

Managing IT Implementation Risk: A Model from High Reliability Organizations

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Keywords: High reliability organization, Risk management, Project management

DESCRIPTION OF THE STUDY

We conducted a case study of a major corporation which successfully built and implemented an IT infrastructure, on time and within budget, in spite of significant constraints and inherent risk factors. Our study involved 1) understanding the implementation challenges faced by the company along with the management strategies employed in response to those challenges, and 2) constructing a prescriptive, theory-based model derived from prior research in High Reliability Organizations (HROs). An HRO, such as a nuclear power plant or air traffic control system, essentially is formed to achieve organizational goals by managing the high levels of risk inherent in its environment (Rochlin 1993; Weick et al. 2008). Our model identifies the HRO-based environmental elements surrounding the company under study and links those elements to strategies employed by managers in ‘traditional’ HROs as well as, we argue, by IS management in this study.

BASIS OF THE STUDY

This research followed an iterative case study approach. The study involved the sequential collection of multiple sources of data, including interviews, documents and archival records. Our primary data were comprised of in-depth interviews with 14 managers and external consultants, all of which were recorded and transcribed. We began with the CIO, the external consultant responsible for managing the project, and the Peoples senior IS management team who reported directly to the CIO. Following this initial set of interviews, the CIO and her team directed us to other personnel who could explain many of the operational details and provide a ‘front line’ perspective of the issues described by senior management. The interviewees also directed us to various project-related documentation, including project planning documents, business process documents (including customer billing and supplier transaction processes), PowerPoint presentations, and contemporaneous archival records such as employee newsletters and training documents.

IMPLICATIONS AND CONCLUSIONS

In linking environmental characteristics to specific management strategies, the model developed in this study provides a set of guidelines for CIOs and senior IT managers facing similar circumstances.

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THE APPLICATION OF IS THEORIES IN OPERATIONS MANAGEMENT RESEARCH: A COMPREHENSIVE META-ANALYSIS

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PROPOSED STUDY / PURPOSE

Organizations use information systems to implement various business processes and decision making from the operational level to the strategic level and from the short term to the long-term strategic planning. In particular, information systems play a critical role in operations management, since many operations management activities are conducted using information systems. We chose to focus our research on operations management, since operations management and information systems are two highly related disciplines: operations management is often the first mover to adopt new information systems and technology. Researchers and practitioners in operations management quickly take advantage of technology innovations such as Internet of Things (IoT), cloud computing, mobile apps, and the exploding area of artificial intelligence (AI). Both information systems and operations management disciplines are facing new challenges to respond to the rapid technology and business innovations. Scholars in both fields must explore new theories to investigate new phenomena. An opportunity exists to develop new theories focused on the applications of new information technology innovations applied to operations management processes. A foundational first step is to identify which information systems theories currently support which operations management processes and research. Therefore, the purpose of this Phase 1 research is to map existing information systems theories to operations management research themes. The output of this research will be an Information Systems/Operations Management/ Technology matrix identifying existing cross-discipline theories, research themes, and technologies.

CONTRIBUTIONS

A major contribution of this research is the cross-integration of the two disciplines with their various theories and information technologies. Findings from this meta-analytic study will contribute both in terms of practical and theoretical significance. From a practical perspective, this study is likely to provide practitioners with evidence to support or challenge the use of specific information systems implementations. From a theoretical perspective, this study will hopefully encourage scholars to develop new theories to examine the use of new and innovative technologies in operations management. Many emerging information technologies have been quickly adopted in the business communities, a result of which has been improved business processes and decision making, as well as the creation of many new business models and markets. Major business consulting firms in the U.S. (e.g., Gartner and McKinsey & Company) issue reports for new information technologies that are and will be reshaping the business community (see, e.g., Bughin et al., 2017; Elumalai et al., 2017; and High, 2017). For example,

Gartner identified 10 strategic technologies (e.g., AI foundation, Intelligent Things, Blockchain) for 2018 (High, 2017). These emerging information technologies generate great innovations in business operations, in particular, in the operations and production area. For example, machine learning enhances data analytics capabilities and thus greatly improves decision making, and intelligent robots largely automate production and operations processes. The outcomes of this study will set the theoretical foundation for future theory development in both IS and operations management research. This information is valuable to scholars interested in pursuing a particular line of research identified through our meta-analysis. Scholars can use the information to decide upon which research themes they want to pursue, look up articles citing the identified “top” researchers, and target those journals which published the cited articles. A final contribution of this research is to provide a stronger inter-disciplinary bridge between IS and operations management, in light of the combined departments at many universities.

METHODOLOGY

This research applies both a bibliometric and a meta-analysis methodology. The purpose of the bibliometric analysis is to identify the most salient journals, authors, and research themes on which to focus the meta-analysis. We will use the Clarivate *Web of Science* to obtain the citations required for the bibliometric analysis. Our search will comprise operations management journal titles, information systems theories and technology labels. For operations management journals, we used the titles of the 80 operations research, management science, and productions & operations management journals listed by the Tueselmann et al. (2015) journal ranking as well as eight additional journals identified via the Peterson et al. (2011) journal ranking. This large journal base (88 journals) ensured solid coverage of the ISOM research landscape. For information systems theories keywords, we used the list of information systems theories published by the Association for Information Systems, which is the leading organization for information systems researchers. The technology keywords were derived from analyzing the articles produced by crossing IS theories with OM research. We used the taxonomy method in information systems research developed by Nickerson et al. (2013). This method involves several iterative steps to categorize different technologies into meaningful groups.

The bibliometric analysis formed the foundation of our meta-analysis by identifying the articles to include in the meta-analysis. We followed a three-phase meta-analysis process proposed by Cumbie et al. (2005): 1) collect the peer reviewed publications from the publication database; 2) classify the papers into a two-dimensional matrix by research topic; 3) evaluate and synthesize the data in each category. We used Hedges’ *g* to control for scale differences in the various research studies so that we could compute a pooled variance of the mean differences. The meta-analysis provides statistical evidence aggregating disparate research findings. The statistical analysis of each category will inform scholars’ decisions to pursue particular areas of research. Areas weak in empirical support are prime candidates for further research and/or theory development.

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HOW TO TEACH ETHICS OF BUSINESS ANALYTICS?

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INTRODUCTION

The emergence of “big data” has inspired new opportunities on how to enhance the understanding of human behavior and interactions between individuals and organizations across all industries. Data gathering is not going away. Consequently, the mining of customer data is going to increase with more organizations accessing computer power using cloud computing. Such an enormous rise of data mining applications has created an equivalent rise in concerns about the ethics of mining customer data for the motive of profit. Probably Cathy O'Neil has best pointed out in *The Weapons of Math Destruction*, that business analytics is being deployed by powerful organizations to achieve goals that can magnify inequality and undermine democratic decision-making. For data analysts to recognize how their skills are being misused and how to resist such misuse they need to be properly trained. The purpose of this research is to create a framework for developing a Business Analytic Ethics course.

DO WE NEED BUSINESS ANALYTICS ETHICS AS A COURSE?

Since business analytics has tremendous impacts on society, the crucial importance of teaching business analytics ethics has grown tremendously. Traditional Business Ethics courses introduce students to ethics-related aspects of the business decision-making process that are common to the entire program population. Therefore, they should definitely add a topic related to the ethics of business analytics that would make all business students aware of its impact. Any business program that has business analytics courses should either incorporate ethics of business analytics into such courses or create a dedicated course that teaches the ethics of business analytics. Given the fact that existing courses are already jam packed with regular topics and a variety of ethical issues that need to be covered, such a marriage would not work very well. After reviewing the scope of ethical issues and concerns that need to be covered, we propose a dedicated course to teach ethics in business analytics.

Such a course should develop fluency in key ethical, policy and legal terms and concepts that are relevant to ethical and privacy implications of collecting and managing big data. Business analysts should learn about some of the common approaches and emerging tools for mitigating or managing these ethical concerns and gain exposure to legal scholarship and policy documents that will help them to understand the current regulatory environment and anticipate future developments. This course should teach students how to reason through these problems in a systematic manner and how to justify and defend their approach in dealing with them. This course should explore the broader impact of the data science field on modern society and the principles of fairness, accountability and transparency as you gain a deeper understanding of the importance of a shared set of ethical values. Students should also learn how to cope with novel challenges for which there are often no easy answers or established solutions.

PROPOSED COURSE TOPICS

A preliminary online review of courses teaching business analytics ethics reveals that currently the Data Science programs are ahead of the Business Schools in addressing the issues of ethics in data-driven decision-making. Such an example is the Data Science Ethics which is a topic-based course created by H.V. Jagadish from the University of Michigan and offered by Coursera and edX. Another example is a case-based course developed by Solon Barcos at Cornell University entitled Ethics and Policy in Data Science. Using those two courses as examples and considering the related published ethical issues in business analytics, we propose the following topics as a framework to design a Business Analytics Ethics course.

- Principle of Informed Consent: What are the current laws that govern the principle of informed consent and why they may not work for the customers of the eBusiness.
- Data Ownership: Who owns the personal data or pictures posted online? What are the limits on recording and use of public data capture?
- Privacy: There is a rise in different value systems concerning data privacy. Even so, there is a fundamental need to control the privacy of personal data in exchange for the services we receive.
- Anonymity: Can anonymity be preserved in all kinds of transactions? What are the drawbacks that come with anonymity?
- Model Validity: Frequently we see inappropriate use of analytical methods leading to erroneous conclusions.
- Algorithm Fairness: As much as analytical algorithms may be completely neutral, selection of model attributes and their proxies, parameters and the training data, just to name a few are all set by humans and may reflect their biases possibly without even intending to do so. Can we audit algorithms?
- Individuality: The de-individualization, because of profiling using data mining, may be defined as a tendency of judging and treating people on the basis of group characteristics instead of on their own individual characteristics and merits.
- Transparency and due Process: How much transparency do business analytics provide? Can we have a due process in analytics?
- Data Sharing: Can be of great scientific value in emerging fields. Who controls it and how?
- Social Consequences: Where ethics is not enough! Even if all of the above are done right, there still might be social issues such as ossification and asymmetry that are the hardest to address. How machines learn to discriminate.

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FORMAL LOGIC TRAINING AND ITS ROLE IN CRITICAL THINKING AND PROBLEM SOLVING

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STUDY BACKGROUND

Information systems and business school educators are constantly discussing how to improve critical thinking skills and problem-solving skills among their students. Furthermore, recruiters and alumni suggest critical thinking skills and problem-solving abilities are among the most important yet often lacking skill sets for graduates.

Our primary focus is on situations involving ambiguity and complexity. Information Systems and Business programs have traditionally been known for graduating highly analytical business professionals. However, many recent evaluations of such programs suggest that schools often fail to produce graduates who are effective and creative thinkers in highly unstructured situations (Datar, Garvin, & Cullen, 2010). Given the contemporary business environment—where exponentially growing amounts of unstructured information is readily available, where product cycles are shorter, where innovation is expected faster, and where technologies such as artificial intelligence are rapidly changing the nature of work—the ability to think critically is more important than ever. Furthermore, the ability to communicate precisely, concisely, and *logically* is a differentiating skill for many graduates.

Our central premise is that logic training leads to more effective critical thinking and problem solving. In fact, logic training is often the missing piece in significantly improving critical thinking and problem solving. While this may appear to be a somewhat simple idea, it is a largely contested notion (ASL Committee on Logic and Education, 1995; Attridge, Aberdeen, & Inglis, 2016; Epp, 1997, 2001; Nisbet et al., 1987). Furthermore, even when this notion is accepted, it is rarely if ever applied to business education.

STUDY METHODOLOGY AND RESULTS

Our study focuses briefly on describing innovative approaches schools are taking to enhance the critical and creative thinking skills of their students. We also describe what we view as key considerations in how to develop curriculum, train instructors, and partner with industry to improve critical thinking.

Our research uses a case approach to explore the ways in which logic training, and the lack thereof, influence effective critical thinking and problem solving. The first case is based on developing queries in a database course. The case demonstrates how most students lack *dynamic responsiveness* to solving problems. In most cases, students can create a query that solves the

problem in its static form. Yet, students rarely succeed in developing queries that will be successful when the underlying data or assumptions to the problem change. The second case focuses on pitch decks created in an entrepreneurship course and demonstrates the key logical flaws—in content and presentation—that students commonly make. Both cases are used to show how logic training can improve student performance.

IMPLICATIONS FOR EDUCATORS

Given the focus on critical thinking and problem solving by educators around the world, we believe it's critical to identify the fundamental logic skills that support effective critical thinking and problem solving. Specifically, we have identified the following skills that teachers should emphasize:

- Recognize valid and invalid argument forms
- Distinguish between the form and content of an argument
- Understand the antecedents and consequents of their own assumptions or the claims of others
- Follow or construct a simple line of deductive reasoning
- Recognize ambiguity in their own communication and that of others
- Determine what conditions satisfy a simple set of rules or constraints

We demonstrate how educators can develop content and assess proficiency (i.e., rubrics) in these areas of logic training.

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DATA VAULT MODEL SOLUTION TO PERSONALLY IDENTIFIABLE INFORMATION

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ABSTRACT

The data vault model has remained relatively unchanged since the advent of Data Vault 2.0. While this model has remained viable through its lifetime, the necessity to further keep information safe has begun to prompt change. This paper will explore the practical benefits and general method of how to alter the data vault model to better fit the needs of today's consumers.

Keywords: Data vault, Encryption, Personally Identifiable Information (PII)

INTRODUCTION

In today's society, information is considered to be one of the most powerful tools one can have. However, simply acquiring and analyzing data is not sufficient. Like any other object of value, it needs a place to be reliably stored. The industry's solution to this is known as a data warehouse. A data warehouse is specifically designed to deal with the long-term storage of data, often from multiple sources. A specific model employed in this research is the Data Vault 2.0 model. This model differentiates itself from other models because it is an insert only architecture. In layman's terms, this simply means that data can be put into the vault but cannot be deleted or altered once inside. More recently however, events have occurred that have necessitated additions to this design model approach.

The General Data Protection Regulation (GDPR) passed within the European Union (EU) is a directive that aims to return control of PII to the individual. PII can be any information that can potentially identify a person, such as a name, birthdate, or even an email address. The directive states that the individual should have ultimate control of their data in any system, and should have the right to delete, change, or restore it at their own will. However, this creates a fundamental conflict with the data vault's design, which does not permit deletions of any kind. So how can the model be updated to adhere to the new guidelines?

Naturally, this raises the question: Why should the US, or indeed any country or business outside of the EU, care about this? The GDPR has already been officially passed and has become effective on May 25, 2018^{[1][3]}. U.S. companies that handle the personal data of individuals located in the EU are closer to confronting this new data security and privacy regime. Any organization that handles any amount of EU personal data would be subject to the GDPR, even if

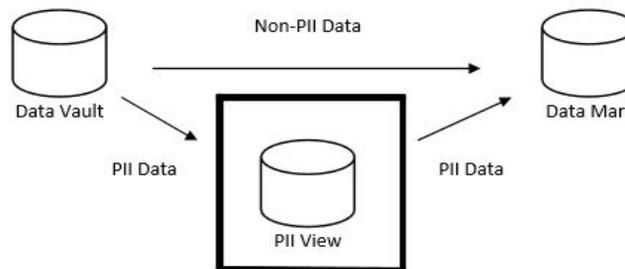
the companies have no physical establishment in the EU. Perhaps the biggest incentive for companies to be compliant would be the significant fines that could be incurred. Fines under the GDPR can vary significantly, with a maximum of the greater of either €20,000,000 or 4% of annual worldwide turnover, depending on the seriousness of the violation^[2].

RELATED WORKS

To the best of our knowledge no other work regarding PII in data vault-based data warehousing environment has been discussed. Nevertheless, we consider current state of the practice, if not the state of the art, in databases regarding the PII protections is fairly represented by vendors such as Oracle’s publicly available research into this field in response to the EU’s GDPR ^[4]. Their approach is similar in that encryption is also a key aspect. However, Oracle has also strongly advocated for pseudonymization of the data. Furthermore, they are able to offer an extra layer of protection by storing master encryption keys within their Oracle Key Vault Service. It should be noted that Oracle has not publicly released any of the details of their efforts, and that their work is more focused in the field of databases rather than data vaults. While the Oracle Key Vault Service could certainly be used in our solution, the practical implementation details are considered to be beyond the scope of this paper

RESEARCH METHODOLOGY

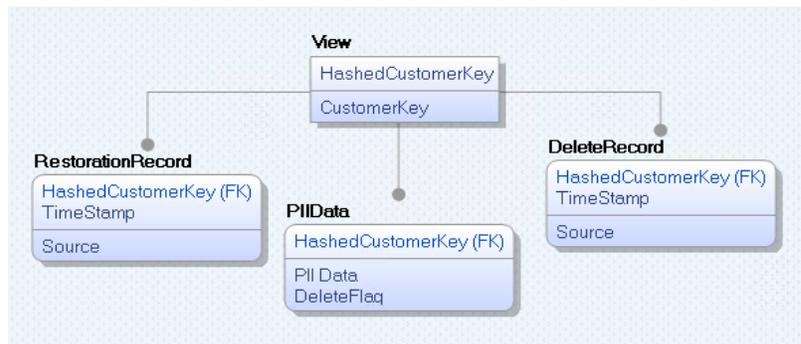
The solution proposed is far more straightforward than one would initially imagine. Data vaults are made up of three entity types: Hubs, which contain surrogate keys as well as business keys; Links, which represent transactions or interactions between business keys and Satellites, which contain the attributes ^{[5][6]}. In the current data vault model, these satellites would be where the PII are stored. In most cases before the GDPR, the PII stored would have minimal-to-no levels of protection. Under the GDPR, this would be a considerable offense. However, instead of reconstructing the entire data vault model, the more practical solution would be as simple as encrypting the data, as well as using a materialized table to access the PII.



This would enable the data vault to safely hold PII, without compromising the fundamental nature of the model. All data requests would be handled through a virtual table located between the data vault and data mart. This materialized PII_view would allow access to the PII along with other generic information, without also giving access to the encrypted data stored in the vault. This offers the benefit of completing the request without having to disturb the contents stored in

the vault. Additionally, the PII remains encrypted until it reaches the data mart. This means that any information intercepted while in transit or while in storage is unable to be decrypted by entities lacking the proper authorization.

As previously mentioned, the fundamental tenet of the data vault model is to allow only insertions. Other operations such as deletions or updates are not even considered under normal circumstances. However, under the GDPR, companies could be forced to delete PII stored in a data vault if so requested by their customer. The proposed model remedies this issue of requiring deletions with the introduction of a new group of entities between the data warehouse and data marts. These entities will act as a ‘view’ of all the PII data contained in the data vault. No other data would be stored within. The term ‘other data’, refers to non-PII related data, as within our PII_view we also store information relating to our PII data. This additional information acts as a record of all deletions and restorations received for the PII contained in the data vault. Additionally, the PII_view will also contain a hashed value. This value will represent all the PII data concatenated together, then hashed for reference.



For the implementation of the proposed model, triggers were created within the PII_view to display the feasibility of our model. Triggers, which are essentially pieces of code that run when types of queries such as INSERTS, UPDATES, and DELETES are used, allow for a simple simulation of how this model would handle delete requests. Two triggers have been included: One which handles reconstructing the PII data from the data vault; and the other which acts to insert a record of the deletion request. These triggers activate when the ‘DeleteFlag’ shown has been updated. For example, when a delete request has come in from a source, the database administrator would update the ‘DeleteFlag’ to 1. From there, the models triggers would handle the rest. The results of such an operation on the PII_view can be seen below. One of the most important aspects of the proposed model is that the data mart no longer has any access to the PII data, and the data is untouched in the data vault. Through these triggers, the PII data can be deleted, updated or restored without compromising the data or the vault.

	HashedCustomerKey	FirstName	LastName	EmailAddress	HashedPersonalData	DeleteFlag
1	0x000055D41C8A62...	0x00000000	0x00000000	0x00000000	0xAFCD3D416A58210...	1
2	0x0002C71B578F59...	0x00A9B758F...	0x00A9B75...	0x00A9B75...	0x4E0C687D6C3C108...	0
3	0x0003AED6E70E1...	0x009E20D61...	0x009E20D...	0x009E20D...	0x2A806FF4E7A8C83...	0
4	0x0004FB61036766...	0x009E20D61...	0x009E20D...	0x009E20D...	0x399369E486D1683...	0
5	0x00057717C48A09...	0x009E20D61...	0x009E20D...	0x009E20D...	0xD3D09EC3F1EFDD...	0

The ability to restore PII data is one of the most fundamental features of this model. The person that owns the data may ask for the PII data at any point, even after it has been deleted. Therefore, special care needs to be taken when handling such requests. In the proposed model, when PII data is ‘deleted’, it is not in fact removed from the vault. Instead, the model nullifies the PII data in the PII_view and stores the hash of the nullified PII data in a satellite.

Instead of keeping the deleted data, a hash of the deleted data is stored. This allows for the data vault to meet the consumer’s requests, while also allowing for future data restoration through the hash. For additional security, the hashes from the PII_view can be directly validated using the hashes in the data vault. All the PII data are assumed to be protected by encryption (possibly using tailored methods, however that is not in the scope of this paper) before being hashed, both in the data vault and in the PII_view, to assure integrity of protected data.

```
Sample Update Trigger which can be used to refresh the cordoned off PII view
CREATE TRIGGER dbo.Repopulate
    ON [dbo].SatPersonalData
    after Update
AS BEGIN
    SET NOCOUNT ON;
    IF UPDATE (DeleteFlag)
        BEGIN
            UPDATE PV.dbo.SatPersonalData --(FirstName, LastName, EmailAddress)
            SET PV.dbo.SatPersonalData.FirstName = B.FirstName,
                PV.dbo.SatPersonalData.LastName = B.LastName,
                PV.dbo.SatPersonalData.EmailAddress = B.EmailAddress
            FROM Inserted I inner join DataVault.dbo.SatPersonalData B
            On I.HashedCustomerKey = B.HashedCustomerKey
            where PV.dbo.SatPersonalData.FirstName = 0 and PV.dbo.SatPersonalData.LastName = 0
                and I.HashedCustomerKey = PV.dbo.SatPersonalData.HashedCustomerKey
        END
    END
END

-- Update Trigger on DeleteFlag in PII Satellite which inserts into DeleteRecord
CREATE TRIGGER dbo.UpdateDeleteSatellite
    ON [dbo].SatPersonalData
    AFTER UPDATE
AS BEGIN
    SET NOCOUNT ON;
    IF UPDATE (DeleteFlag)
        BEGIN
            insert into PV.dbo.DeleteRecord (HashedCustomerKey,HashedPersonalData,LoadDate,Source)
            select I.HashedCustomerKey,I.HashedPersonalData,getdate(), 'FED'
            FROM Inserted I
            Where I.DeleteFlag = 1
        END
    END
END
```

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THE IMPACT OF LEARNING PERFORMANCE ON EDUCATIONAL TECHNOLOGY ACCEPTANCE: EXTENDING THE UTAUT2 MODEL TO THE MOBILE LEARNING CONTEXT

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RESEARCH PROPOSAL

Near ubiquitous mobile device adoption and societal expectations of on-demand services has sparked a rapid growth of mobile learning platforms. While early platforms simply adapted traditional classroom lectures into mobile delivery formats, innovators are developing unique approaches to maximize learning efficacy and efficiency. The proposed study extends Venkatesh et al.'s (2012) UTAUT2 model through the addition of learning performance, assessment level, and individual learner abilities. This extension provides an opportunity for IACIS conference participants to better understand the adoption and continued use of mobile learning platforms and to identify the limitations of mobile learning.

BASIS OF STUDY

While research has focused on the adoption and continued use of systems such as digital learning and mobile learning platforms (e.g., Safie, 2004; Ozok & Wei, 2007; Raman & Don, 2013; El-Masri & Tarhini, 2017), the academic literature has largely avoided an examination of how learning performance, assessment level, and individual learner abilities impact behavioral intent to utilize such platforms. Thus, this research is motivated by the following questions: 1) Does learner performance impact learning technology adoption? 2) Does the assessment of specific knowledge dimensions moderate adoption behaviors? 3) Do culture, gender, learner abilities, and learner experience moderate learning technology adoption behaviors?

To address these questions, a convenience sample of undergraduate students (n=300) will be recruited from U.S. and Turkish post-secondary institutions. Subjects will complete a randomly assigned mobile learning exercise (learning object) followed by an assessment of the knowledge attained. The learning object and accompanying assessment will measure attainment at various knowledge dimensions. Additionally, subjects will complete pre- and post-experiment questionnaires to capture psychological and sociological factors that have previously been shown to impact technology adoption. Collected data will be examined using partial least squares structural equation modeling.

EXPECTED IMPLICATIONS

The findings of this study will benefit scholars and practitioners alike. Specifically, scholars will benefit through an extended UTAUT2 model that aims to have better predictive values in the context of educational technology. Practitioners, including developers of educational technologies, as well as the instructors that use them, will benefit by knowing which antecedents impact measured learning most significantly. Such knowledge could lead to improved educational technologies and applications of such systems.

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IMPROVING GEOSPATIAL DECISION-MAKING PERFORMANCE USING INTENSITY MAPS: A TASK-TECHNOLOGY FIT PERSPECTIVE

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RESEARCH OVERVIEW

Consumers, businesses, and governmental entities increasingly make decisions informed through geospatial visualizations. Understanding if, and how, individual characteristics impact geospatial decision-making performance may provide a framework for improving such visualizations. While information systems literature examines aspects of decision-making performance, user-characteristics, and task-characteristics (e.g., Jarupathirun & Zahedi, 2007; Ozimec, Natter, & Reutterer, 2010; Erskine et al., 2018), no evidence of research that examines the impact of decision-making performance moderated through the use of thematic visualization representation was found. Thus, this research study was motivated by three primary research questions: 1) Are intensity map visualizations effective when performing site selection tasks? 2) Do intensity map visualizations impact site selection task performance? 3) Do individual characteristics influence the perceived fit of intensity map visualizations for site selection tasks?

RESEARCH MODEL AND METHODOLOGY

Goodhue and Thompson's (1995) Task-Technology Fit Theory was developed to explain why some technologies appear to be more effective than others, thus the aforementioned research questions are examined through this theoretical lens. Specifically, this theory is applied in the context of comparing traditional visualization techniques with thematic presentation techniques. A thorough information systems literature review informed the development of a research model consisting of eight hypotheses.

An online experiment designed to measure the impact of user-characteristics on geospatial decision-performance was developed to examine the research model. Research subjects were recruited using various methods and received a small monetary compensation for their participation. The context of the experiment consisted of a retail site selection problem. The first group (n=105) performed the site selection task using a traditional interface, while the second group (n=114) performed the task using a thematic interface. Individual traits, including self-efficacy, relative advantage, and intrinsic motivation, were examined along with perceptions of task-technology fit. Decision accuracy and decision satisfaction were included as measures of decision-performance. Results were examined using partial least squares structural equation modeling (PLS-SEM).

IMPLICATIONS AND CONCLUSIONS

The PLS-SEM analysis revealed several interesting findings. For instance, self-efficacy and relative advantage have significant impacts on perceived task-technology fit. Moreover, perceived task-technology fit has significant positive impact on decision satisfaction and decision accuracy. The thematic presentation method has a significant positive impact on decision accuracy. This research benefits scholars through a more comprehensive understanding of the specific characteristics that influence geospatial decision-making through an extension of the task-technology fit theory. Furthermore, the theory is extended through an examination of self-efficacy, relative advantage, and intrinsic motivation as antecedents of task-technology fit. Additionally, this is the first study to apply the task-technology fit theory in the context of geospatial visualization methods. As research streams examining geospatial analytics, visualization, and decision-making broaden, the findings of this study will frame a more comprehensive understanding of the geospatial decision-making processes. Implications to industry include guidance toward including thematic visualizations for specific site-selection tasks. This is particularly important as geospatial visualization technologies are becoming more readily available to consumers and business professionals who, in many cases, have limited experience developing and interpreting such information.

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EVALUATING EXISTING SOLUTIONS FOR SYN FLOOD DDoS ATTACKS

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ABSTRACT

A SYN flood attack is a common form of DDoS (distributed denial of service) attack that exploits the vulnerability of the TCP 3-way handshake with SYN requests to exhaust server resources and make service unavailable to legitimate users. This study plans to review the major types of SYN flood DDoS attacks, evaluate existing solutions, and propose a simplified solution to detect and mitigate SYN flood DDoS attacks.

Keywords: DDoS, SYN flood, TCP packet, ACK, Router, Detection, Mitigation

DESCRIPTION OF THE STUDY

The proposed study is to review the types of SYN flood DDoS attacks, evaluate the existing solutions, and propose and test a new and simplified detection and mitigation solution. The SYN flood DDoS attack is a distributed service denial attack in which the culprit sends a flood of malicious SYN connection requests to the server with the aim of gaining full utilization of the server resources and blocking out the legitimate requests and connections. Such DDoS attacks may cause serious slowdowns and outages that lead to disruptions of enterprise information systems, online service availability, and online business operations as well as losses of business revenue, business reputation, and customer confidence. Therefore, it is of significant value for researchers in the field of computer information systems to understand how different types of SYN flood attacks work and find out how to effectively detect and mitigate such attacks.

BASIS OF THE STUDY

The proposed study is to be based on a comprehensive literature review and empirical testing using relevant network datasets. The literature review will focus on the types and techniques of different SYN flood attacks, including direct attacks, spoofing-based attacks, and distributed attacks. The review of existing solutions to SYN flood attacks includes evaluations of operating system solutions in memory management and connection recycling, TCP stack tweaking, SYN cookies, RST cookies, SDN (software defined networking) approach, and machine learning approach.

The study will propose a simplified router solution to SYN flood detection and mitigation supported by cloud flare mitigation and OS protection mechanisms. The efficient router system

will use a counter algorithm to monitor packets, detect SYN floods, and mitigate potential DDoS attacks by dropping the flooding packets. The datasets for testing will be from simulated network captures and publicly available DDoS security datasets from CAIDA (Center for Applied Internet Data Analysis) hosted by the University of California's San Diego Supercomputer Center.

CONCLUSIONS AND IMPLICATIONS

SYN flood DDoS attacks can lead to serious negative impact on enterprise networks and information system availability and operations. It is a challenging task for organizations to detect and defend against SYN flood DDoS attacks. This study will reveal how various types of SYN flood attacks work and how to effectively detect and mitigate these attacks to maintain normal network service availability and business operations for organizations.

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TRANSITION FROM MILITARY DEFENSE TO CYBER DEFENSE: CYBERSECURITY EDUCATION FOR VETERANS

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DESCRIPTION OF THE STUDY

Our planned study is to propose a cybersecurity education model for military veterans to transition to the fast-growing civilian career field of Cybersecurity. The proposed model maps the cybersecurity professional traits with the characteristics of military veterans and discusses the opportunities and challenges for veterans in transitioning to cybersecurity education. The study will focus on the key traits of organization, group collaboration, and task-oriented learning in cybersecurity education and map to the specific job roles, tasks, and relevant KSAs (knowledge, skills, and abilities) in the latest NICE Cybersecurity Workforce Framework (NCWF) published by NICE (National Initiative for Cybersecurity Education) (NIST, 2017). This study is of significant value to our veterans and workforce development because the United States needs more and more cybersecurity professionals in every sector and in every region and the military veterans who have served and defended our nation are well-positioned to transition into much needed jobs especially in the cybersecurity field (NICCS, 2017).

BASIS OF THE STUDY

The primary theoretical basis of the proposed study is the research finding by Dougherty (2015) that veterans' positive traits from their military experience help them adjust to college education positively in multiple ways: (a) they are experienced with teamwork and group collaboration; (b) they are motivated as they have high expectations of themselves; (c) they are organized and task-oriented; (d) veterans are experienced learners. In addition, the training in the US Army has produced highly adaptive, agile and innovative soldiers and leaders capable of applying critical and creative thinking skills to various challenges (Delvaux, 2017). Cybersecurity education for veterans should take advantage of the positive background of veterans in course delivery and assessment. Accordingly, this plan is to propose a model of learning and assessment in cybersecurity education for veterans that emphasizes interactive, structured and organized, and collaborative learning and teamwork using the constructive learning community model (Wang & Sbeit, 2017).

To illustrate and test the proposed model of learning, this study is to collect and analyze data on veteran students in the Cybersecurity programs and classes at two different universities in the US. The data collected will include demographics, participation and success rates in collaborative projects including discussions, team projects, and peer reviews, as well as course assessment results and student evaluation results. The data report will only show aggregate results to maintain individual anonymity. The relevant course descriptions, project instructions and rubrics will also be used for data analysis and discussions.

CONCLUSIONS AND IMPLICATIONS

There is fast-growing workforce demand for higher education to produce qualified professionals in Cybersecurity. Military veterans are well positioned to transition to the cybersecurity career field due to their strengths in organization, group collaboration, and task-oriented learning emphasized in successful military training and mapped to the key skills in the cybersecurity profession. The proposed model of learning will help reach a more effective way of teaching, learning and assessment for veterans in cybersecurity education and training. The relevant data and analysis will contribute to the research literature in this area as well.

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USING AMAZON WEB SERVICES TO TEACH SYSTEM ADMINISTRATION

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ABSTRACT

Universities have always struggled to provide students with a hands-on environment to learn proper and up-to-date information technologies. Universities have had to balance a safe work environment for the students with the security and resource needs of the university. The key is to give the students enough leeway to work in an environment that is safe for the university yet still open enough for the students to really experiment with how systems work. In the past, students would build and maintain servers locally. Recently, with the popularization of virtualization, students have been learning to build and manage virtual machines (Marshall, 2011). This virtualized environment allowed for students to have more freedom to experiment, however, providing these environments still requires significant financial investments by the university (Vollrath, 2004). Lately, with the maturity of the cloud, familiarizing students with cloud-based servers has become an important exercise in preparation for careers in information systems (Callender et al, 2015). Thus, the purposes of this presentation are (1) demonstrate how students can use cloud services from Amazon (AWS) to build, maintain and deploy servers in the cloud, and (2) show how the AWS environment is a “safe” environment for students to learn without putting pressure on university security policies and resources. The presentation will include a discussion of how students currently use AWS to meet the objectives of the system administration course and get AWS certifications with little to no resources from the university.

Keywords: AWS, Amazon Web Services, IT, Information Technology, System Administration

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ISSUES ON THE IMPLEMENTATION OF BLOCKCHAIN TECHNOLOGY FOR ENTERPRISE SYSTEMS

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ABSTRACT

Blockchain technology is a distributed ledger being trusted among participants. While the technology has been exposed to us in the form of cryptocurrencies, it is still at the initial stage in terms of the implementation of the technology for enterprises in diverse industries. Business transactions have been traditionally dealt by enterprise systems in the areas of sales, supply chain and logistics, and human resources. However, with the implementation of blockchain technology, business transactions will be processed in the format of hyperledgers or distributed ledgers enabling smart contracts. The paper discusses about issues on the implementation of blockchain technology for the enterprise systems in terms of implementation strategy, technology platform, cost, and security.

Keywords: Blockchain technology, Enterprise systems, Implementation

BASIS OF STUDY ON BLOCKCHAIN TECHNOLOGY AND IMPLICATION

According to Iansiti & Lakhani (2017), just as TCP/IP has been adopted for the World Wide Web in the mid-1990s, blockchain technology is a foundational technology that can significantly transform IT area in the long run. Even though the implementation of blockchain technology for major companies is at the early stage, IT professionals/educators should know the trends or issues for the successful implementation of the technology. Thus, authors reviewed the literature to deliberate issues for the implementation of blockchain technology.

Based on the literature, major corporations would be inclined to set the implementation strategy of becoming partners with ERP vendors who provide the cloud-based software platforms, called blockchain as a service (BaaS) because it would be much easier for major corporation to start implementing blockchain technology with BaaS rather than in-house development. According to Mearian (2017), major ERP vendors supplying the cloud-based BaaS are IBM (Hyperledger Fabric), Microsoft (Azure), HP (R3's Corda), Oracle (Hyperledger), and SAP (Leonardo). It is hyped that blockchain technology would reduce transaction costs coming from the reduction of IT costs based on the disruption and transformation of the existing legacy IT infrastructure. However, increased consumptions of storage, network, and electric power would be required to meet the augmented transaction volume. According to Bloomberg (2018), implementing BaaS on mainframe does not guarantee the reduction of transaction costs.

Security is one of the main advantages blockchain technology can offer. Distributed ledger technology not only employs cryptography, hashing, and time stamp on the block, but also requires multiple processing nodes scattered across multiple participants. That is why it is hard to change, that is, immutable. For example, when insurance companies adopt blockchain technology to process insurance claims, the technology reduces fraud claims. Multiple claims for the same incident would be rejected by the blockchain network because the blockchain network has the information that the claim has been already paid. Moreover, storing historical claims on the ledger will enable insurers to identify suspicious behavior and improve fraud assessment. However, Orcutt (2018) mentioned that as shown in a bitcoin hacking case, human being or 3rd party application software as an interface of blockchain systems would be a frail point for security.

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PERSONAL IDENTIFIABLE INFORMATION AND CHURCH WEBSITES: ARE YOU EXPOSED?

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PROPOSED STUDY

The purpose of this pilot study is to examine the degree to which personal identifiable information is publicly available on church websites.

BACKGROUND OF THE STUDY

Personal identifiable information, or PII, is “any representation of information that permits the identity of an individual to whom the information applies to be reasonably inferred by either direct or indirect means. (US Department of Labor).” PII can be used to uniquely identify, contact, or locate a single person. It does not include publicly available information that is lawfully made available to the public from federal, state, or local government records (University of Michigan). Sensitive PII is a special category of “personally identifiable information, which if lost, compromised, or disclosed without authorization, could result in substantial harm, embarrassment, inconvenience, or unfairness to an individual (https://www.dhs.gov/sites/default/files/publications/privacy/Guidance/handbookforsafeguardingsensitivePII_march_2012_webversion.pdf, p.3).” Stricter guidelines for handling sensitive PII are necessary because of the risk posed to individuals if the data is compromised. Examples illustrating the difference between PII and Sensitive PII are shown in the table below:

Table 1
Personal Identifiable Information vs. Sensitive Personal Identifiable Information

PII includes: name, email address, home address, phone number	
Sensitive PII includes:	
<i>If standalone:</i>	<i>If paired with another identifier:</i>
Social security number	Citizenship or immigration status
Passport number	Medical information
Driver’s license number/State ID	Religious or ethnic affiliation
Alien registration number	Sexual orientation
Bank/financial account number	Account passwords
Biometric identifiers	Last 4 digits of SSN
	Date of birth
	Criminal history
	Mother’s maiden name

HOW DO CHURCHES USE PERSONAL IDENTIFIABLE INFORMATION?

According to Fifthwall, a cyber risk management company, churches use PII to (a) send church bulletins and newsletters, (b) verify purchase orders for resources and charge the credit card on file, (c) process a requested order, (d) contact people for church programs and services, (e) disseminate requested information, (f) maintain accurate attendance records, (g) maintain accurate giving records, (h) provide tax notification and other related documentation, and (i) process gifts through check, credit card, or electronic means. To appropriately manage PII, churches should evaluate the necessity of PII collection and eliminate unnecessary collection, storage and access to PII.

RESEARCH PROBLEM

The authors, both with church affiliations, recently became concerned about whether their own institutions were exposing the PII of members on their respective church websites. Websites are common vehicles for sharing materials about church programs and services, providing contact information, and even submitting on-line donations; any of these practices could result in the intentional or unintentional sharing of PII. For example, one author noted that the bulletin for Sunday services for her church, published on its website, contained information about birthdays, anniversaries, and congregational concerns (often medical related).

The purpose of this pilot study is to investigate the degree to which personal identifiable information is publicly available on church websites. By visually inspecting a random sample of 40 church websites (20 each from two separate Protestant denominations), the authors will seek answers to the following questions:

1. To what degree is member PII available through website pages and embedded documents?
2. To what degree is member *sensitive* PII similarly available?
3. Does church size (defined by membership) effect the availability of PII?
4. Do churches publish website privacy policies?

The authors will share results of the study at the conference and use the findings for future research efforts with a broader sample of websites.

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THE FACULTY BLUES: BRING BACK YOUR SOUL

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ABSTRACT

Are student excuses getting the best of you? As a faculty do you ever get the blues? Student excuses can be never ending! Is acceptance required? The challenge this brings can cause the blues. However, it is possible for faculty to be demanding without being soulless. While students need to be responsible for their actions, faculty are also responsible for creating an environment for students to learn, trust and meet expectations.

Research related to transformative learning has shown that unless students are aware of their behavior patterns change is unlikely. Incorporating such knowledge into faculty practices can encourage and empower students to meet expectations. Ultimately transforming our classrooms and ourselves into faculty without the blues.

This panel will explore how faculty can save their souls from the blues. Hear panelists from junior to senior faculty as we; as department chairs to advisors discuss their soul saving methods to beating the blues. Topics covered include grace and accountability, addressing the stress and permissive indulgence, burnout, trust and the feels. Tips will be shared as well. Audience participation will be required, no excuses!

USING DATA VISUALIZATION TOOLS AND LIBRARIES IN A BI COURSE

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Keywords: Business intelligence, Data visualization, SQL Server, Google, Tableau, NLP

ABSTRACT

This abstract describes the use of data visualization software and APIs in a senior level BI course. The course is an elective in our CIS major program and requires one programming class and one database class as prerequisites. By this point in their college career, students will have experience with joins, aggregation and grouping, subqueries, and union queries, and at least basic competence with computer programming. The main topics of the course include: advanced SQL queries, data integration/warehousing, data visualization, multidimensional cubes, XML/JSON, data mining, and text analytics. We make extensive use of Microsoft SQL Server, including SQL Server Integration Services (SSIS) and SQL Server Analysis Services (SSAS). Students also work with JavaScript and C# languages. Over the past few years, I created several data visualization exercises and assignments for my BI students, which I discuss in this abstract.

In these exercises and assignments, students create dashboards based on queries to databases and other data sources. I frequently use Microsoft’s Adventure Works database for this. I also use unstructured data for some of the visualization exercises. Students learn the Google Visualization API, and the Google Maps API (both are JavaScript libraries). They also create dashboards with Tableau, which is simpler to use but less flexible.

For example, in one assignment, students create a dashboard depicting product sales, based on the Adventure Works tables shown in Figure 1 below. The final dashboard solution is shown in figure 2.

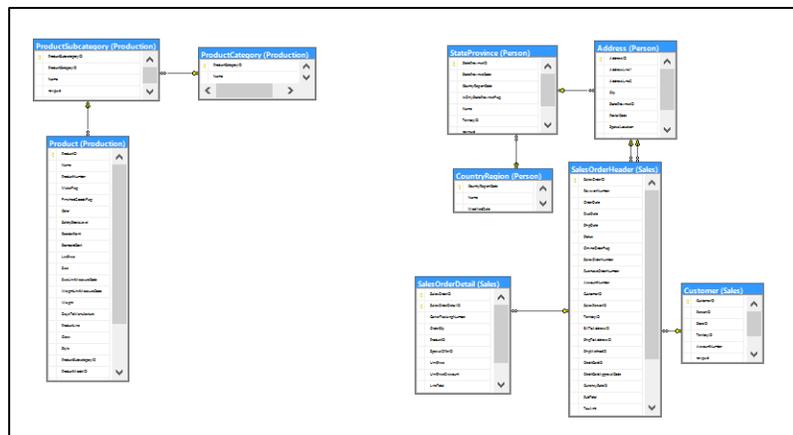


Figure 1. Adventure Works tables used for product sales dashboard.

The dashboard contains a tree map showing a breakdown of product categories and subcategories. This tree map requires a union of three queries on the tables in the left part of figure 1. Each of the queries involves joins and aggregations. It's a tricky query and presents a big challenge to many students.

When the user clicks on a subcategory in the tree map, this triggers another query to get the top 10 selling products of that subcategory, which is displayed in the bar chart. This is a pretty simple query, but also involves joins and aggregation.



Figure 2. Product sales dashboard using Google Visualization and Maps APIs

Selecting a product from the bar chart results in an additional query to display the map, identifying the countries where the selected product has been sold. In the process of accomplishing this task, students also learn about using Google Maps' geocoding web service.

In another assignment, students use Tableau to display a dashboard based on text analytics. Here, the data comes from a natural language processing (NLP) service (e.g. Stanford's CoreNLP API or the AWS Comprehend web service). For example, figure 3 shows a word cloud created by students based on the named entities identified from several online news articles by CoreNLP's named entity recognition (NER) annotator. Size and color of a word depict number of occurrences and number of documents, respectively.

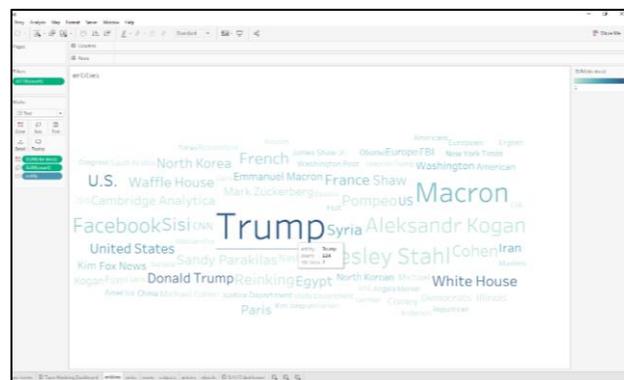


Figure 3. Tableau word cloud of nouns found in several news articles on a given day

So, we see that visualizations can be applied both to structured and unstructured data. These visualization exercises will be presented at IACIS 2018 conference.

ENDPOINT SECURITY KNOWLEDGE AND SKILL OF BUSINESS UNDERGRADUATES

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BASIS OF THE STUDY

Security of information systems is becoming more crucial by the day (Cerrudo, 2017), both conceptual knowledge and skill in tool use being necessary (Tarala, 2011). Countering this trend is the growing perception that young adults preparing to enter the work force are increasingly uninformed about basic endpoint security concepts and tools (Schaffhauser, 2015). This is counterintuitive given the widely assumed facility with information technology of contemporary young adults (Anderson & Rainie, 2012).

STUDY DESCRIPTION

Endpoint security is securing the laptops or desktops, and other networked computing devices used by professionals who, though presumably expert in their fields, are not primarily employed to secure information technology (Lord, 2017). This study aims to establish a baseline of endpoint security knowledge and skill among young-adult business majors at an upper Midwest university. A self-report survey was administered to approximately 800 business majors, mostly sophomores and juniors, in the business-core information systems course. The aim is to guide curriculum development to effectively target areas where instruction and practice are needed.

Instructors from all major programs in the College of Business (accounting, finance, information systems, management, and marketing) as well as members of the university’s administrative computing group were interviewed to describe concepts and tools they regard as particularly important for students. Tables 1 and 2 organize the content areas thus identified by target type, risk type, and mitigation type:

Table 1
Desirable End-Point Security Concepts

Target Types			Risk Types			Mitigation Types		
<u>Personnel</u>	<u>Intellectual Property</u>	<u>Infrastructure</u>	<u>Malice</u>	<u>Error</u>	<u>Disaster</u>	<u>Isolation</u>	<u>Replication</u>	<u>Education</u>
People	Data	Buildings	Phishing	Social media	Falls	Authentication	Battery backup	Social engineering
Structures	Information	Furnishings	Attachments	Account sharing	Dirt	User privileges	Data backup	Malware protection
Policies	Software	Nodes	Malvertising	Lost files	Water	Shareable media	System backup	P2P file sharing
Processes		Links			Heat			
					Power issues			

□

Table 2
Desirable Windows 10 End-Point Security Tools

<u>Isolation</u>	<u>Replication</u>	<u>Education</u>
MyUserName.uwec.edu	Power & sleep settings	Windows defender
Sign-in options	Backup settings	
Windows defender firewall	Windows update	
Internet security settings	Create a restore point	
User account control		
BitLocker		
Run-as-administrator		
VPN (GlobalProtect)		
Startup applications		

INDUSTRY IMPLICATIONS

The implications for the IT industry and for the economy at large are significant since employee error is universally recognized as the common denominator in all information security breaches (). Great risk attends the graduating of business professionals who do not engage in reasonable security practices with their endpoint computing devices. Interestingly, the interviews with instructors and computing professionals yielded some results that surprised this researcher. First, more than twice as many concepts as skills were identified; evidently knowing about security is of greater concern than actually using security tools. Second, the great majority of tools are for isolation, as opposed to replication or education. Third, the anti-malware tool most favored (by interviewees who had an opinion) was Microsoft Windows Defender; this is curious since Windows Defender is almost invisible in anti-malware product reviews (Rubenking, 2018; Tung, 2018).

CONCLUSIONS

Information on young-adult business majors' knowledge and skill in securing their endpoint computing devices will be presented. Specific conclusions of the study have not yet been identified because the data have not yet been gathered and analyzed.

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DO ADAPTIVE SKILLS AFFECT STUDENTS' ABILITY TO COMMUNICATE COLLABORATIVELY IN A BUSINESS PROFESSIONAL MANNER?

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BRIEF DESCRIPTION

“Digital Native” (Prensky) students are well adapted to the use of technology, often being continuously connected electronically with friends and family with the use of Facebook, Snapchat, as well as other social media applications. Within the College of Business, we continue to observe behavior that suggests that there is a comfort level with communicating digitally, but there is a lack of understanding regarding system governance, corporate applications standards and etiquette which are critical components in working within an organization’s IS environment. Inherently, if the student overlooks the importance of developing these adaptive skills, it can affect their ability to communicate collaboratively in a business professional manner, thus impacting their ability to succeed in developing solutions within a team environment. Employers continue to emphasize the need for college graduates who have project management skills and soft skills including collaboration and communication abilities; the use of “A Systems Analysis Role Play Exercise and Assignment” Teaching Case (Mitri, Cole, & Atkins, 2017) simulates a business environment in which students can develop these skills while also learning about the system development process.

BRIEF METHODOLOGICAL DESCRIPTION

The basis of the role-play exercise and assignment is to provide an active learning experience within the investigation phase of the SDLC. The activities within this phase includes: problem identification, feasibility study, cost-benefit analysis, and preliminary project planning (Mitri, Cole, & Atkins, 2017). In order to accomplish the noted tasks, the student teams are required to use a specified collaboration technology as preferred by the instructor, such as SharePoint, Flock or Slack, with the latter two options providing more of a social media atmosphere to the interaction. The focus of the collaboration is on the project planning and feasibility study component for the prioritization, selection and implementation of their recommended solutions in order to resolve the challenges introduced within the simulation. For the analysis portion of the case, students are instructed to use Microsoft Excel, Microsoft Project 2016 and/or Project Libre, an open source substitute to MS Project 2016. During the learning activity, the instructor serves as the administrator and moderator of the collaboration technology for monitoring requests for assistance, inefficient or ineffective approaches to communication, unprofessional comments and content, as well as, intra-team conflicts. As questions or concerns surface, the instructor engages the student or student teams directly and discusses the questions, concerns or

reasons why the comments contained within “company’s” system is not appropriate. Likewise, the instructor will engage with the student teams in assisting with the preparation of the project plan within MS Project 2016 or Project Libre in order to assist with the conversion of collaboration results into recordable tasks that translate to system thinking processes in order to insure the proposed solution addresses the requirements contained in the case.

IMPLICATIONS

At the conclusion of the activity, feedback collected during instructor-student interactions suggests that the experience provides the student with an improved understanding of how to better use technology for collaboration and project management efforts within a formalized business context. Although there was feedback suggesting resistance to the required use of specified technologies, by emulating IS standardization within an organization, teams understood the importance and implications regarding technology governance, standardization, and use within an organization for collaboration and project management purposes.

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KNOWLEDGE MANAGEMENT AS THE BASIS FOR COMPETITIVENESS AND CAPABILITY

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ABSTRACT

Over the centuries we have attempted to classify knowledge, capture it and disseminate it without seriously questioning what constitutes knowledge. While it is indisputable that knowledge is central to the success of every organization, it is difficult to manage. In an attempt to contextualize the basis for the functional parameters of knowledge and its inherent composition, four significant theories of knowledge management are discussed. Therefore, the paper is divided into four sections: 1. tacit knowledge of Michael Polanyi; 2. knowledge creation of Ikujiro Nonaka; 3. knowledge management of Thomas Davenport; and 4. knowledge management systems of Maryam Alavi. In the final section, we contextualize their viewpoints in terms the value added of two key components for organizations—competitiveness and capability.

Keywords: Knowledge management, Tacit knowledge, Explicit knowledge, Knowledge creation
Knowledge management systems

SOCIAL COLLABORATION TOOLS FOR VIRTUAL TEAMS: A GLOBAL LEARNING OPPORTUNITY FOR STUDENTS

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PREPARING STUDENTS FOR TODAY'S WORKING ENVIRONMENT

With the internationalization of organizations and the advancement of communication technologies, virtual teams have become a valuable alternative to collocated teams and extensive international business travel (Colbert et al., 2016). However, virtual team collaboration faces two major challenges: reliance on technology and communication across cultures and times zones (Gilson et al., 2015). University students need to be trained to effectively collaborate in virtual team environments in the workplace. To this end, we developed the Virtual Business Professional (VBP) project. The VBP is a six-week assignment that has run every semester since its pilot in spring 2015. It gives students real-world experience using social collaboration technologies to work with students from universities around the globe.

STRUCTURE AND GOALS OF THE VBP

Using the IBM Connections platform, students work in virtual teams whose members are dispersed across national and international business programs. They never meet in person, plan and hold virtual meetings, co-author and collaboratively revise documents, use project management tools, and create online presentations. In the spring semester 2018, the project involved 578 students in 96 teams and 24 faculty across 7 countries and 15 time-zones.

Oftentimes, students are placed in virtual teams for group projects with little or no instruction on how to use virtual collaboration tools successfully and what communication strategies to employ for virtual team success. The overall goal of the VBP is to guide students to developing strategies to successfully collaborate in a global virtual team. More specifically, the project has four goals:

1. Introduce students to the principles and practices of effective communication in virtual teams.
2. Learn about the use of social collaboration tools in the workplace. IBM Connections provided the students the digital tools needed to hold and record meetings, chat, share and store files, and collaborate in the creation of presentations and written documents.
3. Learn about intercultural communication solutions in a virtual team environment. Students were provided textual materials to learn about benefits, challenges, and techniques of an intercultural environment. The project required that they put this information into practice as they collaborated with team members in other countries using technology-mediated communication.
4. Implement a project-management approach to virtual team coordination tasks. Coordination is commonly identified as the biggest challenge to working in teams—particularly student

teams—so a structure was provided for students to encourage them to prepare for, plan, and report on weekly meetings designed to fulfill specific steps in project completion. These steps were managed using the IBM Connections platform.

LEARNING OUTCOMES OF THE VBP

Based on a comparison of pre- and post-project survey results, the project was successful in reaching the learning goals. Students started the project expecting to encounter the following problems: not meeting in person (69% expected this as a challenge), coordination problems (66%), *lack of participation* (47%), *meeting deadlines* (43%), and *language proficiency difficulties* (41%). *While many teams struggled with these issues in the beginning of the project, they used the learned strategies to overcome these challenges.* After completing the project, students considered all items less challenging. The most dramatic changes included: *meeting deadlines* (7% in the post-survey versus 43% in the pre-survey), *lack of participation* (12% versus 47%), *not meeting in person* (35% versus 69%), *coordination problems* (32% versus 66%), *language proficiency difficulties* (14% versus 41%), and *leadership problems* (9% versus 28%).

Two of our major goals were to help students coordinate their efforts well and communicate effectively in a virtual setting. We found that 80 to 90 percent of students rated team coordination and communication positively. These results were striking because we have done a variety of virtual team projects in prior years and used the same survey items. In past iterations of this project, we have typically observed 40 to 50 percent student agreement on these items. To apply a project management on a single social collaboration platform, significantly increased effective team coordination and communication (Aritz et al., 2017).

CONCLUSION

The communication challenge that students experienced led them to develop their communication skills in a technology mediated environment that is the norm in many organizations today. Our major goals for this project were to allow students to become comfortable working in virtual teams and allow them to explore ways of working with team members for different cultural backgrounds productively. Based on a comparison of pre- and post-project survey results, the project was successful in reaching that goal.

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BIG DATA AND ANALYTICS: A CURRENT ASSESSMENT OF WORKFORCE SKILLS REQUIREMENTS

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Keywords: IT Analytics, Big data workforce, Skills analysis

PROPOSED STUDY

Big data and analytics seem to permeate every aspect of businesses today. The focus of this research study is to assess the skills required by organizations that are hiring analytics and big data personnel. To begin our research, we followed a similar approach to previous studies conducted with the goal of understanding career expectations of positions across the information technology domain (e.g. Todd, Mckeen, and Gallup, 1995; Harris, Greer, Morris, and Clark, 2012).

BASIS OF THE STUDY

Skills data were gathered by searching a large job-posting website that yielded over 3,400 unique job advertisements using “IT analytics”, and “big data” as search terms. The job postings were queried over a 30-day time period under the information technology category. Data items obtained from each listing include job requirements, job title, and location. Over 500 different analytic and big data skills have been identified. Content analysis will be used with a modified pile sort methodology to the obtained data. Using this methodology, we anticipate placing every job skill from each job advertisement into a category. One of the intended goals of the research will be to identify noteworthy groupings of jobs skills in the analytics and big data domain.

IMPLICATIONS

Identifying the analytic and big data skills that are in demand helps students, universities, and anyone looking to pivot into the field. Individuals seeking to enter careers in the area of analytics and big data should have a solid understanding of what organizations require. Additionally, being able to stay in tune with the what the market demands helps position institutions of higher education to adequately and appropriately prepare students for successful entry into a workplace that continues to struggle with the imbalance of supply vs. demand for skilled workers (“Big data, big problem,” 2017).

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GENERATIONS Y AND Z: EMPLOYERS ARE ADAPTING – IS HIGHER EDUCATION DOING THE SAME?

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ABSTRACT

As generally classified and recognized there are six living generations in America (Friesner, 2014). Of these, the four primary generations at work or on college campuses are the Baby Boomers, Generation X, the Millennials also known as Generation Y, and, Generation Z. Each generation has been shaped by the events, leaders, developments and trends of its time. However, the emergence and use of technology has had the most defining impact on generations Y and Z. For example, almost every millennial uses, or, knows how to use a smart phone. However, they likely acquired a smart phone when they were young adults or adults. For Generation Z the smart phone is neither new nor technology – it’s something that they have always had and used their entire life and the device has shaped their social skills, growth and expectations.

As Generation Y matures in the workplace and Generation Z arrives on campus an evolutionary shift must occur. This is part of evolution and those that do not evolve stand to perish. Corporations seem to have understood this as they attempt to adapt and be more attractive to the Gen Y employee. “Employers everywhere know that millions of millennials favor independence and choice.” (Montgomery, 2018). Corporations are offering perks such as flex time, meals, gyms, day-care and student loan assistance. The student loan assistance program seems to be the most attractive to the debt strapped young college graduates. Gen Y is also pursuing higher education at the graduate level in unprecedented numbers compared to prior generation. Gen Z, our current incoming undergraduate students, are even more skeptical of the value of going in debt over a college degree. They are more pragmatic and less idealistic. They make choices that make sense financially but also from a perspective of quality of life and personal satisfaction and fulfillment. There is much to learn about Gen Y and Gen Z. There is a critical need for exploring this area of research study because of its direct implications on the present and future employment of new graduates, and, on the recruiting, enrollment and retention strategies developed and implemented by institutions of higher education.

For both employers and higher education, it is imperative to understand that while Gen Y and Gen Z are similar, they are not the same. The statement “In order to craft messaging, products and experiences that will resonate with Gen Z, brands can’t afford to simply replicate what they’re doing for Millennials. Without engaging this new generation on its own terms, brands will fail to capture the hearts and wallets of Gen Z” (Claveria, 2017) applies not only to marketing and corporations but also to higher education institutions. While both share similar traits such as being massive consumers of technology, they differ on several aspects such as motivation, choice of communication and expectations. Both employers and educators need to understand what factors influence and motivate these generations and appreciate that different generations differ in experiences, characteristics and habits that mold what they value. Each generation has a different

work ethic and a different approach to learning. As employers and educators, we need to step up and adapt to stay relevant for these generations. For example, college campuses in the US have primarily Baby Boomer and Gen X faculty members. However, the incoming Gen Y faculty members get that their students are not going to respond to or learn from a seventy-five-minute lecture. They seem to communicate and connect much better with the younger students.

In summary, employers and college professors and administrators will have to get creative in leveraging technology to employ, educate, engage, motivate and retain Gen Y and Gen Z. In order to be successful employers and effective educators we must understand our audience and the world they inhabit and use that knowledge to adapt and stay relevant. The purpose of this research is to get a better understanding of Gen Y and Gen Z and the world they aspire to inhabit, work and study in so we are able to better serve their needs of and train these incoming generations who are the leaders of the future.

Keywords: Generation Y, Millennials, Generation Z, Technology, Higher Education, Employers

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EXPLORING THE INDEPENDENT AND INTERRELATED ROLES OF GRIT AND SELF-EFFICACY IN DETERMINING INFORMATION SYSTEMS STUDENT PERFORMANCE

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Keywords: General self-efficacy, Task-specific self-efficacy, Grit, Persistence, and Performance

DESCRIPTION OF STUDY

Research has recently highlighted the potential power of grit in understanding information systems (IS) student performance (Brooks & Seipel, 2018). Grit provides a measure of a person’s perseverance and passion for long-term goals (Duckworth, et al. 2007); it provides some explanation for why individuals continue a course of action related to academics and career choices. Additionally, as it relates to choosing an academic or career path, it has been noted that people make choices and decisions largely based on perceptions of their own abilities in a given area. One of the primary drivers of choosing and maintaining a path in a science or technology field specifically is an individual’s self-efficacy (Michie & Nelson, 2006). Self-efficacy has been studied extensively in the workforce literature due to “the ongoing quest to better understand and predict the behavior of individuals in the context of organizations” (Jordan, et al. 2015, p. 165). It is our belief that grit may make a difference in distinguishing between successful and unsuccessful individuals that have both interest and talent. Self-efficacy taps into a different but related evaluation of the self by focusing on perceptions of capabilities and has been shown to be related to persistence and performance. For this study, we include two measures of self-efficacy in our examination of the two-factor model of grit in hopes of explaining performance in higher education and specifically for individuals in information systems. The first type of self-efficacy included is trait-based and is often referred to as general self-efficacy (GSE). General self-efficacy represents “individuals’ perceptions of their ability to perform across a variety of different situations” (Judge, et al. 1998, p. 170). The second is state-related or task-specific self-efficacy. In the information systems literature, it is typically referred to as technical self efficacy (TSE) and represents the “individuals’ belief about their abilities to perform in a given situation” (Brooks, et al. 2011, p 89).

BASIS OF THE STUDY

There are numerous studies devoted to enhancing our understanding of behavior. In an organizational context, this often means understanding individual actions that are related to increased or enhanced performance. Recently, research has tied the concepts of both grit and self-efficacy to performance (Jordan, et al. 2015). A primary goal of this paper is to extend what we now know as it relates to grit and the information systems student by including important and related variables researched extensively in the IS literature: TSE and GSE. We anticipate these factors, both independently and through their interactions, will play an important in determining

students' abilities to deal with the requirements and unique demands of careers in information systems.

There is some expectation of relationships between these constructs as indicated by previous research (Jordan, et al. 2015). Several models will be analyzed with the goal of understanding the implications of including both self-efficacy and grit in the same research study and the issues with and benefits from this approach. An additional goal is to determine if the GSE and TSE are related to grit independently. Analysis will consider how GSE and TSE jointly relate to grit. Final aspects of our study will be to evaluate model fit and the measures specifically. Additionally, we will evaluate the relationship of grit, TSE, and GSE independently to self-reported measures (academic) and other demographic variables.

IMPLICATIONS

By having a stronger foundation in this area, we can better understand the complexities in the relationships of self-efficacy (trait and state specific) and the two-factor model of grit. As educators and practitioners, this also provides an opportunity to more thoroughly understand individuals in the information systems area. With a focus on students, we can determine what factors relate to persistence in an academic setting and potentially impact retention and successful progression through courses and the individual's career. From a workforce perspective, understanding how individuals perceive themselves and how these perceptions influence performance can assist organizations in creating a work place conducive to success and hopefully to lead to lower levels of turnover or turn away.

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USING SCREEN CAPTURE TO PROVIDE FORMATIVE FEEDBACK AND PROMOTE TEACHER PRESENCE IN AN ONLINE COURSE

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ABSTRACT

In recent years, there has been an increase in formalized standards, best practices, and measures to assess the characteristics of effective teaching and learning in higher education. While they differ in scope and focus, what most of these standards agree upon is the importance of feedback, increased instructor presence, students taking more responsibility for their learning, reinforcing high quality work to communicate high expectations, and the use of authentic assessments. Harnessing available technologies to improve how formative feedback is provided to learners is one way to achieve these standards. Using video to annotate projects can provide more meaningful feedback through explanation, clarification, and context-based examples. Also, when learners hear the instructor's voice, it promotes teacher presence, especially in online learning environments, where the instructors and students may never meet. This presentation will share the results of a student survey regarding their feedback preferences and describe how a screen capture tool was used in a pilot study to facilitate instructor feedback on student projects in a fully online graduate course.

Keywords: Educational Technology, Screen capture, Teacher presence, Instructor feedback

LEARNING STYLE: AN INTERACTIONIST PERSPECTIVE

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ABSTRACT

An abundance of different learning style theories exist in conjunction with numerous assessment methods. Nonetheless, they are subject to substantial criticism. To provide a refined scientific basis that classifies individuals based on learning styles, we first enrich the literature by integrating insights from the interactionist perspective and national culture literature. We then discuss how our proposed theoretical grounds and approaches better help us learn, teach, and communicate.

Keywords: Learning Styles, Performance, Interactionist, Personality, National Culture

THE CONVERGENCE OF INFORMATION SYSTEMS AND EDUCATIONAL TECHNOLOGY

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ABSTRACT

Convergence is the coming together of two or more distinct entities to improve performance and efficiency. With convergence, disciplinary boundaries often become blurred, allowing service providers to offer improved services across multiple markets. While Information Systems (IS) and Educational Technology (EdTech) may appear to be two vastly different disciplines, the overlap between the two is actually quite significant. While EdTech is the use of technology to improve education, Information Systems is the backbone that supports education. Both disciplines build and expand upon the use of technology to maintain and solve organizational needs. When we consider how many emerging issues are addressed in IS and EdTech, the convergence is evident as can be seen below:

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| <ul style="list-style-type: none"> • Augmented Reality • Big Data • Bots • BYOD • Coding • Data Analytics • Distance Education • E-Learning • Gamification • Human Computer Interaction • Information & Communication Technology • IOT | <ul style="list-style-type: none"> • Makerspaces/3D Printing • Microlearning • M-Learning • MOOCs • Multimedia • Robotics • Social Media • Usability • Virtual Reality • Wearables • Web 2.0 • Web 3.0 |
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Related to this year's conference theme, this panel will bring together faculty from both disciplines to explore the convergence of IS and EdTech and how interdisciplinary partnerships can be developed to address programmatic needs and prepare our graduates for the jobs of tomorrow.

Keywords: Educational Technology (EdTech), Information Systems (IS), Interdisciplinary partnerships, Higher Education, Interdisciplinary programs, Career readiness

EMBEDDING IT INDUSTRY TRAINING CONTENT INTO COLLEGE COURSES: A LONGITUDINAL STUDY

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Keywords: IT training, Career readiness, Technology training, Workforce development

STUDY PURPOSE

The purpose of this study is to longitudinally survey 800 students who participated in the Microsoft Software and Systems Academy (MSSA) to identify the impact of the MSSA program on their career readiness, marketability, and earning potential using a survey instrument administered at different time intervals. By studying students who have chosen to earn a degree, prepare for industry credentialing exams, and learn employer-centered IT skills through the same conduit, college courses, the hope is to better understand how to structure these courses in the future as well as maximize their value. In addition, this data will be compared with normally collected alumni data to see if bundling industry certificates and associated content into college courses increase the students career readiness, marketability, and earning potential over simply having attended a focused, commercial IT training program with no college credit awarded, or a traditional college degree program without a focus on IT credentialing and career readiness. The goal is to identify the specific value of hybrid programs that blend traditional college courses and industry content.

BASIS OF THE STUDY

The MSSA Program is a unique partnership between a global university and Microsoft that focuses on active duty, transitioning military and veterans who wish to join the ranks of IT professional. Students make this career change or enhancement by enrolling in five technical 300 or 400-level courses, each worth three credits, that are embedded into the traditional college undergraduate degree curriculum as electives. These five courses focus on one of three IT learning paths; cloud application developer, server and cloud administrator, and cybersecurity administrator. Within each course are elements of Microsoft Official Courseware, hosted labs and lab cartridges, and other IT industry content as well as elements traditionally found in college courses such as research papers, discussions, projects, etc. There is some debate over the best way to teach STEM topics that leads the student directly into industry hiring pipelines. In the current marketplace are IT training centers and universities each operating under the assumption that they know best how to train an IT professional.

There have been many STEM initiatives that include IT training that use community colleges as the conduit for technical training. For example, Florida has an Engineering Technology Associate of Science Degree born from a state-wide need for a highly skilled STEM workforce (Barger, Gilbert, & Boyette, 2014). In the European Union, the Skillman Alliance attempts to create standardized curriculum by merging industry needs, standardized curricula, and a clear

understanding of specific job roles in manufacturing (Crisonà, 2017). India considers skill development a national priority and has begun using industry-oriented training programs (Soni & Sharma, 2016) that focus on specific skills. The challenge that exists in the United States is placing a value on each element of the university offering to better understand the merits of blending reputable degree programs with embedded IT skills courses and certification preparation with a focus on career readiness.

IMPLICATIONS

The implications of this research are far reaching as universities and colleges receive directives to be more relevant, employment-focused, and engage in workforce development activities and industry partnerships. There have been sound arguments that suggest a more abstract or theoretical education benefits critical thinking and problem-solving skills whereas a more hands-on, skills-focused education may provide more desirable skills for immediate employment. However, this assumes that each scenario is mutually exclusive, something that is not true within the MSSA Program. A better understanding of the value of each element of the MSSA Program through longitudinal student tracking will answer the lingering question of how technical training combined with a college education can potentially magnify ones earning potential, career readiness, and marketability.

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INFOMANIA: EXPLORING E-LEARNING THROUGH DIGITAL TECH OBSESSION

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ABSTRACT

Coined by Ferrarini (1984) and subsequently defined by online dictionaries into popular parlance, “infomania” refers to an obsessive need to constantly check emails, texts, social media, online news, etc., often resulting in a declining ability to concentrate uninterrupted, concurrently lowering the floor for effective learning of life management skills. Research evidenced that “infomania” derailed knowledge workers causing them to work well below their full potential, producing less output, thinking superficially, and generating fewer new ideas, despite investing an increasing number of hours (Hallowell, 2005). Academics observed that “infomania” equally affected student classroom knowledge acquisition vis-à-vis an increase in errors related to memory-retention, problem-solving, and decision-making. Thus, incorporating the positive attributes of “infomania” into online education may offer one solution to student knowledge acquisition and help negate the fear-of-missing-out (McGinnis, 2016). This panel explores “infomania” from the undergraduate college student perspective, seeking an open-minded discussion of e-learning influences and techniques that may help restore the creative thinking process, increase situational awareness, and re-engage cognitive orientation.

PANEL DISCUSSION

“Infomania” (Ferrarini, 1984) recently re-emerged into popular parlance as an obsessive need to constantly check emails, texts, social media websites, online news, etc., often resulting in decreased mental acuity and an ability to concentrate. This excessive enthusiasm for acquiring digital information evinced negative underpinnings of continuous mental stress, distraction, and reduced intelligence caused by a combination of queued information overload (Gross, 1964; Toffler, 1970; Carr, 2011) and incessant interruptions. Research evidenced that “infomania” derailed knowledge workers causing them to work well below their full potential, producing less output, thinking superficially, and generating fewer new ideas, despite investing an increasing number of hours (Hallowell, 2005). A 2005 study commissioned by Hewlett-Packard (Wilson, 2010) reported that IQ scores of knowledge workers tested while subjected to emails or other digital distraction and overload were reduced by 10 points; then subsequently took 23 to 30 minutes to restore cognitive awareness and concentration on the original task.

Academics observed that “infomania” equally affected student knowledge acquisition vis-à-vis an increase in errors related to memory-retention, problem-solving, and decision-making. Thus, incorporating “infomania” into online education may prove a creative solution to student knowledge acquisition and help negate the fear-of-missing-out (FoMO). Although Kumar (2015) and others argued that typical problems faced by e-learners are: adaptability struggle, technical

issues, computer literacy, time management, & self-motivation, “infomania” was not suggested. Therefore, this panel explores “infomania” from the undergraduate college student perspective, seeking an open-minded discussion of e-learning influences and techniques that can help restore the creative thinking process, increase situational awareness, and re-engage cognitive orientation.

Our discussion focuses on two research questions: 1). How can the construct of “infomania” be successfully incorporated within the online e-learning platform experience to elicit positive results? - *and* - 2). How can educators help students temporarily suspend the pervasive apprehension of FoMO during their participation in online e-learning? To address these questions, we will illustrate the construct of “infomania” via its application to a pilot study of undergraduate college students, all of whom participate in online platforms. Our limited results from twelve interviewees and a six-member focus group sampling of e-learners aged 18 - 26 will then be compared to published professional polls. The intent is to explore the outcomes of our pilot study to better understand how to correlate “infomania” with motivational, emotional, and behavioral e-learning perceptions. We will also discuss the following “infomania” influences.

- Fear-of-Missing-Out (FoMO). FoMO (McGinnis, 2016) is a type of social anxiety characterized by a desire to stay continually connected with what others are doing 24/7/365. Turkle (2011) asserted that when stressed or pressed for time, students escape through the demands of always-on culture.
- Information Overload. An excessive enthusiasm for acquiring digital information may result in distraction, stress, and reduced intelligence caused by information overload (Gross, 1964; Toffler, 1970; Carr, 2011). The volume and intensity of infinitely available information overwhelms users by dominating through natural and insatiable curiosity.
- Language Dependency. Similar to Simon’s (1956; 1972) theories of satisficing and bounded rationality, the construct of language dependency is based upon our own limited experience (Heim, 1990). Heim argues that we are biologically finite in meaningful attendance and cannot proceed at a computer’s breakneck speed. To understand something, we need to reflect and concentrate; but “infomania” erodes our capacity for significance due to a shortened attention span, incessant interruptions, fragmented grasp of data bits, and a poorer understanding of overall language meaning.
- Context Collapse. “Infomania” similarly falls prey to social media context collapse (Wesch, 2009), described as user confusion, meaning loss, overwhelming manipulation, diversion, obfuscation, and contradiction. This phenomenon is disconcerting when overwhelming “infomania” causes users to lose the ability to glean important information from the superficial.

Our panel will synthesize these various theoretical constructs and apply them to the results of the pilot study. We will argue that the common problems faced by e-learners further contribute to “infomania” within the online learning environment, and discuss how attitude change, technological literacy, and concentration techniques may help students gain confidence and succeed in online courses. We will then open the floor to audience discussion and opinions; and solicit areas of interest to provoke further study.

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INTERDISCIPLINARY APPLIED ANALYTICS CONCENTRATION

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ABSTRACT

The Applied Analytics Concentration (AAC) at Bryant University is a multidisciplinary concentration that provides students with a solid foundation in integrating technology and analytical methods to acquire, analyze and apply information for decision making and organizational effectiveness. In the early planning stages of the program, two distinct approaches were considered. One approach was to create a primary concentration in applied analytics that would require students to meet a minimum grade point average in their freshman year in order to enroll in the AAC. This approach would have created an elite honors level program. The second approach, which was adopted, was based on the philosophy that all students at the university would benefit in their professional lives and in their personal lives if they were to acquire higher-level analytic skills. Therefore, the AAC should be made available to all students in the university who elect to take it. A second issue that was considered derived from conversations with the organizations who hire our students. Practitioners complained that students who they have hired for analytics roles in their organizations have a strong analytics background, typically at a graduate level, but have a limited understanding of organizations and how analytics may apply in practical settings.

In order to address the goals stated above, the AAC was designed from the onset as a second concentration, with six required courses. Students are required to pair their AAC with another primary concentration within the College of Business or the College of Liberal Arts and Science that matches their interests and career goals. For example, a business student interested in marketing may take a marketing concentration combined with the core courses in the AAC and double count two courses in marketing that have a strong analytical content. Liberal arts student majoring in sociology or science students majoring in biology may combine studies in their major with an applied analytics concentration that includes double counting analytics courses related to their area of study. In this manner, students not only gain exposure to, and skills in, applied analytics but they also acquire a strong foundation in a chosen discipline to provide the context in which applied analytics may be used effectively in the workplace.

Figure 1 lays out the curricular requirements of the AAC. Four core courses and two electives are required. The core courses adopt a multidisciplinary approach, drawing from applications and examples in business, liberal arts and science. The two elective courses are selected from an approved list of courses in the student's first concentration and are eligible for double counting in the applied analytics concentration and in their first area of concentration.

GENERAL GUIDELINES

Key guidelines were established for the AAC including:

- The applied analytics concentration is by nature multidisciplinary
- The applied analytics concentration will be a second concentration
- Students will be exposed to a balance of theory and application
- Students will graduate with an analytics tool set that will allow them to be productive upon initial hiring and will provide them with a competitive advantage in the job marketplace.
- Students will acquire or be prepared to test for industry certifications (example, SAS/Bryant certification in analytics).
- Student’s must have completed an introductory level Statistics course before starting the AAC
- The two electives in the applied analytics concentration may double count towards the student’s first area concentration
- An external advisory board will be created
- Coops, internship and project sites will be available for students
- Students will have opportunities to enhance their studies through affiliation with the Bryant Applied Analytics Center for Interdisciplinary Studies.

The Applied Analytics concentration began with one section of 25 students in 2014 and will have grown to approximately 400 concentrators by the spring of 2019. Students report that having the AAC significantly enhances their job opportunities. Building on the success of the AAC, a Bachelor of Data Science degree was launched in the fall of 2017.

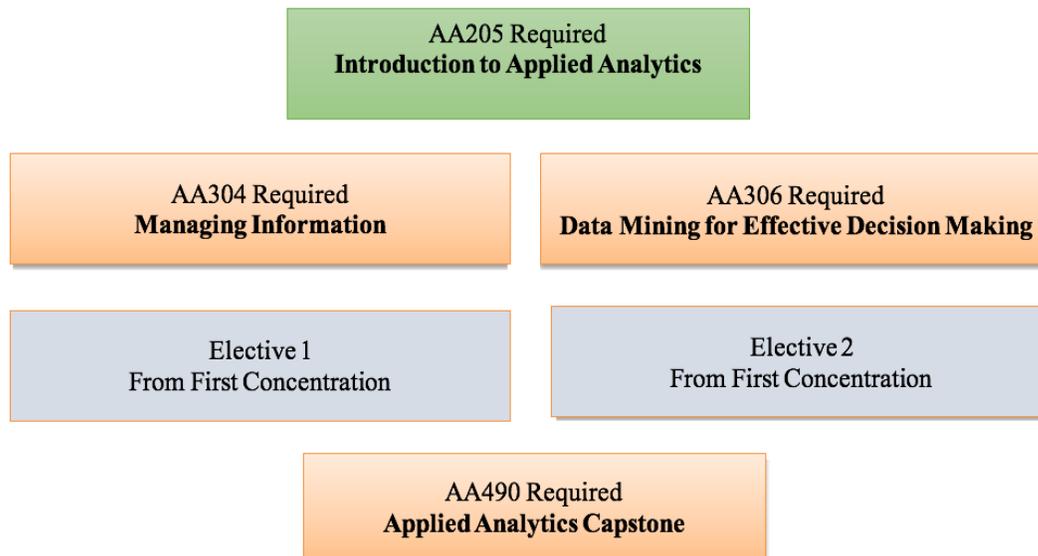


Figure 1: Applied Analytics Concentration Architecture

The Applied Analytics concentration grew from one section of 25 students in 2013 to over 300 concentrators in the spring of 2017. The concentration served as a foundation to build a BSc. Data Science degree which was launched in the fall of 2017.

CHANGING BEHAVIOR USING INFORMATION SECURITY AWARENESS

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PROPOSED STUDY

The submission below is an abstract of on-going research. The session will present findings from a completed study that has not been published yet as well as discuss the implications of security behaviors in higher education. The research team is in the process of evaluating and creating a new information security awareness training that will be implemented across the institution. This topic is important to IACIS conference participants to share ideas about how their institution is handling the same issue. Some institutions have mature information security awareness programs, and many will benefit from the ideas and information in this presentation.

BASIS AND IMPLICATIONS

A recent study examined faculty and staff information security awareness and how it affected their behaviors. Higher education is a data-rich target of distributed systems with large amount of refreshable personally identifiable information. The results indicated that the faculty and staff had high to moderate levels of information security awareness and behaviors. The study concluded with a call to develop a solution to advance the training in an attempt to prevent breaches or attacks. The researchers are examining open-source materials, paid subscription services, and developing their own information security primer. A model will be developed, piloted, and approved. Through administrative support, the training will be implemented throughout the university. This on-going applied research aims to achieve maximum impact to affect behavioral change, not just as a legal protection for the institution. The new security training will be developed using stakeholders across the institution, including faculty, staff, and students. The results from the previous study will be shared along with emerging ideas for developing a new security awareness training for university faculty and staff. The final security primer will be shared for distribution and reuse if possible.

SEVEN HABITS TO ENGAGE STUDENTS WITH TECHNOLOGY: GETTING PERSONAL WITH STUDENTS' SUCCESS HABITS!

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Keywords: Student engagement, Student success, Retention, Technology

INTRODUCTION

Retention in any learning environment is contingent upon continuous engagement, variation in engagement techniques, and student by-ins. Gardner (1999) discusses the need for student emotional intelligence and connection to the academic journey. This philosophy of active engagement can be traced through literature over the course of the last decade as a key success factor. Joe Cuseo's research discusses a simpler finding and needs for a leadership model to obtain interdependence and success. Although the paper suggests seven principles of student success, the scholar's model focused on three key areas: (a) student retention (persistence), (b) student learning (academic achievement), (c) personal development (holistic outcomes). This abstract will focus on the principle of self-efficacy to increase active student involvement. Particularly, the abstract will consider methodologies to engage students through technology to create a journey (path) towards self-efficacy and active involvement in academic success strategies (Cuseo, n.d.). The paper will propose using a leadership model as a framework to generate active technology involvement. The pilot model framework suggests seven technology methods to activate the three-core key areas of student self-efficacy, which teachers can use to increase retention and student self-efficacy.

Self-efficacy can be described as "a teacher's belief in his or her capabilities to positively affect students' learning and success, even among those students who may be difficult or unmotivated" (Pedota, 2015, p. 54). Technology can aid teachers' efforts to increase retention of lecture topics through student interaction and continuous connectivity. Faculty can use technology to engage the digital student culture, which is adoring to its disruptive devices (Spangler, 2015). Literature suggests the digital culture is sophisticated and driven by connectivity and interactive learning, although it simultaneously suggests students don't truly understand how to use simplistic technology software tools. With this oxymoronic literature findings, the abstract will suggest a pilot model teachers can test to foster learning modules and increase retention (Rodi, Spangler, Delorenzo, & Kohun, 2014). To create a successful path for the digital student culture, the model suggests that faculty need to engage technology and innovations use in class along with utilizing a leadership model to create student by-ins to his or her own journey.

PROPOSED STUDY

To prescribe Cuseo's leadership consideration, the abstract will utilize Covey's (2004) Seven Habits of Highly Effective People leadership model to frame how faculty can utilize technology

to increase student learning and success habits. Covey prescribes seven habits of successful people based on self-efficacy principles of creating “an outcome-oriented mindset in every activity” and goal planning through being interdependent of others and accountability (The 7 Habits of Highly Effective People, n.d.). The abstract’s model will focus student technology use on retention actions to decrease students’ attention loss that is suggested in the literature (Prensky, 2012). The pilot test model will focus on engagement techniques to direct digital students’ technology habits towards successful academic actions.

PILOT MODEL TO BE STUDIED

1. Be Proactive (persistence), Students are taught creative success actions with technology:
 - Students create a Google calendar of semester’s assignments
 - Google alarms are created to alert students to assignment due dates.
2. Thinking with End in Mind (persistence):
 - Students create a digital planner to create a work-breakdown schedule for all classes on their mobile devices.
 - Students create a mentoring team to generate a digital journal together on entire classes’ notes. The model suggests teams to increase retention through mentoring and peer-to-peer sharing. The overall final end digital production becomes a digital study guide for finals.
3. First Things First (persistence):
 - Students learn to use Google Docs to create and share their own online Wiki pages for interactive learning.
4. Win/Win (academic achievement):
 - Students learn to create and share YouTube channel video clips they create. The digital video archives answer questions for additional help and topics of interest.
5. Synergistic Activities (academic achievement):
 - Students create cyber-synergy pods (Google Hangout teams) to engage and create peer-to-peer virtual sharing and mentoring.
6. Seek First to be Understood (holistic outcomes):
 - Students create a forum (blog site) for issues and active discussions. The self-driven learning Blogs promote distance communications outside of the typical classroom and promote student ownership in the education process, which they can share and further develop through the academic journey.
7. Sharpen the Saw (holistic outcomes):
 - Students learn to create and share their own Snagit video clip podcasts to foster learning. Students become teachers themselves on classroom topics as part of the learning methods. The clips are cataloged into an online forum to increase retention. Students become holistic learners through action and being teachers themselves.

CONCLUSION

The abstract suggests scholars consider the proposed model a pilot study. The study could determine if technology use and a leadership model combination can create successful habits for gaining student retention. The pilot model success measurement should demonstrate significant advances in Cuseo's three areas: persistence, academic achievement, and holistic outcomes. Although the paper suggests utilizing the Covey's leadership model, the abstract contends there are many leadership models that may offer stronger possibilities with technology to create a journey (path) towards self-efficacy and active involvement in academic success strategies (Cuseo, n.d.).

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EXPLORING POLICE OFFICE USE OF SOCIAL MEDIA TO ENGAGE THE COMMUNITY

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ABSTRACT

Social Media is increasing its use as a tool for commerce, government, education, and social activism. Social Media is an established platform for sharing information and engaging with both virtual and physical communities. The use of social media platforms by law enforcement agencies at all levels (federal, state, local) is not a new trend. However, the use of social media platforms by individual law enforcement officers to engage the community is a recent development. Given the strained state of the relationship between law enforcement and the public in 2018 social media platforms offer an outlet for officers and the public to develop and maintain connections to the public. The purpose of this study is to identify law enforcement officers who are using social media to engage members of their served community at a personal level and study the perceived effectiveness of social media tools. It will examine both what platforms the officers are using, the officers' strategies employed with these platforms, and how the officers rate the effectiveness of the platform and strategy. This study will limit itself to one county located in a state in the northeast. It will use both interviews and survey tools to gather data for analysis.

Keywords: Social Media, Strategy, Law enforcement, Communication