006). Online collaboration principles. *Journal of Asynchronous Learning Networks, 10(*1), 25-34.
3. Kelly, R. (2014). Using apps to improve communication with students. *Distance Education Report, 18*(12), 7.
4. Liu, I. , Chen, M. , Sun, Y, Wible, D. , & Kuo, C. (2010). Extending the TAM model to explore the factors that affect intention to use an online learning community. *Computers and Education, 54*(2), 600-610.
5. Oztok, M. (2013). Tacit knowledge in online learning: Community, identity, and social Capital. *Technology, Pedagogy, and Education, 22*(1), 21-36.
6. Ragin, B. , Burrell, S. , & Flowers, L. (2014). Online advising strategies to promote student retention. *Online Classroom 14*(11), 7-8.
7. Tee, M. & Karney, D. (2010). Sharing and cultivating tacit knowledge in an online learning environment. *International Journal of Computer Supported Collaborative Learning, 5*(4), 385-413.
8. Thebestchools.org. (2015). The 50 best online colleges for 2015-2016. www.thebestschools.org/rankings/best-online-colleges/
9. U. S. Department of Education, National Center for Education Statistics. (2013). Fast Facts: Most popular major. nces.ed.gov/fastfacts/display.asp?id=37

Proceedings of the International Association for Computer Information Systems,
55th Annual Conference, Clearwater Beach, Florida, October 2015

SOFTWARE DEVELOPMENT CURRICULUM: THE PERCEIVED EFFECTIVENESS OF VIDEOS VERSUS READINGS IN AN ONLINE ENVIRONMENT

Stephen F. Beyer, Kaplan University, sbeyer@kaplan.edu
Rhonda G. Chicone, Kaplan University, rchicone@kaplan.edu
Tina Burton, Kaplan University, tburton@kaplan.edu
Catherine Flynn, Kaplan University, cflynn@kaplan.edu

Keywords: Video; Programming; Software Development; Video learning

INTRODUCTION

Video in the classroom has been around almost as long as video has been around. If you did not experience filmstrip projectors and 16 millimeter film projectors in your classroom, you surely know someone who did. As early as 1918 some 8,000 "magic lantern" filmstrip projects were used in Chicago public schools (Dunn, 2011). In 1925, Thomas Edison who had just invented the motion picture projector stated, "…books will soon be obsolete. Scholars will soon be instructed through the eye" (Dunn, 2011, p. 6). Video in the online classroom has a much shorter history and thus needs further study as to its effectiveness, especially as compared to textual readings. This study purports to do just that.

VIDEO ONLINE

If experience counts towards expertise, then Salman Khan is an expert at video in the online environment. In a 2011 TED talk, he mentions an interaction with some cousins he was helping via long-distance tutoring. To supplement his conversations he made and posted some videos on YouTube. Surprisingly, his cousins preferred his videos over his direct tutoring. Upon reflection, Khan realized this made perfect sense. With the videos his cousins could review, pause, repeat and generally work at their own pace. He was not there to say, "do you get it?" The pressure was significantly reduced (Khan, 2011).

This led to the idea of the flipped classroom where students studied concepts and new material, via video, on their own. Then, when students came to class, whether it is a brick and mortar classroom or online, they practiced or discussed the material they learned at home (Khan, 2011). This is reinforced by Harven (2015) who states, "Having students watch videos at home to become familiar with the content and work out some of their own questions by being able to rewind, re-watch, or pause to take notes or look up questions is a great way to introduce a lesson" (p. 1).

Kaltura (2014) published a State of Video in Education report which concluded, among other findings, that 90% of respondents felt that video improved the learning experience and the almost 50% of respondents experienced flipped classrooms. In addition to supporting these points, Barbier and Cevenini (2012), add the advantage of cost-savings to the use of video in the classroom. Specifically they point out that "…replacing the (printed) content with video, reduces the cost of printed textbooks and enables immediate updates to content. While we are not sure that replacing readings with video can "enable immediate updates", we do concur that the costs associated with printed materials could be lowered" (p. 4).

Finally, Guo and Kim (2014) discovered that shorter videos work better than longer videos when used online. In addition, videos with a "talking head" and graphics were more engaging than just graphics alone. They also found that, for online students, tutorial-type videos are more engaging than lecture-type videos.

THIS STUDY

One university has recently, in 2014, introduced a five course Multiplatform Software Development specialization where students are able to study one or more of three programming language tracks taught simultaneously in each course. The language tracks are C#, Java, and Web Development languages (JavaScript, PHP, HTML and CSS). While only required to study one of the three language tracks, the ambitious student can study two, or even all three, of the language tracks. To assist the instructor in this course, most of the courses use multiple short tutorial style videos. The first course alone has fifty-nine short internally produced videos that directly support the coursework. Additionally, the course uses five texts, one for each language track and additional supporting texts.

The question becomes, how effective are the videos in relation to the readings in helping learn the concepts covered in the courses within this program? The methodology used in this study is a combination of an online survey and one-on-one interviews with students who have taken any of the courses within this specialization.

Sixty-five students have been identified, so far, for participation in the study. Of this number, fourteen have, at this time, consented to participate. The remaining potential participants continue to be encouraged to participate. At the time this abstract was submitted, ten of the fourteen consenting participants have taken the on-line survey. Seven of these ten have agreed to one-on-one interviews. Five of the seven have already completed the one-on-one interviews. Each term we invited the new students in these courses to participate in this ongoing study.

While the amount of current data is insufficient for conclusions, based on the current data, 86% of respondents believe that videos are more effective than readings for learning. Additionally, 86% believe that "how to" videos are the type of video they find most effective. We look forward to continuing our research and reporting the results.

REFERENCES

Barber, J, Cevenini, P, Crawford, A. (2012). Video Solves Key Challenges in Higher Education, Cisco Internet Business Solutions Group. Retrieved from http://www.cisco.com/web/about/ac79/docs/re/Video-in-Higher-Education.pdf

Dunn, J. (2011). The Evolution of Classroom Technology. Edudemic. Retrieved from http://www.edudemic.com/classroom-technology/

Guo, P, Kim, J, & Rubin, R. (2014). How Video Production Affects Student Engagement: An Empirical Study of MOOC Videos. ACM, Retrieved from http://pgbovine.net/publications/edX-MOOC-video-production-and-engagement_LAS-2014.pdf

Harven, M. (2015). What YouTube is doing for education, EduTech Times. Retrieved from http://edtechtimes.com/2015/01/07/youtube-education/

Kaltura. (2014). Kaltura Publishes First Comprehensive Survey Analyzing the Impact of Video on Education. Retrieved from http://corp.kaltura.com/company/news/press-release/kaltura-publishes-first-comprehensive-survey-analyzing-impact-video

Khan, S. (2011). Let's use video to reinvent education, TED2011 talk. Interactive transcript retrieved from http://www.ted.com/talks/salman_khan_let_s_use_video_to_reinvent_education

HOSPITAL EFFICIENCY MEASUREMENT USING A DATA ENVELOPMENT ANALYSIS METHOD AND ARTIFICIAL NEURAL NETWORKS

Juyun Cho, Ph.D.
Malik and Seeme Hasan School of Business
Colorado State University-Pueblo
joey.cho@csupueblo.edu

ABSTRACT

The U.S. national health care expenditure including Medicare and Medicaid has been growing enormously, and the growing rate is faster than the average annual growth rate for GDP. The high national health care expenditure can be a threat to the fiscal imbalance of our nation and can be a roadblock in allocating resources to funding education, building infrastructure, and enhancing national security. Improving hospital efficiency is of vital importance to slow down the rapid increase in national health care expenditure.

This paper employs a nonparametric approach to measure the efficiency of each hospital called Decision Making Unit (DMU). Five factors including number of doctors, number of nurses, number of beds, number of inpatients, and number of outpatients of 320 hospitals in Texas are collected.

Using a Data Envelopment Analysis model and publicly available data, the performance of hospitals is evaluated. The efficiency levels of the hospitals are compared and analyzed by considering the five types of variables describing main characteristics of hospitals. Then, the artificial neural networks using a back propagation model are utilized to predict each hospital's efficiency score based on the results of the data envelopment analysis model.

The result of this study gives administrators not only an insight on their current efficiency rate and the ranking among the hospitals participated but also a way of changing their inefficiencies.

Keywords: Hospital Efficiency, Data Envelopment Analysis, Artificial Neural Networks, Backpropagation

Proceedings of the International Association for Computer Information Systems,
55th Annual Conference, Clearwater Beach, Florida, October 2015

EFFECT OF GRAPH REPRESENTATION ON DECISION STRATEGIES

DK Kim, Dalton State College, dkim@daltonstate.edu
Chongwook Park, Georgia Gwinnett College, cpark@ggc.edu

Keywords: Decision strategy, 3d, Graph, Heuristics

The role of visualization became increasingly important in the era of big data and business analytics. In this paper, we study the decision makers' behavior based on the different representation of graphs: 2D vs. pseudo 3D. The latter graphs are those that have only two axis (therefore, 2D in nature), but with 3D effects for decoration; therefore, the third axis in the graphs represents nothing. Such pseudo 3D charts have been criticized for not carrying more information than their 2D counterparts, tend to make readers confused, and therefore should not be used (e.g., Tufte, 1983). Even though such a claim is accepted without much protest, there is a dearth of experimental research that studies the potential detrimental effect of pseudo 3D charts on decision makers. This paper aims to correct such a deficiency in the literature. Particularly, we are interested in whether or not decision makers use different decision strategies. When tasks are more complex, decision makers may change decision strategies to reduce cognitive effort (Vessey, 1994). In such a case, a decision maker may rely on simpler decision strategies, such as heuristics. Since 3D graphs may put unnecessary cognitive burden to readers, our research question is "Will presenting complex pseudo 3D, instead of 2D, graphs result in the use of different decision strategies?"

The data will be collected through an experiment, in which participants will perform a decision making task based on graphs and/or a table using computers. Each participant will go through multiple iterations of the same task with different data in each time. Partly based on the theory of cognitive fit (Vessey, 1991), we manipulate two independent variables: the order of external representation of the problem and task complexity. External representation is either 2D or pseudo 3D graphs of the same data, which are generated by using Microsoft Excel with default settings. The task will have different levels of complexity: simple and complex.

The experiment is time-limited. That is, participants are told to finish the task within a certain amount of time. The total time taken to finish the tasks and their overall accuracy determines their performance. Top performers are offered monetary incentives. That is, answering as quickly as possible and as accurately as possible is rewarding in the experiment. Therefore, time spent on each question and the correctness are the main variables of interest.

When the time is pressing, decision makers may use the one-reason heuristics, which may be observed in the control group. However, if decision makers feel that the first piece of information they have is inadequate, they may obtain another piece of information to corroborate the findings of the first piece. The experiment results can answer to the following questions among others: Which piece of information do they prefer for the task? Do they use the simple heuristics, particularly one-reason heuristics? Can a pseudo 3D graph alone make participants confident enough to make a decision?

An important implication is whether or not the use of pseudo 3D graphs is justified. The use of pseudo 3D graphs are used in many places: advertisement, reports, presentation, Web, etc. If pseudo 3D graphs are inferior to their 2D counterparts, they should not be used or at least not encouraged. On the other hand, pseudo 3D graphs may create different perception about the decision problem compared to 2D counterparts. Therefore, the study may find the potentially good use of pseudo 3D graphs.

References

Tufte, E. R. (1983). *The Visual Display of Quantitative Information.* Cheshire, CT: Graphics press.

Vessey, I. (1991). Cognitive fit: A theory-based analysis of the graphs versus tables literature. *Decision Sciences, 22*, 219-240.

Vessey, I. (1994). The effect of information presentation on decision making: A cost-benefit analysis. *Information & Management, 27*, 103-119.

I.S. CURRICULAR IMPLICATIONS OF ONGOING CHANGES IN MOBILE APP DEVELOPMENT

Thomas S. E. Hilton, University of Wisconsin–Eau Claire, HiltonTS@uwec.edu
Liqiang Chen, University of Wisconsin–Eau Claire, ChenLiqi@uwec.edu

Basis of the Study

As recently as five years ago, mobile app development was viewed by many as an exotic frill in the information systems curriculum, all the moreso as the IS 2010 Model Curriculum relegated all programming to elective status (Topi, et al., 2010). In this paper we propose that mobile app management from initial inception through post-implementation maintenance must become not only a mainstream component in the IS curriculum but be recognized as a major influence on most other components of the IS curriculum as well.

Study Description

We begin this paper with a brief review of the history of mobile phones from the first cellular telephones to proprietary feature phones and then on to today's programmable smart phones (e.g. Clark, 2012). In this review we aim to show how the first highly proprietary, rudimentary app development tools evolved into today's widely available, sophisticated environments.

Next we discuss current characteristics and issues in mobile app development, emphasizing emergent challenges in app design, development tools and methods, and post-implementation app management (Bergvall-Kåreborn & Howcroft, 2014) (Furner, Racherla, & Babb, 2015) (Khalid, Zahra, & Khan, 2014). We also overview the growth of the mobile app market and user base (Meyers, 2011).

Curriculum Implications

The heart of our paper is a discussion of IS curriculum implications for these challenges. We base our discussion on the IS 2010 Model Curriculum (Topi, et al., 2010), showing our view of how mobile app development trends must shape the body of knowledge in the IS field (Iacob, Harrison, & Faily, 2014). Specifically, we suggest changes in the content of each IS 2010 core course and several of the model curriculum's elective courses (Khalid, Zahra, & Khan, 2014) (Humayoun, Hess, & Ebert, 2014) (Zhang, Tsang, Cheow, Ho, & Ho, 2014), and many similar sources.

Conclusions

We conclude with a summary of the changing nature of the IS profession brought on by the rise of smart phone apps and changes to the IS curriculum we believe are therefore necessary. We suggest possible future directions for ongoing evolution of the IS curriculum based on likely further developments in smart phone apps.

References

Bergvall-Kåreborn, B., & Howcroft, D. (2014). Persistent problems and practices in information systems development: a study of mobile applications development and distribution. *Information Systems Journal, 24*(5), 425-444. Retrieved May 16, 2015, from http://onlinelibrary.wiley.com/doi/10.1111/isj.12036/full

e.g. Clark, J. F. (2012). *History of Mobile Applications.* Lexington, KY: University of Kentucky.

Furner, C. P., Racherla, P., & Babb, J. S. (2015). What We Know and Do Not Know About Mobile App Usage and Stickiness: A Research Agenda. *International Journal of E-Services and Mobile Applications, 7*(3), 48-69. Retrieved May 16, 2015, from http://www.igi-global.com/article/what-we-know-and-do-not-know-about-mobile-app-usage-and-stickiness/127986

Humayoun, S. R., Hess, S., & Ebert, A. (2014). Report from the workshop on prototyping to support the interaction designing in mobile application development. *ACM SIGSOFT Software Engineering Notes, 39*(1), 28-30. Retrieved May 16, 2015, from http://dl.acm.org/citation.cfm?id=2557857

Iacob, C., Harrison, R., & Faily, S. (2014). Online reviews as first class artifacts in mobile app development. *Mobile Computing, Applications, and Services*, 47-53. Retrieved May 16, 2015, from http://link.springer.com/chapter/10.1007/978-3-319-05452-0_4

Khalid, A., Zahra, S., & Khan, M. F. (2014). Suitability and Contribution of Agile Methods in Mobile Software Development. *International Journal of Modern Education and Computer Science, 2*, 56-62. Retrieved May 16, 2016, from http://www.mecs-press.org/ijmecs/ijmecs-v6-n2/IJMECS-V6-N2-8.pdf

Meyers, J. (2011, May 6). *The Incredible 70-Year Evolution of the Cell Phone*. Retrieved from Business Insider: http://www.businessinsider.com/complete-visual-history-of-cell-phones-2011-5

Topi, H., Valacich, J. S., Wright, R. T., Kaiser, K. M., Nunamaker, J. F., Sipior, J. C., & de Vreede, G. J. (2010, January 9). *Curricula Recommendations.* Retrieved from ACM: Association for Computing Machinery: https://www.acm.org/education/curricula/IS%202010%20ACM%20final.pdf

Zhang, M. W., Tsang, T., Cheow, E., Ho, C. S., & Ho, R. C. (2014). Enabling Psychiatrists to be Mobile Phone App Developers: Insights Into App Development Methodologies. *JMIR mHealth and uHealth, 2*(4). Retrieved May 16, 2015, from http://mhealth.jmir.org/2014/4/e53

ONLINE PRIVACY: EFFECT OF PERCEIVED RISK, PERCEIVED INFORMATION VALUE AND CYBER-SECURITY SELF-EFFICACY ON INFORMATION SHARING INTENTIONS

Wei Sha, Pittsburg State University, wsha@pittstate.edu

Keywords: perceived risk, perceived information value, cyber-security, self-efficacy, intentions

INTRODUCTION

This research focuses on whether perceived risk, perceived information value and cyber-security self-efficacy could have significant effects on a person's intentions to share private information online. Online users sometimes would willingly share their information with various questionable online websites, and this could lead to disastrous consequences such as identity loss or even financial disasters. This research focuses on examine why people would be so willing to share their personal information online, and provide possible solutions to assist an online user to better protect himself/herself. This study is important topic to IACIS conference participants since this study could advance current understanding about IS research on online privacy issues. Additionally, This study is also closely related to discussion topics of this IACIS international conference such as privacy of information, social networking and e-commerce.

THE STUDY

Perceived risk is defined as the degree to which a person believes that online information sharing could lead to negative outcomes (Featherman and Wells, 2010). Perceived information value is defined as how much value a person would assess on his/her own private information. Cyber-security self-efficacy is defined as the degree to which a person believes in his/her own capabilities to safeguard his/her own private information (Agarwal et al 2000). This research focuses on propose that many online users may have difficulty to evaluate risks associated with online activities, the value of their own personal information and their cyber-security self-efficacy. Many users simply don't believe there are risks in sharing information online, and may have misconceptions about the value of their personal information. They also may not believe their own capabilities to manage complex passwords to protect their online information. This would lead many online users to rely on websites or vendors to protect their privacy. The effect of perceived risk, perceived information value and cyber-security self-efficacy on intentions would be examined in a nomological network. The convergent and discriminant validities for these constructs will also be examined.

Data would be collected from 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. 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 risk to shed new lights on the role of perceived risk, perceived information value, cyber-security self-efficacy on a person's intentions to share private information online. This study is important to IT professionals since the results of this study could help them understand how to alleviate people's risk beliefs and enhance their self-efficacy at the same time. This will help users to better protect their privacy and in turn improve overall business practices.

REFERENCES

Agarwal, R., Sambamurthy, V., and Stair, R.M. (2000). Research report: the evolving relationship between general and specific computer self-efficacy: An empirical assessment, Information Systems Research, 11, 418–430.

Featherman, M. S & Wells, J. D. (2010). The intangibility of e-Services: Effects on perceived risk and acceptance. The DATA BASE for Advances in Information Systems, 41, 110 – 131.

ACTIVE LEARNING IN ONLINE COURSES

Deanna Klein, Minot State University, deanna.Klein@minotstateu.edu
Alex Koohang, Middle Georgia State University, alex.koohang@mga.edu
Joanna Paliszkiewicz, Warsaw University of Life Sciences, joanna_paliszkiewicz@sggw.pl

ABSTRACT

E-learning is becoming increasing popular in higher education institutions. Allen and Seaman [1] reported that at least 7.1 million post-secondary students in the USA are taking at least one online course. As e-learning popularity intensifies and becomes a natural part of educating in higher education institutions, the ensuring of "learning" by "creating new knowledge" in e-learning becomes an imperative element.

The literature supports the notion that “learning” in e-learning is achieved through "active learning" [2, 3, 4]. In active learning, learning focuses on construction of new knowledge. There are a number of elements that play a crucial role in achieving knowledge construction through active learning. These elements are normally included in the design of online course activities, assignments, and/or projects to ensure the success of “learning” in e-learning environments.

The purpose of this study is to 1) gather information on learners’ views about the inclusion of active learning elements in online courses and to what extend they are encouraged in the online course activities, assignments, and/or projects; and 2) assess learners’ perceived views about the importance of inclusion of these active learning elements in their online course activities, assignments, and/or projects.

A survey on knowledge construction through active learning in e-learning was developed and administered students who were taking online courses in a small-sized higher education institution in the Midwestern region of the USA. Students were males and females enrolled in undergraduate and graduate online courses.

The analyses of data are expected to show 1) the learners’ views about knowledge construction through active learning and to what extent active learning is encouraged in online courses; and 2) learners’ perceive importance of active learning for knowledge construction in e-learning. In addition, two selected independent variables (gender and college status) are examined to see if there are difference between these independent variables and the dependent variable of active learning in e-learning. Study limitations, implications, and recommendation for future research will be discussed.

Keywords: active learning, knowledge construction, e-learning, online course design

REFERENCES

[1] Allen, E. & Seaman, J. (2014). *Grade Change: Tracking Online Education in the United States*. Retrieved February 07, 2015 from http://onlinelearningconsortium.org/survey_report/2013-survey-online-learning-report/
[2] Du Plessis, J. & Koohang A. (2007). Securing learning in learning objects. *International Journal of Innovation and Learning*, *4*(2), 197-208.
[3] Hung D. (2001). Design principles for web-based learning; implications for Vygotskian thought. *Educational Technology*, *41*(3), 33-41.
[4] Koohang, A. (2012). Active learning in e-learning: advancing a systemic model. *Issues in Information Systems*, *13*(1), 68-76.

TECHNOLOGY, LEADERSHIP, AND CULTURE: ESSENTIAL IN THE BIG DATA ERA

Deanna Klein, Minot State University, deanna.klein@minotstateu.edu
Gino Maxi, Minot State University, gnmaxi@yahoo.com

ABSTRACT

Data-Based Wisdom can be described as the use of technology, leadership, and culture to create, transfer, and preserve the organizational knowledge embedded in its data, with a view to achieving the organizational vision. Technology, leadership, and culture are essential within the big data era [1, 2, 3, and 4]. With time, technology, leadership, and culture have transformed into more than tangible items that include social leadership concepts and learned behavioral patterns. These ideas have evolved along with the technological advances infused into society as we know it today. Therefore, the value and emphasis to develop and maintain intricate and efficient knowledge management databases suitable to create, transfer, and preserve organizational knowledge embedded in its data, has never been more vital.

The purpose of this study is to research the different uses of Data-Based Wisdom and their purpose. The primary focus is on the use of technology, leadership, and culture to create, transfer, and preserves organizational knowledge embedded in data.

Literature shows that *technology* plays a part in setting the framework where big data lies; technology not only sets the framework for big data, but it also allows for the creation, transfer and preservation of such data due to its purpose within society [1, 3, and 4]. While there are many Leadership styles, the style used within an organization when dealing with big data is determined by the leader and what kind of environmental factors he/she is dealing with, such as high risk, high stress, or Community of Practice [1]. When considering *cultural* impact within the big data era, it would be helpful to consider if culture impacts the changes on how big data is used and viewed by the culture of today's generation, relative to the culture of past generations. The importance will continue to grow as changes in technology, leadership concepts, and culture continue to inundate [2 and 3].

Throughout time, collectively we have advanced our use of technology, and changed the way we lead. These advances have unintentionally changed today's culture. For culture is based on how individuals within our society approached facets of life within the scope of understanding they have gained. Advances in technology has created the need to make life easier and more efficient, changes from a more dictatorship leadership style to a more democratic leadership style has allowed the inclusion of different opinions and expertise within an organization's CoP in regards to big data. This leads to a transition from a more conservative culture to being susceptible to change and has created a culture of new trends and ideas when using technology that allows for the creation and retrieval of data. One cannot conclude that the changes within those facets of life are detrimental to generations to come; for we are living within the scope of our understanding. What we do understand today is that with time, comes change and more data. The emergence, expansion, and widespread use of innovative products and services at decreasing marginal costs have revolutionized global economies and societal structures, facilitating [leadership] access to technology and knowledge [technology], and fomenting social change [culture].

Keywords: technology, leadership, culture, big data

REFERENCES

[1] Benincasa, R. (2012). 6 Leadership Style, and When You Should Use Them. *Fast Company Article*. Retrieved January 5, 2014, from http://www.fastcompany.com/1838481/6-leadership-styles-and-when-you-should-use-them
[2] Generation Culture. (2014). Generation X, and Nexter. *Generation Culture*. Retrieved February 3, 2014, from http://www.generationmodel.eu/
[3] Kohls, R. L. (2013). What is Culture? *Systran Publications*. Retrieved January 31, 2014, from http://www.bodylanguagecards.com/culture/31-what-is-culture
[4] Polonetsky, J. & Tene, O. (2013). Privacy and Big Data: Making Ends Meet. *Stanford Law Review*. Retrieved July 3, 2014, from http://www.stanfordlawreview.org/online/privacy-and-big-data/privacy-and-big-data

Proceedings of the International Association for Computer Information Systems,
55th Annual Conference, Clearwater Beach, Florida, October 2015

A DISCUSSION OF POLANYI'S TACIT DIMENSION AS A PERSPECTIVE OF KNOWLEDGE MANAGEMENT

Robert Joseph Skovira, Robert Morris University, skovira@rmu.edu

ABSTRACT

Keywords: Polanyi, tacit dimension, tacit knowing, knowledge management.

Knowledge management as a field consists of multiple perspectives or views on its nature, its applications, its theoretical grounds, and its empirical approaches to knowledge as a tool for business innovation. This paper is about one of those perspectives which began life as a discussion about the discovery of new knowledge; this perspective is the intellectual work of the scientist-philosopher Michael Polanyi. According to Ma and Yu [10], Polanyi is one of the most cited authors in KM, ever since his idea of "tacit knowing" was introduced to the business world around 1982 [18].

Nonaka (also on the list of most cited authors) and his collaborators [4, 5, 6, 7, 8, 9] while discussing tacit knowledge, have developed a model of creating and using knowledge a a corporate tool for innovation. Davenport (also on the list) and his collaborator [1, 2] have developed a theory of knowledge use and sharing, the knowledge marketplace, for the corporation as a learning organization.

The problem for this discussion is to determine those aspects constituting Polanyi's [11, 12, 13, 14, 15, 16, 17] tacit dimension in order to facilitate further research into the use of knowledge within the business world. Consequently, the essay will look at the nature of the tacit dimension as it integrates his notions of tacit knowing and tacit knowledge. It will consider Polanyi's tacit relation of From – To, subsidiary and focal awareness, indwelling, the roles of language and culture, and his seminal idea of conviviality as a necessary ground for the discovery of new knowledge within problem-solving inquiries.

The essay concludes with the development of a model that places the search for new knowledge at the heart of business innovation. It is this reach of Polanyi's theory of tacit knowledge that makes this a significant paradigm, according to Kuhn [3], in the understanding and interpretation of the particulars of knowledge management.

1. REFERENCES

2. Davenport, T. H. (with Prusak, L.). (1997). *Information ecology: Mastering the information and knowledge environment*. New York Oxford: Oxford University Press.
3. Davenport, T. H. & Prusak, L. (2000). *Working knowledge: how organizations manage what they know*. Boston MA: Harvard Business School Press.
4. Kuhn, T. (1970). *The structure of scientific revolutions*. Chicago: The University of Chicago Press.
5. Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization science 5* 91), 14-37.
6. Nonaka, I. & Takeuchi, H.(1995). *The knowledge-creating company*. Boston MA: Harvard Business School Press.
7. Nonaka, I. (1998). The knowledge-creating company. In *Harvard Business Review on Knowledge Management* (pp. 21-45). Boston MA: Harvard Business School Press.
8. Nonaka, I. & Konno, N. (1998). The concept of "ba": Building a foundation for knowledge creation. *California management review 40* (3), 40-54.
9. Nonaka, I. & Konno, N. (1999). The concept of 'Ba': Building a foundation for knowledge creation. In J. W. Cortada & J. A. Woods. (Eds.), *The Knowledge Management Yearbook 1999-2000* (pp. 37-51). Boston: Butterworth-Heinemann.
10. Nonaka, I. & von Krogh, G. (2009). Tacit knowledge and knowledge conversion: Controversy and advancement in organizational knowledge creation theory. *Organization science 20* (3), 635-652.
11. Ma, Z. & Yu, K. (2010). Research paradigms of contemporary knowledge management studies: 1998-2007. *Journal of knowledge management 14* (2), 175-189.

12. Polanyi, M. (1946). *Science, faith, and society*. Chicago and London: The University of Chicago Press.
13. Polanyi, M. (1951). *The logic of liberty*. Indianapolis, IN: Liberty Fund. (Originally published in 1951 by Routledge & Kegan Paul).
14. Polanyi, M. (1962). *Personal knowledge: Towards a post-critical philosophy*. Chicago: University of Chicago Press.
15. Polanyi, M. (1966). *The tacit dimension*. Chicago: The University of Chicago Press.
16. Polanyi, M. (1969). *Knowing and being*. (Marijorie Greene, ed.). Chicago: The University of Chicago Press.
17. Polanyi, M. & Prosch, H. (1975). *Meaning*. Chicago: The University of Chicago Press.
18. Polanyi, M. (2014). *The study of man*. Mansfield Centre, CT: Mertino Press. (Originally published in 1959 by The University of Chicago Press).
19. Spender, J –C. (1996). Making knowledge the basis of a dynamic theory of the firm. *Strategic management journal 17*, 45-62.

A WEBSITE AUDIT AS A SERVICE LEARNING PROJECT

Philip Kim, Walsh University, pim@walsh.edu

INTRODUCTION

Academic institutions are seeking to integrate service learning courses within their curriculum. Service learning provides a way for students to merge conceptual theories with real-world experiences. Emphasizing community engagement can also enhance the student experience and create a culture of service on campus [2]. Service learning is a "course-based, credit-bearing educational experience in which students (a) participate in an organized service activity that meets identified community needs and (b) reflect on the service activity in such a way as to gain further understanding of course content, a broader appreciation of the discipline, and an enhanced sense of civic responsibility" [1, p.112]. This differs from most extra-curricular service in that there is a formal structure, assessment of student outcomes, and evaluation of student performance.

SERVICE LEARNING

Most non-profit organizations that partner with small private liberal arts universities are small organizations with a local focus. These organizations often have limited financial and human resources [8]. This provides a unique opportunity for students from various disciplines to put theory to practice. A low-risk, but high impact strategy for technology-related courses is to have students conduct a website audit for the service-based partner.

WEBSITE AUDIT

A website audit includes website usability and visibility [4]. There are numerous website usability studies such as the System Usability Scale [11], Questionnaire for User Interface Satisfaction [6], and the Computer System Usability Questionnaire [10] that have been utilized to analyze website effectiveness. Among the various tools, there are common questions among the surveys such as ease of use, visual appeal, accessibility, intuitive design, organization of information, and the accuracy of information.

Additionally, Website content analyses have previously been applied in research studies relating to e-business [5; 7; 9]. Websites have become a strong democratizing tool for non-profit organizations. With numerous low or no-cost web site providers and annual web hosting vendors continually competing on pennies, the cost of implementing a brand new website is no longer a barrier for organizations with limited financial resources [3]. An active and appealing website becomes even more important when trying to recruit the college-aged students to become involved with non-profit service-based organizations that deal with community engagement.

IMPLICATIONS FOR FUTURE RESEARCH

There are still many non-profits that need to focus their efforts on improving their websites. Part of the problem is a lack of awareness of what tools are readily available to create free or low-cost websites. Another challenge is not knowing what constitutes a good and effective website. A website audit can be used as a didactic tool to teach both the service learning client as well as the students what components an effective website should have.

There is also the resource limitations of managing, maintaining, and updating the website. Many non-profit organizations rely on external consultants for IT support and fear their IT budget would be wasted on tasks that should be managed by entry-

level or internship positions. This gap provides a unique opportunity for the IS faculty, IS students, and service partners to work together. These service learning courses should include website audits.

REFERENCES

1. Bringle, R.G., & Hatcher, J.A. (1995). A Service-Learning Curriculum for Faculty. *Michigan Journal of Community Service Learning*, 112-122.

2. Bringle, R.G., & Hatcher, J.A. (1996). Implementing service learning in higher education. *Journal of Higher Education*, 67, 221-239.
3. Carlton, D. and J. Chevalier (2001). Free Riding and Sales Strategies for the Internet. *The Journal of Industrial Economics*, 49, 441-462.
4. Caro, A., Calero, C., Moraga, M.A. (2011). Are web visibility and data quality related concepts? *IEEE Internet Computing*, 15, 43-49.
5. Gordon, R. (2011). An audit of alcohol brand websites. *Drug and Alcohol Review*, 30(6), 638-644.
6. Harper. B. & Norman, K. (1993). Improving user satisfaction: The questionnaire for user satisfaction interaction version 5.5. *In Proceedings of the First Annual Mid-Atlantic Human Factors Conference* (Virginia Beach, VA), pp. 224–228.
7. Herring, S.C. (2010). Web content analysis: Expanding the paradigm. *In International Handbook of Internet Research,* 233-49.
8. Kenix, L.J. (2007) In search of utopia: an analysis of non-profit web pages. *Information, Communication & Society*, 10(1), 69-94.
9. Kim, I. and Kuljis, J. (2010). Applying content analysis to web based content. *32nd International Conference on Information Technology Interfaces*, Cavtat, Croatia.
10. Lewis, J. R. (1995) IBM computer usability satisfaction questionnaires: Psychometric evaluation and instructions for use. *International Journal of Human-Computer Interaction*, 7(1):57–78
11. Lewis, J.R., & Sauro, J. (2009). The factor structure of the system usability scale. *Proceedings of International conference* (HCII 2009), San Diego, CA.

Getting Started with Enterprise Architecture Research:

A Venue to connect with Industry and Government

Sheila A. Cane, The MITRE Corporation, sheila@mitre.org
Richard V. McCarthy, Quinnipiac University, richard.mcCarthy@quinnipiac.edu

Keywords: Enterprise Architecture, EABOK

Enterprise Architecture was added to model curriculum for information systems programs beginning in 2010. There are no quality peer-reviewed publications that specifically support teaching Enterprise Architecture (EA) and virtually no teaching cases.

The Enterprise Architecture Body of Knowledge (EABOK) is an open access, double blind, peer-reviewed online body of knowledge designed to evolve with the relatively young field of EA. The EABOK is a partnership between with government, industry and academia on practical research to provide a mechanism and resources to support teaching EA. It provides a mechanism to connect academics with industry and government partners to advance the field.

The purpose of the presentation will be to describe the EABOK's plan to create a resource for enterprise architecture teaching and research, and to inform faculty of ways in which they can be involved in expanding this body of knowledge. We intend to provide an overview of the EABOK, a discussion of the EABOK as a repository for practical research, including case studies, our plan for registering the EABOK as a peer reviewed open access publication that will generate a additional opportunities for publishing research . We will also discuss ways in which it can be used to link to potential research partners. Finally we will discuss options for the academic community to get involved by participating in the editorial review board and by participating in conferences and workshops.

Proceedings of the International Association for Computer Information Systems,
55th Annual Conference, Clearwater Beach, Florida, October 2015

Selecting Contents for a new Virtualization Course in Information Technology (IT) Track

Azad Ali, Indiana University of Pennsylvania, azad.ali@iup.edu

ABSTRACT

The purpose of this paper is to research for contents in a new developed course in computer technology virtualization for a proposed Information Technology (IT) track. Information Technology programs face changes in their curriculum programs probably more than any other program. Some IT programs may follow traditional steps and develop new courses that are common to IT courses (like a course in programming, database, systems analysis or other similar). However, a course in computer virtualization is atypical to other IT courses. Thus selecting contents for a course like this creates unique challenges that need to be addressed differently.

This paper conducts research and reviews literature on computer virtualization. The goal of this study is to select contents for inclusion in a new course syllabus in virtualization. Our department has decided to introduce a new course in computer virtualization into our curriculum. We intend to include the course contents that we find from our research in this study in our new course syllabus so we present it as we move forward for additional approvals to add the course to our program.

Big Data & Students: Let's Find the Needle in the Haystack

Kristi Berg, Minot State University, kristi.berg@minotstateu.edu
Carla Cabarle, Minot State University, carla.cabarle@minotstateu.edu

Obtaining useful information from big data can be challenging. It is much easier to get the needle into the haystack than out, the same can be said with big data. Data, much like a needle in a haystack, is useless unless it can be transformed into information that can be analyzed and interpreted, then converted into useful knowledge. Students are in the midst of this data explosion. In our classrooms they are preparing for the world of work, but are they really ready for the complexities of big data as it relates to a spike in aspirin sales and do they really understand how Uber is taking taxi cabs off the road with big data?

What is the role of higher education in the big data realm? Not enough based upon the literature. While many degree programs expose students to pre-big data logic, most do not take it to a place of applied research on big data analytics. What's the solution, how do or should we equip our students for the world of big data?

The panelists will address this very issue relating to their respective business disciplines. The session will begin with a review of big data headlines from the past six years followed by a discussion on teaching strategies used to equip students with big data analysis skills and techniques to prepare them for careers for careers in accounting, information systems and other business disciplines.

REFERENCES

Daniel, B., & Butson, R. (2014, September). Foundations of Big Data and Analytics in Higher Education. In International Conference on Analytics Driven Solutions: ICAS2014 (p. 39). Academic Conferences Limited.

Liu, Y. (2014). Big Data and Predictive Business Analytics. The Journal of Business Forecasting, 33(4), 40.

Wahi, A. K., Medury, Y., & Misra, R. K. (2015). Big Data: Enabler or Challenge for Enterprise 2.0. International Journal of Service Science, Management, Engineering, and Technology (IJSSMET), 6(2), 1-17.

PERSONAL TIME MANAGEMENT IN THE DIGITAL WORKPLACE: STEALING COMPANY TIME

Debra J. Borkovich, Robert Morris University, borkovich@rmu.edu
Robert Joseph Skovira, Robert Morris University, skovira@rmu.edu
Frederick G. Kohun, Robert Morris University, kohun@rmu.edu
Jennifer Breese-Vitelli, Middle GA State University, jennifer.breese-vitelli@mga.edu

Abstract

The implementation of corporate codes of conduct, ethics/compliance programs, training, webcams, ID card-readers, bio-technologies, random spot checks of employees' personal items, and felonious pursuit of criminal theft in the workplace have successfully resulted in a decline of white- and blue-collar larceny in recent years. But what about the misappropriation of an employer's time? This panel discussion focuses on the exploration of de Certeau's (1984) metaphoric construct of "la perruque" (French term meaning "wig"), a diversionary practice of using an employer's resources for personal use. De Certeau theorized that a worker's nonproductive time is often disguised as work for the employer and clearly differentiated "la perruque" from the unlawful taking of things or absenteeism since the worker is officially on the job. Organizational time management studies of manufacturing or labor-based environments resulted in affirmative findings that employees spend a certain amount of daily time on what is commonly referred to as personal business. However, the purpose of this panel is to apply the construct of "la perruque" to a knowledge-based 21st century Information Age American workplace where the use of mobile technology devices is mandated and prolific. Unique to this discussion is the examination of invisible organizational remedies to workplace injustices known as the Robin Hood effect (Nadisic, 2008).

Key Words: La Perruque, Robin Hood effect, invisible workplace injustice, pilfering time, organizational culture, mobile technology devices

Discussion

This panel discussion focuses on two questions: 1). How is non-productive time spent in the 21st century digital workplace? - *and* - 2). Why do generally honest employees disguise personal business as productive work time? To address these questions, we will illustrate the social-cultural construct of "la perruque" by applying it to an American white-collar digital environment. Then we will introduce and explore the following five outcomes of workplace injustices that manifest in the diversionary tactic of using an employer's resources for personal use.

- Loss of trust. Workplace cultural changes are signifying disintegrating relationships of mutual trust between employees and employers (Anteby, 2008) fostered by organizational digital environments that mandate and demand its employees to be "always on" 24/7/365.
- Erosion of power and risk. The organizational erosion of power distance and uncertainty avoidance (Hofstede, Hofstede, & Minkov, 2010) are exacerbated by American workers' reliance upon and obsession with mobile digital technology; and the acceptable measures of risk that workers are willing to take while on the job.
- Decline of monochronic behavior. Linear monochronic behavior generally attributed to Americans (Hall, 1990) has manifested into commonly accepted multi-tasking practices of polychronic behavior, as employees covertly and overtly implement personal and business mobile devices in the workplace.
- Robin Hood effect. The real-time demands of corporate life mandating that employees be technologically tethered and always available to employers have resulted in a type of negative reciprocity (retaliatory) known as the Robin Hood effect (Nadisic, 2008). This phenomenon convinces employees that it is acceptable to utilize a few work hours each day for personal business because their respective employers believe it is equally acceptable to take back earned hours of vacation, sick, holiday, evening, and weekend time from the white-collar worker to perform on-call anytime.

- Invisible organizational remedies to workplace injustices. When employees steal company time for personal business as compensation for lost personal time pilfered by the employer, employers turn a blind eye because every level and layer of management is doing the same thing (i.e. pervasive use of mobile tech devices). Alternatively, managers may allocate an invisible wage system of compensatory time (off-the-books while in the workplace) in lieu of formal compensation or benefits (Nadisic, 2008).

Our panel will synthesize these various perspectives to present how American employees manage their personal time during the workday to justify their non-work-related activities as essential and appropriate. We will argue that American workers' reliance upon and obsession with the implementation of 21st century mobile digital technology clearly plays a role in the manifestation of "la perruque" in the white-collar workplace and that these factors influence and convince many American employees that "la perruque" is an acceptable practice. We will then open the floor to audience discussion and opinions; and solicit areas of interest to provoke further study.

References

Anteby, M. (2008). *Moral gray zones: Side productions, identity, and regulation in an aeronautic plant*. Princeton, NJ: Princeton University Press.

De Certeau, M. (1984). *The practice of everyday life*. Berkeley, CA: University of California Press. [Translated by Steven F. Rendall]

Hall, E. T. (1990). *The silent language*. New York: Anchor Books. (Original work published 1959)

Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and organizations: Software of the mind*. New York, NY: McGraw-Hill.

Nadisic, T. (2008). The Robin Hood effect: Antecedents and consequences of managers using invisible remedies to correct workplace injustice. In S. Gilliland, D. Skarlicki, & D. Steiner (Eds.), *Justice, morality, and social responsibility* (pp. 125-153). Charlotte, NC: Information Age Publishing.

BIG DATA:
THE INS AND OUTS OF ADDING AN UNDERGRADUATE MAJOR IN DATA ANALTICS

Michele Kleckner, Elon University, mkleckne@elon.edu
Orion Welch, St. Mary's University, owelch@stmarytx.edu

Keywords: big data, data analytics, undergraduate analytics degree

Introduction

Several universities offer Master's degrees or certificates in Analytics and or Data Mining. A few examples are Stanford University, Northwestern University, and University of California San Diego. Arizona State University is offering a BS in Business Data Analytics. This seems to be echoed in national trends. For example, The McKinsey Global Institute published a report in 2011 predicting there will be a shortage of talent necessary for organizations to take advantage of big data. They estimate that by 2018, the United States could face a shortage of up to 200,000 people with deep analytical skills. They also predict that there would be a critical shortage of managers possessing the know-how to use the analysis of big data to make effective decisions.

Some universities have addressed this need by developing specialized master level programs. For smaller universities it might be more realistic to develop an intersection of expertise between data analytics, information systems, and specific domain expertise that produces a curricular design that is heavily influenced by input from industry and local employment market. Two such attempts will be discussed in this presentation, an Accounting and Data Analytics major that was implemented in 2014 at St. Mary's University and a revised Management Major with a Career Track in Business Analytics will begin fall 2015 at Elon University. Faculty members from these two universities will share what their universities are doing in the area of big data and data analytics. The presentation will describe how their own universities addressed the "big data" major at the undergraduate level. The presentation will include descriptions of their data analytics programs, describe the rationale for creating the new majors, discuss the data analytics courses in the degree plans, discuss the faculty training that occurred, and the initial student interest they have experienced with the new degrees.

BBA in Accounting and Data Analytics – St. Mary's University

The Accounting and Data Analytics major at St. Mary's University offers a distinct degree path for students to complete an undergraduate degree that will satisfy requirements to sit for the CPA examination and provide them with an extremely marketable degree. The state of Texas requires that they have completed a bachelor's degree and have a total of 150 hours, including 30 hours of upper division accounting courses. In addition to a traditional accounting curriculum the new degree provides course work in information systems, data analytics, data modeling, enterprise resource planning, and IT auditing. The new degree has the additional advantage of allowing many students to maintain access to financial aid, which would be generally reduced if they graduated and enrolled in a masters program to complete the 150-hour requirement. The need for the new degree was validated through enrollment management and marketed within the local community as a differentiator to attract both high school and transfer students.

The courses required to support the new majors were a joint effort between the Greehey School of Business (GSB) and the School of Science Engineering and Technology (SET). The students would take programming, systems design, and database classes taught by SET faculty. The GSB would be responsible for developing a data mining class, an enterprise resource planning class, a financial modeling class, and an IT auditing class. One additional new faculty member was recruited with expertise in data mining. Partnerships were established with SAS and SAP and existing faculty were trained at their facilities/programs using faculty development funding. ACL software is used in the IT auditing class. Some of the developed courses are also used to support other business majors, finance and management. The information systems major, which

suffered from continued declining enrollment, was phased out and faculty resources retrained and repurposed to support the new Accounting and Data Analytics major. By the end of the first year the program has attracted over 20 majors.

BS in Business Administration with a major in Management – Business Analytics Career Track – Elon University

The newly revised Management Major at Elon offers three specialized Career Tracks in Business Analytics, Human Resource Management, and Project Management. The rationale for requiring students to select one of these tracks is to better prepare students for internships, targeted job opportunities, and career development. The new track in Business Analytics provides students with a strong foundation in data analytics by bringing together a diverse body of knowledge from consumer behavior, applied statistics, computer information systems, visualization, risk management, supply chain management, and decision theory. Students completing this track will gain greater understanding of how organizations depend on enterprise systems and business analytics to run effectively and efficiently, how business analytics and data mining is driving real-time decision making in most organizations and enabling new levels of competitiveness, and how organizations are using business analytics applications.

Students majoring in management take courses in a common core representing the functional business disciplines. The core curriculum offers 56 hours in fundamental areas of business (accounting, economics, finance, ethics and law, management, and marketing) plus an internship. The Business Analytics Career Track builds further on the Business Administration curriculum with an additional 20 hours. These additional hours include the following courses: Business Economics, Process Management with Logistics Analytics, Analytics for Business Strategy, Data Mining for Managerial Decision Making, and one elective in Project Management, Innovation Dynamics, or Information Security. Analytics for Business Strategy and Data Mining for Managerial Decision Making are two new courses that were created specifically for this track. The Information Security elective is a course taught outside of the Business School by faculty in Information Science. As of April 2014, there were a total of 197 declared management majors, up from 44 in 2013. The addition of the three specialized Career Tracks is expected to draw even more students into the program.

Conclusion

The collection and analysis of vast amounts of data is now associated with every sector of commerce and government. Data analysis can create value by improving decision making, allowing narrower segmentation of customers, supporting new product generation, and improving overall operational performance. It is becoming a key component of competitive strategy in addition to capital and labor. There will likely be a serious shortfall in workers with the necessary skills to analyze and interpret the terabytes of data that is being collected and stored. Universities will likely have to adjust their curriculum and programs they offer to address this need.

References

Manyika, James, Michael Chui, Brad Brown, Jacques Bughin, Richard Dobbs, Charles Roxburgh, and Angela Hung Byers. "Big Data: The next Frontier for Innovation, Competition, and Productivity." *McKinsey Global Institute Report*. 1 May 2011. Web. 8 July 2015.