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Editor
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Journal Profile

The *Journal of Research in Business Information Systems* (JRBIS) is a national blind-reviewed, refereed publication published annually by the Association of Business Information Systems. This refereed journal includes articles from fields associated with business information systems focusing on theory, problems associated with information systems and information resources in education, business and industry, government, and the professions.

Manuscripts are selected using a blind review process. The first issue of the Journal was available Spring 2008. The Journal is listed in the ERIC Database and Cabell's Directory of Publishing Opportunities in Accounting, Computer Information Systems, Education, Instructional Technology, and Management.

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The readership is comprised of college and university faculty, administrators, staff, practitioners, and students engaged in business information systems or preparing for careers in fields related to information resources. The journal is distributed electronically annually to all Association of Business Information Systems members as part of conference registration or membership. The journal is also available online at http://www.abis-fbd.org.

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You are invited to submit manuscripts for publication consideration in the 2019 issue of *the Journal of Research in Business Information Systems (JRBIS)*, a national blind-reviewed, refereed journal published annually by the Association of Business Information Systems (ABIS). According to the Constitution and Bylaws of ABIS, the published articles of *JRBIS* are limited to the papers presented at the previous ABIS Annual Conference and/or published in the *ABIS Proceedings*.

This refereed journal includes articles from fields associated with business information systems focusing on theory; issues associated with information systems; and information resources in education, business and industry, government, and the professions. Manuscripts should address topics of interest to the wide-ranging interdisciplinary and practitioners who read *JRBIS*. The readership is comprised of college and university faculty, administrators, staff, practitioners, and students engaged in business information systems or preparing for careers in fields related to information resources. The journal is distributed electronically annually to all Association of Business Information Systems members as part of conference registration or membership. The journal is also available on the ABIS website for public scrutiny.

Submissions of manuscripts relating to topics, along with research findings, theoretical and practical applications, discussions of issues and methods for teaching and assessing instructional technology, and reviews of textbooks are encouraged. The *JRBIS* is listed in the ERIC Database and five separate volumes of *Cabell's Directory of Publishing Opportunities*, including Accounting, Computer Information Systems, Education, Instructional Technology, and Management. Manuscripts will be selected using a blind review process. Manuscripts should not have been published or be under current consideration for publication by another journal.

Submission and Formatting Guidelines

All manuscripts must be submitted electronically in Microsoft Word format. Manuscripts, citations, and references must use the style format of the *2010 Publication Manual of the American Psychological Association* (6th edition).

Submissions should include a separate file attachment for the title page that contains the following information in this exact order:

- Title of the manuscript
- Each author's full name; position/title; institutional affiliation, including address, city, state, zip code; home, office, and cell phone numbers; and e-mail addresses (identify the main author who should receive all correspondence).
- Number of words in the article (including all parts–everything)
- Biographical paragraph (50-60 words) for each author

- Any acknowledgments or information about manuscript history (e.g., based on a conference presentation)

The second separate file attachment should be the manuscript file that begins with the title of the article, a 50-100 word abstract, 3-5 keywords or phrases describing the focus of the article, and the body of the manuscript. Do not include any identifying information in this file. **Do not include any personal identification or institutional affiliation in this file.**

The manuscript body must adhere to the following guidelines:

- 10-25 double-spaced pages (3,000-6,000 words)
- 1" margins all around
- Times New Roman, 12 pt. font-size text within article
- Bold and center primary headings, with major words capitalized
- Bold and left-align secondary headings, with major words capitalized
- No footnotes or endnotes
- No page numbers or headers or footers

Tables and figures may have varying font sizes (but must adhere to APA Style). Include tables or figures formatted and placed correctly within the manuscript.

Include the References page (Works Cited only) at the end of the manuscript, followed by any appendix information, if necessary.

All submissions will be reviewed by the editor and two reviewers, using a blind-review process. Authors will receive feedback 6-8 weeks after the initial peer review. Manuscripts will be "accepted," "accepted with minor revisions," "possibly accepted after major revision and resubmission for further peer review," or "rejected."

The editor reserves the right to edit selected/accepted manuscripts for publication as deemed appropriate and necessary for the optimization of journal publication and format. The author of the manuscript retains responsibility for the accuracy of a manuscript published in the *Journal of Research in Business Information Systems*.

To ensure your manuscript is considered for publication in the *2019 Journal of Research in Business Information Systems*, submit the manuscript by November 1, 2018, to Dr. Ashley Hall at hallaa@sfasu.edu.

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DATA VISUALIZATION ADOPTION: A FRAMEWORK AND CASE STUDY

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Abstract

Many organizations today are novice users of analytics but desire to become experts. Organizations seeking guidance from existing research on how to improve their application of analytics will find inconsistent advice. This study presents a framework that organizations can use to inform their decisions that take them from adoption through to proficiency with data visualization, a specific skillset within the field of analytics. This framework is used to explain the development of analytics skills in an organization that is a leader in the use of data visualization.

Keywords: *Data Visualization, Analytics, Technology Adoption*

Introduction

Organizations seeking competitive advantage and optimal performance are increasingly turning to analytics. Analytics is a domain of expertise involving data that improves both decision-making quality and organizational processes (Davenport & Harris, 2005). Despite the promise of analytics, it is a relatively new discipline and organizations often do not know how to begin or how to improve on current efforts. Some common challenges organizations experience when adopting analytics are: determining which techniques to use (e.g. data visualization, machine learning), determining which technologies support the application of those techniques (e.g. Tableau, Hadoop), and determining how to hire the people that have the required skillsets. To help organizations in addressing these issues, this paper presents a conceptual framework for how to adopt and improve upon the application of analytics techniques. Since there are many techniques possible within the field of analytics, the technique chosen to illustrate the framework

is data visualization. After the features of the framework are introduced, the framework is used to explain the case of an organization that started from scratch and became a world leader in the use of data visualization.

Literature Review

Business analytics is the process of using data, skillsets, and technologies to make more evidence-based business decisions (Seddon et al., 2016). It is an interdisciplinary field requiring statistics, technology, and business domain expertise (Davenport & Harris, 2005). Some of the many specializations within the field of analytics include data visualization, data mining, and simulations. Although the field is still relatively new, there are estimated to be 250 academic programs teaching analytics and producing between 8,000 to 10,000 graduates per year ("Graduate Degree Programs in Analytics and Data Science", 2018).

Given the potential and momentum of analytics, many organizations have a goal to adopt it and become proficient in its application. To help organizations meet the goal of adopting analytics, recent research has presented many perspectives on what problems exist and how to address them. One study characterizes organizations as being at one of three levels: aspirational, experienced, and transformed (LaValle et al., 2011). At the low end (aspirational), organizations want to have analytics skill sets while presently lacking them, and on the other end they have been transformed by its usage. In this study, the biggest obstacle found in proceeding through the three stages of maturity is *lacking understanding of how to use analytics to improve business*. The solution presented in the study focuses on five points that emphasize identifying problems, embedding methods such as data visualization into business processes, and having an information agenda.

Another study that looked at the adoption of analytics found that 74% of organizations have tried something and found obstacles to its effectiveness (Russom, 2011). Some of these obstacles include *inadequate staffing, lack of business sponsorship, and lack of compelling business cases*. The Russom study did not provide insight into how to overcome these challenges. Another study in the context of the NBA noted that the adoption of analytics is a challenge for organizations because it involves *major organizational transformations* and the *need to establish a sound analytics program* (Shields, 2018). Their recommended solution involves teaching employees the terminology used in analytics, acquiring the right technology, and starting with small projects.

Ransbotham and Kiron (2018) studied the problem of developing expertise in analytics and found that organizations are accumulating more and more data with each passing year, but *are ineffective at knowing what to do with it*. They suggest working on problems and not focusing on acquiring data. Another study on the adoption of analytics found that critical organizational barriers exist that include *knowing what type of analytics to use and where to apply them* (Levenson, 2011). The solution Levenson offers is to list common techniques used in analytics and give examples of situations in which they can be applied.

The aforementioned studies provide helpful insights into the problem of adopting and applying analytics, but in the aggregate they do not convey a consistent solution for organizations looking to get started or to improve. In response to this problem, this paper will introduce a framework for how to go from inception through maturity in using a specific analytics skill, data visualization. This framework is then used to analyze the case of an organization that went from adoption to maturity with this skill.

Approaches to Acquiring Data Visualization Competency

Developing competency in data visualization involves a strategic choice regarding which pathway to follow, represented by arrows 1, 2, or 3 in the decision framework found in Figure 1. This choice is affected by both the technical readiness of the organization to support data visualization and the its level of understanding of business operations. *Technical readiness* involves both a sufficient IT infrastructure (including databases, available data) as well as employees capable of supporting analytics software packages (including Tableau, Power BI, etc.). If any aspect of technical readiness is lacking, then outside support may be needed in order to correctly acquire the needed resources or training. The *level of understanding of business operations, or Business Operations IQ,* refers to how well employees understand different aspects of operations that can be improved by data visualization. Operations that can be improved by data visualization will typically have metrics associated with them. For example, if a sales manager understands how different metrics such as leads and cold calls lead to other key metrics such as closed sales, they will be able to leverage analysis of those metrics. If employees have a low degree of IQ related to business operations, then this skillset must be built up internally before technical resources for data visualization can be used effectively.
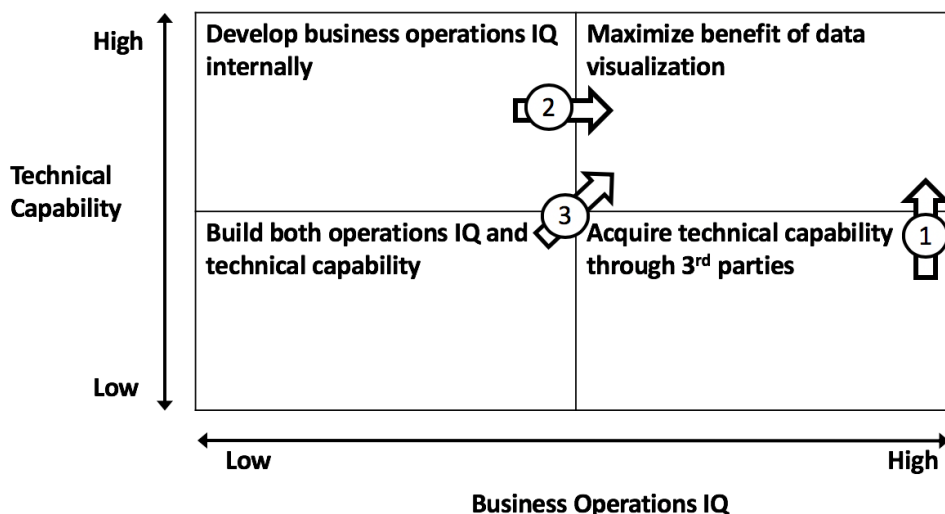
Pathway 1: Outsource

If an organization has employees that understand and can articulate its operations well, but lacks the technical expertise and infrastructure required to support data visualization, then outsourcing is an appropriate path for it to take. In most cases, this path involves simultaneously hiring or reassigning employees to learn the technical details of operating and supporting key software and infrastructure so that an organization can eventually maintain high levels of technical expertise internally. Analytics outsourcing is a growing market in which $46.9 billion was spent in 2013 and it is expected to have grown to $70.8 billion by the end of 2016 (Watson, Wixom, & Pagano, 2013).

Pathway 2: Develop Business Operations IQ

If an organization has a strong IT infrastructure in place and highly capable IT force, it may still need to develop a greater understanding of business operations among key employees. An organization may have poor IQ related to operations if it lacks employees that understand how tasks are performed and coordinated to achieve operational and strategic goals. To become successful in this situation, managers will need to be developed or assigned that can define, monitor, and share metrics that improve operations in key areas of an organization. One source for future high IQ managers may be existing managers that manage people but do not yet understand the details of what those people do. Another source for future high IQ managers may be employees that are not managers but are subject matter experts related to a process that is performed across different individuals or functional areas in an organization.

Pathway 3: Move Directly from Low-Low to High-High

An organization that lacks both necessary technical expertise and business operations expertise will need to develop both capabilities simultaneously. It will need to acquire the

software and infrastructure technologies it needs as well as capable employees to use these technologies. It will also need to develop business operations IQ among business-oriented employees. These two groups of employees (technical and business), along with the outsourcing consultants, will need to work together until data visualization benefits are achieved.

Case Study Methodology

The following section presents the case of an organization that progressed from having no skill in data visualization to becoming a world leader in its application. This organization is well known because it regularly presents at leading professional conferences. One of its key team members is the former president of a regional analytics user group and a highly trained consultant on data visualization. Two researchers from our university interviewed the aforementioned employee and another analytics team member from the same organization on multiple occasions to collect information for this case study. In addition, published articles about this organization's success were also reviewed. The case study created from these interviews and materials was shared with the organization and revised for accuracy.

The Visualization and Analytics Journey of Church, Inc.

The case of Church, Inc. (actual name withheld upon request), a religious non-profit organization that was founded in 1996 and now has 27 locations across 8 states, is an example of an organization that has taken path 3 from Figure 1 and simultaneously improved both its technology capabilities and business operations IQ. This case shows how an organization grew from no experience in data visualization to being a world leader in this space that achieves significant value on a daily basis from its efforts.

Church, Inc.'s scale of operations makes it comparable to many other large organizations.

It has:

- Over 500 motivated and engaged employees

- Customized services delivered to hundreds of thousands of people every week

- Standardized organizational roles that are replicated in many geographic locations

- Challenges in transferring knowledge among multiple locations

- Employees sensitive to having their performance on display to the entire organization

Church, Inc. currently uses over 1,000 data visualization dashboards to help it monitor and improve operations related to many of its standardized organizational roles. These dashboards are developed and maintained by highly skilled experts whose talent was developed internally. The dashboards used by Church, Inc. are critical tools for driving collaboration among employees and volunteers and are considered integral to the growth that Church, Inc. has experienced.

The following material details the journey that Church, Inc. followed while going from novice to expert in data visualization. The organization's journey is characterized by a four-stage model that highlights some of the distinct conditions that existed in each stage of development (See Figure 2 and later, Table 1). In Stage 1, *Developing Awareness*, Church, Inc. discovered challenges in operations that might be addressable through data visualization. In Stage 2, *Proof of Concept*, the organization experimented with solutions that it found useful and which gave it confidence to try even larger visualization initiatives. In Stage 3, *Building Momentum*, success after success made data visualization solutions spread like wildfire in the organization. In Stage 4, *Refine*, the organization learned to deal with information overload and worked on increasingly difficult organizational challenges.
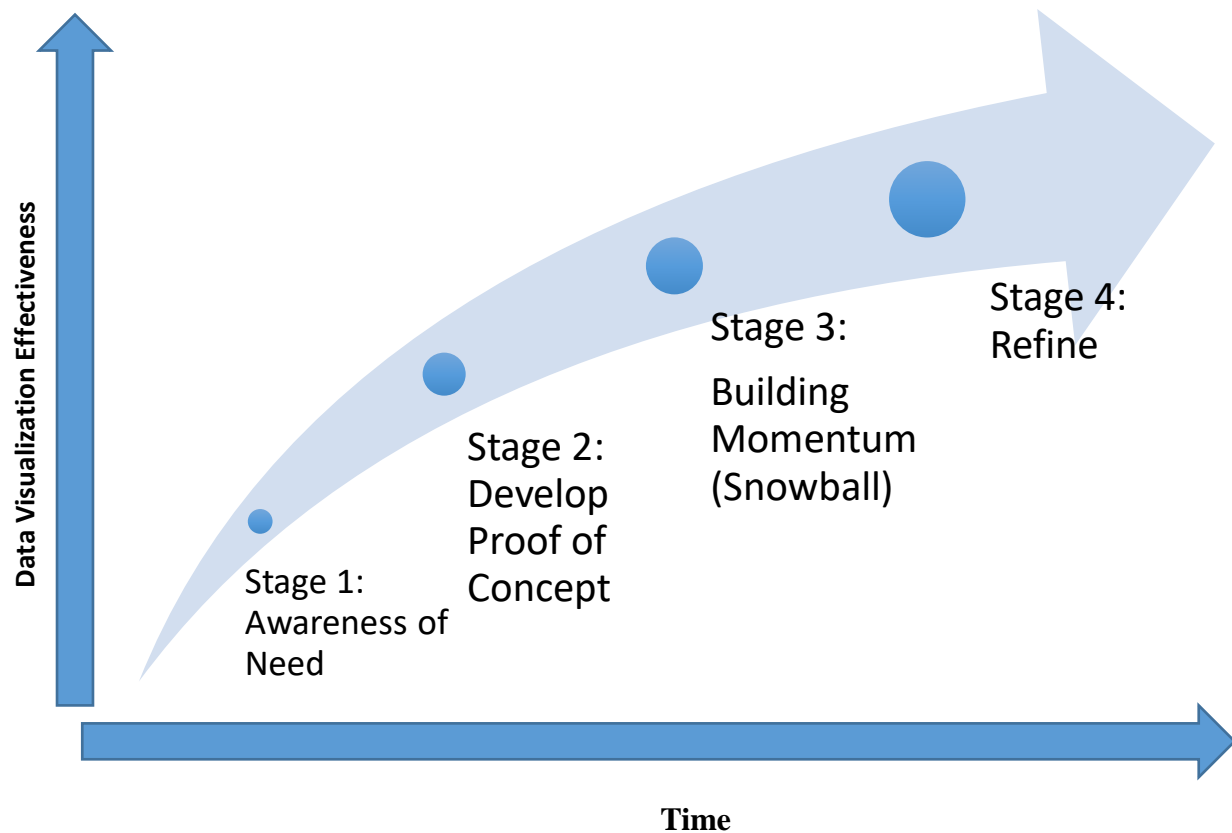
Figure 2. Stages of Data Visualization Implementation

1. **Awareness of Need**

Founded in 1996, Church, Inc. began with 40 active members. One key issue from the very beginning was how to track attendance. Initially, this was done using hand written notes. Through the early 2000s, Church, Inc. expanded its membership, number of locations, and technical capabilities to support its growth. During this early time period it transitioned to tracking attendance data with Microsoft Excel. Challenges with interpreting the increasingly large number of data points led the management team to be open to the emerging capabilities of data visualization.

2. **Proof of Concept**

The management team at Church, Inc. had its first experience with data visualization when it began using Xcelsius by Business Objects with the help of IT consultants. This tool

allowed Church, Inc. to take its rapidly growing volumes of data that were stored in Excel files and convert them into interactive Flash media files. In the sense that a picture was worth a thousand words, management found it useful to track giving and attendance at its six different locations this way. However, there were many challenges associated with this new form of visualization software. For one, it was time consuming to collect the data into Excel spreadsheets and to transform the data into a format that could be used by Xcelsius. As the volume of data increased over time, so did the cost of supporting the process of converting the continuous stream of data manually into a format that could be imported properly. Another concern about the use of the software was that it couldn't connect to other data sources that were proliferating in the organization, such as SQL databases. Yet another significant concern was that expanding the use of the dashboard to each location was problematic – users struggled to learn the technical skills required to use the tool properly.

Although Church, Inc. experienced issues with the use of an early version of data visualization software, grappling with its benefits and challenges prepared them both technically and conceptually to use better tools when they became available. The organization decided to experiment with a new breed of visualization software that made data importation from various sources far easier and did a pilot test of Tableau software. Within just a couple of weeks, an employee was able to duplicate the dashboard related to attendance and giving that had taken far longer than that to create initially. For the next year, the new dashboard and old dashboard were run side by side and the organization became sold on the ease of use and improved graphics in Tableau.

3. Building Momentum

What would eventually become a snowball of requests for visualization dashboards was driven by a single success story that spread throughout the organization. The church had noted that it needed more volunteers to serve (as it is highly reliant on volunteers), and leaders asked the question how many people had applied to serve but had not been utilized. The application and qualification process to become a volunteer is extensive in order that volunteers are proven to be trustworthy (they end up caring for children, parking cars, etc.), and Church, Inc. was confident that such effort was seldom wasted. A visualization of available volunteers was created in just a couple of hours to analyze the number of people that had been vetted but never activated in the organization and they were surprised to discover 3,300 such individuals. Data visualization facilitated segmenting the data further to reveal regional differences. In one particular city, the church campus took this new information and activated 45 qualified volunteers in just two days. Similar successes happened at other campuses and news of these successes drove interest in finding other challenges that data visualization could be applied to.

One key aspect of using dashboards at Church, Inc. is that the dashboards are widely shared across the organization. The direct effect of this is that if a dashboard is created that relates to an organizational role, such as volunteer management, metrics are available for workers to compare their performance in their role with those at other locations. Rather than comparison being viewed negatively, it serves as a motivation for collaboration. When someone with a particular responsibility sees that they are doing poorly in an area that another campus is excelling in, they initiate a conversation with those that are doing well and use that knowledge to improve their performance.

The early success related to the volunteering dashboard created a situation where the adoption of data visualization was organic, and management never had to sell the benefits of it. During this stage of excitement, many requests for dashboards were made as well as access to view existing dashboards. This was a time of trying many approaches and seeing what worked. There were major wins, but there were also excessive resources wasted on dashboards that weren't used.

4. Refine

Eventually, over 1000 visualizations embedded in dashboards were created, and it was clear that not all of them were being used. Redundant requests for visualizations were routinely made without separate departments realizing it. Also, access controls to dashboards with sensitive information were sometimes needed and had to be managed carefully. Another development that occurred at the same time was that one employee reached a rare certification level related to Tableau usage, cementing Church, Inc. as a world leader in data visualization knowledge and capability. Hence, Church, Inc. was positioned to refine what it had done previously given its increasing maturity level related to data visualization.

One important change it implemented during this stage was to standardize the ticketing system used to request dashboards. This contributed to a better screening process that reduced the likelihood of unused or redundant dashboards. Another characteristic of this stage of maturity is that the organization actively looked for ways to refine what it had done in the past, based on advancing skill levels with the technology being used. Lastly, the organization had solved most of the easy problems and began working on visualizations that were far more difficult than the earliest ones. As a result, dashboards now take days and weeks to develop

rather than hours, as they did in the beginning of the adoption process. Table 1 includes

additional information about different dimensions of growth that occurred in each stage.

Table 1. Characteristics of the Data Visualization Stages.

	Stage 1: Awareness of Need	Stage 2: Proof of Concept	Stage 3: Building Momentum (Snowball)	Stage 4: Refine
Governance	Limited	Determine basic data governance policy and access control strategy	Ensure that data security isn't compromised with increased collaboration	Implement granular access control that can adapt to business needs
Personnel	Internal stakeholders become aware of needs.	Initiate employees' skills in implementing visualization technology and understanding of business processes	Expand on skills in previous stage and train end users to use visualization effectively	Data visualization experts learn to manage dashboards like a portfolio of projects
Cost	Limited	Little investment necessary for basic proof of concept. Utilize free trial software where possible	Licensing costs can be managed on a per seat basis to keep costs down, but will rise quickly	Enterprise licensing schemes can easily reach upwards of six figures
Strategic Impact	Build spirit of inquiry about visualization tools and capabilities	Illustrate usefulness of visualization for business application	Operational processes widely impacted and improved	Pace of process improvements slows

Lessons Learned

As Church, Inc. went through its journey through the four stages of maturity, it learned

many things it believes would be of value to other organizations taking the same journey. As

with any new way of doing things in an organization, potential influencers and resistors to data

visualization were considered important to the adoption process. Proponents of data visualization made sure to avoid resistors and to approach likely influencers to inquire about their problems and attempt to create solutions for them. As influencers became sold on the effectiveness of data visualization to solve their problems, they convinced others to be open to using it.

Another issue related to visualization is that from an end user's perspective, adopting it may represent a completely new way of viewing their data. As such, some end users, particularly senior leadership, may not be ready to adopt the bleeding end capabilities of visualization software. For this reason, Church, Inc. adopted a philosophy of "meet the user where they are", which meant that they would accommodate the user rather than forcing a solution on them. In practice, this meant that sometimes a data visualization would be built for an end user that closely matched a previous report built in Excel or other software, rather than what would theoretically be the best way to represent the data. The hope in this situation is that an ineffective report would be gradually improved over time as the end user became aware of better visualization techniques.

One reason that it is important to "meet the user where they are" is that Church, Inc. noted that their internal data visualization experts are continually getting more advanced in their understanding of how data can be visualized. At the same time, end users who are in effect data visualization novices are relatively steady in their level of understanding. As a result, data visualization experts need to make a conscious effort to not alienate their clients who are further and further separated from them by a knowledge gap. One trick to maintaining a connection with end users is to design dashboards using terminology that the user prefers. For example, a

pastor may prefer to see the words "cover charge" rather than "donation" in a report that they use because it more closely matches the way that they think about a particular problem.

Culture was articulated as a key factor in the success of data visualization adoption. In particular, being open to sharing data is a necessary precondition for creating useful dashboards. Even in an organization characterized by selflessness and transparency, people felt nervous about what might be revealed if they shared their data. People often wouldn't verbally communicate their concerns, which might include happiness, nervousness, or fear, but it was easy to sense it. It was critical to emphasize at all times that shared data would not be used to create a scorecard for the purpose of comparing one person with another, but rather it would be used as an opportunity for improvement. It was heavily emphasized that the data visualizations would be used as tools for improvement, and in so doing a culture of communication and collaboration was reinforced.

One surprising lesson they learned relates to data standardization. It is common knowledge in the field of data analytics that having consistent, clean, and standardized data is necessary prior to analyzing it. For many organizations it takes a significant amount of effort to regularly prepare data for analysis in data analysis tools. Church, Inc., however, found that the burden of data cleansing and preparation was a minor issue for them, despite having diverse sources of data. One reason for this is that modern data visualization software is particularly adept at importing data from diverse sources and preparing it for analysis. However, another reason Church, Inc. does not struggle with data preparation is that the providers of data in the organization are actively involved in making it suitable for analysis. The way this came about is that end users would ask for data visualizations of interest to them and the IT staff would tell them it could only be done if the data was collected in certain ways. With a high level of

motivation to get the reports that they wanted, users would modify their data collection so that it was amenable to analysis.

Implications

This study introduced several ideas that are applicable to organizations seeking to become more proficient in their use of analytics. First, it presented a framework that helps organizations identify their strengths and weaknesses based on where they are at and determine the most important steps they need to take to advance to the next level. For example, if an organization knows that it has a strong understanding of how numerical metrics are related to key business outcomes, but it doesn't have people on staff with technical skills related to analytics, then it lacks a key component that must be addressed in order to improve. Although this reference framework was presented in the context of data visualization, it could just as easily apply to any other technique within the space of analytics, such as machine learning or predictive analytics.

Second, this study introduced the idea of stages of adoption maturity. This concept, introduced in Figure 2 and elaborated on in Table 1, acts as a reference framework to help organizations know where they are currently positioned. Furthermore, it highlights the issues that organizations need to be aware of in order to master that stage and move on to the next. For example, an organization entering the building momentum stage (Stage 3) needs to experience a significant success that will inspire the rest of the organization, similar to what Church, Inc. experienced with respect to activating latent manpower for service. It should also be aware that increased use of a technology such as data visualization will rapidly escalate licensing costs.

Lastly, this study communicated important lessons learned in its case study that are applicable to all organizations. One of these is that organizational politics and human nature are

important factors that will ultimately determine the success or failure of an analytics initiative. One of the dynamics to consider is that end users experience analytics differently than technical experts who specialize in its development. Therefore, it is critical to make sure that the end user is accommodated both in terms of their level of understanding related to analytics (which is less than the experts) as well as their insecurities about how sharing their data could put their employment at risk. In such cases, a culture of safety and sharing must be cultivated by organizations that seek the benefits that analytics has to offer.

Conclusion

In this study the problem of how to adopt data visualization, a form of analytics, was addressed through the creation of an adoption framework. This framework conveyed the need for technical skills and business operations IQ in order to create effective dashboards. This framework was expanded further by a figure demonstrating the four stages of maturity that an organization needs to pass through in order to obtain the highest benefit from data visualization. The case of data visualization adoption at Church, Inc. was presented and discussed in reference to Figure 1 and Figure 2. Adopting data visualization at Church, Inc. led to enhanced collaboration and process improvement in every aspect of the organization, fueling its growth as one of the largest organizations of its type in the world.

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PROJECT MANAGEMENT SOFTWARE: DEVELOPMENT AND EVALUATION OF THE PMIS

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Liang Chen, West Texas A&M University
Jeremy C. Bellah, University of Oklahoma

Abstract

There are few, if any, options for software that students can use for project management that meet the following conditions: 1) free, 2) easy to use, 3) supports real-time collaboration, and 4) supports most important project management functions (including earned value analysis). To fill this need we used a design science approach and created a web-based software system that supports the core functions necessary to manage a project. We aligned much of the functionality with the standards defined in "A Guide to the Project Management Body of Knowledge (PMBOK Guide), Fifth Edition" (Project Management Institute, 2013) and supported functionalities for: managing stakeholders, creating a work breakdown structure, creating an activity list, estimating time and cost, tracking progress, and reporting progress. We evaluated the software using undergraduate project management students and found that the software was effective for both managing projects and learning content. We plan to continue development of the system and repeat the evaluation using project management professionals in the context of managing real projects.

Introduction

Many information systems (IS) programs have accepted project management as a core course and some teaching practice has been examined (Baird & Riggins, 2012; Du, Johnson, & Keil, 2004; Frank, 2010; Landry & McDaniel, 2016; Pollard, 2012; Reif & Mitri, 2005; Smith III, Smarkusky, & Corrigall, 2008). However, most of them focus on what concepts and skills

should be taught. As an increasing number of IS projects in industry are managed by software, project management courses are expected to be taught with the assistance of project management software. However, to our knowledge, there is no such educational practice.

This research project began with course prep. One of the authors was looking for tools to use in an undergraduate project management class, and he was disappointed with what he found. He wanted a tool that was free for students, easy to use, and accessible for multiple students to use at the same time. Through Microsoft Imagine, students can download and install Microsoft Project for free. While it is a good product, it is not good for collaboration, and it is not easy to use. Students using the product have a very difficult time doing earned value analysis correctly. There are collaborative tools available for free that claim to be project management tools, but they only provide collaboration. To our knowledge, there is nothing that satisfies the four main needs:

1. Free
2. Easy to use
3. Supports real-time collaboration
4. Supports most important project management functions (including earned value analysis)

Because necessity is the mother of invention, we decided to create the tool using a design science approach. We followed the seven design-science guidelines raised by Hevner, March, Park, and Ram (2004) and discussed how our tool satisfies each guideline as below.

Guideline 1: Design as an Artifact. "Design-science research must produce a viable artifact in the form of a construct, a model, a method, or an instantiation" (p. 83). Our tool is an instantiation of the design of an information system that conforms better to the best practices in project management than do commercial software systems.

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Guideline 2: Problem Relevance. "The objective of design-science research is to develop technology-based solutions to important and relevant business problems" (p. 83). Our tool addresses the need for a project management information system to incorporate the best practices related to the subject.

Guideline 3: Design Evaluation. "The utility, quality, and efficacy of a design artifact must be rigorously demonstrated via well-executed evaluation methods" (p. 83). Our pilot study demonstrates the ability of the tool to accomplish its purpose, which is to incorporate the best practices in managing projects into the functionality of the software.

Guideline 4: Research Contributions. "Effective design-science research must provide clear and verifiable contributions in the areas of the design artifact, design foundations, and/or design methodologies" (p. 83). In this case the artifact itself is the contribution. Examination of the design of the artifact, as described in this manuscript, illustrates the value of the contribution.

Guideline 5: Research Rigor. "Design-science research relies upon the application of rigorous methods in both the construction and evaluation of the design artifact" (p. 83). The detailed descriptions of the design of the artifact in this manuscript attest to the rigor of the construction. The pilot study conducted with students verifies the rigor of evaluation.

Guideline 6: Design as a Search Process. "The search for an effective artifact requires utilizing available means to reach desired ends while satisfying laws in the problem environment" (p. 83). The search process with which this project began illustrates the reality that this project has been a search process from the beginning. It continues to be a search process as we continue to revise and rebuild the tool.

Guideline 7: Communication of the Research. "Design-science research must be presented effectively both to technology-oriented as well as management-oriented audiences" (p. 83). This manuscript is one communication of the research.

As of the writing of this paper, we have finished the most important core functions. It has been evaluated by students in project management classes. This paper describes the design of the software system, the implementation, the evaluation by students, a discussion of the results, and ideas for future research.

Design

When one creates a tool, there are unlimited options – anything is possible. We needed to decide what was most important in project management and what would help in managing real projects. In practice and in teaching, one thing we noticed is that it is very difficult to know how a project is doing without good earned value information. Knowing when to pull the plug on a project can give an organization a strategic advantage, as significant resources are wasted on failed projects (Keil, 1995; Schwalbe, 2015). Project managers need to know if a project is on schedule and on budget to make good decisions (Caniëls & Bakens, 2012; White & Fortune, 2002). Therefore, earned value analysis needs to be a core component of a good project management software system (Liberatore, Pollack-Johnson, & Smith, 2001). To implement this functionality, the software needs to support the monitoring of resources and related costs (De Wit & Herroelen, 1990; Larson & Gray, 2014).

Another important aspect of managing projects is applying good methodology. In teaching, we use the Guide to the Project Management Body of Knowledge (PMBOK Guide) (Project Management Institute, 2013) as a resource to define the important components of project management methodology. Because this structure is known and used globally by Project

Management Professionals (PMPs), we decided to use it as a foundation for much of the functionality.

In practice we find that collaborating and sharing information is important. In past consulting projects one of the authors has searched through old email threads with programmers to find information that needs to be shared with a client. That practice is inefficient, and it is detrimental to the project in the long term because someone might need that information in the future. If the emails are lost, project knowledge is lost. Therefore, good project management software should support collaboration and should store that information in a way that can be accessed at any time (Arnold & Javernick-Will, 2012; Assad & Wasil, 1986). One of the most important activities in managing a project is communicating information to key stakeholders. Stakeholders need, at the very least, information about what has been completed, what is planned, and lessons learned in the process. However, they do not need to be able to access all of the project information. So the system needs to allow stakeholders to access some, but not all, of the information in the project. To provide consistent access to project workers and stakeholders, the software is developed as a cloud application, making it platform-independent (Khan et al., 2012).

To describe the overall design of the system, we developed an Entity Relationship Diagram (ERD) that shows the tables and relationships in the software system. This is included as Figure 1. The rest of this section is given over to descriptions of the entities, attributes, and relationships.

Figure 1. ERD of project management information system (PMIS).
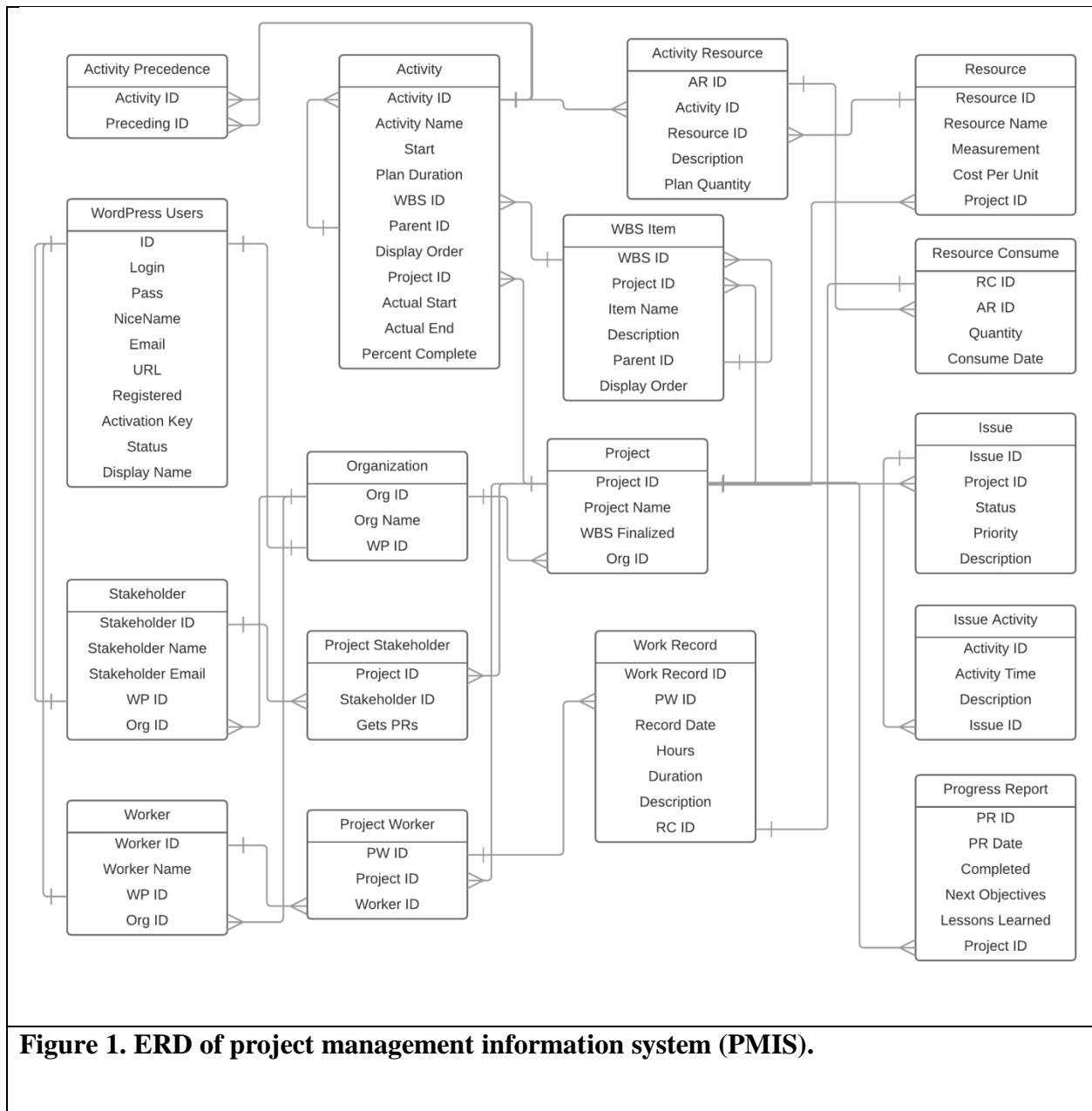
Project

     This is the central entity to which all others are linked. It does not store much information, but it keeps everything in the system organized. The only attribute that is displayed is the Project Name. The WBSFinalized attribute is a true/false value that stores whether or not the work breakdown structure is locked for the project. To keep the work breakdown structure

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and activity list consistent, the software does not allow changes in the work breakdown structure after beginning the activity list. In the future, formal change processes will be implemented to allow for these types of changes. The Org ID attribute links the Project table to the Organization table. Users specified as organizations are the only users who can create projects. Each organization can create multiple projects.

Organization

This entity stores information about users specified as organizations. Organizations are the only types of users who can create projects, add workers, and add stakeholders.

Stakeholder

This entity stores information about users specified as stakeholders. This is not a comprehensive list of all stakeholders on a project. It is used to give key external stakeholders access to progress reports within the system.

Project Stakeholder

This is an associative entity linking Project with Stakeholder. It is needed because each stakeholder can participate in multiple projects, and each project can have multiple stakeholders.

Worker

This entity stores information about users specified as workers. Workers can access most of the system. The only functions they cannot access are creating projects, adding stakeholder, and adding workers.

Project Worker

This is an associative entity linking Project with Worker. It is needed because each worker can participate in multiple projects, and each project can have multiple workers.

Work Record

This entity stores information about actual work that is expended on the project. Workers can enter the date on which the work was done, the times of the day, the total duration of work for the day, and a short description of what was done. When a work record is entered, the system creates an entry in the resource consume entity to track project costs to be used in earned value analysis.

WordPress Users

Because the application is embedded within WordPress, user administration is handled by the WordPress Core. However, it is necessary to access this information so that users can be linked appropriately with projects.

Progress Report

This entity stores information about progress on a project. The primary audience for a progress report is key external stakeholders. For simplicity, the table has few fields, but each field can store large amounts of data. The specific information that is stored for each progress report is the date, objectives completed, planned work, and lessons learned.

WBS Item

This entity stores items for project work breakdown structures. Because there can be multiple levels of items, the Parent ID field is used to support the structure. Each item also has a name, description, and display order.

Activity

This entity stores information about project activities. Activities are the means by which actual work is done. Activities can be broken down into smaller components, which is

accomplished by the Parent ID field. At the highest level every activity is a subcomponent of a deliverable (WBS Item). This is because activities are the means by which deliverables are produced. Activities consume time and cost; therefore, they have planned start dates, planned durations, and they are related to resources (cost). For monitoring activities, it is necessary to keep track of actual start dates, actual end dates, and percent complete. Finally, to support the Gantt chart functionality, activity precedence is recorded.

Activity Precedence

This is an associative entity representing the many-to-many relationship between Activity and itself. Each activity can be preceded by multiple activities, and each activity can precede multiple activities.

Resource

This entity stores information about resources that consume cost on a project. Resources can be labor, materials, or equipment. To properly plan resource use, measurement (for example, labor hours, machine hours, units, etc.) and cost per unit are needed.

Activity Resource

This entity is the associative entity between Activity and Resource. It supports planning specific resource amounts for each activity.

Resource Consume

This entity stores information about how resources are actually used on a project, as opposed to how they are planned to be used.

Issue

During project work, issues come up that need to be addressed. This entity stores information about such issues.

Issue Activity

When addressing issues, it is important to record what was done and why so that all workers know the status. It is also useful for understanding why decisions were made after a project is completed.

Implementation

The system was implemented as a WordPress plugin using HTML, CSS, Bootstrap, JavaScript, jQuery, PHP, and MySQL. Following we describe the system using the page names from the application.

The Project page shows all of the projects in which the current user is a stakeholder, worker, or organizer. A project must be selected before navigating to another menu item. The Stakeholders page is a list of key external stakeholders in a project. If Receives Progress Reports is checked, the stakeholder will receive an email from the system when a new progress report is created. The work breakdown structure (WBS) page allows the user to create a deliverable-oriented breakdown of the work in the project. The WBS must be finalized before activities can be defined in the system. The Resource page can be used to create project resources. These can be labor, materials, or equipment. They must be defined before they are assigned to activities for estimating and allocating project costs. The Project Activities page is used to create project activities, the means by which deliverables are produced. Therefore, each activity is related to a WBS item. Time and cost must be estimated for each activity. To assist with the time estimates,

we built in a functionality for activity precedence. When precedence relationships are defined, start times update automatically for following activities. Cost estimates are handled through assigning resources to activities. The Gantt Chart page is used to see the graphical depiction of activity durations over time. The Workers page allows the user to track workers and work records. Workers must be defined in the system before work records can be entered. Each worker is given a separate login so that he/she can collaborate on the project. The Work Records page provides a good interface for tracking actual work, and entries here create records for resources consumed as well. This allocates cost to project activities that will be used for earned value calculations. The Activity Progress page is used to keep track of activities during execution. Time and cost information must be entered here so that earned value information is correct. Progress on project objectives is entered as percent complete for each activity. Cost information is tracked by entering quantities of resources consumed for each activity. The Issues page allows the user to manage issues that arise when working through a project. It is useful to document and update information about the issues in a place that all workers can access. Each time something happens related to an issue, a worker can enter an activity record to document the updated information. The Progress Reports page displays all of the progress reports for a project in descending order by date. Figure 2 shows the Earned Value page. Earned value information is calculated automatically based on the information entered for activities and resources.

JBPM Project Management   Projects   Initiating ▾   Planning ▾   Executing ▾   Monitoring and Controlling ▾

Project Earned Value

ACTIVITY	PERCENT COMPLETE	EARNED VALUE	ACTUAL COST	PLANNED VALUE	COST VARIANCE	SCHEDULE VARIANCE	COST PERFORMANCE INDEX	SCHEDULE PERFORMANCE INDEX
1.1.1 Create User Requirements	100	$45.00	$0.00	$45.00	$45.00	$0.00	0.00	1.00
1.2.1.1 Create Development Environment	100	$45.00	$195.00	$45.00	-$150.00	$0.00	0.23	1.00
1.2.2.1 Develop Website	100	$1,125.00	$262.50	$1,125.00	$862.50	$0.00	4.29	1.00
1.2.3.1 GO LIVE	100	$135.00	$0.00	$135.00	$135.00	$0.00	0.00	1.00
1.3.1 Manage Project	100	$1,500.00	$135.00	$1,500.00	$1,365.00	$0.00	11.11	1.00
TOTALS	100	$2,850.00	$592.50	$2,850.00	$2,257.50	$0.00	4.81	1.00

Figure 2. PMIS Earned Value Page.

Evaluation

Software evaluation is an important stage in software development. In this section, we first review the literature and practice on software evaluation, and based on our review, a list of measurements is developed. Next, we introduce our evaluation process and data collection. At the end of this section, we present our preliminary results.

Software Evaluation Theories and Practice

Any successful software must be adopted by its users to fulfill its goals. Therefore, software is usually evaluated from the perspective of IT adoption or IS success. For example, the technology acceptance model (Venkatesh & Davis, 1996, 2000) suggests that users' perceived usefulness and perceived ease-of-use influence their decision about how and when they will use an new technology such as a PM software. The model of information systems success (DeLone & McLean, 1992, 2003) identifies six critical dimensions of IS success such as system quality,

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system use, and user satisfaction. In addition, ISO (International Organization for Standardization) 9241 provides requirements and recommendations for human-centered design principles to enhance human–system interaction. In ISO 9241, usability, presentation of information, and dialogue principles have been viewed as key properties of an overall system (Oppermann & Reiterer, 1997). All these theories or standards provide both helpful guidelines and measurable criteria in software evaluation.

When evaluating software, the context matters. Therefore, it is necessary to identify the context of use (Oppermann & Reiterer, 1997). This includes at least four characteristics: user, software, job and task, and organizational environment (Oppermann & Reiterer, 1997). In our case, student users use the PM software to practice project management concepts and principles by managing a group project in a project management class. Therefore, we are going to review the evaluation of PM software and education-oriented software as below.

For PM software, Kliem (2000) provides practical guidelines on evaluating the appropriate PM software to match the needs of a particular organization and suggests that it is important to focus on the specific business features of a package and consider the functionality and ease-of-use of the software interface. Shacklett (2016) suggests that PM software evaluation should consider goals, features, culture, and affordability.

When evaluating education-oriented software, teachers are recommended as the individuals who should be responsible for rating software (Reiser & Keglemann, 1994). However, because teachers are not the main user, they may not be able to provide reliable evaluation. Accordingly, students can serve as software evaluators as well as software users. One advantage of student evaluator is that students are able to provide their first-hand interaction experience with the software that they have been trained to use in their class. For example,

Szajna (1994) used 47 MBA students enrolled in an MIS course to rate database management system software packages and Lasagabaster and Manuel Sierra (2003) obtained a sample of 59 undergraduate students to evaluate CALL software programs using a questionnaire consisting of 18 items. Recently, Ullrich, Shen, Tong, and Tan (2010) used a student sample to evaluate a mobile live video learning system in China.

In order to determine whether the evaluated software is successful, previous studies have compared the evaluated software with alternatives. For example, eight database management software packages were compared in Szajna (1994) and four CALL software programs were compared in Lasagabaster and Manuel Sierra (2003). However, previous studies have not provided a generic baseline. This is probably because software evaluation varies across contexts of use.

Our review of previous studies and practice reveals three conclusions. First of all, usage experience (e.g., ease-to-use), individual impact (e.g., usability, usefulness), and learning outcomes are quite important to evaluate education-oriented software. This conclusion guides us to develop our evaluation measurements. Secondly, students can serve as both users and evaluators in education-oriented software, which leads us to use students as software evaluators in this case. Thirdly, both comparison and baseline approaches can be used to evaluate the target software. This conclusion directs us to include alternative PM software in our evaluation.

Evaluation Measurements

In order to conduct a comprehensive evaluation, we generate our measurements from multiple theories: the model of information systems success (DeLone & McLean, 1992, 2003), the technology acceptance model (Venkatesh & Davis, 1996, 2000), and the literature on the evaluation of education software (Jackson, 2000; Squires & Preece, 1999). In addition, as

mentioned in the Introduction section, the designed PM software should satisfy the four main needs: free, easy to use, supporting real-time collaboration, and supporting the most important project management functions. Our measurements will also cover all the main needs except the first one because this PM software is offered to students for free. Table 1 includes all the measurements and their sources. Detailed items are included in tables in the Evaluation Results section.

Table 1

Study Variables and How They Were Measured

Variable Category	Variables and Their Source
Demographic	Gender, the range of accumulated GPA range, age group, PM experience, and the usage of PM software
Usage experience	Ease-to-use (Venkatesh & Davis, 1996, 2000; Wu & Chen, 2005); Some other items are adapted from the literature on the evaluation of education software (Jackson, 2000; Squires & Preece, 1999).
Individual Impact	Task productivity, Task innovation, and Management control (Torkzadeh & Doll, 1999).
Learning outcomes	Understanding of course materials, student engagement, and project management career (Course learning objectives)
Attitude	Attitude to this software (Bhattacherjee, 2000; Wu & Chen, 2005)
Overall rating	Overall rating of the software and their project performance

Based on these measurements, we generated 37 statements. Among them, 35 are rated by a 5-likert scale, from strongly disagree (1) to strongly agree (5), and the other two are rated from poor (1) through average (3) to excellent (5).

Evaluation Process

Student evaluators can review software using the provided criteria and then make a judgment about the quality of the software they have reviewed (Reiser & Keglemann, 1994). We evaluated the software by allowing students to use the software to manage projects in their project management class. This pilot study gave us the ability to gather valuable information related to the use of the tool, but the sample size was not large enough to support broad implications. We gave students access to the software to manage their projects. Students were not required to use the software and they also had free access to Microsoft Project, which allowed us to compare the evaluated software with Microsoft Project. At the end of the semester, we administered a survey to the students to measure usage experience, individual impact, and learning outcomes.

Evaluator Recruitment

We sent the survey to the 61 undergraduate students who enrolled in two sections of a project management class this semester in a medium sized public university. Students had the opportunity to use the software to manage their projects. As an alternative, Microsoft Project was made available to students. Students who chose to participate in the study would access an online survey using a link provided by the instructor. Students' names were not collected in the survey. Only one survey was completed for each student. Students were not compensated for their participation in the study. After a few rounds of reminders, 24 responded to the survey, with a response rate of 39.3%. Among them, 54.2% and 45.8% are female and male, respectively. Half

of participants are 20-25 years old and an extreme majority of them are seniors. Most participants have different levels of project management experience, as either team member, project manager, or other roles in project management. Before taking this course, all participants except one had no experience of using project management software.

Among the 24 participants, two did not complete the survey, and four indicated that they primarily used Microsoft Project to manage their project in this course. Without sufficient sample size of Microsoft Project users, the comparison between this software and Microsoft Project would not be conducted at this stage. The following results report the evaluation of this software from 18 complete responses.

Evaluation Results

All the 37 statements are scored at least 4 (somewhat agree or good), indicating that this software receives favorable evaluation from the participants. Because we do not have sufficient sample size to compare the evaluation of this software with that of other software, we need to set a baseline threshold so that we can better evaluate the performance of this software. When the baseline threshold is set as 3 (Neither agree nor disagree or average), we find all the 37 statements are scored significantly higher than 3. If we increase the baseline threshold to 4 (somewhat agree or good), 26 out of 37 statements are significantly higher than the threshold. In this study, we take a conservative approach and use 4 as the baseline threshold to report the following results.

Usage experience. Six out of ten statements regarding usage experience are scored significantly higher than 4. Overall, participants agree that this software is easy to use (Q01, Q02, Q03, Q04, Q06) and facilitates team collaboration (Q05). Participants need to have a clear and understandable interaction with the software, and they need to easily navigate the software and locate the appropriate functions on the software. From the four non-significant statements, this software may be further improved by providing an appealing interface (Q08) and easy-to-use help functions to reduce the learning cost and mental efforts (Q07, Q09, Q10). These results are presented in Table 2.

Table 2

Significance of User Experience Variables

ID	Statement	Mean	STD
Q01	It is easy to use this software	4.67***	0.49
Q02	My interaction with this software is clear and understandable	4.56***	0.51
Q03	I can navigate on the software without a hassle	4.50**	0.71
Q04	It is easy to locate the function on this software	4.39*	0.61
Q05	This software is easy to facilitate team collaboration	4.39*	0.61
Q06	It is easy to get this software to do what I want it to do	4.39*	0.61
Q07	It takes a lot of time to learn this software (reversed)	4.33	0.69
Q08	The interface of this software is appealing	4.28	0.67
Q09	This software provides easy-to-use help functions	4.22	0.88
Q10	Interaction with this software does not requires a lot of mental effort	4.17	0.79
* sig. at $\alpha < 0.05$, ** sig at $\alpha < 0.01$, *** sig. at $\alpha < 0.001$.			

Individual impact. Five out of eleven statements regarding individual impact are scored significantly higher than 4. This software is perceived quite helpful in regulating work processes and performance (See Q11, Q12, and Q15) and improving the user's efficiency (See Q13 and Q14), indicating that this software achieves the two major purposes of project management. None of the statements about task innovation (See Q18, Q19, and Q20) scored significantly higher than 4, indicating that this software may not help users create and try out new ideas in their work. However, this function is not the main purpose of project management software. These results are presented in Table 3.

Table 3

Significance of Individual Impact Variables

ID	Statement	Mean	STD
Q11	This software helps management control the work process	4.61***	0.50
Q12	This software helps management control performance	4.44**	0.62
Q13	This software allows me to accomplish more work than would otherwise be possible	4.39*	0.70
Q14	This software saves me time	4.33**	0.49
Q15	This software improves management control	4.33**	0.49
Q16	It is easy to communicate objectives and progress to stakeholders by using the software	4.33	0.59
Q17	This software increases my productivity	4.28	0.67
Q18	This software helps me create new ideas	4.22	0.73
Q19	This software helps me come up with new ideas	4.17	0.71

ID	Statement	Mean	STD
Q20	This software helps me try out innovative ideas	4.11	0.76
Q21	The stakeholders appreciate the ease of access to project information in the software	4.00	0.69
* sig. at α < 0.05, ** sig at α < 0.01, *** sig. at α < 0.001.			

Learning outcomes. As educators, we focus more on the effectiveness of this software on students' learning outcomes. Interestingly, eight out of ten statements about learning outcomes are scored significantly higher than 4. Overall, this software helps students better understand key concepts in project management (See Q22, Q23, Q25, Q26, and Q27). In addition, the use of this software also increases students' capability and confidence in managing a project (See Q24, Q28). Surprisingly, participants indicate that they had a better engagement with the instructor as a result of using this software. These results are presented in Table 4.

Table 4

Significance of Learning Outcome Variables

ID	Statement	Mean	STD
Q22	I understand how to make a Work Breakdown Structure better as a result of using the software	4.67***	0.49
Q23	I understand how to perform Earned Value Analysis better as a result of using the software	4.67***	0.49
Q24	Using this software increases my capability in managing a project	4.61***	0.5
Q25	I understand project management methods better as a result of using the software	4.56***	0.51

Q26	I understand how to make a Gantt Chart better as a result of using the software	4.56***	0.51
Q27	I understand project management concepts better as a result of using the software	4.50***	0.51
Q28	Using this software enhances my confidence in managing a project	4.44**	0.62
Q29	I engage with the instructor better as a result of using the software	4.33**	0.49
Q30	Using this software improves my interest in project management	4.28	0.75
Q31	I engage with other students better as a result of using the software	4.17	0.71
* sig. at $\alpha < 0.05$, ** sig at $\alpha < 0.01$, *** sig. at $\alpha < 0.001$.			

Attitude to the software and overall rating. All four statements about the attitude to the software are scored significantly higher than 4.0, indicating that participants had a very positive attitude toward this software. In addition, participants gave a high rating to the software and their overall project performance. All these evaluation results demonstrate that this software is very useful. These results are presented in Table 5 and Table 6.

Table 5

Significance of User Attitude Variables

ID	Statement	Mean	STD
Q32	Using this software for project management would be a wise idea	4.61***	0.50
Q33	I like the idea of using this software for project management	4.61***	0.50
Q34	Using this software for project management would be a good idea	4.61***	0.50

ID	Statement	Mean	STD
Q35	Using this software for project management would be a pleasant experience	4.50***	0.51
* sig. at α < 0.05, ** sig at α < 0.01, *** sig. at α < 0.001.			

Table 6

Significance of Overall Rating Variables

ID	Statement	Mean	STD
Q36	Please rate the overall performance of this software	4.33**	0.49
Q37	Please rate the over performance of your project	4.33**	0.49
* sig. at α < 0.05, ** sig at α < 0.01, *** sig. at α < 0.001.			

Feedback from participants. A few participants provided their feedback at the end of the survey. Their feedback indicates that the PM software has accomplished its initial goals. As one participant commented, "Overall, the program was very easy to learn and use." Another participant commented that "It (the software) was very helpful." Another participant mentioned that he employed this PM software to drive a data mining project for another course and honed his PM skills.

They also suggest that future revisions can consider some extra functions such as editing and deep collaboration. As one participant commented, "while editing may create issues later on in the process, some initial stages of the project creation in the program would be nice." Another one commented that "everything worked great but it was just hard to get the other team members to put in the necessary inputs so we could get our job done." Another participant mentioned that "the only suggestion I would make would be to allow editing functions."

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Conclusion and Recommendations

While the pilot study was useful for gaining information about the use of the tool by students, it did not provide enough information to support broad implications. The most important results from this study were the ideas that it generated. By developing a tool that encapsulated the core functions of good project management methodology, we were able to see the potential of what a fully developed system could be.

Imagine a project management information system that could operationalize the best practices in the industry. Imagine a tool that not only helped users to organize information related to a project, but also helped them to use good methodology appropriately. There are information systems in other fields that do similar things. For example, SAP is generally considered to be the leading software system for enterprise resource planning (ERP). It enforces best practices in ERP. Users benefit from using SAP because it forces them to perform transactions correctly. An information system that enforced best practices in project management would be extremely valuable.

Future Research

The standards contained in the PMBOK Guide (Project Management Institute, 2013) define the best practices for project management. In fact, they are recognized by the American National Standards Institute (ANSI) as the official standards for the discipline. We plan to continue development of the software, but to focus it on operationalizing the PMI standards. As a result, we expect to have a tool that will enable a user to manage projects more effectively.

When the new functionality is added, we plan to repeat the study with professional projects. This will require the participation of project management professionals in industry. We

expect professionals to be more critical of the software, as they have more experience with project management software systems.

We used students as our evaluators in this case. In the future, when the PM software is extended to PM professionals, we expect to perform a large-scale evaluation from those professionals.

Limitations

The sample size and the nature of the sample itself limited the power of the evaluation. Although our sample size was small, it could not have been much larger, given our environment. In addition, students in a project management class do not have experience using project management software before taking the class. Consequently, they are not in a position to make a substantive judgment about the improvements gained by using our tool.

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IDENTIFYING HIGH DEMAND INFORMATION TECHNOLOGY CERTIFICATIONS THAT SYNERGIZE WITH ACADEMIC PROGRAMS

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Abstract

The demand for Information Technology (IT) graduates continues to grow, along with the demand for IT graduates to have more employer-desired IT skills. Some employers require professional certifications for new hires; however, academic programs have only begun to integrate certification pathways into their curricula. These IT certification programs can be expensive for both the academic programs and their students. If academic programs can identify IT certifications that are in demand from employers and compatible with curricula, the process of certification integration in academic programs may be more beneficial to academic programs, employers, and graduates.

Keywords: Information Technology, Certification, Employment, Curriculum

Introduction

Academic programs strive to provide employers and communities they serve with quality graduates that possess the necessary skills to improve and sustain organizations. In the academic area of Information Technology (IT), the challenge for programs is to remain relevant in the rapidly evolving area of technology. The continuing growth of technology use by employers not only increases the demand for skilled graduates, but also increases the competitiveness for graduates in the hiring process (Chung & Khan, 2012). Graduates need to be equipped and aligned with the right skills to fill open positions, also known as the Skills Gap (Restuccia, Taska & Bittle, 2018). Previous experience is the highest desired asset of applicants in IT-based positions (Harris, Greer, Morris, & Clark, 2012; Wierschem & Mediavilla, 2018), however, up

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to 23% of employers now require IT certifications for new hires, and up to 85% prefer at least one IT certification (Hunsinger & Smith, 2009; Hunsinger, Smith, & Winter, 2011; Wright, 2015). This trend may negatively affect unprepared academic programs as certification programs can be costly to implement. Certification programs exist mainly outside the university level – due to the high costs typically associated with them; but may have a dramatic impact if employers continue to increasingly require IT certifications for employment (Krutchen, 2010; Gabberty, 2013). Although costs can discourage academic programs from integrating certification programs within the curriculum, certification programs are still considered a 'good fit' to integrate into current academic programs (Daniels, 2011). This 'fit' can be accomplished in a variety of ways, such as using certification-specific objectives in courses, specialized courses, experiential learning, capstone courses, and boot-camp style intensive courses (Knapp, Maurer, & Plachkinova, 2017).

Demand for IT graduates was predicted to double from 2010 to 2016 (Quan & Cha, 2010). While the demand has increased, CompTIA (2012) predicted that by 2014 the skills gap in IT-based fields would also increase by 30% compared to 2010. These skills within the skills gap were found to increase in importance to organizations from 2005-2010 and were predicted to continue to increase until at least 2015 (Lee & Michandani, 2010). Academic programs have responded by increasing conferred bachelor's degrees in IT by 8% per year from 2012 – 2016 (National Center for Educational Statistics, 2018), and reducing the Skills Gap ratio from 1.25 to 1.17 from 2012 – 2016 (Restuccia, Taska, & Bittle, 2018). This continued IT skills gap has provided a tremendous opportunity for academic programs to attract new students through certification offerings, while meeting the challenge to ensure graduates have the right skills when they graduate. Which IT certifications employers desire, however, can be difficult to estimate.

Statement of the Problem

Organizational strategies have driven the use of information systems in organizations and the technologies that drive these systems can be expected to increase in complexity over time (Kroenke, 2018). Knowledgeable employees are needed to maintain and implement these systems. The problem addressed in this study is to further understand this trend of employers requiring IT certifications and how academic programs can better prepare to fulfill the needs of employers. Krutchen (2010) found integration of certification programs into traditional academic programs can be costly; however, Daniels (2011) suggested that certification programs can integrate into curricula easily. More information is needed to identify high demand IT certifications that are also compatible with academic programs.

Purpose of the Study

The purpose of this study was to examine and identify which IT certifications are of most value to employers and capable of being integrated into academic curricula. This study obtained information about the demand of IT certifications. Data collected for this study was analyzed to address the research questions below, and provide educators, employers, and students with information concerning the demand of IT certifications.

Research Questions

RQ1. Which IT certifications and categories are most important to employers?

RQ2. Which IT certifications and categories are both important to employers and compatible with academic curricula to provide the most value to IT graduates?

Review of the Literature

Human Capital Theory

The main premise of the human capital theory is to explain why employers may consider additional requirements for new potential hires. The human capital theory describes how organizations and individuals perceive that knowledge and skill gain by human capital leads to increased productivity, profits, and earnings for employees (Reed & Wolniak, 2005). For employers, this theory suggests that by requiring more skills/knowledge in the hiring process, employees in turn may be more productive and produce higher profits. However, academic programs and employers have been found to disagree on what exactly these skills entail (Stevens, Totaro, & Zhu, 2011). Other research reinforces that the theory may indeed provide evidence that the human capital theory at a minimum plays a part in increasing the value of gaining skills and knowledge, or education (Van, 2010).

From a global level, human capital theory emphasizes the need for education in order to become part of a global economy (Almendarez, 2013). From a national level, the significance and growth of educational requirements is highlighted as employers continue to increase the need for postsecondary education by increasingly requiring postsecondary education for job attainment. By 2018, it is estimated that 62% of employment will require postsecondary education, as compared to 55% in 2009 (Oblinger, 2012). This suggests that through the human capital theory, employers increasingly value forms of education that increase knowledge and skills for employees.

Employers and Academic Programs

Academic programs are commonly understood to produce graduates that can enter the workforce. Employers will hire these graduates based upon their needs; however, research

suggests that there is a mismatching of graduate skills and employer needs (Walters, 2004). This mismatch is referred to as The Skills Gap, typically measured by demand/supply (Restuccia et al., 2018). Skill gaps can vary based on industry and can be lessened by either a reduction in demand and/or an increase in supply. Supply, in this case, refers to the ability for skilled workers to fill the current job openings. For academic programs, this presents a complicated task of attempting to predict employer needs (or the skills required for future positions) in order to create graduates that will be hired into the future open positions.

The issue of alignment of graduates with employer needs is further compounded in the information technology field. Information technology fields had experienced a decline in enrollment due to the attention placed on information technology outsourcing (Hirshheim & Newman, 2010). While enrollment of information technology majors was in decline in academic programs, the demand from employers increased at twice the rate of other areas of employment (Quan & Cha, 2010). Chung and Khan (2012) further emphasized the supply issue of graduates in information technology fields and the high demand for employees in the information technology sector. From 2005 – 2010 this decline was approximately 17%, based on conferred bachelor's degrees (NCES, 2018). From 2012 – 2016, however, conferred bachelor's degrees in IT have risen by an average 8% per year (NCES, 2018). This suggests that academic programs responded to the continuing demand increase through an impressive increase in the number of graduates. But was it enough? Is the demand side of the ratio also increasing? From 2000 to 2015 there were over 765,000 graduates in IT; however, over 1,445,000 computer-related jobs were created, creating an IT skills gap of 1.88 over 15 years (Snyder, de Brey, & Dillow, 2015; BLS occupation code 11-3021 and OES occupation code 15-0000). Other research showed that in 2012 -2016, the IT skills gap ratio decreased from 1.25 to 1.17 (Restuccia, Taska, & Bittle,

2018). In order to ideally reach a 1.0 skills gap ratio, academic programs would need to continue

to increase the number of conferred degrees (an 8% increase per year in conferred degrees

resulted in a ratio decrease of .07). Demand is projected to increase by 12% from 2016-2026 in

the IT sector, while all occupations are expected to increase by 7.4% (BLS, 2018), signaling a

continued high demand in IT graduates compared to other occupational areas.

While academic IT programs have increased the number of graduates and therefore the

supply, employers have also responded by not requiring an academic degree for 53% of entry-

level IT positions (Wiershem & Mediavilla, 2018). Wiershem and Mediavilla (2018) also found,

however, that 53% of the same employers indicated that at least 75% of their employees hold an

academic degree – showing evidence that employers *prefer* to hire candidates that do possess an

academic degree. For academic programs, this means that graduates of their programs will be

competitive in the hiring process as long as the graduate can fulfill job requirements.

Many employers communicate with academic programs in attempt to provide future

outlooks to the academic programs so the programs can adjust to the future needs of employers.

The most desired skill of employers in 2012 was experience (Harris et al., 2012). Tabatabaei and

Gardiner (2012) reinforced this factor and included academic performance. This preference by

employers has continued, and it is estimated that when 'weighted' and compared, experience

consists of 50%, academic degrees 30%, and certifications 20% of overall relative value

(Wierschem & Mediavilla, 2018).

Experience may be gained by graduates during their academic career though items such

as internships, experiential learning, culminating project courses, and student employment.

Internships can be incorporated into a curriculum through an internship course, for example.

This allows students to not only gain highly valuable experience, but also progress in their

academic degree. Experiential learning, or learning by doing, can also be utilized within courses. For example, instead of having a student create a webpage in a web development course, the student could work with a local client to help them develop a webpage, gaining experience while meeting academic objectives. Another approach would be to create a culminating project course, where students work on major projects with real clients related to their discipline. Finally, student employment opportunities can be created to allow students to work in technology support, for example. Any experience opportunities academic programs can provide to students may help increase employment opportunities for future graduates. While certifications may be considered the 'least valued', it should be noted that they can also serve as an alternate for experience (Kabia, 2011). For academic programs that want to differentiate themselves while providing the most 'compatible' graduate, this means not only should they provide additional experience opportunities, but also consider incorporating IT certification opportunities.

Information Technology Certifications

Information technology certifications may be an important part of providing employers with necessary personnel in order to continue to operate effectively. Certifications can provide potential employees with more confidence, self-efficacy, and a sense of inclusion (Brooks, Riemenshchneider, Hardgrave, & O'leary-kelly, 2011). Also, professionals with these traits are more likely to continue learning new skills (Lohman, 2009). It is now common for employers to base job requirements on certifications and experience (Hunsinger et al., 2011), and up to 85% of employers now prefer graduates or potential hires to possess at least one certification beyond a possible degree in information technology (Hunsinger & Smith, 2009). In 2015, it was estimated that 23% of all IT positions now require a certification (Wright, 2015). Also, professionals with certifications are more likely to value certifications (Messmer, Hill-Rodriguez, Williams, Ernst,

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&Tahmooressi, 2011). As more professionals obtain certifications, the demand for certifications may increase at a faster rate.

While a number of academic programs currently offer certifications for future graduates, certification programs may be a good fit for academic programs without certification pathways to consider and integrate into current curriculum (Daniels, 2011). Academic programs likely cannot offer all certification programs as they can be expensive for both the programs and students (Krutchen, 2010). The overall expense of incorporating an IT certification into an academic program can vary greatly and is typically determined through negotiations between a vendor and the university. For example, faculty may need to be trained (certified), specialized lab equipment, a testing center, membership fees, and each individual exam completed by students may be another cost to consider. Many of the IT certifications do provide academies, which are groups of universities that share curriculum, lab equipment, and testing centers. These extra resources can help lessen the overall cost to the university and provide best practices within the curriculum.

The type of certification offered is important as it will influence the promotability, and in effect, the value of the academic program as based on the human capital theory (Gleghorn, 2009). Gabberty (2013) warned that the certification trend affects all areas and could have a dramatic impact on academic programs. If an academic program provides a less-valued certification pathway, the value to graduates may be lessened, as compared to high-demand certification pathways – creating increased difficulty in employment and possibly reduced salary potential.

The requirement and desirability of graduates to have IT certifications as well as bachelor's degrees is further complicated by the additional desire for soft-skills, or non-technical

skills (Bailey, 2014). Other research by Aken, Litecky, Ahmad, and Nelson (2010) indirectly emphasized this point by finding that 39% of IT positions in 2010 were listed as IT management. Coes and Schotanus (2009) identified this trend of shifting to business skills from IT expertise as well. If academic programs focus on non-technical skills, this leaves little room for certification integration as many certifications are technical-based. Having the knowledge of which certifications are most desired may allow academic programs to reinforce non-technical skills while offering technical-based certifications to meet both demands.

Methodology

Data Collection and Analysis

The data collection in this study was completed by using readily available data from Business News Daily (Previously Tom's IT Pro). The steps they used to obtain their data are described below. The data was scraped from their website and then further analyzed and refined to answer the research questions in this study.

Business News Daily (2018) presents their data in the form of 'niches' that categorize the many different areas of information technology. These niches include Big Data, Business Continuity & DR, Cloud IT, Computer Forensics, Computer Hardware, Computer Networking, Data Center, Database, Enterprise Architect, Healthcare IT, Help Desk, Information Security, IT Governance, IT Trainer, Linux, Mobile App Development, Mobility, Programming, Project Management, Storage, System Administrator, Telecommunications, Unified Communications, Virtualization, VoIP & Telephony, Web, and Wireless Networking. They are identified through study of IT certification programs and credentials, the IT job market, and various market analysis and job placement firms.

Once the niches were identified, relevant certifications were identified for each of the specific areas based upon appeal to an IT audience and the size of the collection of certifications in the niche area. Finally, the categories were subjected to a search engine review based upon permutations of the niche name to further solidify not only the niche, but also the certifications within each niche.

The actual 'tally' for each certification located within each niche was calculated by screen scraping major job posting sites on a random weekday. Job posting sites were chosen based on the ability for the job posting site to include salary data, mention job duties and responsibilities, and mention certifications by name. The current roster for the job posting sites used to calculate the total number of certification 'hits' are SimplyHired, Indeed, Linkedin, and Linkup. It is important to note that the total number of search results populated to the website represent one weekday of totals.

At this point, the data was then collected by the researcher through manually scraping the Business Daily News site on March 6, 2018. Since the data was organized by category, the researcher combined all the categories to create a single list of IT certifications and ranked them by their total number of search results. Duplicate IT certifications (appearing in more than one category) were removed and a final list of 140 IT certifications was the result.

Of the 140 IT certifications, the researcher further refined and limited the results by only including those certifications that had at least 5,000 search results. The researcher assumed that to increase the value of an IT certification to an IT graduate, the more 'popular' or in-demand IT certifications should be used. This action reduced the list of IT certifications from 140 to 15 IT certifications.

From the literature review, the researcher concluded that Work Experience was the unique skill that was highly desired by employers, and yet most difficult for academic programs to provide to graduates. For the 15 IT certifications left, each was examined for their requirements also regarding work experience. Only two certifications required work experience (in order to obtain the certification) and this field was added to the dataset.

The final dataset was then imported into Tableau and visualized by examining the largest ten certifications by category and individual certifications. The data was then further visualized to include and exclude the two certifications that require experience. All the results are below.

Results

Initial data collection and preparation created a list of 15 IT certifications. These IT certifications are presented in Table 1, sorted by total number of search results.

Certification	Category	Simply Hired	Indeed	LinkedIN	LinkUP	Total	Work Exp
PMP (Project Management Institute)	Project MGT	14,503	15,387	15,635	7,949	53,024	3
CISSP [(ISC)2]	information Security	10,104	11,351	11,189	5.977	38,621	5
CISM (ISACA)	Information Security	3,104	3,485	3,827	11,209	21,625	0
CSM (Scrum Alliance)	Project MGT	3,276	3,809	4,777	2,108	13,970	0
CCNP (Cisco)	Networking	3,708	4,045	4,151	1,684	13,588	0
Security+ (CompTIA)	Information Security	3,197	3,357	1,405	1,526	9,709	0
CEH (EC-Council)	Information Security	2,211	2,553	2,439	1,430	8,633	0
RHIT (AHIMA)	Healthcare	2,184	2,572	2,387	1,190	8,333	0
RHIA (AHIMA)**	Healthcare	1,899	2,160	2,074	1,060	7,193	0
GSEC (SANS GIAC)	Information Security	1,484	1,781	1,745	854	5,864	0
A+ (CompTIA)	Hardware	1,957	2,157	1,292	251	5,657	0
Server+ (CompTIA)	System Admin	2,207	2,401	109	913	5,630	0
ITIL Foundation (ITIL)	Help Desk	1,604	1,727	1,459	722	5,512	0
C Language Certified Associate	Programming	3,316	349	1,793	0	5,458	0
CCNA Wireless	Wireless	1,426	1,926	1,170	500	5,022	0

Table 1 Certifications by Demand

RQ1. Which IT certifications and categories are most important to employers?

To answer this question, Table 1 can be used to identify that employers are most seeking IT certifications in the categories of Project Management and Information Security. Specifically, the top IT certification in Project Management is PMP, and in the category of Information Security, the top IT certification is CISSP.

When viewing by IT certification category, Figure 1 shows the top ten categories in a visual format, to further emphasize the size of the categories of Information Security and Project Management as related to the other categories. These are not specific certifications, but instead certification categories. Although much smaller in size than Information Security and Project Management, it is worth noting that the categories of networking and healthcare are the next two largest categories. The number within the bubble is the number of 'hits' for each category.
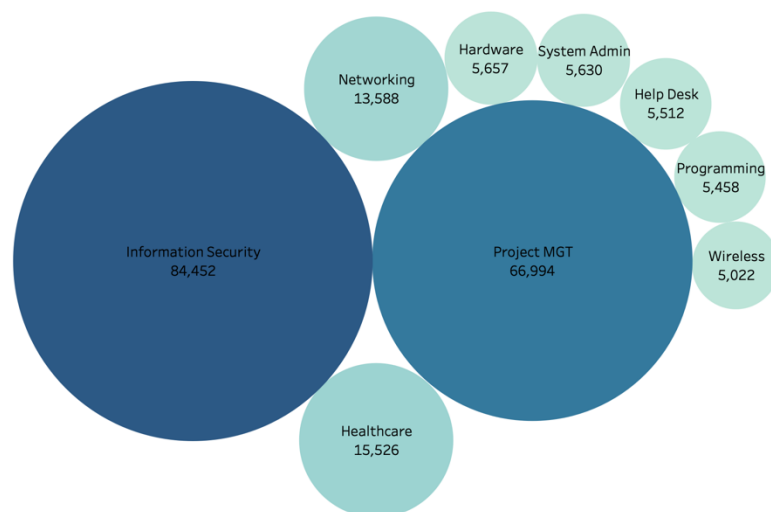

Figure 1. Top Ten Categories

Figure 2 shows the top ten certifications without categories. By not grouping the certifications into categories, the highest demand shifts from information security category to the PMP certification. The darker the shade of color from green to blue, the more 'hits' or popularity of the specific IT certification in job postings. The CISSP certification, from the Information Security category, is the second highest demand certification, but is significantly lower than the PMP certification. This shows that Project Management certifications may be based on one 'top' certification, but the information security category is much more flexible – meaning an IT graduate can have choices in which certification in information security to pursue. For example, while a CISSP certification is in demand at almost twice that of a CISM certification, the difference is much less than the difference between Project Management certifications.
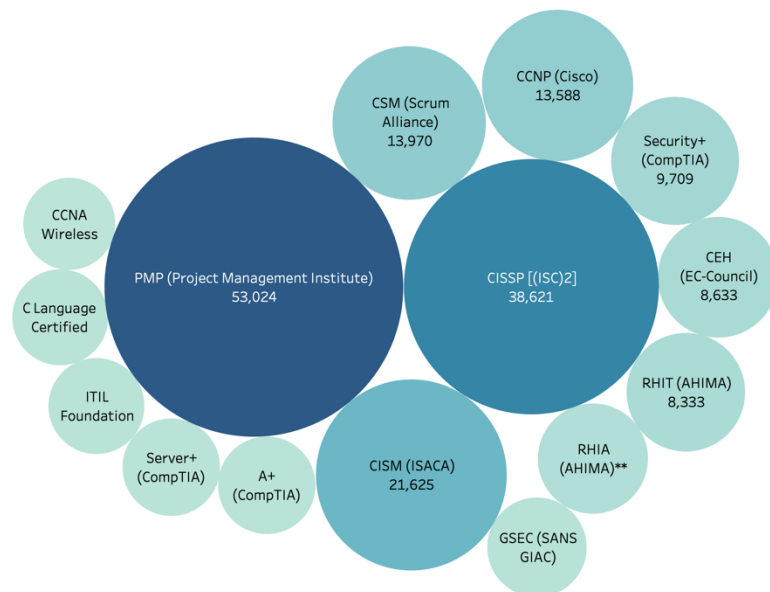

Figure 2. Top Ten IT Certifications

RQ2. Which IT certifications and categories are both important to employers and compatible with academic curricula to provide the most value to IT graduates?

Research question 2 was answered based upon the assumption that academic curricula almost certainly cannot provide IT graduates the work experience required by the two most popular certifications, even with internships and student employment.

The PMP certification requires a secondary degree AND work experience. With a four-year degree, a candidate would still need 4,500 hours of leading projects and an additional 35 hours of specialized education in project management. This would equate to just over 7 semesters of project lead experience at 40 hours per week (and 16-week semester), making this certification just not feasible in the academic setting (PMI, 2019).

The CISSP certification, the second most in-demand IT certification, also has work experience requirements before the certification can be obtained. Work experience first must fall within 2 or more of the eight domains outlined by (ISC)2, and has to accrue monthly. The CISSP certification does allow part-time work experience (20+ hours per week) and full-time work experience (35+ hours per week). The total amount of work experience required is a minimum of 5 years of cumulative paid work experience (full-time equivalent) and does count a four-year degree (or other credential from a list) as the equivalent of 1 year of work experience. Internships can count towards this experience as well. For example, if a student used their completed degree as work experience, they would still need a minimum of 7,280 hours of full-time work experience, or 35 hours per week (considering two 16-week semesters per year) for approximately 13 semesters. This experience requirement is also just not feasible in an academic setting. ((ISC)2, 2019).

Therefore, the constraint for this question was limiting the question only to IT certifications that do not require work experience. For the IT graduate, it may still be beneficial to prepare for the most popular IT certifications; however, the basis of this study was founded upon completion of an IT certification *before* graduation – to allow IT graduates to have additional credentials upon graduation. In Figure 3 – Top Ten Categories Without Experience, information security still holds a major portion of the certification demand; however, other categories become more important, such as networking and healthcare, and project management decreases significantly in size. This result suggests that the most 'valued' category for employers and academic programs would be Information Security.
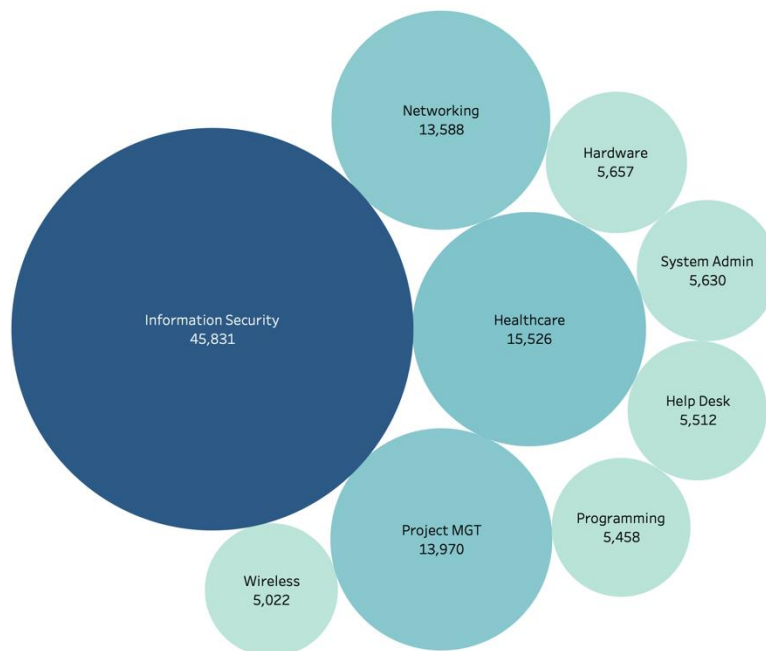

Figure 3. Top Ten Categories Without Experience

Finally, when examining specific IT certifications without categories and experience in Figure 4, the CISM certification is the most demanded IT certification. However, unlike the

Figure 2 visualization, the other IT certifications have more significance in comparison. This result shows that with the removal of not attainable certifications during an academic career (CISSP and PMP), individual IT certifications in demand become much more similar in demand when compared to each other. In particular, the CCNP certification and the CSM certification are almost equal in size, but there is not a specific healthcare IT certification similar in size comparison. When considering individual certification paths, this final result shows that there are several viable options beyond information security certifications for academic programs to consider.
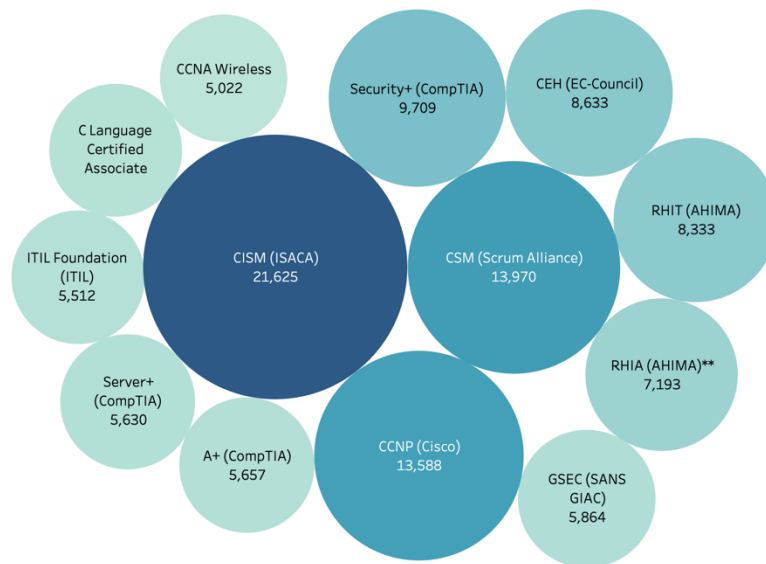

Figure 4. Top Ten IT Certifications Without Experience

Recommendations

Based on this analysis and visualization of IT certification data and the review of the literature, the main recommendations from this study are as follows:

- Universities should offer IT certification pathways for IT-based majors.

- Universities should consider offering high demand certifications, or similar IT certifications within a high-demand category.

- Universities should continue to offer and find innovative ways for students to obtain on-the-job experience.

- It is important to note that the specific IT certifications mentioned in this study are all in the approximate top 10% of IT certifications in demand.

The researcher recommends that academic IT departments strongly consider adding IT certification pathways for IT majors within their curriculum. These IT certifications can be a valuable skill and credential for IT graduates, and also help them compete in today's IT job market. Many IT certifications offer course curriculums, discounts, and support in implementing such a program within a university. This study only provides a snapshot and is repeatable to provide even more updated information. It is important to mention that this study did not consider other IT certification factors besides required work experience, as that factor was decided to be the most difficult to achieve due to work experience requirements in an academic setting.

This study also provided some surprise to the researcher, such as healthcare IT certifications and their demand. This may provide a university a 'cutting edge' addition to their programs. While information security and project management are highly valuable, other categories such as networking and operational IT administration-based categories (hardware, help desk, etc.) should

also be considered. While not as in-demand as the top performers, these categories were still included as some of the top categories in-demand.

Future research in this area may want to address the ease of entry with some of these IT certifications, and also the difficulty for faculty to become qualified to facilitate these certifications in an academic setting. The operational cost of offering such programs in an academic setting was not part of this study but may be an important factor when assessing the feasibility of implementing a certification pathway into an academic curriculum. Universities should consider faculty expertise, available equipment, and expected volume of students when evaluating the overall cost of incorporating such a program.

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INVESTIGATING STUDENT PERCEPTIONS OF
HALF SEMESTER ONLINE CLASSES

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Abstract

With the rise of online programs, there has also been an increase in class term-length options as opposed to the traditional 16-week semester. Through pre- and post-experience surveys, this study investigated students' views on a pilot offering of half-semester online courses. Questions pertaining to students' motivation for signing up for the half-semester class, the perceived benefits and challenges of the half-semester format, and any concerns they had about the structure of the class were asked. The findings indicate that a majority of students liked the condensed format and would choose to enroll in another one. Implications for educators and administrators are discussed.

Keywords: online education; condensed class; half-semester class

Introduction

With the rise of online programs, there has also been an increase in various class time-frame offerings as opposed to the traditional 16-week semester. Often, students who enroll in online classes have other life demands such as work or family that keep them from attending class face-to-face. Given the presence of these additional time commitments, completing classes in an accelerated format appeals to some students. The purpose of this study was to investigate student expectations of and satisfaction with half-semester (8-week) online classes as they related to new offerings piloted in a college of business in 2017. Student views were examined in

terms of motivation for enrolling, expectations of work, and future enrollment intentions if additional classes were offered in a condensed format.

Literature Review

As universities seek to find ways to attract and retain students, online programs have been on the rise. Numerous older studies have examined the effectiveness of courses offered in a condensed or intensive format and found that students performed just as well in the shortened time frames in on campus courses (Brackenbury, 1987; Caskey, 1994; Ewer, Greer, Bridges, & Lewis, 2002; Messina, 1996). Further, some of these older studies have provided data suggesting that students do even better in the condensed on-campus classes than in the traditional length classes (Boddy, 1985; Spurling, 2001; Van Scyoc & Gleason, 1993). Scott (1993) stated that with intensive courses, "Students and faculty reported they were able to concentrate exclusively on a small number of classes and could plan their schedules better" (p. 1).

More recent studies have also found favorable results for shorter classes. Harwood, McDonald, Butler, Drago, and Schlumpf (2018) investigated student outcomes in both traditional and intensive online classes. The researchers found "Results of the overall comparisons in student performance measures indicate no significant differences between intensive and semester long course formats" (p. 5). Similarly, Monto's study (2018) found that "A *t*-test comparing grade means demonstrated no statistically significant difference between the grades for the two formats" (p. 655) when comparing five-week hybrid courses to eleven-week traditional classroom courses.

Austin and Gustafson (2006) performed a study using over 45,000 observations to investigate the link between course length and student learning. Findings suggested that there was a significant improvement in taking shorter courses. They state, "Compared to a sixteen-

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week semester, there is an improvement at 8 weeks, 4 weeks, and 3 weeks." They further stated that the benefits peaked at four weeks. They go so far as to suggest, "Universities wishing to maximize learning with limited resources might consider changing their course structure from predominately sixteen-week to four-week semesters, a more modular system" (p. 36).

Along with student performance, student satisfaction is an important component of the overall effectiveness of a course. Ferguson and DeFelice (2010) studied both intensive and full-semester courses. They state that this satisfaction can be further complicated by the mode of delivery (traditional on campus or online). The courses in their study were online courses. They found no significant difference in the perceived learning for the students in the full-semester vs. five-week semester courses, though the full-semester perceived learning reported slightly higher. Interestingly however, the mean final grade was significantly higher for the students in the five-week course as compared to the students in the full-semester course. Other differences were that the students in the five-week course were less satisfied with the communication with their instructor, but more satisfied with communications with classmates than were the full semester students.

Another concern that showed up in the review of literature was from administration about the rigor of compressed courses as compared to traditional length courses. To maintain credit standards, the rigor of a compressed course needs to be comparable to a traditional 16-week course. In a study by Lutes and Davies (2013), workloads of 16-week and 8-week courses for approximately 29,000 students were examined. Students reported the number of hours spent on learning activities outside of class. Results indicated a statistically significant difference in workload between the two types of sessions. On average, those taking a semester long course reported 21 minutes more per credit per week than those taking it during the compressed time

frame for a total of 63 more minutes per week adjusted for the reduced schedule. However, it was further reported that the disaggregated results indicated that the difference in workload was more likely based on subject and instructor rather than term-length as it related to course rigor.

Methodology

In Spring 2017, the department under investigation decided to pilot half-semester online courses. Four upper-level business courses were offered in the initial semester – two before spring break and two after. In Fall 2017, the same four courses were offered again in the half-semester format, but their positions in the semester switched.

To gather student feedback, after obtaining IRB approval, pre- and post-experience surveys were administered. The researchers collected data from eight classes over two semesters. From the Spring 2017 data collection, 76 pre-experience surveys and 89 post-experience surveys were completed. In Fall 2017, 42 pre-experience surveys and 54 post-experience surveys were completed. There was diversity in participant age, ranging from 18-22 to those in their 50s.

Open-ended questions pertaining to students' motivation for signing up for the class, the perceived benefits and challenges of the half-semester format, and any concerns they had about the structure were asked on the surveys. The pre-experience survey was administered at the beginning of the semester in order to capture participants' initial views early. Half-semester classes were a new experience for the majority of students, so the researchers sought to better understand their motivation and expectations of the course.

Findings

Participants were asked what motivated them to sign up for a half-semester class. The responses grouped into multiple themes including 1) schedule preference; 2) faster pace; 3) required class; 4) work schedule; and 5) unaware of half-semester format. Many of the

respondents mentioned a half-semester class works better with their schedule due to various time demands. In addition, comments were made about being able to "focus on my other classes" by finishing a course in half the time. As one student put it, "I could complete one of my classes halfway through the semester and be able to put more focus on my other classes as they get harder toward the end of the semester."

A common response among participants was that they liked the idea of completing a three-hour course in half the time of a traditional semester. The faster pace of the course also appealed to some due to less time to procrastinate. As one student commented, "If I am allowed time to procrastinate … I will." The classes chosen for inclusion in this pilot offering of half-semester courses were required classes for some majors, so some respondents indicated that they took the class in the half-semester format simply because it was offered that way at the time when they needed to take the class. Of the four classes offered in the half-semester format, three were only offered in the condensed format in that semester. Some participants felt that the half-semester format would allow them to take more classes per semester and therefore graduate earlier. For example, one comment received indicated, "I am motivated to do the half-semester course because I am a full time employee and it is difficult for me to take over six hours per semester. This is a way where I can take more [classes] and still be able to work." A final category of responses centered around not knowing that the class would be only half the semester. The dates of the course were visible when students selected the class and signed up; however, due to the rarity of classes being anything besides a traditional semester, some students apparently overlooked that information.

When participants were asked in the pre-experience survey about the perceived benefits of the half-semester course, the responses primarily centered around finishing the class faster. In

addition, comments were made about staying more engaged in the class and having less chance of losing interest due to the condensed format. Schedule benefits, as discussed earlier, were also provided as a potential benefit of taking classes in the half-semester format. Specifically, it was mentioned that if employees knew they would have a busy season at work for a month or two, they could schedule their classes around that instead of having to work through it as in a traditional 16-week semester. Finally, several participants indicated an expectation for the class work to be condensed and more focused in the shorter classes. This is an important finding that will be further discussed in the implications section.

Though participants highlighted many perceived benefits of the half-semester courses, they also provided feedback on the challenges they envisioned with the course as well. There were four key challenges identified: 1) work load; 2) time management; 3) retaining the information; and 4) challenges related to taking the condensed class in the second half of the semester. In the pre-experience survey, a majority of participants indicated the class work load as the main challenge associated with the half-semester course. Related to the work load were concerns about time management. Students expressed apprehension about meeting all the course deadlines. Another concern pertained to being able to retain the information given the fast pace of the course. Finally, concerns were expressed related to starting a half-semester class in the last half of the semester when other full semester courses were increasing in difficulty and assignments.

The post-experience survey also asked participants to rate their agreement with three statements. The first statement was "More classes should be offered in the half-semester format."
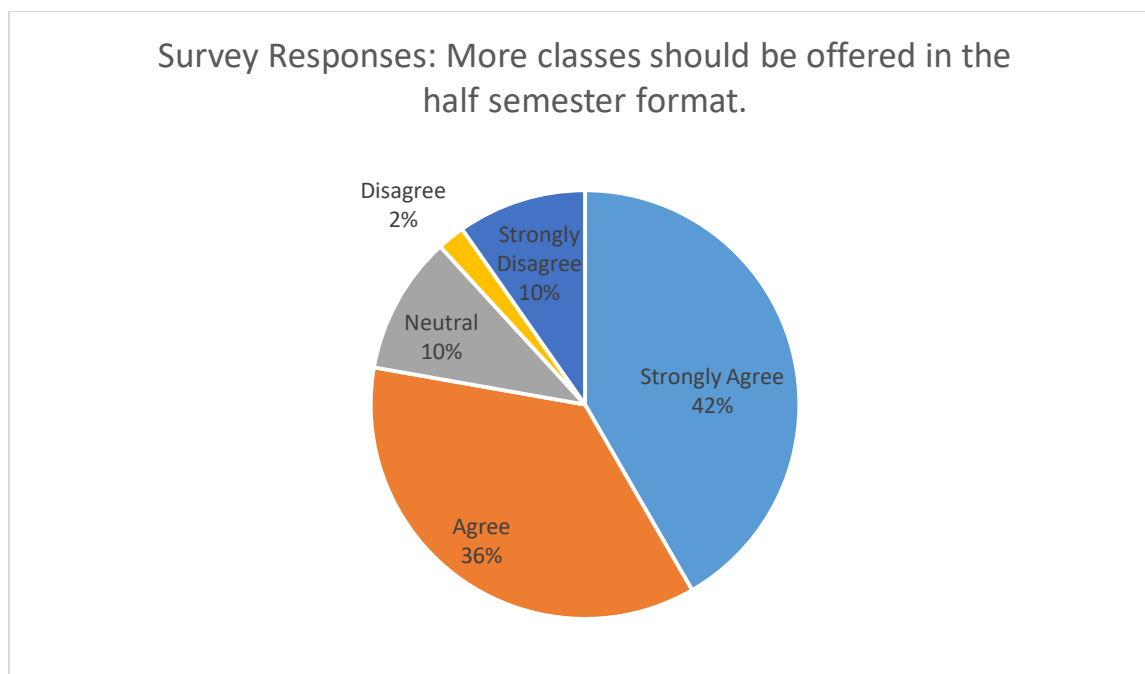
Figure 1. Survey responses on offering more classes in the half-semester format.

Over 77% of participants agreed or strongly agreed with that statement. While the majority of

respondents thought that more classes should be offered in this format, nearly 10% strongly

disagreed with the statement. When asked which classes, if any, should be offered in the half-

semester format, responses included classes focused on technology, communication, and

electives. Some respondents expressed concerns with offering math-based classes or classes with

a lot of reading in the half-semester format. However, many participants suggested that any class

could be offered in this format, and they often compared the half-semester format to taking a

summer school class, which is five weeks long.

The second statement was "If offered, I would choose to enroll in another half-semester

course." Nearly 80% of participants agreed or strongly agreed with this statement. Despite the

overwhelming majority of students who would choose this format if available, approximately

11% strongly disagreed with the statement. This is an important finding, and educators should

consider that not all students may like or feel that they would benefit from the condensed class format.

Finally, the participants were asked to indicate their level of agreement with the statement "I will recommend half-semester courses to others." Over 77% of the students surveyed agreed or strongly agreed with that statement. Nearly 50% (49.31%) strongly agreed. Less than 10% of participants strongly disagreed with the statement.

In the final section of the survey, participants were asked to rate four elements of the class: reading, writing, assignments, and group work. Respondents could indicate whether each element was "As I expected," "More than expected," or "Less than expected." Over 28% of the participants rated the course assignments as more than expected. This finding might be linked to the previous finding that some students expected the course load to be condensed and the total workload to be reduced due to the compressed format of the class. Implications for educators related to this finding will be further discussed in the next section. The category with the greatest variation in responses was that of the amount of group work in the class. While approximately 59% of participants indicated that the amount of group work was as expected, 15% indicated that it was less than they were expecting, and nearly 26% indicated that it was more than they expected. This finding may be explained by the variety of courses included in this study, as not all classes have an equal amount of group work in them.

Implications

Given the increase of programs seeking to meet students where they are and provide options for non-traditional students to obtain a college degree, there has been an increase in various term-lengths of classes in addition to the traditional 16-week semester (e.g. half-semester courses, five-week summer courses, Maymesters, Wintermesters, weekend courses). As such,

this study's findings have practical implications for educators and administrators considering offering half-semester online classes.

As students adjust to this new structure, expectations need to be managed. Based on this study, it appears that some students thought the half-semester course would be easier than a full semester offering of the course due to the time constraints. As one student commented, "I believe you cut the fluff out of classes when they are structured [for a] half-semester." In addition, some students cited a condensed workload as a potential benefit in the pre-experience survey. While it may be true that instructors may modify the course to meet course objectives in the half-semester timeframe, students should not expect to do half the work since the class is only half the semester. They are still receiving three hours of credit for completing the course, and the content covered should be comparable to the regular semester. As students gain experience with half-semester courses, they may develop more accurate expectations of the class work involved. The fast pace of the class with rapid deadlines, as compared to a 16-week course, may explain why so many students felt the assignment load of the half-semester course was more than they expected. Instructors and academic advisors should work to inform students early and often that the same content will be covered in the half-semester course as is offered in the full-semester course, and students should expect more work per week since they are completing the course in half the time.

The findings of this study suggest a mostly positive view towards half-semester online courses. As such, educators and administrators should consider expanding the number of courses offered in this format. While not all students will choose to enroll in this half-semester format, many seem to like the option.

When first implementing a change from the traditional sixteen-week semesters, communication efforts should be increased. Students need to be well informed about the

different course length and what choosing to enroll in such a class practically means for them. This could assist in managing expectations, helping students make informed decisions on whether half-semester courses are the right decision for them, and emphasizing the importance of having all class materials on day one, as students who wait to obtain their required class resources will quickly fall behind given the accelerated pace.

Conclusions

Compressed classes provide an alternative delivery that is desirable to some students. Being able to provide this additional service to students could make an education more accessible to those students with outside responsibilities which make a traditional 16 week course term more difficult to schedule. The shortened time frame, such as two classes in each 8-week session as opposed to four classes for the entire 16-week session, allows for students to concentrate on fewer classes at a time while still completing the same number of hours. Though attention to the rigor of the content needs to be a priority, as with any class, the literature review supports the fact that students may receive a similar quality educational experience in the condensed form and results of the current study indicate students welcome the eight-week delivery opportunity.

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USING TWITTER IN BUSINESS AND EDUCATION: TWEETING ISN'T JUST FOR THE BIRDS

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Abstract

Twitter is a global, social media tool that allows for networking and connecting on an impressive scale. The purpose of this study was to understand student perceptions of the use of Twitter in the business environment and provide a resource for business instructors to use when teaching Twitter in their own classrooms. Tips for best practices from research and personal experience will be presented so that instructors can use Twitter in their own classrooms.

Introduction

Founded in 2006, Twitter is still a strong and recognized term in our society. According to the Twitter website, Twitter is used to keep in touch with happenings in the world. Anyone can quickly and easily create a free account and begin connecting with other individuals around the globe. Twitter can be used for free marketing by businesses and for connecting quickly with customers. Like many social media platforms, Twitter creates a diverse way to stay in contact with various stakeholders in the business environment. A study conducted by Clutch (Herhold, 2017) shows that companies are using social media to increase revenues and sales. Twitter is one of the most valuable social media tools used by 80% of the businesses surveyed, and nearly 80% of companies were posting their own content to their social media sites. This creates a potential skill that many students need to have. If companies are posting their own information on their sites, these same companies will need employees to create this content.

By working with students to fully utilize the benefits of Twitter, engaging and informed conversations and connections can take place. Many people believe that Twitter is a personal

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resource to use to communicate with friends, but Twitter can help a business, too. As shown in the literature, many employees are expected to use social media resources to communicate on the job and obtain information quickly. Therefore, introducing and reinforcing appropriate online behavior is a priority of educators.

Purpose and Objectives

The purpose of this study was to understand students' use of Twitter both personally and professionally and provide a resource for business instructors to use when teaching Twitter in their own classrooms. The goal was to help educators to better prepare students to enter a workforce that can be displayed for the world to see. Questions addressed in this study include:

- How are students currently using Twitter?

- What are the students' perception of the use of Twitter in their professional lives?

- What are practical guidelines for Twitter in a business class?

Review of Literature

Twitter's website states that its services will help a business thrive by directing traffic to the business' website and engaging customers. Simply described by Blessing, Blessing, and Fleck (2012), "Twitter allows the quick transmittal of short messages (tweets) to anyone who subscribes to a user's message feed. These messages keep the receivers apprised of the sender's thoughts and actions on an ad hoc basis" (p. 268). Because Twitter allows back-and-forth comments, conversations can be sustained to establish and maintain a relationship. The ability to constantly update others allows businesses to stay in touch with customers with continuous updates, promotions, and other items of interest.

According to a letter to its shareholders, Twitter (2018) has continued to grow, with over 335 million active users worldwide. The number of DAILY active users increased 11% from the

previous year. This leads one to believe that Twitter users are using their accounts more

frequently. With so many potential customers, it is logical that companies would begin to

interact with and promote their products using Twitter. In fact, Holmes ("Inside the

Growing…," 2016) states that 90% of U.S. companies use some form of social media to reach

their customers, but many of these same companies are not actively training their employees to

effectively use Twitter. Whereas companies used to hire social media managers to be

responsible for online content, companies are now looking for their employees to engage

audiences.

In order to expand their customer engagement, companies are now asking employees to

post about their company on their own personal Twitter accounts. Messages sent by a friend or

acquaintance are more likely to be trusted (Holmes, "Top 5 Social…," 2016). If an employee

posts about a new product offering, the receiver may be more likely to try it. This concept

extends the company reach to more people and more potential customers. Multiple websites and

apps give a score based on the "influence" an individual has when they post on social media. A

popular site, Kred, allows for individuals to give "Kred points" to other individuals to increase

their "score of influence". Hall (2018) explains that Kred uses "each social action by you or your

followers results in a certain number of points and there is an activity page where you can see

exactly what has contributed to your Kred score…"

New hires should be taught to effectively use social media to bring more value to their

companies, which is where using Twitter in the classroom can help our students build these

skills. The computer company, Dell, utilizes a Twitter account for "24X7 Global Support" to

provide help and proactive information to their customers (@DellCares, 2017). With this type of

constant connection, it is important for students to realize the impact that social media can play

on the connections and networking of the business and the customer. In the business arena, Twitter is being used to market, brand, and create synergy between organizational groups (Greer & Ferguson, 2011). Twitter is being used to gather marketing data, respond to emergency situations, and even provide health-related information to the public (Hughes & Palen, 2015).

Many academic studies have shown how Twitter has been used to better engage students. KQED, Inc (2017), explains that "Teachers and students use Twitter for *communication and conversation* so they can keep the in-class discussion going after class" and that "Twitter is a great way to *add context to content* especially when students need to study a topic and find experts in the field and ask them questions on Twitter." These studies can be useful in guiding instructors in how to use the tool in their own classrooms. Junco, Elavsky and Heiberger (2013) used Twitter outside of class and found increased student engagement and higher grades. This study also found that active faculty engagement in Twitter helped to stimulate learning on the platform. Another study, that had the instructors tweeting informative message pertaining to course concepts to students each day, found that students receiving the Tweets outperformed students who did not receive these same messages (Blessing, Blessing, & Fleck, 2012). These authors believed that these simple reminders helped students better recall information because students were more likely to reflect on the course material outside of class. Junco, Elavsky and Heiberger (2013) stressed that how Twitter was used was very important because the platform seems to be better used for "answering questions, encouraging discussions and providing support" (p. 283).

Methods and Procedures

This study used Twitter in three sections of an introductory Business Communication class at a regional university in the Southwest United States. Before using the tool for classroom

engagement, students were asked about their use and perceptions of Twitter in order to understand their background with using the social media tool. Survey data was collected using Qualtrics, an online survey system. Findings from this survey were used to inform the two instructors who would use Twitter extensively in class assignments throughout the semester.

Students' initial perceptions were measured at the beginning of the course. A total of 92 responses were collected from three sections of the course, which was a 97.9% response rate. This sample included a diverse mix of students and included 15% freshmen, 46% sophomores, 34% juniors, and 5% seniors. Many of these respondents could be considered traditional college students as indicated by their age as 92.4% were between 18-22 years old. Only one respondent was over age 30. The majority of respondents (45%) indicated their field of study was in the College of Business, whereas 28% were in the College of Education, and 14% were in the College of Sciences and Mathematics. Other majors represented include College of Fine Arts (7%), College of Forestry and Agriculture (3%), and College of Liberal and Applied Arts (3%).

Findings and Results

Results from the survey are presented below and explained further in the Discussion and Implications for Educators sections that follow.

Many students already use Twitter. When asked if they had a personal Twitter account, 73.91% replied "Yes," 11.96% replied "Yes, but it is inactive," and 8.7% replied, "No. I had an account but not anymore." A small number (only 5.43%) indicated they had never had a Twitter account. Similarly, 73.17% of students indicated they currently posted on their personal Twitter account, whereas 26.83% said they did not.

Table 1

Question: On average, how often do you post on your personal Twitter account?

	Responses
Multiple times a day	21.74%
Once a day	2.17%
A few times a week	15.22%
Once a week	5.43%
A few times a month	16.30%
Once a month	0.00%
Less than once a month	8.70%
Never	17.39%
Not applicable	13.04%

Students were also asked about following accounts through their personal Twitter

account. In response to the question, "Do you follow any people or organizations (Other than

what is required of this course) on your professional Twitter account?" 92.41% responded they

did, and 7.59% responded they did not follow others. Next, students were asked how many

people or organizations that they followed. The vast majority (65.88%) followed more than 50

accounts. However, 15.29% of respondents only followed one or two accounts. Most students

(61.96%) believed they were very familiar with using Twitter and 17.39% were somewhat

familiar with using Twitter. Other student responses indicated that 10.87% were only familiar

with Twitter "very little," and 9.78% were not very familiar with Twitter at all. Students were

asked about how they used Twitter. Most students used it as a way to stay in touch with friends,

read about news and events, and be entertained (i.e. watching videos).

Table 2

Question: Do you think you will use Twitter in your chosen career/job?

	Responses
Yes	34.78%
No	19.57%
Maybe	45.65%

Student responses to address why they would use Twitter included communicating with a

client or to post about events at the job. Common comments about why the student did not feel

they would use Twitter included that the communication method was too informal for their

chosen field (like Accounting and Banking) or that information was too personal to share (like

Social Workers or Nurses).

Table 3

Question: As a future professional in your field, how important do you think the use of social

media skills such as Twitter will be?

	Responses
Very important – I need to have these skills when I graduate	33.70%

Important – I need to have these skills when I graduate, but will have time to improve	32.61%
Needed, but these can be learned on the job	25.00%
Not important – my chosen field does not rely on communication skills to be successful	8.70%

Discussion

Results from the survey responses can be useful for educators who are considering using social media to enhance their teaching. Since it is general knowledge that most students use some kind of social media on a daily basis, it is easy to draw assumptions on this topic. However, using a pre-survey allows the instructor to gear the pedagogy toward a particular class' existing body of knowledge as it relates specifically to Twitter, which they may or may not use. The survey data provides insight into this body of knowledge as well as the cultural underpinnings of Twitter use, specifically.

For example, based on responses, typical college students have a Twitter account (over 85%), post at least once a week (44.5%), and are familiar with using Twitter (over 79%). Therefore, adding Twitter into classroom assignments should require little extra instruction.

These initial findings show that students are unsure about how Twitter could have professional implications. With over 45% of students marking "Maybe" on the question if they would use Twitter in their chosen career/job, it is clear students do not see how social media will continue to impact their professional lives. As the Clutch survey previously mentioned found, with 80% of companies creating and posting content, it is likely these students will be using social media in their jobs.

Although most students (over 91%) believed that social media skills would be something they would need in future jobs, only 33.7% thought they needed the skills upon graduation. We see this as a disconnect, and believe it is an implication of the importance of teaching social media use such as Twitter in the business classroom. According to the survey, while our students knew social media is important, they could not articulate how it specifically applied to their own field, thus leading to the 33.7% response rate mentioned above.

As business professionals, we instructors know that some employers may provide training, but this may not be the case in every business. A future job candidate may find that others are already more adept at these skills as it relates to business communication and therefore miss an opportunity. Teaching Twitter in the classroom provides excellent opportunity for college-to-career instruction. Over 84% of the students surveyed had a personal Twitter account but struggled with ways to apply the communication benefits and networking in a professional manner. Utilizing Twitter in the classroom provides excellent opportunities and examples of positive and effective communication and marketing skills and situations.

Implications for Educators

Incorporating Twitter into a classroom requires a departure from a traditional teaching approach. Although it is easy for an instructor to begin using Twitter to communicate with the class, careful consideration should be made to illicit the true benefits of student engagement. As Lumby, Anderson and Hugman (2014) state, "A superficial approach to social media would frame it simply as a collection of new channels of communication between lecturers and students…. [instead] social media opens up new possibilities for engaging students in their own active learning" (p. 129). Asking students to use Twitter and other social media requires them to engage in the material in a more contemporary mode with which they are likely to be familiar.

Students are responding using prompts that are more like "real world scenarios." The days of self-contained learning from the four walls of a classroom are gone; replaced by global access to information and individuals from virtually any place on Earth. By utilizing Twitter to have students connect with and follow businesses, students engage in active learning and build connections that can help lead them to a successful career in business.

Although most students in the study (79%) indicated they were familiar with using Twitter, some instruction must still be provided to ensure students are using the technology correctly and to help those who need additional assistance with the tool. It is also important to help the students connect their personal use of Twitter with their planned future professional communications. As instructors, we learned that while students are aware of the value of social media in their personal lives, and that they can acknowledge the idea of social media being used in the business arena, there may be a disconnect between how social media platforms such as Twitter can be used in their selected careers. Students use Twitter, but they do not always understand how it can be used in a professional setting.

Some ideas to increase student engagement include:

- Have students tweet links to their own weblog or website so that others can view the information more readily (McCorkle & Payan, 2017)
- Provide a class hashtag to encourage or require in-class tweeting to stimulate discussion much like what is used at a professional conference (McCorkle & Payan, 2017)
- Create interest in the course content by having fun and/or competitive goals using Twitter
- Have students find experts in the business field on Twitter and Tweet them questions (KQED Inc, 2017)

- Utilize unique hashtags for quick reference to online information for notes, articles, and discussions

- Have groups follow a business on Twitter

- Have groups create a Twitter page that other class groups can then follow

- Encourage students to follow local Twitter pages in areas such as arts, athletics, news, and their own personal/professional interests

- Encourage students to follow academic Twitter pages (i.e. school/university/academic clubs)

Future Research

This study reviewed initial student perceptions of using Twitter. A follow-up study is being done to see how these same students' perceptions may have changed after being exposed to various ways to use Twitter in a professional setting. With the advancement in technology and ways to connect through social media, it is important for students to be able to separate the professional from the personal. With the multitude of social media platforms, the study could be extended to review how other platforms, such as Snapchat, can be used in a professional setting. The study could also be extended to review the public perception of well-known businesses, such as Whataburger, and how much was learned about the business through a social media platform. A connection could also be researched about how large a part social media plays in the advancement of international business ventures and client perception in local markets.

Social media has many platforms with new technology being produced every day. Our students live in a culture of sharing and connection via these platforms. It is important to provide instruction on professional behavior online, and in-person, while helping to connect them to future business opportunities.

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SOCIAL MEDIA: SUGGESTED GUIDELINES FOR BUSINESS USE

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Abstract

The focus of this study is to examine literature related to guidelines that businesses are using for the use of social media in the workplace, and to analyze trends for company policies relating to social media use. As part of the study, short case examples are provided that could be used by educators to illustrate the issue of using social media in the workplace for business students. A better understanding of appropriate social media usage in business for future business employees may ensure a more effective transition to using social media effectively in the workplace.

Introduction

It has happened again. Hayley Geftman-Gold, a vice president and senior legal counsel for CBS' office in New York used a posting on Facebook to express her personal opinion that she felt no sympathy for "Republican gun toters" (Repugs was her term for Republicans) in the recent Las Vegas mass shooting at a country music festival. She was fired for violating CBS' company standards with "deeply unacceptable" comments on social media (Hui, 2017). When an attorney and executive for a major corporation has difficulty keeping personal feelings from Facebook, how does an entry-level business graduate know what is acceptable use of social media?

In an earlier incident in 2013, the senior director of corporate communications at IAC was on her way to Cape Town, South Africa. She sent a message to her 170 Twitter followers:

"Going to Africa. Hope I don't get AIDS. Just kidding. I'm white!" While her plane was still flying from London to South Africa, her message received tens of thousands of angry responses from those who viewed it as a racist remark. Although that was not her intent, she was quickly fired from her communications job shortly after her plane arrived (Brewer & Westerman, 2018).

While these two examples illustrate actual incidents of job loss due to social media, other employees may have had negative effects in the workplace due to their communication on social media. When a company looks at social media, employers should have a clear policy that discusses expectations, rights, and the obligations regarding social media use (Hebblewhite, 2017). A solid and understandable company policy may be the best practice for avoiding social media mishaps by employees which impact the image of the company as well.

Purpose

The purpose of this paper is multifaceted. 1) to examine current literature in the area of social media, 2) to analyze trends for company policies relating to social media use and 3) to provide a case study for faculty to use with students to help them have a better understanding of the differences between personal and professional use of social media and to better understand the intersection of the two with the ultimate goal of maintaining one's employment.

Findings

After examining secondary research the following five trends related to social media use in business were determined by the authors:

1. There is widespread social media use and many platforms are used by business.

2. There are blurred lines between public and private usage.

3. There is a prominent increase of public presence in social media.

4. There appears to be a focus on immediacy rather than on accuracy in social media messages.

5. Developing effective social media policies for companies are key to companies' success.

These five trends are presented in the following paragraphs:

Widespread use and platforms

Since the emergence of the ideological and technological foundations of Web 2.0, social media has taken on many forms including: social networking sites (e.g., Facebook), content sharing websites for video, pictures, and other elements (e.g., YouTube, Flickr), user-sponsored blogs, company-sponsored blogs, business networking sites (e.g., LinkedIn), collaborative sites (e.g., Wikipedia), virtual worlds (e.g., Second Life), and social bookmarking sites (e.g., dig, reddit) (Cappel & Huang, 2017). According to Aichner (2015), as of January 2014, Facebook was the largest global social network that unfortunately has around 8.7% fake accounts. Not only have individuals embraced the social media world, by 2017, the most popular social media links on company websites were Facebook, Twitter, LinkedIn, and Internal Blog, YouTube, and Google+. Each social media link provides companies with different ways to reach their customers (Aichner, 2015):

1. Facebook – companies create dedicated pages, write postings, as well as upload pictures and videos.

2. YouTube – companies create corporate video channels and upload videos for product tests, commercials, and interviews.

3. Google+ – companies have the possibility to create a dedicated page, write text postings, and upload pictures or videos similar to Facebook.

4. LinkedIn – companies create a corporate profile, post news and publish job offerings.

5. Twitter – companies create an account and post short tweets (text or picture postings).

Companies are using social media to develop brand loyalty and to grow an online community (Hsiung, 2017). For example, Hsiung (2017) highlights Southwest Airlines' social command center that provides support whenever Southwest is flying and answers customer online queries within 15 minutes which generally is faster than standing in line to speak to the gate agent. The social business team proactively develops engaging content to generate conversation while listening and responding to its customers. When used appropriately, social media can enhance the public profile of a business and increase both the customer base and customer satisfaction.

Blurred lines between public and private usage

Johnston (2014) states that private and public social media usage is most often merged. Therefore, employers must carefully navigate their corporate social responsibility of free speech, collective information sharing, and stakeholder engagement/dialogue (Stohl et al., 2015). An employer has legal risks from actions of its employees in the following areas: reputational harm (disgruntled employees can cause damage to a company's reputation), legal liability (a social media platform could violate areas such as sexual harassment, vilifying employees, bullying, discrimination, or victimizing others), confidential information (information held by the employer could be revealed by employees), or defamation (a careful examination of posts is important here). A company may not be able to regulate all social use by an employee. However, traditional boundaries among corporate, private, and public spheres in most business social media use guidelines has led to the expansion of organizational control beyond employees' organization roles (Stohl et al., 2015) which tends to inhibit corporate social

responsibility. Even though the lines are blurred between personal and work-related use, work-related social media use may be specified in a company policy.

Prominent increase of public presence of social media

Reporting in the media has been greatly scrutinized in the last few years. With social media taking a prominent place in presidential elections beginning with Barak Obama in the 2008 and 2012 presidential runs, according to Lang (2016), candidates have realized the extensive reach and the cost savings that may be gained through the use of social media since more people than ever get their news mainly from social networks. The problem is that anything can be posted on social media creating a feedback loop that gains momentum and generates chatter whether it is completely true or not. Patel (2017) says that social media lessons from the election "news" are:

1. Social media matters – social media is changing the world by shaping and broadcasting everyone's biases.

2. Social media drives traditional media – journalists follow key social media accounts and report on the popular posts.

3. Millennials use social media more – about a third of 18- to 29-year olds name social media as the most helpful source.

4. Everyone knows who Donald Trump is – he has the largest and most engaged social media following among politicians. During the campaign, he received nearly $2 billion in free media coverage by being boastful, unapologetic, and downright offensive to some on social media.

5. Hashtags are still important – social media marketing campaigns are effective if done correctly and the hashtag is an important component.

6. Politicians cater to social media – even though Trump had more responses overall from Twitter and Facebook, Clinton and Sanders had strong showings on Instagram and YouTube.

7. Followers don't necessarily equate to votes – even though Trump's social media presence dominated Clinton's, she received more popular votes in the 2016 presidential election.

8. Followers are useful in polling data – forecasting the results of an election is easier.

9. Different brands use social media in different ways – candidates use different patterns that reflect their political style and branding.

10. Memes can be made in unexpected ways – social media creates more faux pas for candidates especially when the news media is hungry for hot political stories.

While the political world has fully embraced social media, Veldeman et al. (2015) found that between business to business (B2B) firms and information technology (IT) firms, 40.8% of the IT companies versus 26.7% of industrial B2B companies use a social media strategy. This could be explained because IT companies do not perceive disadvantages, have a familiarity with new technologies, and strive to meet the needs of stakeholders who already use social media applications. B2B enterprises have been slow to achieve the benefits from social media's broader communication reach (Veldeman et al., 2015).

Immediacy has more focus than accuracy

With the almost instantaneous avalanche of information provided by social media outlets, journalists may be tempted to report what hasn't been fully vetted as accurate. Therefore, the Associated Press organization published a seven-page Social Media Guidelines for AP employees that makes clear that journalists must always identify themselves as journalists and must refrain from declaring their views on contentious public issues (AP, 2013). The guidelines

also state that if a journalist "friends" someone on Facebook, it is wise to friend someone on the opposing political side so bias cannot be claimed. Journalists are admonished not to retweet opinioned information which will cause problems but judiciously retweet the information and state that they are simply reporting it.

Like journalists who are urged to be judicious in their online activity, private businesses must make sure their employees understand their rules for social media use. Therefore, before a company can enforce any rules related to private social media activity by employees, it would have to be clear that comments or activities could significantly damage the employer's interest as a business (Hebblewhite, 2017).

Social media policies for companies are key

Companies are quickly learning that a social media policy for their organization is necessary. To find out how popular this topic is, a Google search returns about 415,000,000 items to choose from. The need for this information is readily apparent in that there are related searches to social media policy examples for nonprofits, corporate, employees, school, and specific company policies. These search items include arguments for why a business needs a policy with multiple examples and templates to help businesses determine their own policy. Fuduric and Mandrelli (2017) analyzed organizational social media policies for corporate and non-profit organizations and concluded that organizations need to define visionary social media policies and strategies and then communicate the policies in a clear and well-structured way. Social media policies should be developed to:

1. clearly state their views on the importance and role of social media;
2. manage employee expectations regarding the organization's social media presence; and

3. effectively and consistently support communication and branding efforts and communicate the organization's values (Fuduric & Mandrelli, 2017)

Social Media Best Practices Guidelines

What are some best practices that an organization uses in developing and implementing a social media policy? One best practice is offered by the Society for Human Resource Management (SHRM) where members are provided a social media policy for download which includes the following elements for adaptation to any organization:

1. Know and follow the rules –

   a. Carefully read these guidelines, the [Employer] Statement of Ethics Policy, the [Employer] Information Policy and the Discrimination & Harassment Prevention Policy, and ensure your postings are consistent with these policies.

   b. Inappropriate postings that may include discriminatory remarks, harassment, and threats of violence or similar inappropriate or unlawful conduct will not be tolerated and may subject you to disciplinary action up to and including termination.

   c. Always be fair and courteous to fellow associates, customers, members, suppliers or people who work on behalf of [Employer]. Also, keep in mind that you are more likely to resolve work-related complaints by speaking directly with your co-workers or by utilizing our Open-Door Policy than by posting complaints to a social media outlet.

   d. If you decide to post complaints or criticism, avoid using statements, photographs, video or audio that reasonably could be viewed as malicious,

obscene, threatening or intimidating, that disparages customers, members, associates or suppliers, or that might constitute harassment or bullying.

2. Be honest and accurate –

   a. Make sure you are always honest and accurate when posting information or news, and if you make a mistake, correct it quickly. Be open about previous posts you have altered.

   b. Remember that the internet archives almost everything; therefore, even deleted postings can be searched.

   c. Never post any information or rumors that you know to be false about [Employer], fellow associates, member, customers, suppliers, people working on behalf of [Employer] or competitors.

3. Post only appropriate and respectful content -

   a. Maintain the confidentiality of [Employer] trade secrets and private or confidential information.

   b. Respect financial disclosure laws.

   c. Do not create a link from your blog, website or other social networking site to an [Employer] website without identifying yourself as an [Employer] associate.

   d. Express only your personal opinions. Never represent yourself as a spokesperson for [Employer]. Put a disclaimer such as "The postings on this site are my own and do not necessarily reflect the views of [Employer]."

4. Using social media at work – Refrain from using social media while on work time or on equipment we provide, unless it is work-related as authorized by your manager or consistent with the Company Equipment Policy.

5. Do not use [Employer] email addresses to register on social networks, blogs or other online tools utilized for personal use.

6. Retaliation is prohibited –

   a. [Employer] prohibits taking negative action against any associate for reporting a possible deviation from this policy or for cooperating in an investigation.

   b. Any associate who retaliates against another associate for reporting a possible deviation from this policy or for cooperating in an investigation will be subject to disciplinary action, up to and including termination.

7. Media contacts –

   a. Associates should not speak to the media on [Employer's] behalf without contacting the Corporate Affairs Department.

All media inquiries should be directed to the Corporate Affairs Department (Social media policy, 2012). Another best practice policy example is described by Hebblewhite (2017) and includes the following components:

1. Identify what is appropriate use on the internet and email and clearly state what is and is not acceptable.

2. Clarify how the company plans to monitor and audit employee compliance with the policy.

3. Discuss how information is logged and who has rights of access.

4. Describe circumstances for disclosing logged information.

5. Focus on how applications for non-work related use of social media outside working hours is concerned.

6. Link policy clearly to other company IT policies already in place.

7. Describe how any current legislation related to regulation of social media is concerned.

Additional employer/employee social media usage considerations are provided in the literature. Nearly every business and their employees have a social media presence so social media guidelines for the business as well as employees' personal channels are important (Rook, 2018). During work hours, Rook (2018) suggests that businesses should not block social media sites company-wide, but rather establish a social media policy that outlines acceptable usage guidelines that includes limiting personal social media use to breaks and lunch time and then trust employees. The first amendment protects workers' right to free speech and the ability to organize so employers cannot legally tell their employees what they can and cannot talk about on their own personal social networking channels. However, employers can write guidelines for posting on social media and request employees follow them (Rook, 2018). The National Labor Relations Board (NLRB) offers guidance on employer social media guidelines (Heller, 2018). While the rules NLRB had previously determined were presumptively lawful, new guidance based on a legal challenge to Boeing's social media policy suggests that employers should avoid the following sorts of blanket rules prohibiting employees from:

1. making disparaging or negative remarks about the company;

2. criticizing the employer;

3. making false or inaccurate statements;

4. providing that wages, benefits, or working conditions are confidential or preventing employees from discussing them; and

5. joining outside organizations.

In addition to these examples, corporate policies are wide and varying. Therefore, companies must target a social media policy to meet the needs of their business employees and clientele.

Summary and Reflection

Social media policies from several companies and professional organizations have been outlined in this study. Upon reflection related to this research, key components must be addressed in an effective social media policy.

1. Who is the audience for the policy (customers, employees, shareholders, others)?

2. What legal constraints are to be considered? This would include freedom of speech for employees, customers and shareholders. Protection for the company such as revealing trade secrets and practices or impact on the company image.

3. Who has authority to speak for the company on social media?

4. What are ramifications and/or penalties for those abusing social media? For example, what is the threshold for employees being fired or reprimanded?

In order for business students to understand the impact of a social media policy, examples would be useful. The following case study provides an avenue to discuss social media policy with business students.

Case Discussion

Following is a case discussion that can be used with business students to help them have a better understanding of the differences between personal use of social media and professional use of social media and to better understand the intersection of the two with the ultimate goal of maintaining one's employment.

The three case examples are for a fictitious company called the Puff and Fluff Company. Each example focuses on a different concept. After presentation to students, the cases can be discussed. Students can determine how the cases reinforce concepts that have been discussed. Finally, students can recommend how the case can or cannot be resolved.

Puff and Fluff Case 1. You are employed by the Puff and Fluff Company that specializes in cream puffs and cotton candy. The most popular seller is the Extremely Puffy Fluff, our signature cream puff. You know the secret recipe for the Extremely Puffy Fluff. You have decided for Christmas you will post the recipe on your personal Facebook page which you have set to "friends only" so that all your family and friends can make their own Extremely Puffy Fluff. You are so happy about such an easy solution to your Christmas shopping.

Suggested discussion points and responses.

1. What social media policy elements would the company publish to prevent unauthorized sharing of this information? They would have to add guidelines for employees to maintain the confidentiality of trade secrets and private or confidential information.

2. What company rules did this action violate? Sharing trade secrets outside the company is prohibited.

3. What security exists with "friends only" setting? A friend of a friend could access this so you would not be able to control access.

Puff and Fluff Case 2. You sell a lot of Puff and Fluff cotton candy to the local school district who uses it for its school carnival. You have heard through the "grapevine" that the superintendent has been mismanaging funds for the district. You are incensed. You go on social media to voice your negative opinion about the superintendent. You know all of this information because you are a sales manager for Puff and Fluff and have talked to school employees. Your employer learns that you have been defaming one of their best customers. So now what happens?

Suggested discussion points and responses:

1. Is there a company policy on sharing confidential information? You cannot share confidential information on a public forum. Violating the company policy could result in dismissal or other penalties.

2. How does the company approach an employee in this situation? Face-to-face communication would be the best approach to get details of the breach of confidentiality.

Puff and Fluff Case 3. Puff and Fluff is trying to hire an assistant sales manager. You, as hiring manager, decide to check out one of the top candidates on social media. You find the applicant's webpage and find several posts that say that the best job is one where you don't have to do much work, have short work hours, have limited duties, and have lots of time for recreation. You decide not to hire this applicant based on the self-incriminating posts. What issues should be considered in this example?

Suggested discussion points and responses:

1. Does the company have a policy relating to using social media in the hiring process? The HR response might vary from company to company.

2. Should photographs be considered with making a hiring decision? There could be positive as well as negative photographs on a personal social media account.

3. Should outside of work interests be considered? There could be both positive as well as negative associations or interests which would be difficult to assess in an employment process.

Through the use of these examples, students may develop a more practical understanding of the intricacies of social media use in the workplace. Another related activity would be to have students form teams and write similar cases based on their life experiences which could be shared and discussed with the class.

Conclusion

Companies need to develop employee-usage policies related to social media in the workplace. In addition, such policies must be reviewed and updated frequently as this is an area that is constantly changing. Employees must have training related to the social media policy to enhance compliance. While many companies' social media policies initially focused on Facebook, there are many other platforms that should be included. The policy should have flexibility to encompass new technologies as they develop.

Faculty should help future business employees understand the importance of effectively using social media in the workplace. A thorough understanding of the company policy on social media will encourage employee use in a clear and effective manner. No future employee should

face action that will threaten a business career because the employee did not understand a

company's social media policy or the reasons for it.

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