



Association of Business
Information Systems

**ASSOCIATION OF BUSINESS
INFORMATION SYSTEMS**

2018 REFEREED PROCEEDINGS

**FEDERATION OF
BUSINESS DISCIPLINES**

**March 2018
Albuquerque, New Mexico**



Association of Business
Information Systems

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2018 Refereed Proceedings
Albuquerque, New Mexico

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ASSOCIATION OF BUSINESS INFORMATION SYSTEMS

CONGRATULATIONS!

Recipients of the ABIS 2018 Federation of Business Disciplines Paper Award

Project Management Software: Development & Evaluation of the PMIS

J. Christopher Zimmer, West Texas A&M University

Liang Chen, West Texas A&M University

Jeremy Bellah, West Texas A&M University

CONGRATULATIONS!

Recipient of the 2018 FBD Outstanding Educator Award

Sherry Rodrigue, Nicholls State University

ABIS 2018 Program Overview

Thursday March 8, 2018

7:30 a.m. – 10:00 a.m.	8:00 a.m. – ABIS & ABC – SWUS Joint Breakfast
	8:30 a.m. - ABC-SWUS & ABIS Joint Session - Best Paper Presentations
10:30 a.m. – 11:45 a.m.	Session: Improving the IS Curriculum
11:45 a.m. – 1:30 p.m.	Lunch on your own *Executive Board Meeting
1:30 p.m. – 3:00 p.m.	Session: Teaching about Social Media
3:30 p.m. – 5:00 p.m.	Session: Communication Issues in an IT-enabled world
5:30 p.m. – 7:00 p.m.	FBD Presidential Welcome Reception

Friday March 9, 2018

7:30 a.m. – 8:30 a.m.	ABIS & ABC – SWUS Joint Breakfast
8:30 a.m. – 10:00 a.m.	ABIS Business Meeting * All Members Welcome *
10:30 a.m. – 12:00 p.m.	Session: Business Analytics 1
Noon – 1:30 p.m.	Lunch on your own
1:30 p.m. – 3:00 p.m.	Session: Business Analytics 2
3:30 p.m. – 5:00 p.m.	Roundtable Discussion of IS Topics



ASSOCIATION OF BUSINESS INFORMATION SYSTEMS

**March 8, 2018
(Thursday)**

7:30 a.m. – 10:00 a.m. Joint Session with ABC

Ballroom A

7:30 AM – 8:30 AM

ABIS and ABC – SWUS Joint Breakfast

All ABIS and ABC – SWUS presenters and members are invited to enjoy a delicious breakfast

ABIS or ABC-SW Association Name Badge REQUIRED for Attendance at Breakfast

8:30 AM

Ballroom A

SESSION A ABC-SWUS and ABIS Joint Session - Best Paper Presentations

Session Co-Chairs/Association Presidents: Kelly A. Grant and Degan Kettles

ABC-SWUS Best Paper:

Communications Strategies for Human Resource Managers and Other Counselors: Extensions and Applications of Equity Theory

N. Lamar Reinsch, Lubbock Christian University

Vicki Gates, Georgetown University

ABIS Best Paper:

Project Management Software: Development and Evaluation of the PMIS

J. Christopher Zimmer, West Texas A&M University

Liang Chen, West Texas A&M University

Jeremy C. Bellah, West Texas A&M University

Don't Bite my Bytes: A Burkeian Analysis of Corporate Responses to Data Theft in Cyberattacks

Tammy L. Croghan, Northwestern State University

Jon Michael Croghan, Northwestern State University

Reagan Escude, Northwestern State University

10:00 a.m. – 10:30 a.m.

Exhibit Hall (Ballroom C)

FBD Coffee Break

Please make plans to visit the exhibits for information on the latest books and newest educational technologies. Let our exhibitors know how much we appreciate their presence and continued support! Great Door Prize Drawings take place at **10:15 a.m.** in the Exhibit Area. *Must be present to win.*

ASSOCIATION OF BUSINESS INFORMATION SYSTEMS

March 9, 2017
(Thursday)

10:30 a.m. – 11:45 a.m.

Tewa

FBD / ABIS Choice Pick Session

SESSION B Improving the IS Curriculum

Session Chair: Shane Schartz

Undergraduate Management Information Systems Classes: A Pilot Study to Investigate Student Perspectives

Kimberly L. Merritt, Oklahoma Christian University

K. David Smith, Cameron University

The Importance of Information Technology Certifications to Employers of Information Technology Graduates

Shane Schartz, Fort Hays State University

Web Design and Mobile App Skills for 2020

Randall McCoy, Morehead State University

Approaching Recursively-Emergent Wicked Problems in Information Systems Design with a Designerly Epistemology of Practice

Jeffrey Babb, West Texas A&M University

Leslie Waguespack, Bentley University

David Yates, Bentley University

11:45 a.m. – 1:30 p.m.

Lunch on your own...

Kiva Boardroom

ABIS Executive Board Meeting and Luncheon By Invitation Only

1:30 p.m. – 3:00 p.m.

Tewa

SESSION C Teaching Social Media

Session Chair: Marsha L. Bayless

A Class Assignment: Helping Business Students Learn about Protecting Their Identities in a Technological Age

Betty Kleen, Nicholls State University

Lori Soule, Nicholls State University

Sherry Rodrigue, Nicholls State University

Social Media: Suggested Guidelines for Business Use

Marsha L. Bayless, Stephen F. Austin State University

S. Ann Wilson, Stephen F. Austin State University

Using Twitter in Business and Education: What the Tweet is That?

Carol S. Wright, Stephen F. Austin State University

Laurie S. Rogers, Stephen F. Austin State University

Amanda Smith, Lufkin Independent School District

ASSOCIATION OF BUSINESS INFORMATION SYSTEMS

**March 9, 2017
(Thursday)**

3:00 p.m. – 3:30 p.m.

Exhibit Hall (Ballroom C)

FBD Coffee Break

Please make plans to visit the exhibits for information on the latest books and newest educational technologies. Let our exhibitors know how much we appreciate their presence and continued support!

Great Door Prize Drawings take place at **3:15 p.m.** in the Exhibit Area. *Must be present to win.*

3:30 p.m. – 5:00 p.m.

Tewa

SESSION D Communication Issues in an IT-enabled World

Session Chair: S. Ann Wilson

Electronic Communication's Role in the Success of Minority and Women-Owned Businesses

Manuel G. Guerrero, Stephen F. Austin State University

Ann Wilson, Stephen F. Austin State University

Consumer's involvement in the CSR loop on social media

Yafei Zhang, West Texas A&M University

5:30 p.m. – 7:00 p.m.

Exhibit Hall (Ballroom C)

FBD Presidential Welcome Reception

Everyone is invited to attend this FBD conference-wide social event. Visit with long-time friends and make new ones as you enjoy light appetizers and live music. A Cash Bar is available and a limited number of drink tickets will also be distributed. Stop by to relax and wind down from the day's conference activities before heading out to other association and cultural events, dinner, or historic sites.

Enjoy your evening in Albuquerque!

ASSOCIATION OF BUSINESS INFORMATION SYSTEMS

**March 9, 2017
(Friday)**

7:30 a.m. – 8:30 a.m.

Ballroom B

ABIS and ABC–SWUS Joint Breakfast

All ABIS and ABC – SWUS presenters and members are invited to enjoy a delicious breakfast

ABIS or ABC-SW Association Name Badge REQUIRED for Attendance at Breakfast

8:30 a.m. – 10:00 a.m. ABIS Business Meeting

Tewa

SESSION E

ABIS Business Meeting

*** All Members Welcome ***

Session Chair/ ABIS President: Sherry Rodrigue

All members are invited to join us for our annual business meeting.

The meeting agenda includes:

- Election of Officers and Executive Board positions
- Discussion of topics related to our Journal of Research in Business Information Systems (JRBIS)
- Information and discussion on next year's conference
- General discussion on topics introduced by general membership

10:00 a.m. - 10:30 a.m.

Tewa

FBD Coffee Break

Please make plans to visit the exhibits for information on the latest books and newest educational technologies. Let our exhibitors know how much we appreciate their presence and continued support!

Great Door Prize Drawings take place at **10:15 a.m.** in the Exhibit Area. ***Must be present to win.***

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*All FBD conference participants are eligible to have their work considered
for the low submission fee of \$40.*

ASSOCIATION OF BUSINESS INFORMATION SYSTEMS

**March 10, 2017
(Friday)**

10:30 a.m. – 12:00 p.m.

Tewa

SESSION F Business Analytics I

Session Chair: Robert Mitchell

Implications of Cultural Components of the Data Analytics Corporate Environment

Robert Mitchell, University of Arkansas at Little Rock

Richard Woolridge, University of Arkansas at Little Rock

Vess Johnson, University of Arkansas at Little Rock

Efficacy of Text Mining Techniques on IS Curriculum Content Decisions using Job Posting Data

Richard Kumi, University of Arkansas at Little Rock

Richard Woolridge, University of Arkansas at Little Rock

Data Visualization Adoption at Life.Church: A Case Study

Degan Kettles, Brigham Young University

Noon – 1:30 p.m.

Lunch on your own

Don't forget to stay connected with ABIS between conferences!

Follow us at: <https://www.facebook.com/AssocBusInfoSys/>

<http://www.abis-fbd.org/>

Contact us at: ABIS.FBD@gmail.com



Association of Business
Information Systems

ASSOCIATION OF BUSINESS INFORMATION SYSTEMS

March 10, 2017
(Friday)

1:30 p.m. – 3:00 p.m.

Tewa

SESSION G Business Analytics II

Session Chair: Daniel Friesen

Data Mining and Analytics: Revenue Growth

Marcel Robles, Eastern Kentucky University

Jim Larsgaard, Eastern Kentucky University

Data Analytics Curriculum Issues

Daniel Friesen, University of North Texas at Dallas

Theodore Larson, University of North Texas at Dallas

3:00 p.m. - 3:30 p.m.

Exhibit Hall (Ballroom C)

FBC Coffee Break

Please make sure to visit the exhibits for information on the latest books and newest educational technologies. Let our exhibitors know how much we appreciate their presence and continued support!

Great Door Prize Drawings take place at **3:15 p.m.** in the Exhibit Area. *Must be present to win.*

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ASSOCIATION OF BUSINESS INFORMATION SYSTEMS

**March 10, 2017
(Friday)**

3:30 p.m. - 5:00 p.m.

Tewa

SESSION H Round Table Discussion of IS Topics

Guided discussion on current issues in our discipline, such as creating business analytics programs, online teaching, enhancing enrollment, and research methods.

Topic Coordinators: **As Assigned**



**Association of Business
Information Systems**

Make plans to join us in Houston for our 2019 conference.



46th Annual Conference
March 13-16, 2019
Hyatt Regency Houston
Houston, Texas

ASSOCIATION OF BUSINESS INFORMATION SYSTEMS

Poster Presentation

Session C

Friday, March 9 – Coffee Break III

10:00 a.m. – 11:00 a.m.

Theme: Student Learning

Benefits and Challenges of Half Semester Online Classes

Ashley Hall, Stephen F. Austin State University

Susan Evans Jennings, Stephen F. Austin State University

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Project Management Software: Development and Evaluation of the PMIS

J. Christopher Zimmer, West Texas A&M University
Liang Chen, West Texas A&M University
Jeremy Bellah, West Texas A&M University

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 the menu structure with the Process Groups 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.

1 Introduction

Many information systems (IS) programs have accepted project management as a core course and some teaching practice has been examined (Baird and Riggins, 2012; Du, Johnson, and Keil, 2004; Frank, 2010; Landry and McDaniel, 2016; Pollard, 2012; Reif and Mitri, 2005; Smith III, Smarkusky, and Corrigan, 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). 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.

2 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 and Bakens, 2012; White and Fortune, 2002). Therefore, earned value analysis needs to be a core component of a good project management software system (Liberatore, Pollack-Johnson, and Smith, 2001). To implement this functionality, the software needs to support the monitoring of resources and related costs (De Wit and Herroelen, 1990; Larson and 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 menus and functions.

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 and Javernick-Will, 2012; Assad and 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.

2.1 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 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.

2.2 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.

2.3 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.

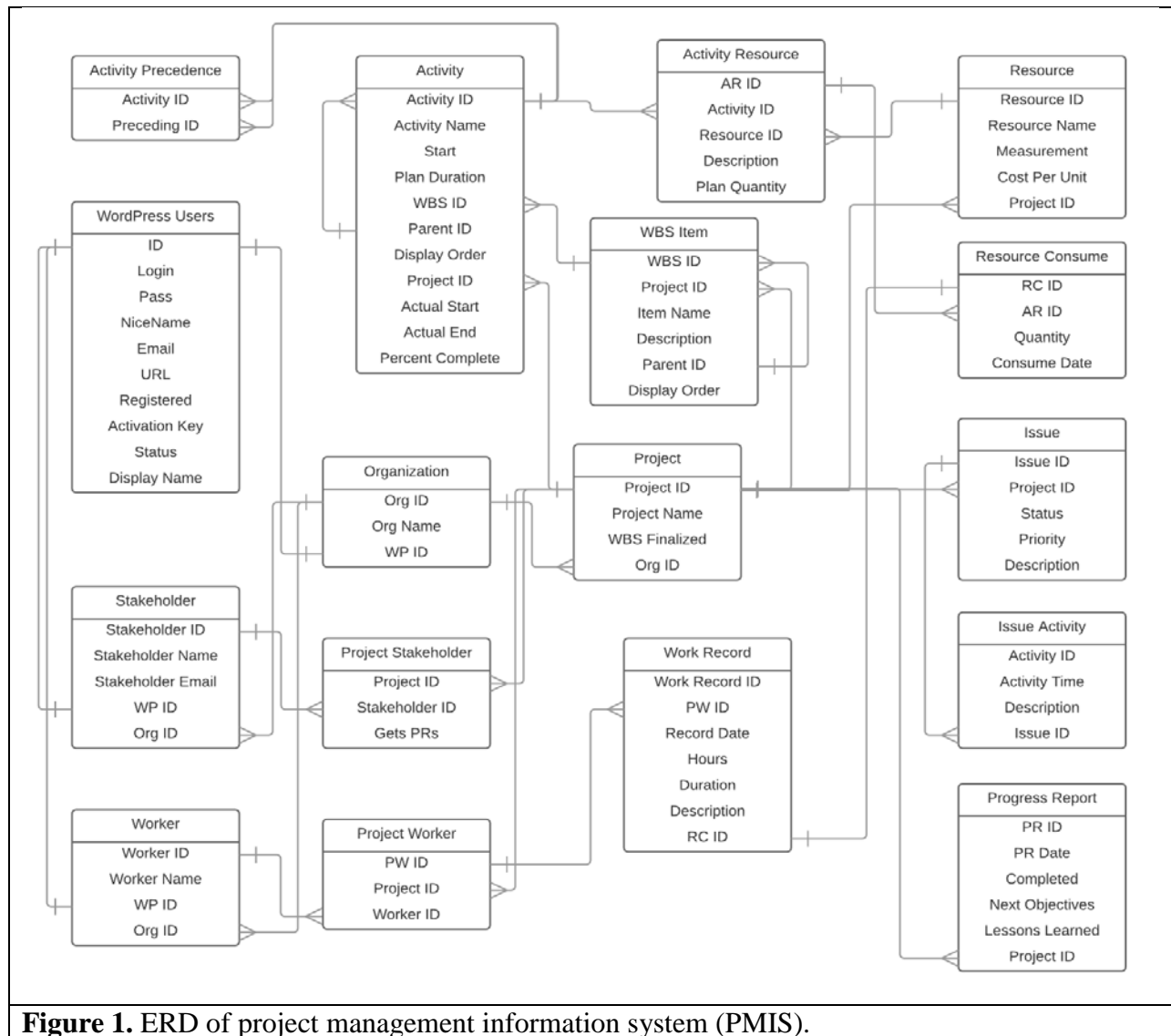


Figure 1. ERD of project management information system (PMIS).

2.4 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.

2.5 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.

2.6 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.

2.7 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.

2.8 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.

2.9 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.

2.10 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.

2.11 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.

2.12 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.

2.13 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.

2.14 Activity Resource

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

2.15 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.

2.16 Issue

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

2.17 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.

3 Implementation

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

Figure 2 shows the Project page. This 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.

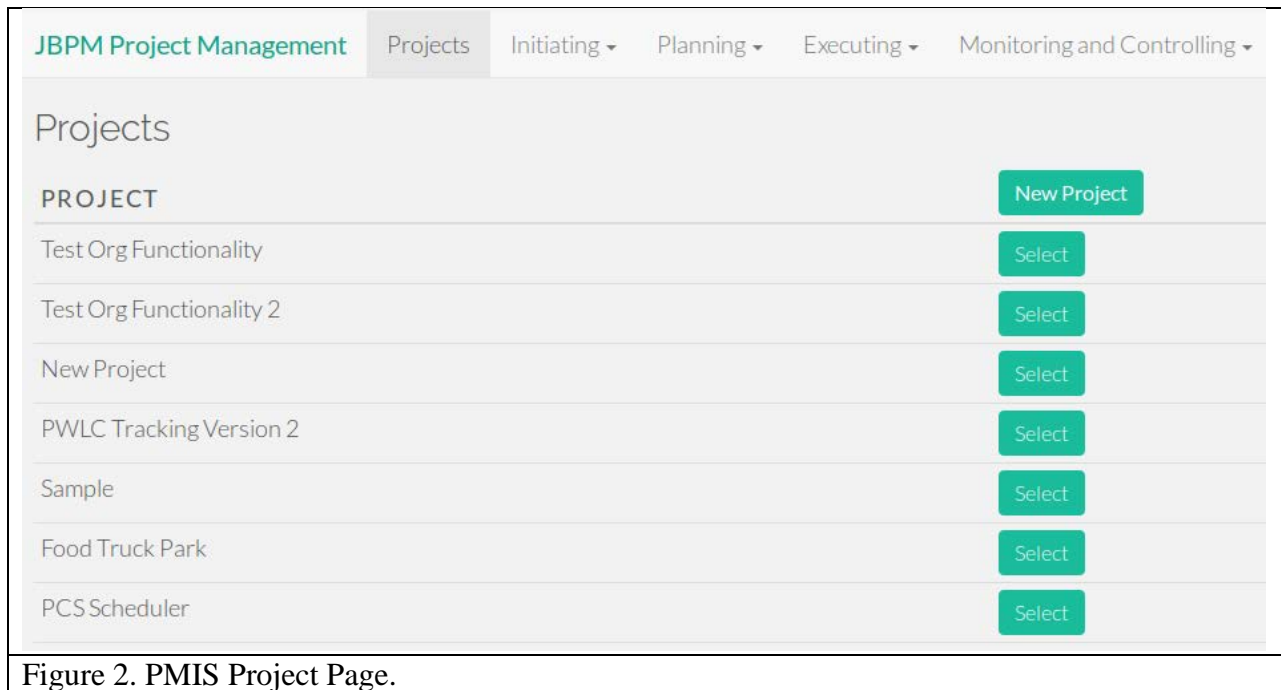


Figure 2. PMIS Project Page.

Figure 3 shows the Stakeholders page. This 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.

STAKEHOLDER	EMAIL	LOGIN	RECEIVES PROGRESS REPORTS	
Test User	test@test.com	gracie	0	Edit

Figure 3. PMIS Stakeholders Page.

Figure 4 shows the WBS page. The work breakdown structure is a deliverable-oriented breakdown of the work in the project. The WBS must be finalized before activities can be defined in the system.

- 1 Food Truck Park
 - 1.1 Facility
 - 1.1.1 Land
 - 1.1.2 Parking Lot
 - 1.1.3 Building
 - 1.1.3.1 Structure
 - 1.1.3.2 Equipment
 - 1.2 Food Trucks
 - 1.3 Operational Items
 - 1.3.1 Employees
 - 1.3.2 Menus
 - 1.3.3 Food
 - 1.3.4 Procedures

Figure 4. PMIS Work Breakdown Structure Page.

Figure 5 shows the Resources page. Resources can be labor, materials, or equipment. They must be defined before they are assigned to activities for estimating and allocating project costs.

NAME	UNIT OF MEASURE	COST PER UNIT	
Consulting	Hour	\$55.00	Edit
Programming	Hour	\$25.00	Edit

[New Resource](#)

Figure 5. PMIS Resources Page.

Figure 6 shows the Activities page. Project activities are 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 screenshot displays the 'Project Activity List' page in a PMIS system. The page is titled 'JBPM Project Management' and has navigation tabs for 'Projects', 'Initiating', 'Planning', 'Executing', and 'Monitoring and Controlling'. A dropdown menu is open over the 'Planning' tab, showing options: 'WBS', 'Resources', 'Activities' (highlighted), 'Gantt Chart', and 'Workers'. The main content is a table of activities with the following columns: 'WBS ITEM', 'ACTIVITY', 'PLANNED START', 'PLANNED END', 'COST', and 'PRECEDING ACTIVITIES'. There are also action buttons like 'New Activity', 'Edit', 'Resources', 'Precedence', and 'Change Order of Items'.

WBS ITEM	ACTIVITY	PLANNED START	PLANNED END	COST	PRECEDING ACTIVITIES	
1	Food Truck Park					New Activity
1.1	Facility					
1.1.1	Land					
1.1.1.1	Research Options	2017-01-01	2017-01-08	\$0.00		Edit Resources Precedence
1.1.1.2	Purchase Land	2017-01-08	2017-02-12	\$0.00	Research Options	Edit Resources Precedence
						Change Order of Items
1.1.2	Parking Lot					
1.1.2.1	Pave Parking Lot	2017-02-12	2017-02-26	\$0.00	Purchase Land	Edit Resources Precedence
1.1.3	Building					
1.1.3.1	Structure					
1.1.3.1.1	Build Structure	2017-02-12	2017-07-27	\$0.00	Purchase Land	Edit Resources Precedence
1.1.3.2	Equipment					
1.1.3.2.1	Purchase Equipment	2017-06-01	2017-06-29	\$0.00		Edit Resources Precedence

Figure 6. PMIS Activities Page.

Figure 7 shows the Gantt Chart page. It is the graphical depiction of activity durations over time.

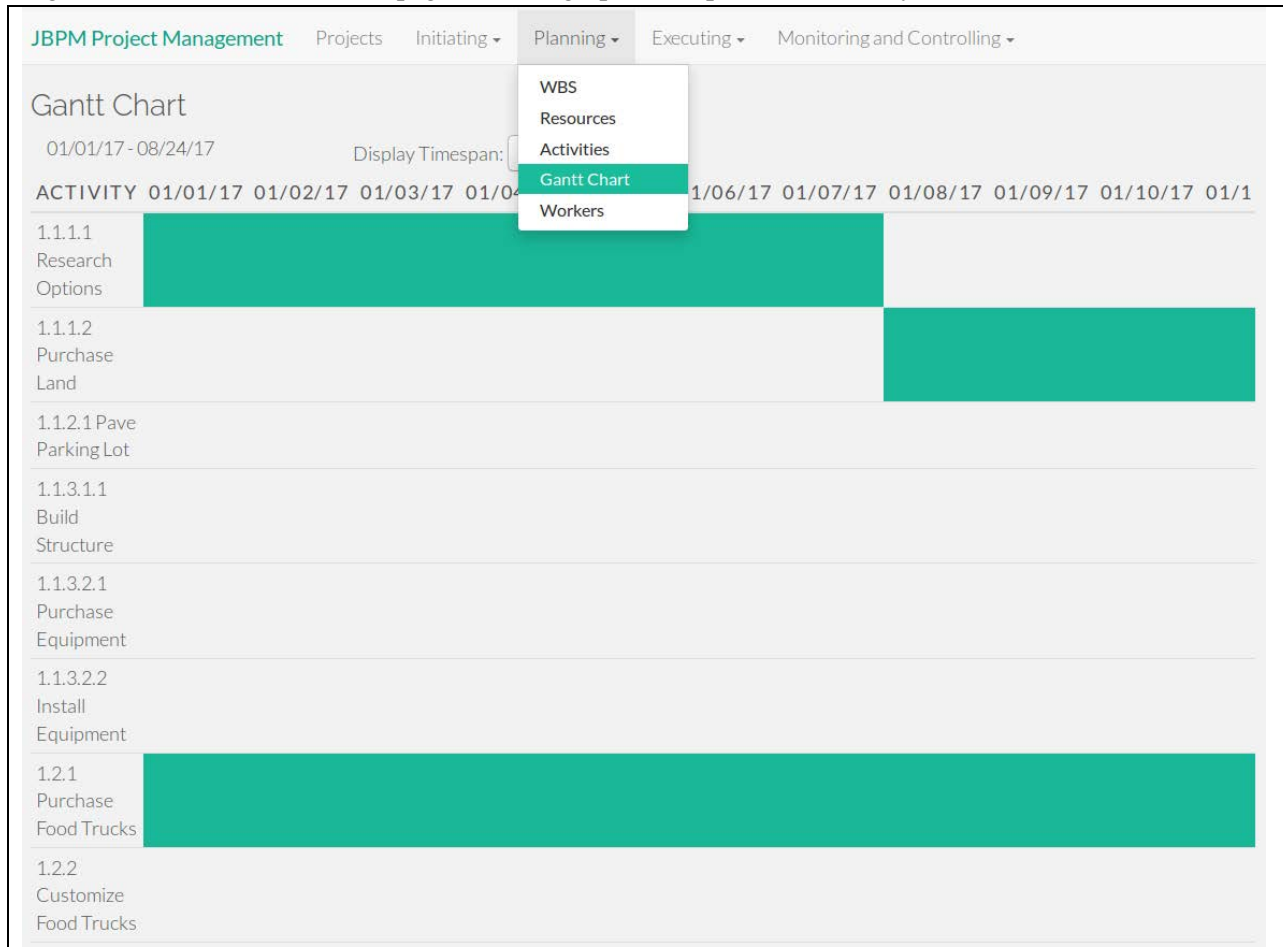


Figure 7. PMIS Gantt Chart Page.

Figure 8 shows the Workers page. 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.

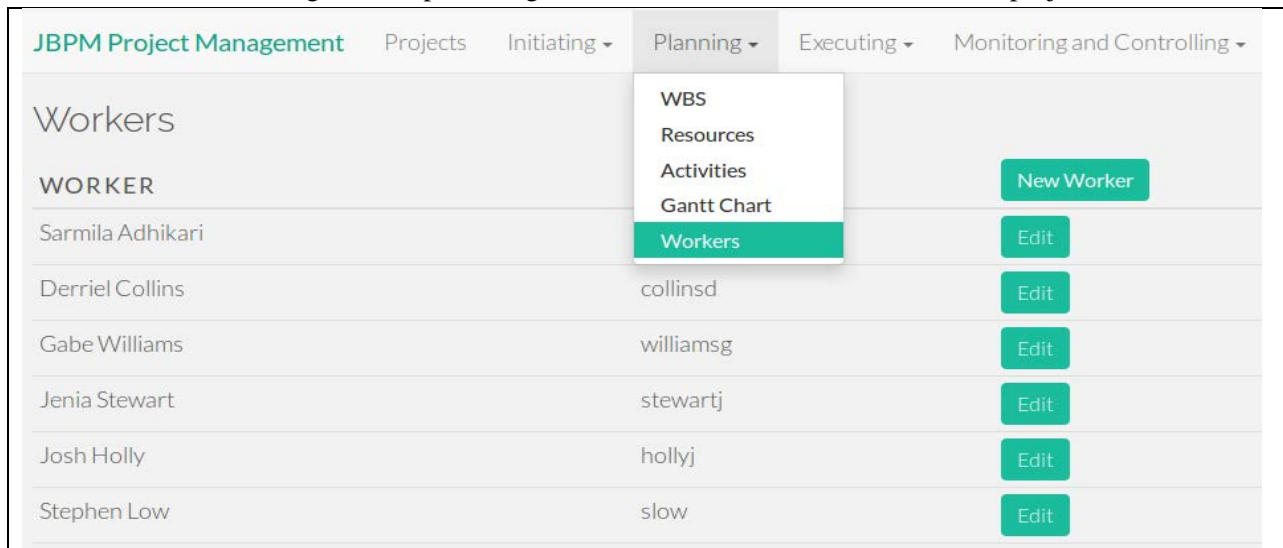


Figure 8. PMIS Workers Page.

Figure 9 shows the Activity Progress page. 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.

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Project Activity Progress

Activity Progress
Issues
Work Records

WBS ITEM	ACTIVITY	ACTUAL START	ACTUAL END	COMPLETE	COST			
1 Pony Express								
1.1 Basic User Requirements								
	1.1.1 Create User Requirements		2016-10-27	100	\$0.00	Edit	Resources	Complete Activity
1.2 Functioning Website								
1.2.1 Development Environment								
	1.2.1.1 Create Development Environment		2016-10-27	100	\$195.00	Edit	Resources	Complete Activity
1.2.2 Final Website Development								
	1.2.2.1 Develop Website		2016-12-15	100	\$262.50	Edit	Resources	Complete Activity
1.2.3 Live Website								
	1.2.3.1 GO LIVE		2016-12-15	100	\$0.00	Edit	Resources	Complete Activity
1.3 Oversight								
	1.3.1 Manage Project		2016-12-15	100	\$135.00	Edit	Resources	Complete Activity

Figure 9. PMIS Activity Progress Page.

Figure 10 shows the Work Records page. Not only does this page provide a good interface for tracking actual work, but entries here create records for resources consumed as well. This allocates cost to project activities that will be used for earned value calculations.

DATE	WORKER	HOURS	DURATION	DESCRIPTION	SOURCE	
2016-12-15	Gabe Williams	3	0	project notebook	Manage Project - Software Development	Edit
2016-12-15	Jenia Stewart	3	0	project notebook	Manage Project - Software Development	Edit
2016-12-15	Stephen Low	3	0	project notebook	Create Development Environment - Software Development	Edit
2016-11-17	Stephen Low		1	progress report #4	Manage Project - Software Development	Edit
2016-11-10	Stephen Low		1	progress report #3	Manage Project - Software Development	Edit

Figure 10. PMIS Work Records Page.

Figure 11 shows the Issues page. Issues arise when working through a project, and 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.

ISSUE	STATUS	PR		
Vitamin Levels	Unresolved	0	Edit	Activity (11)
Practice Table	Resolved	0	Edit	Activity (5)
Surgery Type	Resolved	0	Edit	Activity (5)
Bowel Movements	Resolved	0	Edit	Activity (3)
Meals and Snacks	Resolved	0	Edit	Activity (3)

Figure 11. PMIS Issues Page.

Figure 12 shows the Earned Value page. Earned value information is calculated automatically based on the information entered for activities and resources.

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 12. PMIS Earned Value Page.

Figure 13 shows the Progress Reports page. This page displays all of the progress reports for a project in descending order by date.

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Project Progress Reports

2016-11-15

Objectives Completed

- Installed a survey that meets client requirements
- Added more pictures that can be used within the slideshow
- Added a Board of Directors page with links about each member

Next Objectives

- Integrate website out of Cloud9 and go live

Lessons Learned

- Learned how to create and update a survey
- Learned you can't have a preview page for a link

[Edit](#)

2016-10-27

2016-10-13

1

[New Progress Report](#)

Figure 13. PMIS Progress Reports Page.

4 Evaluation

4.1 Evaluation Process

We evaluated the software by allowing students to use the software to manage projects in their project management class. We gave students access to the software to manage their projects. Students were not required to use the software; they also had free access to Microsoft Project. At the end of the semester, we administered a survey to the students to measure usage experience, individual impact, and learning outcomes.

4.2 Measurements

In order to conduct a comprehensive evaluation, we generate our measurements from multiple theories: the model of information systems success (DeLone and McLean, 1992, 2003), the technology acceptance model (Venkatesh and Davis, 1996, 2000), and the literature on the evaluation of education software (Jackson, 2000; Squires and Preece, 1999). Table 1 includes all the measurements and their sources. Detailed items are included in tables in Section 4.4.

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

Table 1. Study variables and how they were measured.

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 two are rated from poor (1) through average (3) to excellent (5).

4.3 Data Collection

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. A half of participants are 20-25 years old and an extremely 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 other software to manage your

project in this course. Without sufficient sample size, the comparison between this software and other software would not be conducted at this stage. The following results report the evaluation of this software from 18 complete responses.

4.4 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.

4.4.1 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 have a clear and understandable interaction with the software and they can easily navigate the software and location the function 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.

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 $\alpha < 0.001$.			
Table 2. Significance of User Experience Variables.			

4.4.2 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) is 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.

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
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 $\alpha < 0.05$, ** sig at $\alpha < 0.01$, *** sig. at $\alpha < 0.001$.			
Table 3. Significance of Individual Impact Variables.			

4.4.3 Learning Outcomes

As educators, we more focus 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.

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 $\alpha < 0.001$.			
Table 4. Significance of Learning Outcome Variables.			

4.4.4 Attitude to the software and Overall Rating

All the four statements about the attitude to the software are scored significantly higher than 4.0, indicating that participants had very positive

attitude to 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.

ID	Statement	Mean	STD
Q32	Using this software for project management would be a good 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
Q35	Using this software for project management would be a pleasant experience	4.50***	0.51
* sig. at $\alpha < 0.05$, ** sig at $\alpha < 0.01$, *** sig. at $\alpha < 0.001$.			
Table 5. Significance of User Attitude 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 $\alpha < 0.05$, ** sig at $\alpha < 0.01$, *** sig. at $\alpha < 0.001$.			
Table 6. Significance of Overall Rating Variables.			

5 Future Research

This study follows a design science approach to create a project management tool for educational purpose. The utility of this software was tested by a group of students. The evaluation results indicate that this software achieve the expected goals. This software system will be extended incrementally, focusing on the most important functionalities first. Some additional functions will include:

- Formal change management
- Resource leveling (Liberatore et al., 2001)

- Net Present Value (Liberatore et al., 2001)
- Risk management (Kidd, 1990)
- Life cycle management (Mir and Pinnington, 2014)

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.

6 Limitations

Although our sample size was small, it could not have been much larger, given our environment.

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A CLASS ASSIGNMENT: HELPING BUSINESS STUDENTS LEARN ABOUT PROTECTING THEIR IDENTITIES AND PRIVACY IN A TECHNOLOGICAL AGE

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Abstract

This paper discusses a classroom homework project completed by students in a sophomore-level computer information systems class related to management information systems. The course focuses as an introduction to information resources, system design, and information management. Topics include such areas as hardware and software, data management, decision support, e-commerce, e-business, and security and ethics. A topic analysis of student written comments concerning important concepts learned from the project assigned during their study of information systems security and ethics identified 13 words and phrases that were mentioned most frequently. At the very top of the list was “identity theft,” followed by “privacy,” “personal information,” “credit card,” “Privacy Rights Clearinghouse,” “online shopping,” “hack/hacked/hacking,” “debit card,” “smart phone,” “fraudulent,” “social security number,” “social media,” and “password.” Overall written feedback on points learned from the assignment indicate that, prior to completing the assignment, many students lacked a knowledge of important information on how they (and in turn the businesses they work for) should act to protect their identities and personal information in today’s technological environment.

Introduction

Students enroll in CIS 231, Management Information Systems, at Nicholls State University following completion of a software tools course that focuses largely on Excel spreadsheet and Access database projects. Following the software tools course, the CIS 231 course covers information systems and technology hardware, software, data resource management, telecommunications, e-business, e-commerce, decision support, systems analysis and design, and security and ethics. Most students enrolling in the course are sophomores and juniors. Like many other schools, the enrollment in the college of business courses reflects a wide variety of ages, with the university overall reflecting 21.71% non-traditional age students and 66% first-generation college students.

This paper focuses on an assignment given to students in one professor’s online sections during the course segment addressing information systems security and ethics. In 2004 the professor experienced the long hours of dealing with personal identity theft; following that time of stress and frustration, the professor assessed that if a professor could become a victim and realize he/she did not know all the steps to take to best protect personal identity against theft, then likely 18- to 30-year old’s also did not know what to do to protect themselves and their

families. Beginning the very next semester, and now assigned every semester, a graded homework/project regarding protection of identity and privacy has been incorporated into the course. Although the assignment has changed somewhat over the semesters, its design and content has been relatively consistent over the past few semesters.

Literature Review

In September 2017, The New York Times reported that Equifax, one of the major consumer credit reporting agencies, had a data breach that compromised personal information for as much as 143 million American consumers (Bernard, Hsu, Perlroth, & Lieber, 2017). This breach included a great deal of personal information, including addresses, birth dates, Social Security and driver's license numbers. Also in 2017, the Insurance Information Institute (iii) addressed identity theft and cybercrime and reported the 2017 Identity Fraud Study, released by Javelin Strategy & Research. The study showed that \$16 billion was stolen from 15.4 million US consumers in 2016; this was up from the \$15.3 billion stolen from 13.1 million consumers in 2015. According to iii, 16% of the 3.1 million complaints received by the Federal Trade Commission (FTC) in 2015 were identity theft complaints.

The FTC also reported in 2014 that 17.6 million individuals, about 7% of all US residents 16 years of age or older, have been victim to one or more incidents of identity theft ("Identity Theft: Planning for the Future," n.d.). While the financial ramifications of such an incident can be calculated, some of the other complications may be harder to assess. Often consumers use the same or similar usernames and

passwords for other accounts. The accessed/stolen information can then be used to obtain access to other accounts such as medical or even government records. Identity thieves use this information to obtain employment and medical care, while others use this fraudulently acquired identity to commit criminal activity.

Identity theft is not isolated to businesses or home users. Many individuals use personal devices in many shared environments. As stated by Henderson, Selwyn, Finger, and Aston (2015), technology is now woven deeply into the fabric of university teaching and learning. Students use technology for a range of tasks from accessing learning management systems, e-journals, and plagiarism detection tools to word-processing, email, Google and Wikipedia, in addition to various personal aspects. Henderson *et al* found that 95.4 % of those surveyed reported using a personally owned laptop/desktop computer for college, and nearly that many were also using a smartphone. In addition, roughly 50% had some form of a tablet as well. However, the use of personal technology in a public/shared environment may expose the student to security issues. Henderson *et al* also reported that about 60% of students surveyed used computers provided by the university. While using one's own technology may provide a convenience factor, equipment provided by a university may have more security systems in place.

In 2014, after several universities nationwide reported data breaches, a *Forbes* article listed a top five information security threats for college students (Poremba, 2014). The article stated that the data breaches in university data was only one concern to students; a college campus is a hotbed for

security incidents. Listed among the security threats that all college students should be aware of are the following: phishing, ransomware and malware, password problems, Wi-Fi, card-not-present transactions, and bring your own device (BYOD). Writing for the Discover Card website, DeNicola (2016) created a section with cybersecurity lessons for college students, suggesting to parents that such conversations are just as important as conversations about studying hard and doing laundry. The site reinforces the following security practices: using different and strong passwords, choosing security questions carefully, enabling two-factor authentication for extra security, not sharing private information over a phone, keeping unfamiliar objects off computers, maintaining up-to-date anti-virus software, covering a webcam, and simply knowing the security risk with technology.

In a study of students in an introductory information systems course by Zhang and Prichard (2009), students at their university were surveyed to determine Internet users' security perceptions, knowledge, experiences, and practices. The results showed that in general users agreed that security education is important to both business and home users, with more importance towards business users. The responses showed that students were aware of security issues and had knowledge of means to protect against them. However, many responses showed that most students did not have a full understanding for the reality of the threats and did not have the best defensive practices in place to prevent against them. Of those surveyed, 86.7% had antivirus software, but only 17.8% ran it more than once a week. Likewise, 73.3% of those surveyed had anti-spyware/adware

software installed, but only 14.4% ran it more than once a week.

Education about cyber security threats alone may not help users prevent the attacks. White's study (2015) tries to show how an increase in education and preventative behaviors would lower security incidents for home computers. However, findings showed just the opposite; an increase in education and preventative behaviors actually increased security incidents for home computers. The survey classified the participants as computer professional/technician, computer user, or non-computer user. One significant finding was that those classified as computer professional/technician experienced more security incidents at home than the other two classifications. One suggestion is that while computer professionals/technicians perceive the risk and are educated about it, they are willing to take more risk at home in a leisure environment. The study also suggested that despite being educated on the security threat, having the knowledge on preventative measures may also make the actions feel less risky than to less educated users. The more educated users may also have more knowledge to identify and report the incident, over less educated users. Lastly, the more educated users may spend more time using the technology, which opens the exposure for more attacks.

As the above brief review of the literature illustrates, identity theft continues to be of key concern in society, and the impact is huge in terms of actual dollar theft, in addition to the stress, strain, and time impact on victims. While one might anticipate that younger citizens, who have grown up around technology, might be least vulnerable to these types of threats, the

literature also suggests that they are not always sufficiently knowledgeable about steps they personally, as well as the businesses in which they are employed, should be taking to reduce the possibility of identity theft and increase protection of individual privacy in a technological age. These findings suggest value in including a homework assignment related to protecting one's identity in today's technological society.

A Description of the Assignment

Although some textbooks place security and ethics chapters near the end of the management information systems text or perhaps eliminate the topics almost in entirety, the professor teaching the course described in this paper has moved the topic into the middle of the term. In addition to completing a quiz and posting a short forum/discussion board entry, students complete a graded homework project during the study of the topic.

In recent semesters, the professor has focused on using the website presented by the Privacy Rights Clearinghouse (PRC), based out of California. While there are undoubtedly numerous other websites that could be used as a reference for the assignment, or some who would suggest that students be allowed to find their own sources, the wealth of information available through this website makes it a one-stop source for students. By using a one-stop source, the instructor specifically assigns and directs from which sections to research/read; this helps ensure students invest more time in reading useful content. The instructor also views the site as a credible website, and all teachers recognize that many times students simply do not use

sites with credibility when left to find their own sources.

According to their website, "Since 1992, Privacy Rights Clearinghouse has empowered individuals to protect their privacy by providing direct one-to-one assistance, creating original education publications, and advocating for consumer-friendly policy"

(<https://www.privacyrights.org/about>). The organization has 501(c)(3) nonprofit status and is a consumer education and advocacy organization. For many years it has been funded by foundation grants, individual donations and *cy pres* settlement awards that are the result of unclaimed class action settlement awards. In the case of Privacy Rights Clearinghouse, those unclaimed settlement funds would come from settlement funds related to those injured from privacy rights violations in some manner. While the organization started as a program of the Center for Public Interest Law at the University of San Diego School of Law, it later became a project of the Utility Consumers' Action Network, and has since 2014 become an independent nonprofit organization. While the organization's direct advocacy efforts are aimed at the California state level, the organization has been involved in identifying and bring attention to privacy-related issues impacting all consumers since its inception in 1992. The organization has published many guides for consumers as laws are passed and continues to update these in a timely manner.

Perhaps of most value to consumers interested in protecting their identities in a highly technological age are the extensive educational, informative resources the PRC provides for key areas in which privacy and

identity are important to safeguard. Visitors to the website can find a wealth of information on protecting their privacy in each of the following topic areas: banking and finance, credit & credit reports, data breaches, health and medical, ID theft and social security numbers, online activities, people search and data brokers, phone, privacy at home, safety and security, shopping, and work and school (<https://www.privacyrights.org/about>).

A review of professional backgrounds of key officers of the PRC identifies President, Norman Shelden, a past Senior Assistant Attorney General in the California Attorney General's Consumer Law section. Susan Henrichsen, Secretary-Treasurer, spent 29 years as a Deputy Attorney General in the same Consumer Law section. Evan Hendricks founded the Privacy Times newsletter and served as editor and publisher from 1981-2014. Pastor Herrera Jr. served as Director of the Los Angeles Department of Consumer Affairs for 19 years. Aleecia M. McDonald is a privacy researcher at Stanford University's Center for Internet & Society, focusing on public policy issues related to Internet privacy (<https://www.privacyrights.org/about/officers-and-board-members>).

The graded homework assignment the students complete in the course is designed to provide them with information that can help them better protect their identities and information privacy while engaged in various activities using today's sophisticated computers and other electronic devices. The instructor directs the areas of the website from which students further select passages. Students successfully complete much of the assignment by reading within a certain section and then writing a summary of four

new points they learned while reading information from that topic area. Thus, the pressure of "is this what the teacher wants for an answer" goes away as they write their personalized responses. The spring 2017 semester assignment is summarized in bullet format below to more clearly illustrate what students were asked to read and how they were to respond.

- In approximately 175-250 words, provide a clear overview of the Privacy Rights Clearinghouse, addressing mission and goals, content available on the website, and work backgrounds of key people providing content for the site
- From the home page, click on the data breaches tab and then select something from 2017 that appeals to you and read it. In a paragraph, identify which breach you chose to read and summarize new points you learned by reading the alert. How valuable are the new things you learned and why?
- From the home page, click on the Identity Theft tab and scroll down to find two related quizzes.
 - Take the Workplace Identity Theft quiz. Then write a description of how you scored and what you learned that could be improved at your workplace to reduce the risk of identity theft.
 - Take the Identity Theft IQ quiz. Then write a description of how you scored and specifically what you found you need to do to better protect yourself against identity theft in the future. (Of course, your instructor keeps your answers confidential!)

- Reflect specifically on the Identify Theft IQ quiz. Suggest two more points or statements that could be added to the quiz to bring the quiz more up to date considering today's technology capabilities.
- Within the Identity Theft tab, read the consumer guide, "Identity Theft: What to do if it happens to you." Scan down through many areas in this document.
 - Write a paragraph that fully details all the actions you must take in what order to deal with the identity theft if it involved a situation of new credit accounts being established in your name.
 - Explain the difference between fraud alerts and credit freezes. While both can be established with the national credit bureaus, there are differences between the two. Why do you sometimes need both if the identify theft is extensive?
- Under the Privacy tab, select one of the guides that relates to shopping online. Identify which guide you chose and then provide a one-paragraph summary that gives an overview of four new key points you learned.
- Under the Health and Medical tab, read one of the guides. Be sure to identify which specific one you chose, and then provide a one-paragraph summary that gives an overview of four new key points you learned.
- Under the Safety and Security tab, read one of the guides. Be sure to identify which specific one you

chose, and then provide a one-paragraph summary that gives an overview of four new key points you learned.

- Provide a final paragraph in which you summarize the most important information you will take away from this assignment.

Although the professor required students to take two identity theft quizzes in the past, those quizzes are perhaps the one area of the website that does not necessarily reflect potential issues considering more recent technology, and those quizzes are no longer required in the assignment as of fall 2017. By the time the students complete the assignment, they have read valuable information that can guide them in better protecting their identity and protecting their financial information. As the statistics cited in the literature review revealed, many of today's students will likely be a victim of information or identity theft one or more times in the future. Knowledge presented in the assignment, when applied to their personal situations, will reduce some of privacy risks.

Analysis of Data

The authors used those culminating paragraphs from students enrolled in eight sections of CIS 231 for the data analysis presented below. These sections were all online sections, beginning fall 2015 and continuing through spring 2017. A total of 139 students' materials were used in this analysis. Those labeled XB in the table below were double-paced eight-week sections within the totally online degree program, and those labeled WWW were 16-week sections within a regular-length fall or spring term. Both sections in any given semester completed the same assignment.

As in any summary of class assignments, a wide variety of approaches were used by students; some offered specific comments, while others generalized more broadly.

While scanning the responses within each class, a list of commonly viewed words/phrases was compiled. When a new word/phrase appeared multiple times, it was added to the list. Once the list was complete, the Navigation Pane feature in Microsoft Word was used to find all occurrences of each of the words/phrases within a response. After scanning responses of all 139 students who submitted assignments, a total of 28 words/phrases was

recorded. Table 1 displays the 28 words/phrases count breakout by class.

Of the 28 phrases/words, 13 of them had recorded counts of 10 or more. Within the responses from 139 students, “password” was found 11 times, “social media” 12 times, “social security number” 13 times, “fraudulent” 14 times, and “smartphone” 15 times. At the high end in number of responses, “credit card” was found 45 times, “personal information” 60 times, and “privacy” 91 times. The phrase found the most was “identity theft.” This was in 99 of the 139 responses, which equates to 71.2% of the responses.

Table 1. Counts of words/phrases by class

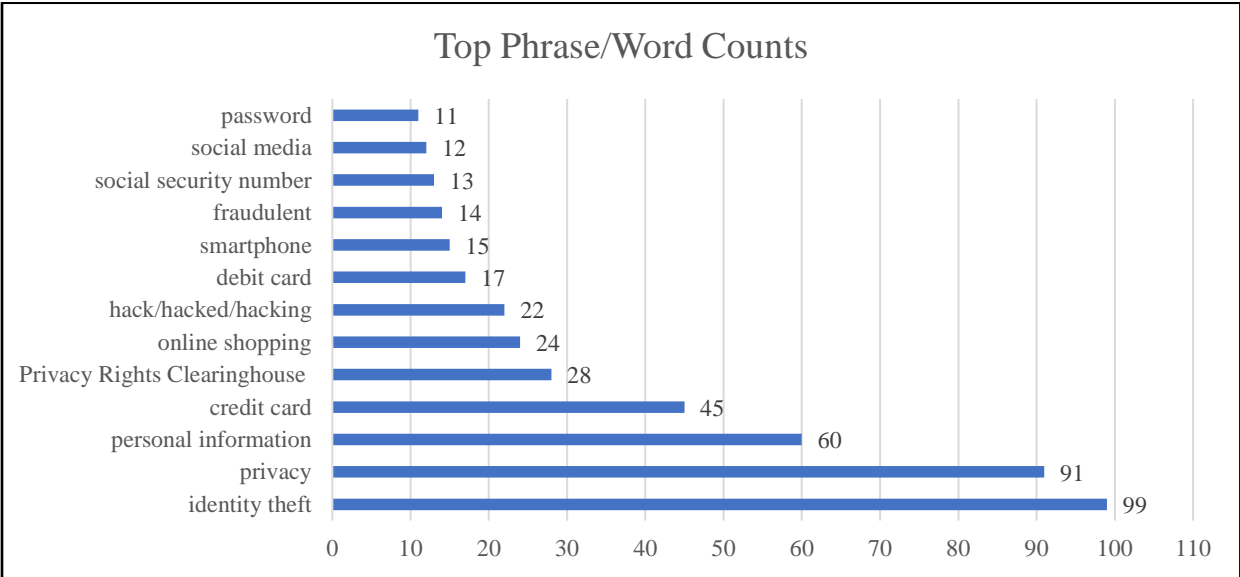
Word/Phrase	F 2015		S 2016		F 2016		S 2017		TOTAL
	WWW	XB1	WWW	XB1	WWW	XB1	WWW	XB1	
identity theft	20	7	14	10	20	8	16	4	99
privacy	22	10	9	11	16	0	23	0	91
personal information	13	10	5	2	8	4	17	1	60
credit card	8	8	2	12	2	0	9	4	45
Privacy Rights Clearinghouse	4	5	1	4	4	4	6	0	28
online shopping	6	0	8	2	0	0	6	2	24
hack/hacked/hacking	1	4	9	3	0	0	5	0	22
debit card	1	4	2	5	0	0	5	0	17
smartphone	1	3	2	4	3	2	0	0	15
fraudulent	4	3	2	0	2	1	2	0	14
social security number	4	2	0	0	4	0	3	0	13
social media	2	1	1	1	2	1	3	1	12
password	2	1	4	0	0	1	3	0	11
crime	3	0	0	0	1	0	0	0	4
identity fraud	0	0	0	0	0	0	2	1	3
data breach	0	0	0	2	0	0	1	0	3
HIPPA	0	0	0	1	0	0	2	0	3
social security card	0	1	1	0	0	1	0	0	3
consumer rights	0	0	0	1	0	0	0	1	2
medical privacy	0	0	0	0	1	0	1	0	2
anti-virus software	0	0	0	1	0	0	1	0	2
chip card	2	0	0	0	0	0	0	0	2

pre-approved offers	0	0	0	0	0	1	0	0	1
unsafe links	0	0	0	1	0	0	0	0	1
credible website	0	0	0	1	0	0	0	0	1
virus protection	0	0	0	1	0	0	0	0	1
cybercrime	0	1	0	0	0	0	0	0	1
unauthorized	0	0	0	0	0	0	1	0	1
Number of Students Completing Assignment	26	17	19	17	21	8	27	4	139

Figure 1 depicts the phrases/words having recorded counts of 10 or more. The general point of the students' mention of identity theft was that the students either did not know how many ways it could occur, and/or they did not know all the steps involved in restoring their credit history if it does occur. For some of those who may not have built much credit yet at the age of 19 or 20, perhaps of more interest to them was information about online shopping safety measures that should be taken or what risks they are taking when using their smartphones for so many online applications. Many students either did not

understand how fraudulent credit cards could be set up in their names or did not know that that a credit card was safer to use when shopping online than a debit card. Some students also reported carrying social security cards in their wallets and/or being too careless in providing that number to others and learning they needed to change these habits. While many students reported having heard of HIPAA, the Health Information Portability Act, they did not have a clear understanding of when their medical records could still be shared and with whom.

Figure 1. Top Phrase/Word Counts.



By the end of the course, students had completed six graded homework projects, including one related to new hardware and software, an Access database assignment, an Excel spreadsheet assignment, a competitiveness with e-business assignment, an e-commerce assignment, and the security assignment. As additional anecdotal support of the value of the security-related graded project, the authors found that when students were asked in a final bonus forum/discussion board to discuss the three graded projects (out of six assigned) of most value to them, a number of students mentioned the security assignment and justified it because of all the information they learned and their increased appreciation for the need to protect their identities and personal financial information.

Conclusions and Implications

Significant data breaches of far-ranging impact will undoubtedly continue in the future. As a brief review of the literature shows, not everyone is savvy in how to protect themselves against identify theft most effectively. The reality is that everyone is vulnerable and a potential victim; thus, there is value in learning more about how to protect oneself in routine activities and what habits can help reduce the chance of it happening in a technological age.

The assignment described in this paper is an easy assignment to create and allows students some flexibility of the materials they read related to various types of security threats. Most teachers would probably agree with the statement that their students are more Smartphone app savvy than the teacher, but the analysis of student self-reported learning benefits reveals that not all

are knowledgeable in how to protect themselves or even how many ways identity and personal privacy can be breached in our technological society. Word counts of analyzed content revealed the top four words/phrases mentioned in the summary paragraph of the assignment were “credit card,” “personal information,” “privacy,” and “identity theft.”

The professor will continue to assign this project in upcoming semesters; only when a large majority of students consistently report they already knew all the information they were assigned to read will the assignment be dropped. Information security is an important part of information systems knowledge, and everyone is vulnerable, as the fall 2017 Equifax data breach recently illustrated. By learning more about information security and protection from a personal or consumer perspective, students can better understand the need for businesses to focus on security of data.

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DATA MINING AND ANALYTICS

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Abstract

Several companies are using their saved customer data to perform data mining and analytics. The resulting information is used to predict future trends and open new sources of revenue. The raw data can be sold to analytics companies that specialize in analyzing data. Current research shows the growth and importance of data mining and analytics in companies of all industries and sizes.

Introduction

Information is power. Almost all companies deal with data in one way or another. These data can include customer information from online shopping sites such as Amazon; customer account information from banks, credit card companies, financial institutions; and medical information from insurance companies. Companies are making important business decisions by analyzing such data. If properly analyzed and used, data can provide key information that benefits the company. Therefore, data mining and data analytics are crucial for many organizations today.

Data analytics is “the discovery and communication of meaningful patterns in data” (Techopedia, 2017, p. 1). Data analytics is applied to business data to describe, predict, and improve business performance.

Data mining is the process of discovering interesting knowledge, such as patterns, associations, changes, anomalies, and

significant structures, in large amounts of data sets stored in databases, data warehouses, or other data repositories (What is, 2017).

The goal of data mining is to extract information from a data set and transform it into an understandable structure for further use (Thearling, 2017). Data mining software is one of a number of analytical tools for analyzing data. The actual data mining task is the automatic or semi-automatic analysis of large quantities of data to extract previously unknown thought-provoking patterns such as groups of data records (cluster analysis), unusual records (anomaly detection), and dependencies (association rule mining) (Thearling, 2017).

Problem Statement

The purpose of this study was to highlight the importance and strategic use of stored data.

Methods and Procedures

Personal interviews were conducted with multiple business executives to help the researcher further comprehend the data as processed by companies. Organizations typically have identical data being processed throughout departments or units..

One executive reflected that all call center data can be analyzed to better serve customers by automating certain processes that do not require the caller to speak to customer service personnel. Another executive commented that his company has so much data; yet, they are not using it

meaningfully and only archiving and purging the data after a specific time period.

Some concern was expressed about selling the data because of a potential violation of The Health Insurance Portability and Accountability Act of 1996 (HIPAA) and Protected Health Information (PHI) protection laws.

Understanding Data Mining

Data mining is the automated extraction of hidden predictive information from large databases--information that experts might miss because the data lies outside of their expectations. Data mining tools predict future trends and behaviors, allowing businesses to make proactive, knowledge-driven decisions. Data mining tools can also answer business questions that are traditionally time-consuming to resolve (Thearling, 2017).

Many companies already collect and refine large amounts of data. Data mining techniques can be implemented rapidly on existing software and hardware platforms to enhance the value of existing information resources. Data mining can also be integrated with new products and systems as they are brought online. When implemented on high performance client/server or parallel processing computers, data mining tools can analyze massive databases to deliver answers to questions such as, "Which clients are most likely to respond to my next promotional mailing, and why?" (Thearling, 2017, p. 1).

Data Analytics and Mining Are Important

In today's modern economy, many organizations are taking advantage of analytics to spur growth and innovation.

Companies are using data tools to create new products, serve customers, and add jobs to the job market.

A survey conducted by Ipsos Public Affairs polled 1,565 senior executives and business decision-makers in the United States and Europe. The survey showed that organizations of all types and sizes are using analytics (Frenkel, 2015). Sixty-seven percent (67%) of senior executives and decision-makers said data analytics is important for their companies; 69% from the U.S, 65% in Europe. Data analytics are important to 60% of small companies (50 or fewer employees); 57% of these companies are American, 62% European. At midsize companies (51 to 500 employees), 87% of U.S. and 79% European respondents said analytics is important. For companies with more than 500 employees, 97% of American senior executives and 82% of European senior executives said analytics is important. Additionally, 61% of business executives surveyed in the U.S. and 58% in Europe said data analytics is important to their companies' plans to increase number of staff.

Data analytics helps companies serve their customers' needs more effectively according to 79% of respondents in the U.S. and 80% in Europe. About 70% of executives in the U.S. and 72% in Europe said data analytics is important to their firms' plans to create new products or services, and 33% of American respondents; 24% of European executives expect 10% or more of their companies' growth to be related to data analytics in the next few years. For the next few years, 53% of the U.S. administrators and 43% of European administrators expect data analytics to spur significant growth (Frenkel, 2015). The Ipsos Public Affairs'

survey confirms how data analytics is critical for companies of all sizes and types.

Prospects and Challenges with Big Data

During the last decade, people have accumulated more data than were even available during the preceding century (Moorthy, Lahiri, Biswas, Sanyal, Ranjan, Nanath, & Ghosh, 2015). The cost of storage has fallen immensely because of cloud storage capabilities; therefore, it is easier to keep data than to discard it (Cukier & Mayer-Schonberger, 2014). The problem, however, is not the storage and analysis; but, rather how organizations effectively and efficiently transform relevant data reliably into useful information (Moldoveanu, 2013).

Big data is a term that describes the large volume of data sets so complex that they become difficult to process with on-hand database management tools on a day-to-day traditional data application practices. Although, it is not the amount of data that's important; it is what organizations do with the data that matters. The challenges of big data include capture, storage, search, sharing, analysis, and visualization (Moorthy et al., 2015).

Big Data Technologies

Several big data technologies used today include Hadoop, Google's Bigtable, NoSQL, and HBase. Hadoop is most popular right now and is a disruptive Big Data technology originally initiated by Yahoo to build an advanced search engine and process the generated data. It has evolved into a large-scale data processing environment with two components: MapReduce for data processing and

Distributed File System (DFS) (Moorthy et al., 2015).

Recommendations for Benefitting from Big Data

According to Moorthy et al. (2015), organizations need to develop three mutually supportive capabilities to benefit from Big Data:

- Source both internal and external data creatively by organizing IT infrastructure and optimally identifying, combining, and managing the data.
- Mobilize competent manpower in multiple departments that can work with advanced analytical methods for forecasting and predicting, creatively generating and delivering value offers and optimizing the overall processes dynamically.
- Transform the organization to harness the benefits of emerging opportunities using Big Data.

Three logical steps of framing the problem, solving the problem, and communicating and acting on the results are suggested to take advantage of Big Data (Moorthy et al., 2015). Some of the potential marketing benefits that businesses had as a result of Big Data are listed below:

- Customer Service Agents reduced average customer interaction time by 30-40% as they had all information available instantaneously and did not have to ask the customer questions. This reduction in time resulted in every agent handling 30% more customers per day.

- Analytics provided information regarding customer household, product holding, rate plans, usage pattern, etc. Agents were enabled to actually cross-sell and upsell products to customers over the same service call. This implementation resulted in significant increase of sales.
- Predictive analytics initiatives helped manage risk and control with better forecasting of revenue expectations.

Consumer Privacy and Data Security Concerns

Advancements in Big Data impose several new challenges in terms of data collection: analysis, interpretation, and use (Moorthy et al., 2015).

An online travel search engine, Orbitz.com, was displaying costlier search results to online customers who were using their Apple devices when compared to those using their PCs. Consumers typically assume that a search engine provides best options based on their parameters. However, Orbitz is using the parameters combined with its own device analytics, even though it is not approved by customers. Orbitz's CEO defended this practice by saying that they found Mac users tended to be 40% more likely to choose 4-5 star hotels, compared to PC users (Moorthy et al., 2015)

Another example is when Target marketing was distributing maternity product coupons to households based on the maternity products they purchased. The problem was that they sent maternity clothing and nursery furniture to a home with a high school age girl, which made her mother mad at Target.

These types of issues violate customer privacy and cause constant battle within and between customers and corporations. Legal, ethical, and privacy concerns are imminent, complex, and different from past decades (Moorthy et al., 2015).

Further, data security is another major concern. Information security breaches are not completely avoidable. Several cases of security breaches, especially in the retail industry (e.g., Target), have resulted in data thefts and credit card frauds.

Analytics Can Help in Cross-Sell of Insurance Products

Research has provided clear indication on how data analytics is a powerful tool in identifying cross-selling opportunities (Desik & Behera, 2015). Cross-selling of insurance products is a complex process that requires much understanding of the products and the customers (Gupta & Donald, 2003).

It has been shown that the hybrid method (combination of profiling and affinity analysis) is able to capture the prospects for cross-sell. The ROI of 33% demonstrated the benefits of applying the analytics in finding the new prospects, instead of targeting the entire customer base, thus reducing customer dissatisfaction (Desik & Behera; Moorthy et al., 2015).

Problem Solving Method

The Data from all of these business units (insurance companies) can be classified according to the types of claim forms the insurance companies use. So it is possible to extract all of this data into a common repository or warehouse from where mining and analytics can be performed. Data mining and data analytics experts need special software to understand how to interpret and

use all of this big data meaningfully. Further, all of the claim forms have a lot of personal information that can be abstracted when being extracted into the data warehousing tables. That way it is ensured that the PHI is protected and HIPAA laws are not violated. But also the key is to ensure that customers are aware of this data analytics, and any contractual agreements in safeguarding their data are not violated as well.

Methods of observing patterns in the data and predicting future outcomes or behaviors can turn data into information; for example, the number of patients in a certain age group who went to a doctor with certain conditions to observe common medical conditions prevailing in an age group. This kind of data can be used to collaborate with pharmaceutical companies to formulate optimal drugs.

An additional opportunity with the output of data mining is the ability to sell the data to data analytics companies that are particular kinds of data mining and research. During this process it is critical to ensure that privacy and ethical issues are properly considered and any laws are not violated.

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USING TWITTER IN BUSINESS AND EDUCATION: WHAT THE TWEET IS THAT?

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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 is to discuss 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 that instructors can use in their own classrooms.

Introduction

Twitter was founded in 2006 and is still a strong and recognized name in our society. Students can quickly and easily create a free account and begin connecting with other individuals around the globe. Twitter can be used for free marketing for businesses and quick connecting for customer service. By working with students to fully utilize the benefits of Twitter, engaging and information conversations and connections can take place. According to the Twitter website, Twitter is used to keep in touch with happenings in the world. Many people believe that Twitter is a personal 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 is to discuss the use of Twitter in the business environment and provide a resource for business instructors to use when teaching Twitter in their own classrooms. The goal is to help educators to better prepare students to enter a workforce that can be displayed for the world to see. Questions that will be asked in this study include:

- How are businesses using Twitter to promote and market their businesses?
- What are guidelines for using Twitter effectively?
- What are practical uses 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 (2017) has continued to grow with over 328 million active users worldwide. The number of users who use their accounts increased 5% from the previous year, but the number of DAILY active users increased

12%. 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. There are even websites and apps that give a score based on the “influence” an individual has when they post on social media. Once such website and app is named Klout and it “can help you discover and be recognized for the influence you have in the world by reviewing your activity on social media” (Lane, 2017).

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

Using both published research and personal experience, this paper will present best practices of using Twitter to engage students in the course content beyond what is presented in lecture. Instructors will present and model Twitter use in business settings, with students being led through the set-up and creating of their own professional Twitter accounts. Students that have personal Twitter accounts will be instructed not to utilize their accounts for the purpose of this study, but instead use their newly created professional accounts.

Students will be required to use their professional Twitter accounts to connect (follow) the department's own professional Twitter account, which will be set up specifically for this course and study. Feedback will be provided from both the instructors and the social media professional to improve the students' social media use in professional business communications. Giving students the opportunity to engage in professional social media communications in a learning environment will provide a safe place to develop these skills, as well as help to promote proper social media communications when in professional environments.

Students will be required to follow experts in the business field on Twitter, retweet and reply to professional communications in regards to business information, and take part in professional discussions about class content.

This study will also present a proposed course model to integrate Twitter into a class. The study will be conducted in the Spring semester of 2018 in a Sophomore level university course that is required of all general business majors as well as is a core course for the university. A social media

professional will provide feedback and input during the course of study.

Implications for Teaching

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).

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 connect students to business experts, students engage in active learning and building connections that can help lead them to a successful career in business.

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

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