
# ASSOCIATION OF BUSINESS INFORMATION SYSTEMS

---

# 2017 REFEREED PROCEEDINGS

---

# FEDERATION OF BUSINESS DISCIPLINES

## March 2017
## Little Rock, Arkansas


# ASSOCIATION OF BUSINESS INFORMATION SYSTEMS

---

## 2017 Refereed Proceedings
## Little Rock, Arkansas

---



www.abis-fbd.org

**ASSOCIATION OF BUSINESS INFORMATION SYSTEMS**
**PEER REVIEWERS**

**Akhilesh Bajaj**, University of Tulsa
**Carla J. Barber**, University of Central Arkansas
**Joselina D. Cheng**, University of Central Oklahoma
**Brenda Hanson,** Northwestern State University
**Karen Hardin**, Cameron University
**Aurore Kamssu**, Tennessee State University
**Degan Kettles**, University of Central Oklahoma
**Margaret Kilcoyne**, Northwestern State University
**Jim Larsgaard**, Eastern Kentucky University
**S. Mantravadi**, University of West Florida
**Julie McDonald**, Northwestern State University
**Carmella Parker**, Northwestern State University
**Curtis Penrod**, Northwestern State University
**Begona Perez-Mira**, Northwestern State University
**Jason Powell**, Northwestern State University
**Marcel M. Robles**, Eastern Kentucky University
**Shane Schartz**, Fort Hays State University
**Lori Soule**, Nicholls State University
**James (Skip) Ward,** Fort Hays State University
**S. Ann Wilson**, Stephen F. Austin State University
**Richard Woolridge,** University of Arkansas, Little Rock
**Carol Wright**, Stephen F. Austin State University
**Sarah Wright**, Northwestern State University

# ASSOCIATION OF BUSINESS INFORMATION SYSTEMS
# PAST PRESIDENTS

2015 Jim Larsgaard, Eastern Kentucky University
2014 Joselina D. Cheng, University of Central Oklahoma
2013 Kimberly L. Merritt, Oklahoma Christian University
2012 S. Ann Wilson, Stephen F. Austin State University
2011 Roslyn Lisenby-Turner, Southern Arkansas University Tech
2010 Daniel Friesen, University of North Texas, Dallas Campus
2009 Daniel Friesen, University of North Texas, Dallas Campus
2008 Carla J. Barber, University of Central Arkansas
2007 Chynette Nealy, University of Houston—Downtown
2006 Julie McDonald, Northwestern State University
2005 Beverly Oswalt, Southern Arkansas University
2004 Vanessa Ritchie, Mississippi Gulf Coast Community College at Perkinston
2003 Maggie McClintock, Mississippi University for Women
2002 Margaret Kilcoyne, Northwestern State University
2001 Carolyn Ashe, University of Houston—Downtown
2000 Lisa Miller, University of Central Oklahoma
1999 Walter Creighton, Northwestern State University
1998 Marsha Bayless, Stephen F. Austin State University
1997 Harry Nowka, Southwestern Oklahoma State University
1996 Betty Rogers, University of Arkansas
1995 Donna Redmann, Louisiana State University
1994 Betty Johnson, Stephen F. Austin State University
1993 Wanda Stevens, Cameron University
1992 James Barr, University of Central Arkansas
1991 Terry Roach, Arkansas State University
1990 Betty Kleen, Nicholls State University
1989 Anita Bender, University of Central Oklahoma
1988 Robert Olney, Southwest Texas State University
1987 Maxine Hart, Baylor University
1986 Jeanine Rhea, Oklahoma State University
1985 Beverly Chiodo, Southwest Texas State University
1984 Marian Crawford, University of Arkansas
1983 Floyd Langford, Louisiana Tech University
1982 Patricia Robbins, Southeastern Oklahoma State University
1981 Eugene Jones, Northeast Louisiana University
1980 Robert Mitchell, University of Arkansas
1979 Reba Neal, Louisiana Tech University
1978 Reba Neal, Louisiana Tech University

**ASSOCIATION OF BUSINESS INFORMATION SYSTEMS**
**2015-2016 OFFICERS**

| | |
|---|---|
| President: | **James (Skip) Ward**<br>Fort Hays State University<br>Hays, KS<br>jgward@fhsu.edu |
| Vice President/Program Chair: | **Sherry Rodrigue**<br>Nicholls State University<br>Thibodaux, LA<br>sherry.rodrigue@nicholls.edu |
| Secretary: | **Degan Kettles**<br>University of Central Oklahoma<br>Edmond, OK<br>dkettle@uco.edu |
| Treasurer: | **Carla J. Barber**<br>University of Central Arkansas<br>Conway, AR<br>cjbarber@uca.edu |
| Proceedings Editor: | **Clive Muir**<br>Stephen F. Austin State University<br>Nacogdoches, TX<br>muirc(at)sfasu.edu |
| Historian/Parliamentarian: | **Marsha Bayless**<br>Stephen F. Austin State University<br>Nacogdoches, TX<br>mbayless@sfasu.edu |
| Journal Editor: | **Lori Soule**<br>Nicholls State University<br>Thibodaux, LA<br>lori.soule@nicholls.edu |
| Past President: | **Jim Larsgaard**<br>Eastern Kentucky University<br>Richmond, KY<br>jim.larsgaard@eku.edu |

## ASSOCIATION OF BUSINESS INFORMATION SYSTEMS (ABIS)

### 2016 - 2017 OFFICERS

| | |
|---|---|
| President | **James (Skip) Ward,** Fort Hays State University |
| Vice President/Program Chair | **Sherry Rodrigue,** Nicholls State University |
| Secretary | **Degan Kettles,** University of Central Oklahoma |
| Treasurer | **Carla J. Barber**, University of Central Arkansas |
| Proceedings Editor | **Clive Muir,** Stephen F. Austin State University |
| Past President | **Jim Larsgaard**, Eastern Kentucky University |
| Historian/Parliamentarian | **Marsha Bayless**, Stephen F. Austin State University |
| Journal Editor | **Lori Soule,** Nicholls State University |

Reviewers

**Akhilesh Bajaj**, University of Tulsa
**Carla J. Barber**, University of Central Arkansas
**Joselina D. Cheng**, University of Central Oklahoma
**Brenda Hanson,** Northwestern State University
**Karen Hardin**, Cameron University
**Aurore Kamssu**, Tennessee State University
**Degan Kettles**, University of Central Oklahoma
**Margaret Kilcoyne**, Northwestern State University
**Jim Larsgaard**, Eastern Kentucky University
**S. Mantravadi**, University of West Florida
**Julie McDonald**, Northwestern State University
**Carmella Parker**, Northwestern State University
**Curtis Penrod**, Northwestern State University
**Begona Perez-Mira**, Northwestern State University
**Jason Powell**, Northwestern State University
**Marcel M. Robles**, Eastern Kentucky University
**Shane Schartz**, Fort Hays State University
**Lori Soule**, Nicholls State University
**James (Skip) Ward,** Fort Hays State University
**S. Ann Wilson**, Stephen F. Austin State University
**Richard Woolridge,** University of Arkansas, Little Rock
**Carol Wright**, Stephen F. Austin State University
**Sarah Wright**, Northwestern State University

**ASSOCIATION OF BUSINESS INFORMATION SYSTEMS**

**CONGRATULATIONS!**

**Recipients of the ABIS 2017 McGraw-Hill Education Distinguished Paper Award**

*Towards Meeting The Need For Data Analytics Skills In Business Students*
**Lori Soule,** Nicholls State University
**Ronnie Fanguy,** Nicholls State University
**Betty Kleen,** Nicholls State University
**Ray Giguette,** Nicholls State University
**Sherry Rodrigue,** Nicholls State University

**CONGRATULATIONS!**

**Recipient of the 2017 FBD Outstanding Educator Award**
**James (Skip) Ward,** Fort Hays State University

**ABIS 2017 Program Overview**

**Thursday March 9, 2017**

| | |
|---|---|
| 8:00 a.m. – 10:00 a.m. | **8:00 – 8:30 a.m. – ABIS & ABC – SWUS Joint Breakfast** |
| | **8:30 a.m. - ABC-SWUS & ABIS Joint Session - Best Paper Presentations** |
| 10:30 a.m. – 12:00 p.m. | **"Social Security" - What Businesses and Students Need to Know About Social Media and Online Security Breaches** |
| Noon – 1:30 p.m. | **Lunch on your own**<br>***Executive Board Meeting - Riverview (CC)** |
| 1:30 p.m. – 3:00 p.m. | **Keys to Student Motivation, Success, and Critical Thinking** |
| 3:30 p.m. – 5:00 p.m. | **Online and Traditional Classroom Technologies and Innovations** |
| 5:30 p.m. – 7:00 p.m. | **FBD Presidential Welcome Reception** |

**Friday March 10, 2017**

| | |
|---|---|
| 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. | **Preparing Business Students for Workforce Expectations** |
| Noon – 1:30 p.m. | **Lunch on your own** |
| 1:30 p.m. – 3:00 p.m. | **Classroom Trends and the Impact on Students** |
| 3:30 p.m. – 5:00 p.m. | **Information Systems in Healthcare and Government** |

## ASSOCIATION OF BUSINESS INFORMATION SYSTEMS

**March 9, 2017**
**(Thursday)**

8:00 a.m. – 10:00 a.m. Joint Session with ABC — Riverview (CC)

**8:00 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**

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

**Session Co-Chairs/Association Presidents: Susan E. Jennings and James (Skip) Ward**

**ABC-SWUS Best Paper:**
*Improving Performance Evaluations:*
*The Role of Intrapersonal Communication, Message Strategy, and Age*
**Jon M. Croghan, Northwestern State University**

**ABIS Best Paper:**
*Towards Meeting The Need For Data Analytics Skills In Business Students*
**Lori Soule,** Nicholls State University
**Ronnie Fanguy,** Nicholls State University
**Betty Kleen,** Nicholls State University
**Ray Giguette,** Nicholls State University
**Sherry Rodrigue,** Nicholls State University

10:00 a.m. – 10:30 a.m. — Governor's Hall 1 (SHCC)

**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. – 12:00 p.m. — Conway (CC)

**FBD / ABIS Choice Pick Session**

**SESSION B** **"Social Security" - What Businesses and Students Need to Know About Social Media and Online Security Breaches**

**Session Chair:** **Degan Kettles**

*Gone Phishing: A Review of Recent Security Breaches*
**Ashley A. Hall**, Stephen F. Austin State University
**Carol S. Wright**, Stephen F. Austin State University

*Social Networking and Professionalism: Preparing Students for Success*
**Kristen L. King,** Eastern Kentucky University
**Marcel Robles,** Eastern Kentucky University

*A Framework for Understanding and Controlling Trust-based Vulnerabilities that Lead to Sensitive Information Disclosure in Online Communication*
**Degan Kettles,** University of Central Oklahoma
**Warren L. Dickson,** University of Central Oklahoma

Noon – 1:30 p.m. **Lunch on your own**

**ABIS Executive Board Meeting and Luncheon** **By Invitation Only** **Riverview (CC)**

1:30 p.m. – 3:00 p.m. — Neosho (CC)

**SESSION C** **Keys to Student Motivation, Success, and Critical Thinking**

**Session Chair:** **Shane Schartz**

*The "KEY" To Success: Innovation for Everyone*
**Matthew Sutherlin,** Henderson State University
**Amy Counts,** Lakeside Middle School
**Michelle Johnson,** Henderson State University
**Susan Evans Jennings**, Stephen F. Austin State University

*Incorporating Teaching Techniques that May Increase Students' Self-Efficacy and Thereby Enhance their Learning Critical Thinking Skills Taught in a Business Information Systems Course*
**Jim Larsgaard**, Eastern Kentucky University

*A Comparative Analysis Of Virtual And On-Campus Student Motivation Using An Information System Simulation*
**Shane Schartz,** Fort Hays State University

*Utilizing Technology to Create a Passport for Student Success*
**Marsha Bayless,** Stephen F. Austin State University
**S. Ann Wilson,** Stephen F. Austin State University
**Carol Gilliland**, Stephen F. Austin State University

**March 9, 2017**
**(Thursday)**

3:00 p.m. – 3:30 p.m. Governor's Hall 1 (SHCC)

**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. Neosho (CC)

**SESSION D Online and Traditional Classroom Technologies and Innovations**

**Session Chair: Carla J. Barber**

*A Preliminary Study - The Use of VoiceThread in the Online Business Classroom*
**James Ward,** Fort Hays State University
**Minghao (Edward) Tao,** Fort Hays State University
**Yaprak Dalat Ward,** Fort Hays State University

*The Importance of Social Presence in an Online Class*
*"Cause One is the Loneliest Number You Will Every Do"*
**Susan Evans Jennings**, Stephen F. Austin State University
**Matthew Sutherlin,** Henderson State University
**Amy Counts,** Lakeside Middle School

*Active Learning with Technology*
**Marcel Robles,** Eastern Kentucky University

*Cool Tools For School*
*Keeping Your Students Engaged In Your F2F And Online Classes*
**Carla J. Barber,** University of Central Arkansas

5:30 p.m. – 7:00 p.m. Governor's Hall 1 (SHCC)

**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 Little Rock!***

## ASSOCIATION OF BUSINESS INFORMATION SYSTEMS

**March 10, 2017**
**(Friday)**

7:30 a.m. – 8:30 a.m. Arkansas Ballroom (M)

**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 Neosho (CC)

**SESSION E ABIS Business Meeting * All Members Welcome ***

**Session Chair/ ABIS President: James (Skip) Ward**

***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. Governor's Hall 1 (SHCC)

**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 10, 2017**
**(Friday)**

10:30 a.m. – 12:00 p.m. Neosho (CC)

**SESSION F** **Preparing Business Students for Workforce Expectations**

**Session Chair:** **Carmella Parker**

*Analysis of Required Qualifications from Information Technology Job Postings*
**Richard W. Woolridge**, University of Arkansas at Little Rock
**Kun-hee Kim**, University of Arkansas at Little Rock

*Connecting with Community: Implementing an Experiential Learning Pilot Project for Computer Information Systems Graduates*
**Begoña Pérez-Mira**, Northwestern State University
**Sarah Wright**, Northwestern State University
**Tom Hanson**, Northwestern State University
**Brenda Hanson**, Northwestern State University
**Sue Champion**, Northwestern State University

*Employers' Expectations of College Graduates: Specifically Related to International Business*
**Marcia Hardy**, Northwestern State University
**Margaret Kilcoyne**, Northwestern State University
**Weiwen Liao**, Northwestern State University
**Carmella Parker**, Northwestern State University

*Employers' Expectations Of College Graduates Specifically Related To Cyber Business Law*
**Eddie Horton**, Northwestern State University
**Margaret Kilcoyne**, Northwestern State University
**Carmella Parker**, Northwestern State University
**Curtis Penrod**, Northwestern State 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. Neosho (CC)

**SESSION G** **Classroom Trends and the Impact on Students**

**Session Chair:** **Lori Soule**

*MOS Excel Certification: Does the Couse Type Matter?*
**Lily Pharris**, Northwestern State University
**Mary Beth Tarver**, Northwestern State University
**Curtis Penrod**, Northwestern State University

*Social Media? #whatdoyouteach?*
**Sheila Pearson**, Southern Arkansas University
**Ronnie Watson**, Southern Arkansas University

*Four, Eight, or Sixteen Weeks: Does Course Length have an Effect on Students' Grades?*
**Lori Soule**, Nicholls State University
**Sherry Rodrigue**, Nicholls State University

*An Ambient Information System to Reduce NIHL Risk Among Music Students*
**Jason W. Powell**, Northwestern State University

3:00 p.m. - 3:30 p.m. Governor's Hall 1 (SHCC)

**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.*

**ASSOCIATION OF BUSINESS INFORMATION SYSTEMS**

**March 10, 2017**
**(Friday)**

3:30 p.m. - 5:00 p.m. Neosho (CC)

**SESSION H Information Systems in Healthcare and Government**

**Session Chair: S. Mantrovadi**

*An Empirical Investigation of Factors that Influence Government Apps Usage/Adoption*
**Aderonke A. Oni**, Covenant University, Nigeria
**Efosa C. Idemudia**, Arkansas Tech University
**Babafemi O. Odusote**, Covenant University, Nigeria

*Using Geographic Information Systems to Capture Spatial Patterns in Nursing Home Quality in the Southwestern United States*
**S. Mantravadi**, University of West Florida
**Kai Zhang**, University of Texas Health Science Center at Houston

*Decision Support Tools: A Comparative Analysis In The Healthcare Industry*
**Aurore J. Kamssu**, Tennessee State University
**Jeffrey S. Siekpe**, Tennessee State University
**Olawale Adeyemo**, Tennessee State University

ABIS
Association of Business Information Systems

**Make plans to join us in Albuquerque, New Mexico for our 2018 conference.**

♦♦♦

**45th Annual Conference**
March 7 - 10, 2018
Albuquerque Convention Center / Hyatt Regency

**TABLE OF CONTENTS**

*(Click on the title below to view the paper)*

# TOWARDS MEETING THE NEED FOR DATA ANALYTICS SKILLS IN BUSINESS STUDENTS

Lori Soule, Nicholls State University
Ronnie Fanguy, Nicholls State University
Betty Kleen, Nicholls State University
Ray Giguette, Nicholls State University
Sherry Rodrigue, Nicholls State University

## ABSTRACT

*National and State of Louisiana statistics reflect strong opportunities in data analytics through 2024. A challenge to educators is balancing the broad range of topics, such as statistics, math modeling, data management, computer programming, accounting, and marketing, which must be addressed in data analytics courses to provide students with an effective skill set in this area. This paper discusses the evolution of a first course in data analytics at one of the universities within the University of Louisiana System, as well as the planned revisions for the next time the course is taught.*

Key Words: data analytics, course design, CIS curriculum

## INTRODUCTION

Today's computer information systems educators will reflect that the term *data analytics* is a popular one in both information systems literature and business literature. Companies continue to seek solutions for their data warehousing, data integration, and predictive analytics. In solving their data analytics needs, organizations have to address everything from initial needs assessment to defining user requirements, evaluating and selecting products or services, and implementing analytics initiatives. The task for information systems educators is determining what curriculum changes need to be made to best prepare today's information systems and business students with the skills for positions in companies in the age of data analytics. Careful research, planning, and design must take place, even when the changes are as minor as the addition of one or two required or elective courses in data analytics.

## DEMAND FOR BUSINESS ANALYTIC SKILLS

Government employment projections often provide helpful insight for faculty considering curriculum changes in universities. Tables 1 and 2 contain government projections related to Business Analytic skills. Table 1 shows projections on the national level and Table 2 shows similar data provided by the State of Louisiana. In both cases, the outlook is the highest level possible ("Much faster growth than average" rating by the US Department of Labor and 5/5 stars by the LA Workforce Commission). With such a high level of demand growth predicted, Colleges of Business, especially those with Computer Information Systems programs, are wise to accept the imperative to provide their students with the knowledge and skills necessary for their alumni to qualify for such positions.

**Table 1**
**US Department of Labor: Bureau of Labor Statistics, Demand for Business Analytics**

| Occupational Title | 2015 Median Annual Pay | Education Required | Employment 2014 | Projected Employment 2024 | Change, 2014-24 | | Outlook |
|---|---|---|---|---|---|---|---|
| | | | | | Percent | Numeric | |
| **Management Analysts** | $81,320 | Bachelor's | 758,000 | 861,400 | 14% | 103,400 | Much faster growth than average. |
| **Market Research Analysts** | $62,150 | Bachelor's | 495,500 | 587,800 | 19% | 92,300 | Much faster growth than average. |

Source: Reformatted from US Department of Labor: Bureau of Labor Statistics: Occupational Outlook Handbook
http://www.bls.gov/ooh/business-and-financial/market-research-analysts.htm
http://www.bls.gov/ooh/business-and-financial/management-analysts.htm

**Table 2**
**State of LA: Louisiana Workforce Commission's Occupation Outlook**
**Demand for Data Analytics**

| Occupational Title | 2015 Average Annual Pay | Education Required | Employment 2014 | Projected Employment 2024 | Change, 2014-24 | | Outlook |
|---|---|---|---|---|---|---|---|
| | | | | | Percent | Numeric | |
| **Management Analysts** | $72,695 | Bachelor's | 3,680 | 4,200 | 14% | 520 | 5/5 stars |
| **Market Research Analysts** | $51,526 | Bachelor's | 1,900 | 2,300 | 21% | 400 | 5/5 stars |

Source: Reformatted from State of Louisiana: Louisiana Workforce Commission's Employment Projections: Long-term Occupational Projections for All Occupations to 2024
http://www.laworks.net/LaborMarketInfo/LMI_OccAllProj.asp?years=20142024

## CHALLENGES OF TEACHING DATA ANALYTICS

The greatest challenge of teaching data analytics is covering its broad range of interdisciplinary topics (Schoenherr & Speier-Pero, 2015), which can include statistics, math modeling, data management, computer programming, accounting, marketing, and consumer ethics (Henry & Venkatraman, 2015). Bringing these skills together in one class is difficult for instructors, and even more so for students. Properly covering all these topics can take an entire degree program, so a single, stand-alone class must by default be something of a compromise (McClure et al, 2008).

Data analytics is still a relatively new topic in the business curriculum, and finding appropriate teaching materials, such as textbooks, tools, and software, can be difficult (Liu, 2016). There is general agreement, for instance, that an important part of any data analytics course are projects based on actual case studies which use large sets of both structured and unstructured data (Henry & Venkatraman, 2015; Cavazos et al, 2014; Aasheim & Williams, 2015). However, these can be expensive or difficult to use in a classroom setting (Goh & Sun, 2015). If necessary, structured data can be collected from public sources such as the census bureau or major league baseball (Meyer, 2016), and unstructured data can be obtained from web-based social media sites (Goh & Sun, 2015).

Several software tools are available, and the instructor must decide whether to use easy-to-master packages such as Excel or Matlab, or more sophisticated products such as Microsoft SQL server, Rapid Miner, or R (Liu, 2016). Again, there are trade-offs. Some instructors believe that spreadsheets are not powerful enough to manage realistic data sets (Meyer, 2016), but if students have little or no programming background, they may be unprepared to use more advanced software.

Another popular tool is visualization software. Products such as Tableau or Orange can help students learn how to interpret data by graphically highlighting its salient properties and patterns (Warner, 2013). Such visualizations help students understand what the data models actually signify and how to apply this knowledge to business goals.

Perhaps the most important, and most difficult, decision will be how to integrate quantitative analysis into the course (McClure et al, 2008). Business students may come to the class having taken only calculus and business statistics, yet the syllabus covers data modeling, regression, classification, and clustering (Aasheim & Williams, 2015; Chaojiang et al, 2015). Liu (2016) suggests that the instructor get an early indication of where students are, be prepared to adjust the pace of class as needed, and even to review basic topics if necessary.

However, data analytics is much more than math. One danger of focusing on “number crunching” and modeling techniques is that they may overshadow the equally important non-technical aspects (Warner, 2013). Critical thinking skills related to communication, psychology, and business are also necessary to interpret and utilize information mined from data. One way instructors can promote these skills is by having students formally present their project results in class (Goh & Sun, 2015; Liu, 2016).

Given the significant opportunities in data analytics for bachelor’s degree graduates through 2024, data analytics courses are undoubtedly growing within universities across the country. Faculty will be challenged to design courses with effective content so that graduates will be ready with the skill set business and industry are looking for in this area.

## DATA ANALYTICS IN UNIVERSITY OF LOUISIANA SCHOOLS

How are schools within the University of Louisiana System meeting the demand for graduates with data analytics skills? Colleges of Business certainly recognize the need to integrate more data analytics skills within their curricula, and it is common for quantitative analysis to be required of all business students. More and more, business schools are also offering additional courses above and beyond the basic minimum requirement to allow their students to develop more depth of skill in this important area.

In the University of Louisiana system, few degree programs offer a major or concentration in data analytics. Of the nine universities in the system, only three have analytics programs (full majors or concentrations) listed in their current (2016) catalog: Louisiana Tech University, Northwestern State University, and University of Louisiana at Lafayette. Louisiana Tech offers Analytics concentrations within their Business Administration and Marketing majors. The University of Louisiana at Lafayette offers an Informatics major with a concentration in Business. Interestingly, this program is housed outside of its business school. Finally, although Northwestern State University does not offer a Bachelor's Degree with an Analytics focus, it does offer an opportunity for students who have already graduated with a Baccalaureate Degree to return to campus to work on a Certificate in Business Analytics. Table 3 below presents an overview of data analytics programs of the nine schools within the University of Louisiana System.

**Table 3**
**Status of Data Analytics Majors and Concentrations in University of Louisiana System Schools in 2016**

| University of Louisiana System Schools | Academic Programs Focused on Business Analytics |
|---|---|
| Grambling State University | None |
| Louisiana Tech University | Business Administration Major--Quantitative Analysis Concentration<br>Marketing Major--Marketing Analytics Concentration |
| McNeese State University | None |
| Nicholls State University | None |
| Northwestern State University | Post Baccalaureate Certificate in Business Analytics |
| Southeastern Louisiana University | None |
| University of Louisiana at Lafayette | Informatics Major, Business Concentration |
| University of Louisiana at Monroe | None |
| University of New Orleans | None |

While Table 3 shows that only three University of Louisiana System schools are offering complete majors or concentrations in data analytics, it is likely that at least some of the remaining six schools without a major or concentration do offer at least one or more data analytics courses. The following section of this paper address how the first specific data analytics course at the authors' institution has evolved and describes the current content and structure of the course.

## THE EVOLUTION OF A COURSE IN BUSINESS DATA ANALYTICS

In 2015 one of the authors was asked by the CIS department head to teach a Special Topics class in Data Analytics. A textbook, Donnelly's second edition of *Business Analytics*, was chosen, and the course was first offered in the fall 2015 semester. The pre-requisite for the course was QBA 283, Business Statistics II. The course was designed to have concepts presented in class followed by discussion of the concepts, and suggested out-of-class review work. Eleven chapters were to be covered over the length of the semester. Student assessment consisted of four exams and a comprehensive final. In addition, the students were to submit their evaluation of three case studies.

However, as the course progressed, it became apparent that the students did not have the needed foundation in statistics and the Excel skills to complete the suggested assignments. Four weeks into the course, after the first exam, the instructor changed teaching strategy. Instead of suggested out-of-class work, those problems were covered in class at a slower pace while discussing the statistical tests and demonstrating the Excel skills needed to run the tests. The course covered only nine chapters. These change had a positive effect on the results of the second exam.

Once the course was over, the instructor re-worked the course for the next offering. Several data analytics textbooks were reviewed; they either spoke of the three types of data analytics (predictive, prescriptive, and descriptive) with minimal mention of statistics or they were heavy on statistics. The instructor needed a blend of statistics that covered the different types of data analytics and different software packages on the market that were being used for data analytics.

While attending the 2016 Association of Business Information Systems Conference, the instructor attended a presentation by Mitchell and Thambusamy (2016) on "Developing Data Analytics Skills in a Business Computer Applications Course." This presentation provided useful advice to the instructor to re-design the data analytics course.

Based on information from Mitchell and Thambusamy's presentation, the instructor redesigned a new course, CIS 370, Data Analytics I. For a statistical reference, students would still be able to use the original Donnelly textbook from their QBA 282/283 courses.

Several online resources will be used including the following:

- *Analyzing and Visualizing Data with Excel* (Hoter, 2015)
- *Data Visualizations with Power BI in Excel 2013* (Neeb, 2014)
- *Faster Insights to Data with Power BI Jump Start* (Tejedor and Weyn, 2014)
- *From Data to Insight and Impact: The BI Revolution* (Reguera, 2014)
- *Big Data Analytics* (Ramos and Sen, 2013)
- *My Excel Online* (http://www.myexcelonline.com/)
- *The Microsoft Virtual academy* (http://www.microsoftvirtualacademy.com/):
    - The Business Intelligence Revolution
    - Power Query and PowerPivot in Excel
    - Data Visualization with Power Business Intelligence

The revised Data Analytics course will be taught in spring 2017 and will include these topics:

- Descriptive Analytics including:
  - Visualizing and exploring data
  - Descriptive statistical measures
  - Probability distributions
  - Statistical inference

- Predictive Analytics including:
  - Trendlines and regressions analysis
  - Forecasting techniques

- Functions and complex formulas including:
  - Financial, logical, lookup

- Table Intelligence including:
  - PivotTables and Pivot Charts (including Slicers and Quick Explore)
  - PowerPivot
  - Interactive Dashboards (PowerView)

- Visual Presentation/Data Visualization including:
  - Flash Fill/Quick Analysis
  - Conditional formatting
  - Data bars
  - Sparklines
  - Charting

- Excel customization including:
  - Options, Quick Access toolbar, ribbon
  - Effective spreadsheet design
  - Introduction to data cleansing using Flash Fill
  - Viewing data options using Quick Analysis

- Word skills including:
  - Document design: multiple-page documents/sections, headers/footers,
  - Visualization: graphics and related features
  - Research tools: citations, referencing, hyperlinks/cross referencing

Besides using Excel in the class, students will be exposed to Orange (http://orange.biolab.si/) and Tableau Desktop (http://www.tableau.com/products/desktop).

Assessment will consist of three scheduled exams and a data analysis project. For the data analysis project, the students will (a) analyze a given dataset, (b) answer specific questions related to the analysis of the data, (c) develop an interactive dashboard in a workbook of organized worksheets used in the analysis, and (d) develop a short report providing the descriptive analysis, including appropriate visualization components.

Upon completing the course, students will have an understanding of the scope of business analytics and of the primary statistical tools used in business analytics. More specifically, students will be able to:

- Effectively design spreadsheets for long-term viability
- Apply Excel analytical tools to business problem solving and critical thinking scenarios
- Use advanced Excel tools for data analytics
- Critically analyze appropriateness of data analysis techniques
- Use visualization tools for business communication and reporting
- Communicate effectively in a virtual environment

## FUTURE PLANS FOR A DATA ANALYTICS CONCENTRATION

A second course in data analytics is also currently being designed by the CIS faculty at the authors' university. Like many other universities, the authors' CIS department faculty is stretched thin in covering all the courses in the curriculum. The department currently has plans to hire a faculty member who will help integrate data analytics into several business courses, such as statistics, and in marketing and management courses. With a new faculty member, the department can have strong guidance in how to structure a complete academic concentration in data analytics, which is a goal of the department. Of course, as many universities recognize, the number of academically qualified applicants in this field is undoubtedly too few to meet the needs of institutions desiring to hire in that area of expertise.

## CONCLUSIONS AND RECOMMENDATIONS

This paper has identified the need for graduates with a strong data analytics skill set and reviewed the challenges of designing effective data analytics courses. Although a review of academic majors in all the schools within the University of Louisiana System shows only three schools currently offering majors or concentrations in this area, the authors' university has implemented a specific data analytics course in its curriculum. The paper reviews the evolution of the first iteration of that course and planned revisions as a first step in moving toward a 15- to 18-hour concentration in data analytics.

## REFERENCES

Aasheim, C., Williams, S., Rutner, P., & Gardiner, A. (2015). Data analytics vs. data science: A study of similarities and differences in undergraduate programs based on course descriptions. *Journal of Information Systems Education, 26(2).*

Cavazos, C., Schuster, C., & Smith, B. (2014). Effective strategies for teaching marketing analytics. *Proceedings of the Marketing Management Association,* San Antonio, Texas.

Chaojiang W., Feng M., & Yan Y. (2015). Teaching data mining to business undergraduate students using R. *Business Education Innovation Journal, 7(2).*

Goh, T., & Sun, P. (2015). Teaching social media analytics: An assessment based on natural disaster postings. *Journal of Information Systems Education, 26(1).*

Grambling State University. (2016). Academic majors. http://www.gram.edu/academics/majors/

Henry, R., & Venkatraman, S. (2015). Big data analytics: The next big learning opportunity. *Academy of Information & Management Sciences Journal. 18(2)*, 17-29.

Liu, K. (2016). What your industrial analytics course needs. *Industrial Engineer, 48 (4)*.

Louisiana Tech University. (2016). Academic degrees. https://secure.latech.edu/academics/degrees.php

McClure, R., & Sircar, S. (2008). Quantitative literacy for undergraduate business students in the 21st century. *Journal of Education for Business. Jul/Aug2008, 83(6)*.

McNeese State University. (2016). Academic degrees. http://catalog.mcneese.edu/content.php?catoid=3&navoid=66

Meyer, C. (2015). 8 tips for teaching big data. Retrieved from https://www.aicpa.org/interestareas/accountingeducation/newsandpublications/pages/how-to-teach-big-data.aspx.

Mitchell, R. B., & Thambusamy, R. (2016). Developing data analytics skills in a business computer applications course. *Association of Business Information Systems Conference Proceedings*, Oklahoma City, Oklahoma, 1-6.

Nicholls State University. (2016). Programs, degrees, and areas of study. https://www.nicholls.edu/programs/

Northwestern State University. (2016). Academics, Business and Technology. https://www.nsula.edu/academics/businessandtechnology/overview-cis/

Northwestern State University. (2016). Online programs. https://www.nsula.edu/ensu/online-programs/business-analytics/

Schoenherr, T., & Speier-Pero, C. (2015). Data science, predictive analytics, and big data. *Journal of Business Logistics, 36(1)*.

Southeastern Louisiana University. (2016). Academic degrees. http://www.southeastern.edu/acad_research/degrees/

State of Louisiana: Louisiana Workforce Commission's Employment Projections: Long-term Occupational Projections for All Occupations to 2024. http://www.laworks.net/LaborMarketInfo/LMI_OccAllProj.asp?years=20142024

US Department of Labor: Bureau of Labor Statistics: Occupational Outlook Handbook. http://www.bls.gov/ooh/business-and-financial/market-research-analysts.htm http://www.bls.gov/ooh/business-and-financial/management-analysts.htm

University of Louisiana at Lafayette. (2016). Academic majors. https://www.louisiana.edu/academics/majors-degrees/college

University of Louisiana at Monroe. (2016). Academic majors. http://www.ulm.edu/majors/

University of New Orleans. (2016). Academic majors. http://www.uno.edu/Academics/

Warner, J. (2013). Business analytics in the MBA curriculum. *Proceedings of the Northeast Business & Economics Association*, Bretton Woods, New Hampshire.

# SOCIAL NETWORKING AND PROFESSIONALISM: PREPARING STUDENTS FOR SUCCESS

Kristen L. King, Eastern Kentucky University

## ABSTRACT

*Due to the prevailing use of social networking sites by students in preparation for their careers and those professionals looking to hire them, it is more important than ever to maintain professionalism when considering online presence. Professionalism, as is included and emphasized in most business curriculum, is adapting to address the unique situations and opportunities that social networking sites present on the hiring and employment process. In an effort to align industry and employer expectations with student or potential employee behaviors, this paper attempts to identify both the positive and negative online behaviors that might be considered 'red flags' and assess student perceptions regarding how their online presence may be viewed by others, especially those from a hiring standpoint.*

## INTRODUCTION

In past years, job seekers were put off by the idea of potential employers browsing their personal social networking sites in an attempt to pre-screen applicants (Drouin, O'Connor, Schmidt, & Miller, 2015; Stoughton, Thompson, & Meade, 2015). However put off this may make an individual feel, using social networking profiles as a tool in hiring is now a frequently used practice, which is especially important given that approximately 65% of all Americans use some sort of social networking site (Jobvite, 2013; Perrin, 2015). Considering the majority of Americans, especially college students, are interacting on a variety of social networking sites on a daily basis, it becomes even more important for educators to prepare, advise, and education them in the way of a professional online persona. Therefore, those in academia are charged with making sure students are educated and prepared in such a way that they are able to appropriately, digitally represent themselves. This is even more important considering the newest generation of college students have spent their entire lives in a digital environment, which will ultimately shape experiences, how they share information, their digital footprint, and the effect this may have on future employment opportunities (Aksoy et al., 2013; Bennett, Maton, & Kervin, 2008; Wesner & Miller, 2008). This paper attempts to identify both the positive and negative online behaviors that might be considered 'red flags' and assess student perceptions regarding how their online presence may be viewed by others, especially those from a hiring standpoint. The goal is to better prepare students for their careers after college, especially with regard to expectations for social networking content, which can be achieved through developing and adapting curriculum and to address these trends.

## METHODOLOGY

In preparation to formulate a student survey to assess relationships and opportunity for growth between student perceptions of their online presence and potential employer expectations, twenty five industry professionals from multiple states in the US who directly involved in hiring new employees at some point in their career were contacted and asked the following questions: With

regard to social networking, what kinds of ***positive*** content would you, as an employer, appreciate seeing as a part of an applicant's profile?; With regard to social networking, what kinds of ***negative*** content would you, as an employer, view as cause NOT to hire an applicant?; How often does your company do a check of popular social networking sites to vet applicants (always, frequently, sometimes, or not at all)?; and "If you company does check the social networking pages of applicants, which sites are examined? A list was comprised from those responses of both positive behaviors (community involvement; professional involvement; volunteering; sharing industry-related content, e.g., business articles; engagement with other users) and negative behaviors (poor grammar/spelling, foul language, crude/sexual jokes, lewd pictures, incomplete/rarely used profile, racist/homophobic/misogynistic content, negative comments about individuals, and negative comments about former employees). Furthermore, a list of social networking sites that industry professionals acknowledged as those often vetted for applicant profiles was comprised, including Facebook, Twitter, Instagram, and LinkedIn.

A survey was then comprised with student assessment in mind, using the lists of both positive and negative behaviors as suggested by those industry professionals mentioned above. Students were asked to classify behaviors as either positive or negative (in the eyes of an employer) and select from a list of popular social networking site to identify those on which they had active profiles. In addition, questions were included assess how students believe employers use social networking profiles to examine potential candidates (How often do you think employers check the social networking profiles of job candidates?), the degree to which students believe their content is inaccessible to non-friends (I believe the content I post to my social networking profiles is private), and the degree to which they have modified site settings (I have updated the privacy setting on my social networking profiles so that my content is only available to a limited audience). These questions were ranked on a 7-point Likert scale ranging from Never (1) to Always (7) and Strongly Disagree (1) to Strongly Agree (7), respectively.

The survey was disseminated to students in the fall semester of 2016 who were enrolled in a variety business classes at a southeastern US university, including Introduction to Business, Managerial Reports, and Professional Communication. 173 unique responses were collected, with the final count of respondents as n=166 after incomplete responses were removed.

## RESULTS

From the industry-professional responses collected, more than 80% indicated that their companies either always or frequently check profiles on popular social networking sites in an attempt to vet applicants. This indicates that while social networking sites are often used for personal reasons, the content published is not only of interest to family and friends, but to those looking to learn more about the personality and character of individuals they are considering to hire. This is of added importance when one considers that for the most part, aside from LinkedIn, the purpose of most social networking sites does not reflect that of *professional* networking, achievement, and discussion.

In considering the student perspective, when asked if they thought employers checked the social networking site profiles of applicants, there was an average response of 5.67 where 1 represented Never and 7 represented Always. This is a good indicator that students understand the importance

of and responsibility to maintaining a professional image, even on personal social networking profiles. Respondents also indicated on which social networking sites they maintained a current profile, as summarized in Figure 1.

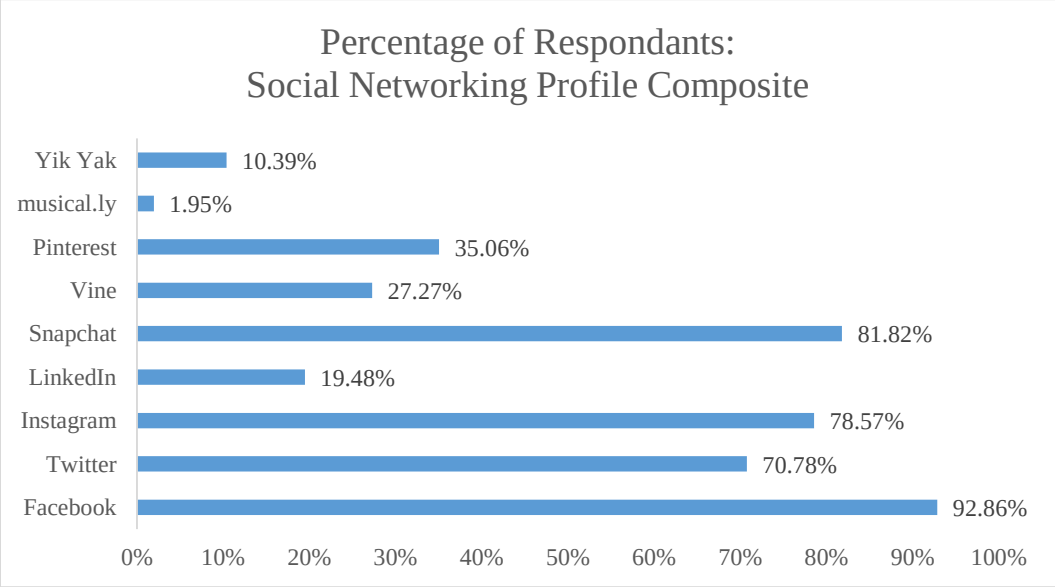



*Figure 1: Active Social Networking Profiles as Indicated by Respondents, by percentage*

By far, the most popular social networking site used, as indicated by student responses, is Facebook, followed closely by Snapchat, Instagram, and Twitter. Also of note, less than 20% of respondents reported having an active LinkedIn profile, which may be an area of opportunity for student development, as LinkedIn provides a professional platform on which to building networking, a dynamic resume, and a business portfolio. Furthermore, when students were asked if they believed the content posted on their social networking profiles was private, the average response was 3.01, where 1 represented Strongly Disagree and 7 represented Strongly Agree. While the actual content posted to an individual social networking profile may or may not reflect professionalism at all times, it is of note that students are at least self-aware that others, even those in an unintended audience, may be privy to their online communication.

Perhaps in light of this realization, students reported an average response of 4.94 when asked if they had changed the default security settings on their social networking profiles so content is only available to a limited audience. However, it is important that individuals, especially students, do not gain a sense of safety from these settings, as research tells us that teens and college students are more active than ever, even compulsive, in checking news feeds and posting content (Aksoy et al., 2013; Lewis & West, 2009).

Interesting results were also found in the students' classification of those positive and negative social networking activities. For the most part, students were able to correctly identify content that employers deemed as both appropriate and inappropriate; however, a few areas for improvement with regard to student social networking presence emerged, especially important to consider in business curriculum development, as will be discussed in the recommendations below. Figures 2 and 3 summarize these results.

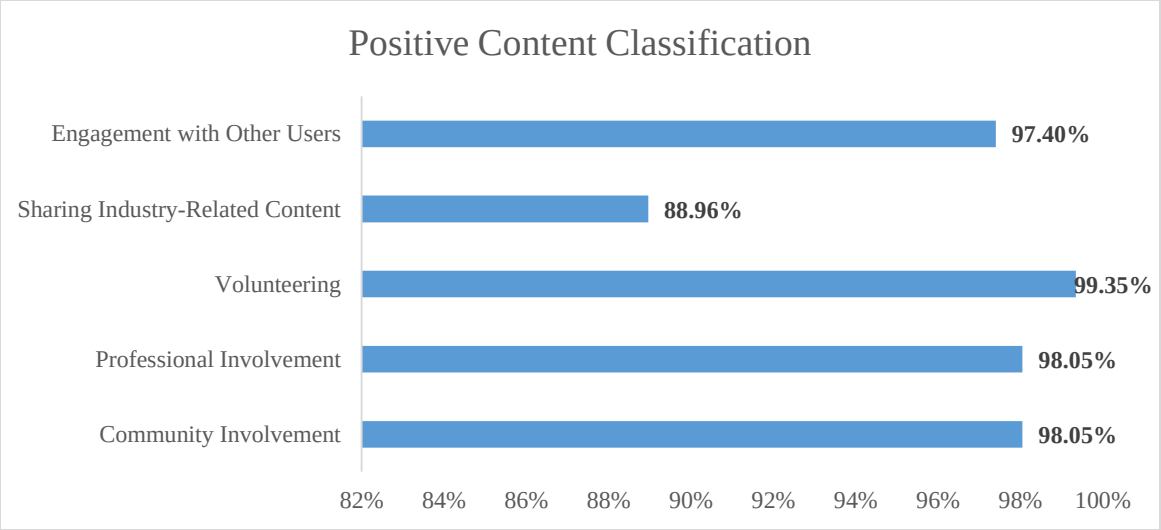



*Figure 2: Student Classification of Industry Professional Content Described as Positive*

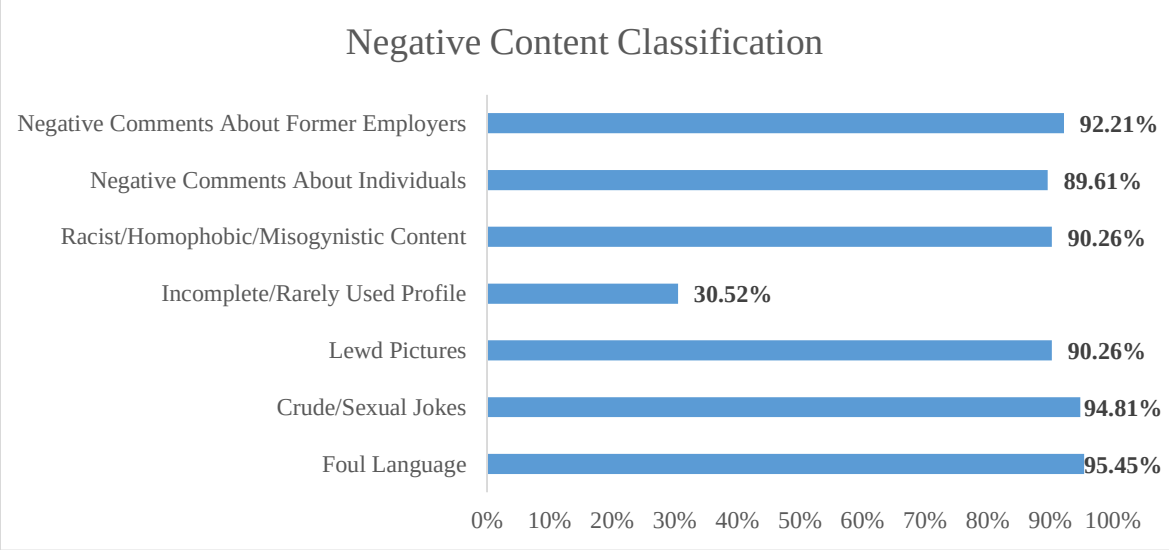



*Figure 3: Student Classification of Industry Professional Content Described as Negative*

## CONCLUSIONS AND RECOMMENDATIONS

In light of these results, one area for improvement is that of encouraging students in those less-obvious areas of both positive and negative social media content. For example, a significantly fewer number of students identified sharing industry-related content as a positive type of content employers would appreciate seeing on a job candidate's social media profile than the other four options. While the majority of students did identify this item correctly as a positive indicator, it might be of note to include and emphasize when advising students of appropriate online content, as many of the industry professionals who responded indicated this was an area of particular interest, as it showed an awareness and working knowledge of both business practices and current events.

Furthermore, while a good majority of the surveyed industry professionals indicated that an incomplete or rarely used social networking profile might be a negative indicator when considering an applicant, students were much less likely to identify it as such. In today's technology-driven business world where a majority of communication, branding, public relations, marketing, etc. occurs with both internal and external contacts, employers more than ever desire candidates who recognize the importance of social media and are an active, responsible participant. In some cases, then, no profile (or a minimal one), might be worse than one with a great deal of content. In this way, we should encourage our students to make sure their social networking footprint accurately reflects them both as an individual, and as a potential job candidate. Academics also might want to encourage student participation on LinkedIn, as these results indicate it is less frequently used than other platforms, although it offers a wonderful way for students to highlight and promote their professional achievements and goals.

Future research on the topic would warrant further discussion with industry professionals on creating curriculum that specifically aligns with standard business expectations of those entering the work force. Furthermore, universities could greatly benefit from continuing relationships with local businesses and professionals, who serve as a valuable, credible source of information for students, especially in the form of guest speakers, internships, co-ops, and mentoring relationships. Aligning our curriculum to ensure we are preparing students for the work force in such a way that encourages them to make good decisions regarding maintaining a professional online persona not only serves the current needs of our students who are operating in a dynamic, online world, but also those of the of businesses that will ultimately choose to hire them.

## REFERENCES


Aksoy, L., van Riel, A., Kandampully, J., Bolton, R. N., Parasuraman, A., Hoefnagels, A., . . . Komarova Loureiro, Y. (2013). Understanding Generation Y and their use of social media: a review and research agenda. *Journal of Service Management, 24*(3), 245-267.

Bennett, S., Maton, K., & Kervin, L. (2008). The 'digital natives' debate: A critical review of the evidence. *British journal of educational technology, 39*(5), 775-786.

Drouin, M., O'Connor, K. W., Schmidt, G. B., & Miller, D. A. (2015). Facebook fired: Legal perspectives and young adults' opinions on the use of social media in hiring and firing decisions. *Computers in Human Behavior, 46*, 123-128.

Jobvite. (2013). Social recruiting survey results. Retrieved from <http://web.jobvite.com/Q313_SocialRecruitingSurvey_LandingPage.html>

Lewis, J., & West, A. (2009). 'Friending': London-based undergraduates' experience of Facebook. *New Media & Society, 11*(7), 1209-1229.

Perrin, A. (2015). Social Media Usage: 2005-2015. *Pew Internet & American Life Project.* Retrieved from http://www.pewinternet.org/2015/10/08/social-networking-usage-2005-2015/

Stoughton, J. W., Thompson, L. F., & Meade, A. W. (2015). Examining applicant reactions to the use of social networking websites in pre-employment screening. *Journal of Business and Psychology, 30*(1), 73-88.

Wesner, M. S., & Miller, T. (2008). Boomers and millennials have much in common. *Organization Development Journal, 26*(3), 89.

# ACTIVE LEARNING WITH TECHNOLOGY

Marcel M. Robles, Eastern Kentucky University

## ABSTRACT

*Various technological tools used in active or experiential learning have been studied including simulations, gamification, and student-generated learning (e.g., podcasts, blogging, and screencasts/videos). The uses and benefits of implementing these selected technology tools into strategic instructional methods are reviewed after a brief overview of active learning.*

Key Words: active learning, simulations, gamification, student-generated learning

## INTRODUCTION

Using active learning techniques in technology education is beneficial to students because they need not only to learn, but also to apply real-life skills. While passive learning can promote students' knowledge base, active learning allows students to practice theories and skills. Teachers must provide feedback throughout the process to guide students with problem solving and ensure they are applying concepts to real business situations, such as hiring decisions, negotiations, and marketing research methods.

Active learning comprises applying learned skills to real-life situations and using critical thinking skills to solve problems (Paul & Mukhopadhyay, 2004; Snyder, 2003). Current technology enables teachers to update classroom strategies to include active learning methods that motivate students and provide an engaged learning environment. Learning to adapt to new technology is a skill on its own as students will need to adapt to new technology and systems throughout their careers. Because it is possible, and even highly probable, that technological systems used by different organizations will not be exactly the same as the technology platform learned in class; teachers should utilize various software and materials other than just Microsoft Word, which Laurillard (2002) compared to a quill pen.

Active learning can enhance student understanding of subject matter while also developing essential soft skills and technical skills that will translate into the business world. When coupled with technology, active instructional methods can become a motivating way for students to learn. The purpose of this paper is to inform business and technology education teachers about a few teaching strategies that incorporate technology with active learning to enhance student understanding of business concepts.

## ACTIVE LEARNING IN BUSINESS EDUCATION

Research shows the positive use of technology to enhance active learning in business education. Active learning involves students "doing something and taking the lead in thinking about what they are doing" (Snyder, 2003, p. 161); it promotes interaction and feedback among peers and teachers (Wilson & Sipe, 2014). Students take a participatory role rather than a passive role they would take in lectures (Snyder, 2003). Both traditional and active learning methods promote mastering concepts and skills, but active learning develops thinking and writing skills more thoroughly (Wilson & Sipe, 2014). Active learning can increase skills such as creativity, problem solving, and critical thinking (Paul & Mukhopadhyay, 2004).

Experiential learning is a type of active learning technique in which students learn through experiencing real-life situations in the safe environment of the classroom (Paul & Mukhopadhyay, 2004). Various experiential and technological tools exist that can aid in the learning process, including simulations, gamification, and student-generated learning tools.

## SIMULATIONS

Simulations require participants to take on the active role of decision maker within a business, usually as a department manager or another type of business executive, in order to solve a problem. Some simulations are able to be performed by one person, while others require a team role playing together to dissect and analyze various methods for solving the problem. Armer (2011) suggested having students participate in a computerized entrepreneurship simulation to emulate Chief Executive Officers who are making decisions on behalf of the company. Not only are students able to apply concepts learned from the classroom to an actual practice, but also they are excited and driven by the computerized competition (Armer, 2011).

Social and teamwork skills can be developed through group simulation work (Xu & Yang, 2010), which is important in a real business environment as well. Xu and Yang (2010) found that students can develop high levels of knowledge and problem solving skills through simulation use when team members present diverse perspectives. Students reported that computerized simulations were more interesting and motivating than traditional team projects even though they require more effort (Tompson & Tompson, 1995).

## GAMIFICATION

Gamification or the act of learning through computerized/online games is increasing and could potentially eliminate lectures and presentations (Cohen, 2011). Games are able to make learning enjoyable and allow students to use trial and error while learning. Gamification is more than entertainment; it also provides a way to engage and motivate students by providing rewards for each level during the learning process (Schachter, 2014).

Throughout the process of gamification, students are provided instructions, challenges, and feedback from professors regarding their progress on the level or section of the game, which enables them to learn from the game (Schachter, 2014). Experiential learning through gamification may be more beneficial than traditional teaching because the games "encourage exploration, collaboration, and the exchange of ideas while removing unwanted pressures that can interfere with students' abilities" (Cohen, 2011, p. 17). Further, becoming familiar with gamification as a process to learn is helpful to students since many businesses are using gamification to train employees (Gamification, 2015). For example, Deloitte created a game in which users have to earn privileges; and Adobe and Microsoft have developed games to train users on software (Gamification, 2015). As technology advances, organizations are adapting innovative methods to teach new hires, and students may benefit from learning the technology before they enter the workforce, especially while learning in a safe environment where feedback is offered from teachers.

## STUDENT GENERATED LEARNING

Student-generated lessons have also increased, whereby the teacher serves as a resource to facilitate the learning process, and students take the lead on developing lesson plans (Wheeler, Yeomans, & Wheeler, 2008). Various tools can be used to incorporate technology into these student-led plans. By creating their own learning tools, students learn critical thinking skills, independence, creativity, and confidence that would be difficult to gain in traditional classroom lecture (Wheeler et al., 2008). Podcasts, blogs, and screencasts/videos provide a way for students to learn new technology and apply classroom content to real world business situations.

**Podcasts.** A podcast is a form of audio recording that can be streamed online or downloaded and listened to on portable devices or desktop computers (Lee, McLoughlin, & Chan, 2008). Podcasts have been used by higher education institutions for years to distribute orientation information, lectures, interviews, and other academic information to students (Lee et al., 2008). Podcasts can also be used to provide supplementary information for student use to enhance their understanding of lessons from the classroom (Powell & Robson, 2014; Swan & Hofer, 2011).

Student use of podcast technology requires and enables a great amount of collaboration; and students must articulate their understanding of content by reporting to an audience that they value (Lee et al., 2008). Additionally, students are able to learn problem-solving skills and important communication skills by working collaboratively to develop a podcast (Lee et al., 2008).

**Blogs.** A blog is "an online journal where one or more contributors participate in a focused discussion" (Deed & Edwards, 2011, p. 12). Blogs created by students can be shared with other students to improve learning. One study observed that students were more motivated to learn and pay attention to online work through blogs rather than offline work that only a professor sees (Yang & Chang, 2011).

Results of one study conducted in an undergraduate marketing class in which students were asked to create a blog and update it with marketing stories were positive. The students viewed this project as exciting and became more involved with researching and applying concepts from the classroom to actual business practices (Kaplan, Piskin, & Bol, 2009).

Blogging also can be a useful learning tool for younger students to develop and enhance literacy skills. McGrail and Davis (2011) conducted a study in which elementary students created their own blog posts. Results showed that these students were able to understand their audience, which allowed them to be more effective and write in a "readerly way, by attending to their readers' needs and interests" (McGrail & Davis, 2011, p. 432).

**Screencasts/Videos.** Screencasts and video recordings are similar in that they provide a visual form of learning that may or may not include audio. Both can be used by individuals to see an activity on a screen whether it be a demonstration or presentation. Screencasts are different from videos in that they are solely computer based through sharing a section of a computer screen of the presenter and can include text captions or narratives to allow the student viewer to reflect on previous class material (Powell & Wimmer, 2014).

Video recordings generated by students has also been a growing trend in the educational industry (Thomas & Marks, 2014). Student-generated videos enable students to learn material from the perspective of another student. Social work students who created videos to present to in class mentioned increased development of their project management skills as they collaborated with others to create the video (Thomas & Marks, 2014). Another benefit of students generating screencasts or videos is that they have an additional tool to review at a later time to aid in studying (Powell & Wimmer, 2014).

Technology in experiential learning provides students with transferrable skills. Adapting to new types of software and systems in the classroom prepares them to learn new systems when they enter the workforce. Simulation, gamification, and student-generated learning tools helps students develop soft skills necessary to succeed in business, and provide them with knowledge and confidence to use technology and apply concepts as they enter the business world.

## REFERENCES


Armer, G. M. (2011). Practice makes perfect: Using a computer-based business simulation in entrepreneurship education. *MPAEA Journal of Adult Education, 40*(1), 23-25.

Cohen, A. M. (2011). The gamification of education: Why online social games may be poised to replace textbooks in schools. *Futurist, 45*(5), 16-17.

Deed, C., & Edwards, A. (2011). Unrestricted student blogging: Implications for active learning in a virtual text-based environment. *Active Learning in Higher Education, 12*(1), 11-21. doi:10.1177/1469787410387725

Gamification in education and libraries. (2015). *Library Technology Reports*, *51*(2), 20-28

Kaplan, M. D., Piskin, B., & Bol, B. (2009). Educational blogging: Integrating technology into marketing experience. *Journal of Marketing Education*, *32*(1), 50-63. doi:10.1177/0273475309335652

Laurillard, D. (2002). *Rethinking university teaching: A conversational framework for the effective use of learning technologies* (2nd ed.). New York, NY: RoutledgePalmer.

Lee, M. W., McLoughlin, C., & Chan, A. (2008). Talk the talk: Learner-generated podcasts as catalysts for knowledge creation. *British Journal of Educational Technology, 39*(3), 501-521. doi:10.1111/j.1467-8535.2007.00746.x

McGrail, E., & Davis, A. (2011). The influence of classroom blogging on elementary student writing. *Journal of Research in Childhood Education, 25*(4), 415-437.

Paul, P., & Mukhopadhyay, K. (2004). Experiential learning in international business education. *Journal of Teaching in International Business*, *16*(2), 7-25. doi:10.1300/J066v16n02_02

Powell, L., & Robson, F. (2014). Learner-generated podcasts: A useful approach to assessment? *Innovations in Education & Teaching International*, *51*(3), 326-337. doi:10.1080/14703297.2013.796710

Powell, L. M., & Wimmer, H. (2014). Evaluating the effectiveness of self-created student screencasts as a tool to increase student learning outcomes in a hands-on computer programming course. *2014 Proceedings of the Information Systems Educators Conference*, *31*(3061). Retrieved from www.aitp-edsig.org

Schachter, H. (2014). Taking a business cue from games. *The Globe and Mail.* Retrieved from http://libproxy.eku.edu/login?url=http://search.proquest.com.libproxy.eku.edu/docview/1517873713?accountid=10628

Snyder, K. (2003). Ropes, poles, and space: Active learning in business education. *Active Learning in Higher Education*, *4*(2), 159-167.

Swan, K., & Hofer, M. (2011). In search of technological pedagogical content knowledge. *Journal of Research on Technology in Education*, *44*(1), 75-98. doi:10.1080/15391523.2011.10782580

Thomas, K. A., & Marks, L. (2014). Action! Student-generated videos in social work education. *Journal of Technology in Human Services*, *32*(4), 254-274. doi:10.1080/15228835.2014.922912

Tompson, G. H., & Tompson, H. B. (1995). Using computer simulations for group projects in business. *Journal of Education for Business*, *71*(2), 97-104.

Wheeler, S., Yeomans, P., & Wheeler, D. (2008). The good, the bad and the wiki: Evaluating student-generated content for collaborative learning. *British Journal of Educational Technology*, *39*(6), 987-995. doi:10.1111/j.1467-8535.2007.00799.x

Wilson, L. E., & Sipe, S. R. (2014). A comparison of active learning and traditional pedagogical styles in a business law classroom. *Journal of Legal Studies Education*, *31*(1), 89-105. doi:10.1111/jlse.12010

Xu, Y., & Yang, Y. (2010). Student learning in business simulation: An empirical investigation. *Journal of Education for Business*, *85*(4), 223-228. doi:10.1080/08832320903449469

Yang, C., & Chang, Y. (2012). Assessing the effects of interactive blogging on student attitudes towards peer interaction, learning motivation, and academic achievements. *Journal of Computer Assisted Learning*, *28*(2), 126-135. doi:10.1111/j.1365-2729.2011.00423.x

# SOCIAL MEDIA? #WHATDOYOUTEACH?

Sheila Pearson, Southern Arkansas University
Ronnie Watson, Southern Arkansas University

## ABSTRACT

*Social media sites and tools are innovating faster than any other communications technology in history. However, many seem hesitant and struggle to develop their social media presence. As a result, business schools, and especially marketing and information systems areas, are exploring ways to incorporate social media into their curriculums. This paper illustrates how one business school identified a framework for introducing a social media course into the curriculum.*

Key words: social media, social media education, social media in business

## INTRODUCTION

Many businesses struggle and even fail with social media because they lack a plan. They know what the end result of their efforts should be, increase their business, but lack the strategy and objectives to get there. In a recent Fortune article, Ryan Holmes, CEO of Hootsuite, stated that while the business world is undergoing a transformation with the advent of the Internet, many businesses still aren't on social media and those that are often fail to tap social media's full potential (Holmes, 2015). He further states that a recent McKinsey Global Institute report concludes that social technologies stand to unlock $1.3 trillion in business value, yet only 3% of businesses are maximizing on this opportunity. Some of these holdouts believe "it's just a fad" (Holmes, 2015, para. 3). According to the Pew Research Center, 76% of online adults use social networking sites as of July 2015 (Pew Research Center, 2016).

So why are businesses still hesitant to have a social media presence? Are there too many social sites to choose from? How do they initiate a social media program? How do they keep up with the changes? Senior management is reluctant to funnel monies into social media simply because results can be hard to measure compared to other media such as web, print ads, and broadcast (cite). However, the questions of where and how to start and how to track the results are solvable. How? Social media education.

Social media education is coming of age. Young adults embrace social media, using it to connect with their friends. Young adults, ages 14-18, have grown up with the Internet. They are what is referred to as "digital natives" (Ciampa, Thrasher, and Revels, 2016). They use information technology and online information effortlessly. Martinez-Aleman (2014) reported that surveys of current college students suggest that students clearly want more technology-enabled interactive learning opportunities. Martinez-Aleman also reports (2014) that students believe social media are first and foremost "social" applications and are not meant for presenting an academic identity but for sharing information about themselves with their peers. Many companies seek a return on investment from social media, but such a financial outcome may not be the goal. It may be that the company is still in existence 5 years from now, if it uses social media (Qualman, 2013, p. 257).

Clearly, the need to outline how social media should be taught is necessary. Karen Freberg, a strategic communications professor at the University of Louisville identifies social media as one of the most demanding, time-consuming, and challenging courses to teach at the university level (Freberg, 2016). Susan Chesley Fant, an instructor at the University of Alabama who teaches a course called Introduction to Digital and Social Media Marketing, notes that "attention is the scarcest resource companies must compete for 24 hours a day 7 days a week. It's all about **Monitor, Amplify, Respond,** and **Lead**" (Fant, 2013).

## A SOCIAL MEDIA COURSE FOR BUSINESS STUDENTS

*Social Media for Business*, a 15-week semester course, is designed for juniors who have completed all pre-business requirements. Assignments cover social media platforms, policies, and analytics. Students engage in tasks such as maintaining accounts in social media and analyzing their social media presence and outcomes. Case studies are used throughout the course to cover certain theoretical concepts. The course description, required textbooks, and course objectives for IS 3143 Social Media for Business are presented below:

**Course Description:** This course provides concepts and techniques for retrieving, exploring, and analyzing a social network and social media data. The course will present students with the "how to" maintain a social media presence for business.

**Textbooks:** *Socialnomics: How Social Media Transforms the Way We Live and Do Business,* Erik Qualman, John Wiley & Sons, 2013
*The Art of Social Media,* Guy Kawasaki and Peg Fitzpatrick, Penguin Group, 2014

**Course Objectives:** Upon completing this course, students should be able to:

- Utilize several models to identify traffic patterns and spread information
- Complete a project involving planning, executing, and evaluating social media
- Demonstrate understanding the strategic use of new and social communication technologies for businesses and individual career advancement.
- Apply basic strategic applications of social media tools
- Utilize key metrics (Twitter Analytics, Google Analytics, Keyhole, Hootsuite, etc.) to assess goals and return on investment (ROI)
- Apply ethical principles to the use of web and social media data

## SOCIAL MEDIA PLATFORMS

There are many social media platforms in today's environment. Print, radio, and television advertising have been in use for many decades and have established guidelines and policies. Social Media platforms are constantly evolving and changing at a rapid rate. It will be important to teach how to use some of the platforms, but impressing on the students that social media is in a constant state of flux. "There are dozens – if not hundreds – of Social Media applications, and new ones are appearing on the horizon every day. If you still need time to run your core business, you simply cannot participate in them all, especially since "being active" is one key requirement to success" (Kaplan, 2010, p.65). Most students are familiar with social media and a lot are active in one or more platforms. Teaching students to look at these platforms from a business perspective will be a

challenge. There is a need to illustrate how to apply business communications and marketing concepts to these platforms.

The main platforms are Facebook, Twitter, YouTube, and LinkedIn. Facebook is the largest social network on the Web. It has the best brand recognition and has 1.55 billion active users all across the globe. Its users do not expect a high volume of new content to stay engaged (Helmrich, 2016.). Twitter is limited to 140 characters, but someone's tweets seem to be in the news every day. The platform has 313 million users, but seems to be declining this year. There are strong indications that the company may be bought by another company. Twitter can share video, images, links, polls and more. Interaction with other users is possible by mentioning their usernames in posts. Twitter is a great way to quickly connect with people all around the world (Helmrich, 2016). "YouTube has over a billion users and everyday people watch hundreds of millions of hours on YouTube and generate billions of views. YouTube overall, and even YouTube on mobile alone, reached more 18-34 and 18-49 year-olds than any cable network in the U.S" (YouTube, 2016, Statistics, para. 1). LinkedIn is a social media platform geared toward professionals, and they use the platform to make new connections. The platform is good for recruiting for open positions, connecting with like-minded professionals, connecting with media outlets, increased brand exposure, improving search engine optimization, and others (DeMers, 2015). Some of the new changes in social media are: Video especially live streaming is getting bigger, buy buttons and markets are spreading into many social platforms, communication is increasing, and people want to personalize the content they are receiving (DeMers, 2016). While social media platforms and tools change, the basics of social media stay the same. Tools and platforms change as fast as developers can create and issue them. It is not necessary to reinvent the course with every change in technology (Joly, 2016).

## SOCIAL MEDIA POLICIES

Social Media is still a relatively new subject for both companies and education. Should a company have a social media policy in place? The answer is YES. Why? It identifies the purpose of social media for the company, outlines the rules and regulations, and provides the legal guidelines for employees conduct using social media. "With a guide of this type in place, employees can be trusted to exercise their creativity and show their personalities without worry or stress that what they're sharing on social media could negatively impact their careers or jobs" (Fontein, 2016, para. 4). In an Entrepreneur article by Mark Henricks, he suggests three reasons to establish a social media policy.

1. **Protect the company's reputation**—As a general rule people don't want anything appearing on social media that would not want to see on the front page of the local newspaper. Offensive behavior and image issues are among the most common problems that surface when employees mix business with personal use of social networking sites (Henricks, 2011).
2. **Minimize confusion about murky legal issues**—having a social media policy can minimize legal concerns associated with employee's questionable actions and opinions expressed throughout social media (Henricks, 2011).
3. **Raise awareness of the brand**—having clear guidelines identified can help employees recognize ways they can use social media to help achieve business goals. A social media policy should illustrate to employees how they should comment on blogs, posts, tweets, etc. (Henricks, 2011).

Providing specific guidelines for a social media course will indicate to the students what to expect in their online conduct.

## SOCIAL MEDIA ANALYTICS

There is a need to teach social media analytics in a course about social media. Continuous improvement is core to a lot of business and education practices. Continuous improvement cannot take place without some point of reference or measurement of outcomes. "The business challenges marketers face with social analytics include knowing what factors to measure, how to measure, and how to analyze the stat that comes out of these measurements. From there, one needs to determine how to properly utilize this analysis to predict future customer behaviors, outcomes of marketing initiatives, and changing of developing trends in the marketplace" (Qualman, 2013). Each company or individual will have different metrics that will relate to their type of brand or business.

Teaching students to use and understand these social media analytic tools will prepare them to monitor and improve social media outcomes. There are many social media analytic tools available. Many are free and some for purchase. In sampling several syllabi for existing social media courses, several require students achieve a certification in social media analytics.

There are many tools available for social media analytics. Facebook Insights is a tool that is available if the firm has over 30 fans. It includes: demographic data, engagement data, location data, views, and reach of posts. Twitter Analytics is a built-in analytics platform that tracks monthly stats, popular tweet, mentions, and followers for the month. Google Analytics can measure website traffic, but also show how many visits a site receives via each social media platform. Keyhole can measure a brand or trend's impact on Twitter, Facebook, and Instagram by tracking hashtags, keywords, and campaign metrics. Hootsuite is a social media management dashboard that can track a multitude of metrics including times for customer service issues. Klout gives a score out of 100 based on the company's ability to engage and drive action. The tools are too numerous to list.

Analytic tools are evolving as fast as or faster than the platforms themselves. Some analytic tools will need to be used to teach social media effectively.

## SUMMARY AND CONCLUSIONS

Social media has transformed the way people live and work, and it can make people more productive (Qualman, 2013). A course in social media will need to be flexible. The social media landscape is always changing, and so too do the assignments, lessons, and syllabi (Freberg, 2016). Social media will continue to be a part of our lives for the foreseeable future. Businesses can use social media as an effective tool to engage with their customers. Development of a social media course utilizing the identified curriculum frameworks within this paper will provide students a foundation in social media for their future business careers.

**REFERENCES**


Ciampa, M., Thrasher, E. H., & Revel, M. A. (2016). Social Media Use in Academics: Undergraduate Perceptions and Practices. *Journal of Education Technology*, 12(4), 10-19.

DeMers, Jayson. (2015). The Definitive Guide To Marketing Your Business On LinkedIn *Forbes.* http://www.forbes.com/sites/jaysondemers/2015/09/18/the-definitive-guide-to-marketing-your-business-on-linkedin/#38f483496684

DeMers, Jayson. (2016). The Top 7 Social Media Marketing Trends Dominating 2016. *Forbes.* http://www.forbes.com/sites/jaysondemers/2016/08/01/the-top-7-social-media-marketing-trends-dominating-2016/2/#3b1e382e3ac8

Freberg, K.(2016). How I teach social media in my university classroom. https://blog.hootsuite.com/teach-social-media-university-classroom/

Fant, S. (2013) http://www.slideshare.net/susanchesleyfant.

Fontein, Dara (2016). "How to Write a Social Media Policy for Your Company", https://blog.hootsuite.com/social-media-policy-for-employees/

Helmrich, Brittney. (2016). Social Media for Business: 2016 Marketer's Guide. *Business News Daily*. http://www.businessnewsdaily.com/7832-social-media-for-business.html

Henricks, M, (2011). Why You Need a Social Media Policy. https://www.entrepreneur.com/article/217813

Holmes, R. (2015). Why businesses Can't survive Without Social Media. http://fortune.com/2015/11/18/businesses-cant-survive-social-media/

Joly, K. (2016). 5 things I've learned teaching social media marketing for higher education #hesm. http://higheredexperts.com/edu/2016/03/31/5-things-ive-learned-teaching-social-media-marketing-in-higher-education/

Kaplan, Andreas M. and Haenlein, Michael. (13 January 2010). Users of the world, unite! The The challenges and opportunities of Social Media *Business Horizons*, Vol. 53, No. 1. pp. 59-68

Martinez-Aleman, A. (2014). Social Media Go to College, Change Magazine, Jan-Feb, 2014. http://www.changemag.org/archives/back%20Issues/2014/January-February%202014/socialmedia_full.html.

Pew Research Center (2016). Social Networking Use. http://www.pewresearch.org/data-trend/media-and-technology/social-networking-use/.

Qualman, Erik. (2013). *Socialnomics: How Social Media Transforms the Way We Live and Do Business 2ed*. Hoboken, NJ: Wiley.

YouTube (2016) https://www.youtube.com/yt/press/statistics.html.

# USING GEOGRAPHIC INFORMATION SYSTEMS TO CAPTURE SPATIAL PATTERNS IN NURSING HOME QUALITY IN THE SOUTHWESTERN UNITED STATES

S. Mantravadi, University of West Florida
K. Zhang, University of Texas Health Science Center

## ABSTRACT

*Information systems, as well as Applications of geographic information software and large databases, can draw light to issues apparent in the health care business. The purpose of this study was to explore the geographic trends in nursing home quality in Southwestern states, using the Nursing Home Compare dataset. Using Geographic Information Systems (GIS) to evaluate nursing homes addresses quality of care in the context of payer expansion and the geographic dispersion of beneficiaries.*

## INTRODUCTION

There has been an influx of the baby boomers into the healthcare industry; many of whom are eligible for or are receiving nursing home care. According to the National Nursing Home Survey, approximately 1.3-1.6 million elderly patients receive care from nursing homes (Castle & Ferguson, 2010; KFF, 2015). Nursing Home residents often face low quality of care, and this has been a critical area of research (Castle & Ferguson, 2010). Average quality of care for nursing home residents has consistently remained low (Werner & Konetzka, 2010). More than 1/3$^{rd}$ of nursing homes certified by Medicare or Medicaid have quality ratings of 1 or 2 stars, out of 5 stars, (KFF, 2015). Nursing home care is dominated by public insurance (50% Medicaid, 16% Medicare), so the government and policy makers are invested/interested in ensuring that the public's money is well spent towards nursing home care (KFF, 2007; Werner & Konetzka, 2010; Castle & Ferguson, 2010). There are various definitions of nursing home quality; for example in the nursing home compare data, there are 181 indicators to be considered (Castle& Ferguson, 2010; CMS, 2016). Quality indicators are usually defined by measures of structure, process, and outcome (Castle & Ferguson, 2010). Structural measures of quality include organizational structure and characteristics, while process measures concern what actually is done/occurs during the care process (Castle & Ferguson, 2010). Finally, outcome measures evaluate health outcome (Castle & Ferguson, 2010). Quality of life as a global measure of care has also been emphasized (Werner & Konetzka, 2010). Nursing Home Compare data is publically available, and provides standardized quality of care information (Castle & Ferguson, 2010).

Several provisions of the Omnibus Budget Reconciliation Act of 1987 (Nursing Home Reform Act of 1987) made progress in the field of nursing home quality. This policy led to the implantation of Medicaid-Medicare certifications (15 months), inspections, and a comprehensive regulatory system, known as the Minimum Data Set (Werner & Konetzka, 2010; KFF, 2007). The incorporation of the minimum data set (MDS), provides detailed information about resident quality of life, for quality improvement purposes (KFf, 2007). These regulations have posed minimum standards for nursing home quality (Werner & Konetzka, 2010). Progress has been made regarding quality of care, such as a reduction in use of restraints, catheterization, functional

decline, facility deficiencies, and hospitalizations (Werner & Konetzka, 2010; KFF, 2007). However, these regulations alone are not the panacea/cure all for low quality of care; issues with quality still exist despite regulations and market reforms (Werner & Konetzka, 2010).

Many factors are related to low quality of care in nursing homes, including staffing levels (number of nurses/staff involved in care), ownership status, and deficiencies. Inadequate staffing levels are associated with low quality of care, and staffing levels have been stable at low levels in nursing homes for the past couple years (KFF, 2007). Although many studies evaluating nursing home staffing and quality of care have issues with sample size, study design, and quality indicators, the few methodologically robust studies indicate that there is a negative association between staffing levels and quality of care (Castle, 2008).

The health care industry is dominated by nonprofit ownership. It has been noted that in for-profit nursing homes, deficiencies (health inspection) are higher, while quality ratings and staffing levels are lower (Harrington, Olney, Carrillo, & Kang, 2011; KFF, 2015).Thus, in this study, nursing home ownership, staffing, and deficiencies will be incorporated as layers into ArcGIS, a geographic information systems (GIS) mapping software.

Nursing Home Compare is the most comprehensive and reliable data source for nursing home quality of care indicators (Long Term Care Community Coalition, 2015; CMS, 2016). Data incorporates quality ratings information about the health inspections (deficiencies and penalties), staffing, and quality measures (Long Term Care Community Coalition, 2015; CMS, 2016). The majority of the data contained in public reporting, such as Nursing Home Compare, evaluates a specific arena of quality of care including pressure sores, infections, pain, or unexplained weight loss (Werner & Konetzka, 2010).

The purpose of this study was to explore the impact of ownership, nursing home health inspection deficiencies, and staffing levels on nursing home quality, as well as geographic trends in nursing home quality in Southwestern states. The data that will be used for this project incorporates information from the Centers for Medicare and Medicaid Services Minimum Data Set (MDS) and Medicare/Medicaid inspections. Using geographic information systems to evaluate quality of care in nursing homes is necessary, as it is challenging to ensure optimal quality of care with the expansion of payers and changes in resident demographics due to the geographic dispersion of beneficiaries (KFF, 2007).

## METHODS

The ArcGIS was used for mapping and spatial analysis of nursing home quality of care data. The usage of geographic information systems allows researchers to incorporate information technology when evaluating health in terms of the broader environment. Health and healthcare quality depends on location; and using geographic information systems aids in evaluating spatial autocorrelation in nursing home quality. In other words, use of such an information technology tool can explore if quality of care in nursing home “neighbors” are more related than nursing homes spaced farther apart. As per Tobler’s First Law of Geography (spatial autocorrelation), “everything is related, but near things are more related than distant things” (Environmental Sciences Research Institute, n.d.).

The data is from the Nursing Home Compare dataset, which incorporates data from the Centers for Medicare and Medicaid Services' (CMS) Health Inspections and the Minimum Data Set. The CMS Minimum Data Set is mandatory for Medicare-and-Medicaid certification (CMS reimbursement), and includes information about aspects of resident health (CMS, 2016). This data source contains data from every nursing home that is certified by Medicare and Medicaid (reimbursed by the centers of Medicare and Medicaid Services), and provides information about quality of care from Q32014 to Q12015. However, data regarding nursing homes that are not Medicare or Medicaid certified are not included (CMS, 2016).

The data was filtered to include only Medicare and Medicaid certified nursing homes in the South West region of the United States. According to the United States Census Bureau designated regions and divisions, the West South Central Southwest division/region is defined as the states of Arkansas, Louisiana, Oklahoma, and Texas (Census, 2016).The data includes information on nursing home providers' addresses and zip codes. Using the Texas A&M University (TAMU) Department of Geography, TAMU GeoServices, addresses were geocoded into ArcGIS (TAMU, 2016). The TAMU GeoServices is an Environmental Sciences Research Institute (Esri) Development Center (EDC). For this study, layers incorporated were provider information, quality of care, deficiencies, penalties, ownership, and state averages of quality measures.

The Nursing Home Compare data was downloaded as several csv files, one file for each layer. Each file was imported into ArcGIS, using the add ASCII data feature. The Geoprocessing Join function was used to join the nursing home quality of care, deficiencies, penalties, ownership, and state averages files with the geocoded provider information file. Maps of nursing homes and an overall map of the nursing home providers in the southwest region of the United States were generated. The primary measure of nursing home quality was the quality rating, from the MDS and health inspection surveys in the Nursing Home Compare data; the staffing rating and health inspection deficiency ratings were also considered in analyses.

For spatial analysis of nursing home providers, several methods were used. In order to identify the distribution of the data, a histogram was generated using STATA. Considering the geographic distribution of the data, the central feature of high quality nursing homes in each state was identified. The central feature considers the most centrally located, in this case, nursing home; the central feature was used in order to ensure that the center that was identified occurred at a feature (or in this case, at a nursing home location).

Thus for spatial analysis, the average distance between a nonprofit and a for-profit nursing home was used (3.673 km) as a baseline for proximity analyses conducted in this study (Grabowski et al., 2011; Zheng, Mukamel, Friedman, Caprio, & Temkin-Greener, 2015)). Thus, the proximity buffers in this study evaluated whether, on average, the nearest nursing home of similar quality (high or low quality) was located within 3.673 kilometers. In order to identify nursing homes with high quality measures, attribute extraction was used. Within ArcMap, the select attribute by attributes option was used for quality measures greater than or equal to 3 (high quality). Then, point proximity buffers were created for nursing homes with high quality/staffing ratings, and for nursing home providers with lower ratings. In other words, proximity analyses conducted in this study analyzed if a high quality nursing homes located within 3.673 km of another high quality nursing home.

To evaluate the extent of spatial autocorrelation (akin to Pearson's correlation coefficient), cluster analysis was performed, to assess the cluster of high quality and staffed nursing homes and the cluster of low quality and low-staffed nursing homes. Since ratings are categorical variables (5 point scale, with 5 being the best), the Average Nearest Neighbor index (ANNI) method was used. The ANNI will evaluate clustering, dispersion, and random distribution. Thus, clustering of nursing homes indicates that similar rated nursing homes are clustered (High quality-High quality). Therefore, the select by attribute function was be used within the high quality nursing home layer to choose relevant nursing homes in each state (Arkansas, Louisiana, Oklahoma, and Texas). Currently, a cluster analysis for all 4 states was conducted; clustering within each state was analyzed. In addition, clustering of nursing homes by ownership will be evaluated, statewide.

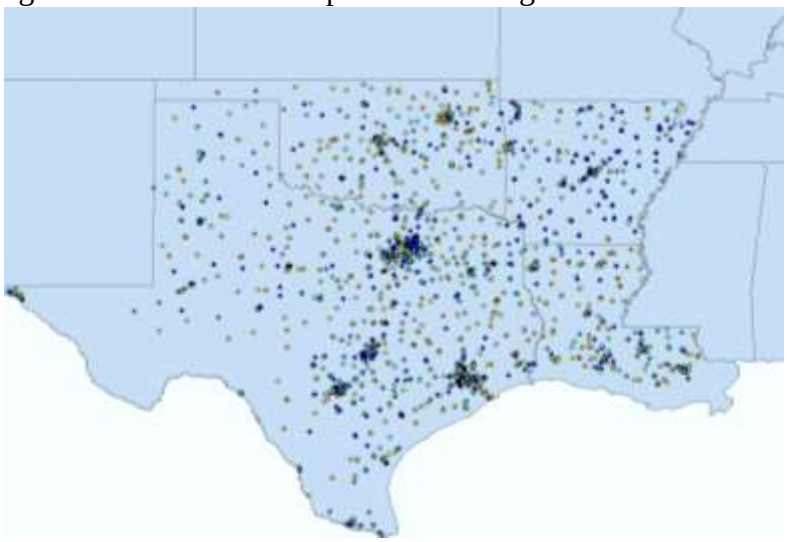
**RESULTS**

There were a total of 2,304 nursing home providers included in the sample. The data consisted of points, as the locations of each nursing home provider. As expected, nursing homes were clustered in metropolitan areas and bigger cities, with higher populations. This reflects the demand/need for these healthcare services.

**MAPS**

Several maps were created, illustrating the locations of all nursing home providers in the Southwestern states.

Figure 1. Color-coded Map of the Nursing Homes in the Southwestern U.S.: Quality rating



Black dots = unavailable data.

Figure 1 shows the distribution of quality ratings in nursing homes. Overall, from the map, it is evident that the previous literate on nursing home quality is confirmed. A majority of the sample of 2,034 nursing homes have low quality ratings, from 1-2 stars (as shown in red and yellow), with a few nursing homes rated as 3 (pale green). In metropolitan areas, such as Dallas, TX and New Orleans, LA, quality ratings are higher than in other rural areas in each of the states.

Similarly, a majority of the nursing home providers in the southwestern U.S. have low staffing ratings, from 1-2 stars, illustrating that nursing homes are understaffed, as shown in the figure (2) below. Contrary to quality ratings, low staffing ratings occur even in big cities/metropolitan areas.

Figure 2. Color-coded Map of the Nursing Homes in the Southwestern U.S.: Staffing rating

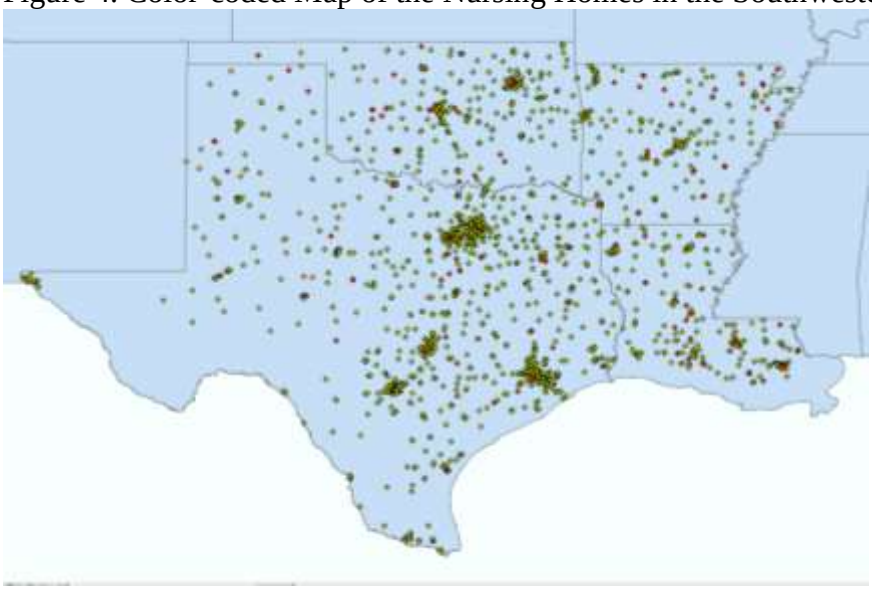
Black dots indicate unvaiable data.

Figure 3. Color-coded Map of the Nursing Homes in the Southwestern U.S.: Inspection rating

Black dots indicate unavailable data.

The figure 3 illustrates that majority of nursing homes in the southwest have low health inspection ratings (higher deficiencies); this is evident as a majority of providers are yellow or light blue. In metropolitan areas, such as Dallas, TX, nursing homes with higher health inspection ratings are grouped together. Maps of ownership status of nursing home providers in Texas showed that a majority of nursing homes were for-profit. This is consistent with economic literature on nursing home ownership status.

Figure 4. Color-coded Map of the Nursing Homes in the Southwestern U.S.: Ownership status



The above figure (4) indicates the ownership status of nursing homes in the southwest. Green color coded points indicates for-profit nursing homes, while orange/yellow points indicate government run nursing homes. Finally, red dots indicate nonprofit nursing homes. In the southwestern states, especially in major cities in Texas, for-profit nursing homes dominate. Very few nonprofit nursing homes were located in these southwestern states, and were spread out throughout each state. Black dots indicate unavailable data.

## STATISTICAL ANALYSIS

In order to verify the data distribution of quality measures, a histogram was generated for quality, staffing, and deficiency ratings. For the Health Inspection rating, values were distribution around 2 and 4 stars. The most of the nursing homes in the sample have a quality rating of 2 or 5. The distribution of the staffing rating is moderate – a majority of the nursing homes have a staffing rating of 3.

Fisher's exact test was performed to determine if there is an association/relationship between ownership and quality measures; the exact test was used since one or more of the cells had less than 5 observations. The Chi square analyses were also conducted in order to evaluate if there is quality measures are correlated with each other.

The Fisher's exact test, indicated there is an association between quality and ownership status, confirming the results from the previous literature (Grabowski et al., 2013). The chi square test underestimates, since 54% of the cells are less than 5 observations. Essentially, the relationship between quality rating and ownership status is statistically significant. Thus, we reject to the null hypothesis. In other words, the variation in quality rating is likely due to ownership status.

Health inspection ratings ($\chi^2$=47.15, p<0.0001) and staffing ratings ($\chi^2$=34.85, p=0.004) are correlated with ownership status. The chi-square tests indicate that quality of care measures are strongly correlated with each other. Staffing is also strongly related to health inspection ratings

($\chi^2$=88.06, p<0.0001). Similarly, quality of care is correlated with staffing, and variation in health inspection ratings is associated with staffing levels. The variation in quality measures is not due to random chance.

## CONCLUSIONS

Nursing homes in the Southwestern United States are spatially located in large metropolitan areas; as seen in maps of nursing homes generated, nursing homes are sparsely located in rural areas, and are often fraught with various measures of low quality. Maps of nursing homes and quality measures from the Nursing Home Compare data illustrated that nursing homes in the Southwestern U.S. are low quality, have high health inspection deficiencies, and are inadequately staffed. In addition, Maps indicated that nursing homes in Texas, Oklahoma, Arkansas, and Louisiana, in the U.S. Census Bureau Designated West South Central region, are primarily for-profit. Quality, staffing, and health inspection deficiencies are correlated to ownership status. Reduced staffing is associated with reduced quality rating in nursing homes, and reduced health inspection ratings. The results of the cluster analysis indicate that overall, nursing homes with high quality are not tightly clustered together.

This study has both methodological strengths and weaknesses. The use of the Nursing Home compare data provided a detailed look at various aspects of quality in Medicare-Medicaid certified nursing home providers. Another strength is that this study also incorporated a large sample size of nursing homes. Data regarding nursing home quality and spatial location was complete and accurate; there were very few missing or unavailable data on nursing home quality. The data confirmed the correlation between quality ratings, ownership, staffing, and health inspection deficiencies, from the literature. In addition, the sample size considered here was large, with 2,037 nursing homes in the southwest United States considered; data was "representative," as data on each and every Medicare-Medicaid certified nursing home provider was analyzed.

On the other hand, the Southwestern states considered in this paper have the highest amount of for-profit nursing home providers (>75% in each state) ), as evidenced in the color coded maps, and Texas, Louisiana, and Oklahoma have been documented as having the highest percentages of nursing homes with l out of 5 star quality ratings, compared to the rest of the United States (KFF, 2015); for-profit nursing homes often have lower quality as evidenced in this analysis, generated maps/figures, and previous literature (KFF, 2015; Grabowski, 2013). This study may not be generalizable nationwide, especially to states with a nonprofit ownership majority. Since the locations of nursing homes are dependent on population size and density, the cluster analysis should be interpreted with caution. Another limitation of this study is the use of the ANNI is that the exact numerical value of the quality, staffing, or health inspection ratings was not incorporated within the data analysis. Nursing homes (either 3, 4, or 5), were considered, and the exact magnitude of the rating was not considering in the coefficient/ratio.

The results of this study should be interpreted in the economic and geographical context of nursing home supply/demand. Geographic differences in the supply of nursing homes, specifically nursing home beds, have been documented (CDC, 2013). These geographic differences in supply of nursing home beds are almost twice as likely to occur in community beds (CDC, 2013). Use of services also varies geographically; for example, in Texas, the use of nursing home services is

higher than the national average (CDC, 2013). Population size plays a role in the number of nursing homes in each city and the demand for healthcare services for this population. Research has shown that quality of care varies by the size of the nursing home provider/facility (KFF, 2015). There is also geographical variation in the nursing home facility size (KFF, 2015).

Future research should also incorporate population density, facility/spatial demographic characteristics, capacity, and payer source. The regional and census tract level demand for nursing homes services should be incorporated into the analysis; state level analyses are not enough. The number of individuals over the age of 65 in each state indicates the number of individuals who can qualify for nursing home services; for example, in Texas there are 3,099,081 residents over the age of 65 (Census, 2015). Arkansas, Oklahoma, and Louisiana have 466,191, 562,531, and 632,894, respectively, residents over the age of 65 (Census, 2015). However, this is not representative of the spread of nursing homes/supply for services and the demand for services at the local level. For example, in Arkansas County, Arkansas has 3,250 individuals over the age of 65 as of 2014, while Harris County, Texas has 409,083 individuals over the age of 65, and as mentioned previously, demand for care/usage of services is higher in Texas than in other states (Census, 2015). In addition, evaluating changes in quality of nursing home care over time would provide a better understanding of resident needs and effective policies.

The significance of this study using GIS software for business information systems and nursing home quality is for governmental accreditation and policy organizations; such healthcare business organizations are thus able to make effective decisions to evaluate changes in nursing home quality in regional locations, using available, secondary data on nursing home quality. In addition, the results of this study are relevant to nursing homes, as the effective use of GIS technology can help in planning nursing home services to meet demand, especially in rural areas.

## REFERENCES


Castle, N. G. (2008). Nursing home caregiver staffing levels and quality of care a literature review. *Journal of Applied Gerontology*, *27*(4), 375-405.

Castle, N. G., & Ferguson, J. C. (2010). What Is Nursing Home Quality and How Is It Measured? *The Gerontologist, 50*(4), 426–442.

Centers for Disease Control and Prevention (CDC) (2013). Retrieved from https://www.cdc.gov/nchs/data/nsltcp/long_term_care_services_2013.pdf

Centers for Medicare & Medicaid Services (CMS). (2016) *Nursing Home Compare* [Homepage]. Retrieved from https://www.medicare.gov/nursinghomecompare/search.html [Data set]

Environmental Science Research Institute (Esri). (n.d.). *Average Nearest Neighbor (Spatial Statistics)*. Retrieved from http://resources.esri.com/help/9.3/arcgisdesktop/com/gp_toolref/spatial_statistics_tools/average_nearest_neighbor_spatial_statistics_.htm

Esri (n.d.). *GIS dictionary: Tobler's First Law of Geography*. Retrieved from http://support.esri.com/en/knowledgebase/GISDictionary/term/Tobler's%20First%20Law%20of%20Geography

Folland, S., Goodman, A.C., & Stano, M. (2013). *The economics of health and health care*. Upper Saddle River, NJ: Pearson Education, Inc.

Grabowski, D. C., Feng, Z., Hirth, R., Rahman, M., & Mor, V. (2013). Effect of nursing home ownership on the quality of post-acute care: An instrumental variables approach. *Journal of health economics*, *32*(1), 12-21.

Harrington, C., Olney, B., Carrillo, H., & Kang, T. (2012). Nurse staffing and deficiencies in the largest for-profit nursing home chains and chains owned by private equity companies. *Health services research*, *47*(1pt1), 106-128. doi:10.1111/j.1475-6773.2011.01311.x

Kaiser Family Foundation (2015). *Reading the stars: Nursing home quality star ratings, nationally and by state*. retrieved from http://kff.org/medicare/issue-brief/reading-the-stars-nursing-home-quality-star-ratings-nationally-and-by-state/

Kaiser Family Foundation (2007). Nursing home quality: Twenty years after the Omnibus Reconciliation Budget Act of 1987. Retrieved from https://kaiserfamilyfoundation.files.wordpress.com/2013/01/7717.pdf

Long Term Care Community Coalition. (2015). *Nursing home quality standards: A primer for managed care organizations*. Retrieved from http://www.ltccc.org/publications/documents/LTCCC-Primer-Nursing-Home-Quality-for-MCO-FINAL_000.pdf

Texas A & M University (TAMU) Geoservices. (2016). *Geocoding services*. Retrieved from http://geoservices.tamu.edu/Services/Geocode/

U.S. Census Bureau. (2016). *Regions and Divisions*. Retrieved from http://www.census.gov/econ/census/help/geography/regions_and_divisions.html

U.S. Census Bureau. (2015). *American Fact Finder*. Retrieved from http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml

Werner, R. M., & Konetzka, R. T. (2010). Advancing nursing home quality through quality improvement itself. *Health Affairs*, *29*(1), 81-86.

Zheng, N. T., Mukamel, D. B., Friedman, B., Caprio, T. V., & Temkin-Greener, H. (2015). The effect of hospice on hospitalizations of nursing home residents. *Journal of the American Medical Directors Association*, *16*(2), 155-159.

# DECISION SUPPORT TOOLS: A COMPARATIVE ANALYSIS IN THE HEALTHCARE INDUSTRY

**Aurore J. Kamssu,** Tennessee State University
**Jeffrey S. Siekpe,** Tennessee State University
**Olawale Adeyemo,** Tennessee State University

## ABSTRACT

*Decision support tools have become a very important component of corporate decisions making. In the healthcare sector, the use of such tools is now very common as they are an integral part of the health information systems (HIS). The current study analyzes the application of two decision support tools in hospitals. These tools are* ***DiagnosisOne*** *and* ***Archimedes IndiGO.*** *The literature review identifies the best practices of decision support tools which included but is not limited to: training and development of HIS users, enhanced service user interactivity, constant monitoring of HIS outcomes, and effective hospital leadership and management. The question here is which of the two tools is more beneficial for hospitals and under what circumstances? The findings showed that the hospital using the* ***DiagnosisOne*** *was more serious about the best practices and so they could attain effective and efficient outcomes. Moreover, these hospitals were able to use the tool to minimize cases of adverse medical errors*

**Keywords:** decision support tools, health information systems, DiagnosisOne, Archimedes IndiGO, decision support systems, decision making.

## INTRODUCTION

Information and communication technology (ICT) is rapidly becoming the driving force of almost every aspect of our life. Most of the activities and tasks performed in today modern organizations are influenced by various information systems which are components of ICT (Klein & Hirschheim, 2011). One ways information systems are used in organizations today is through decision support systems (DSS); also known as decision support tools. DSS play the role of computerized information systems in supporting organizational decision making activities (Kohli & Kettinger, 2004). The healthcare sector is one area where the use of DSS has increased tremendously. This increase can be attributed to the fact that DSS generally improve the administration of healthcare systems and therefore, protect human life (Lindgren, Henfridsson & Schultze, 2004).

Adverse medical error is a serious problem confronting many countries in the world. Rothman (2011) reported that the medical errors is a serious challenge not only developing nations, as it is sometimes believed, but also most developed countries including the United States. Such findings create a sense of urgency to remediate the threats that those errors pose on the life of individuals and their families. As the number of people affected by adverse medical errors increase, the credibility of the health system as an avenue for wellness and health is put into question. Such doubts create reluctance in using health facilities. It therefore becomes important to analyze different healthcare systems, isolate the problems and take the necessary precautions to reduce or eliminate those medical errors. To this end, the current focuses on ways in which DSS may be

applied in hospitals to address the identified problem. The research investigates the use of two types of DSS in two different hospitals to find how efficient these systems are in improving the quality of healthcare. It is important to review of existing literature to understand the available decision tools and their efficiency and effectiveness on the healthcare systems.

## LITERATURE REVIEW

The healthcare sector continues to receive a lot of attention when it comes to its effectiveness and efficiency. Mainly, because any malfunctions within the healthcare system may result in loss of life. Knowing that human lives are precious and irreplaceable, efforts have constantly been made to advance the level of quality of healthcare at various health facilities (Berner, Detmer & Simborg, 2005). In a bid to minimize the occurrence of adverse medical error within healthcare facilities, a number of information systems have been introduced to complement the day-to-day activities of health workers. Therefore, it is important to first review the studies on medical errors in the healthcare sectors; second, analyze the health information system, and finally, investigate the decision tools used by the healthcare industry.

### Health Information Systems

A good number of researchers have devoted their time and effort studying healthcare and the application of information systems in the healthcare area. The combination of healthcare and Information system is known as the area of health information systems (HIS). In his study, Kaplan (2014) focused on current and emerging technology systems and devices in the healthcare sector. He found that healthcare facilities spending more and money on technology systems to accomplish task that use to be done manually a decade ago. Ross and Lin (2003) asserted that most healthcare providers have made it a requirement for their facilities to adopt and use information systems in the course of service delivery. This shift to information technology can be attributed to the fact that information systems and devices make most jobs easier and faster (Eysenbach, Powell, Kuss & Eun-Ryoung, 2012).

Picano (2004) analyzed the implementation of new technologies in the healthcare environments in developed countries; his study put emphasis on the approach by which different health facilities roll out their information systems including DSS. Four core best practices were identified to be associated with the implementation of HIS. They include training and development of HIS users, enhanced service user interactivity, constant monitoring of HIS outcomes, and effective hospital leadership and management. These core best practices have been agreed upon in the literature. For instance, Markus, Majchrzak and Gasser (2012) argue that HIS must never be seen as dogmatic and static aspects of healthcare delivery; therefore, it is important that health professionals receive training frequently to adapt to the constant changes associated with the use of the HIS. Likewise, Oddo (2011) claimed that the use of HIS requires constant monitoring, to evaluate the systems for lapses and to ensure that they achieve desired outcome. Roscam (2000) further indicated that HIS are only effective when they achieve the original purposes for which they are implemented. The bottom line is that the effectiveness of DSS is appreciated if the DSS tools achieves and improve the quality of healthcare as set by each healthcare facility.

## Medical Errors and Decision Support Systems

It is obvious that there is a need to minimize adverse medical errors caused by human mistakes. This study will investigate the efficacy of two different decision support systems used within the health sector. This analysis may help identify best practices that come with the use of these DSSs that make them more efficient and effective. The project will also help in detecting specific DSSs that could be applied in unique cases of health related scenarios. On the whole, the project is very necessary in expanding the depth of knowledge in decision support tools, specifically in such a sensitive and useful area as healthcare delivery.

This is an expected outcome of the project because it will investigate the efficacy with the use of two different DSSs within the health sector. By so doing, it will be possible to identify best practices that come with the use of these DSSs that make them more efficient and effective. The project will also help in detecting specific DSSs that could be applied in unique cases of health related scenarios. On the whole, the project is very necessary in expanding the depth of knowledge in decision support tools, specifically in such a sensitive and useful area as healthcare delivery.

Meanwhile, Kreps (2002) observed that adverse medical errors continue to distract the achievement of this important vision. One of these is DSS. On the whole, the use of DSS as a means of minimizing cases of adverse medical errors has been justified with the argument that most of these errors are caused by human mistakes. Meanwhile, DSS minimizes direct human involvement in decision making activities (Elder & Hickner, 2005). Therefore, fewer resources are applied within the hospital context to achieve better results and hence attain efficiency. In the same token, existing literature supports the notion that the use of decision support systems (DSS) can help achieve efficiency; especially when resources are used in a manner that they guarantee full or maximum outcome (Davison, Martinsons & Kock, 2004).

## RESEARCH METHODOLOGY

The underlying issue in this research is the efficient and effective use of decision support tools within the healthcare sector. The variables of efficiency and effectiveness are made an underlying issue because it is posited that the mere presence of DSS do not necessarily guarantee success with decision making activities within an organization such as a hospital (Hevner, March & Park, 2004). Gostin (2011) argued that due to the popularity of DSS, most organizations including those in the health sector have made efforts to adopt one form of it or the other. Regrettably, the best practices needed to make these information systems effective and efficient have not been sought after. It is therefore expected that best practices considered critical for attaining both efficiency and effectiveness while applying various types of DSS be considered and utilized properly. This is because the more such best practices are used, the better the chances of having a successful outcome with the information systems (Bernhardt, 2010).

### Model

Based on reviewed literature, it is perceived that there is a casual relationship between application of best practices in DSS in the health sector and the prevention of adverse medical error. In effect the variable of reduced adverse medical errors can best be attained if there is an effect and efficient

way of applying the DSS in the hospitals. As explained earlier, this relationship does not directly focus on the selection of one DSS over the other. Rather, it looks at the extent to which the DSS was applied in a way that helped in achieving the purpose for which it was set. The relationship shall therefore be explored by first investigating and understanding the reasons for which the two different DSSs were selected for the two hospitals. After this, the approach to implementing the two DSSs will be investigated to know how well various acts of best practices were fused to make them effective and efficient in achieving their purposes.

*$H_0$: Effective and efficient implementation of decision support tools will not minimize adverse medical error*

*$H_1$: Effective and efficient implementation of decision support tools is needed in minimizing adverse medical error*

**DATA**

The project collected qualitative data in the form of oral content from interview sessions held with respondents from two identified hospitals that use two different types of decision systems tools. Because the study deals with qualitative data, it can be inferred that the project follows a qualitative methodology. As explained by Kumar (2005), a qualitative research is one in which the researcher seeks to understand human behavior and the factors that influence their behavior. In the context of the current study, the human behavior in question was the approaches used in implementing the types of DSS used in these health facilities. As part of exploring the approaches to implementation, it was expected that the best practices that are used in the implementation will be identified and critiqued. The critique of the approaches to implementation is what is expected to help the researcher make a decision on whether or not the systems used are effective and efficient.

As part of the qualitative research method, content analysis method was devised to study the outcome of the interview. What this means is that the researcher set some key themes based on the measures of the study. The responses given by the respondents were then critiqued in line with what has stated in literature as best practices for implementing DSS. The outcome of the analysis was then used to determine whether or not a particular decision support tool was effective and efficient for the purpose for which it was used. The interview involved two heads of IT department in two different hospitals. The first hospital used a clinical DSS known as Archimedes IndiGO whereas the second one used DiagnosisOne DSS. The qualitative research was not conducted to purposely compare these two DSSs but to find how effectively and efficiently each of them was used for the purpose for which it was introduced.

The measures basically refer to the items to which respondents respond to in a typical research (Potter, 2006). With the current research, data was collected through an interview. This means that an instrument guide was prepared. This guide had three major divisions, each of which carried one key measure. The first was on the purpose of introducing decision support tools. The second was on the implementation of the tools, and the final measure focused on the outcomes received from the tools.

## RESULTS

The interview was conducted among two respondents each of which was the head of IT in their respective hospitals. The first line of questions was posed to find the reasons behind the selection of the types of DSS they used at their hospitals. Respondent 1 indicated that his hospital used Archimedes IndiGO. The full meaning of IndiGO as used in the context of the DSS was found to be individualized guidelines and outcomes. As a result, it was said to have been implemented to offer customized reporting and tracking system on each patient. The Archemides IndiGO functioned based on the commercialization of the Archimedes Model. When each patient's medical history and record is tracked, it is expected that health providers will be able to deliver accurate care that addresses the specific health needs of patients. Adverse medical errors were expected to be avoided when using the Archimedes IndiGO because patient care and treatments were expected not to be mixed up for different care users.

The second hospital used a DSS called DiagnosisOne. This system was used for the purpose of offering clinical decision support, order sets, analytics, and public health recording and surveillance. Basically, the DiagnosisOne integrates a SmartConsult dashboard which stimulates an electronic health record view and updates patient information when a patient has an encounter with the doctor during diagnosis. By implication, DiagnosisOne was implemented to help in minimizing adverse medical error by ensuring that doctors access the most accurate and correct information about patients during diagnosis so that issues of wrong diagnosis can be avoided. Indeed Smith (2013) observed that wrong diagnosis is the first stage and major factor leading to adverse medical error.

In the second line of questions, I wanted to know the extent to which the hospitals applied some of the best practices identified in literature when the DSSs were being used. The interviewees were therefore asked about the extent to which they applied four major types of best practices. These included training and development of HIS users, enhanced service user interactivity, constant monitoring of HIS outcomes, and effective hospital leadership and managements. The responses gathered showed that even though all two hospitals made use of these best practices, the one with DiagnosisOne was more particular about these practices. This was detected as the respondent indicated that the hospital had a decentralized organizational structure which ensured that the DSS was managed independently from other mainstream duties at the hospital. Consequently, the hospital's IT department had much independence to regulate and monitor the use of the DSS by enforcing the four best practices. At the hospital using Archimedes IndiGO however, no such independence existed for the IT department. For this reason, even though the four best practices were in place, they were only integrated into the larger operationalization of the hospital. In effect, DiagnosisOne was used in a more efficient and effective way than Archimedes IndiGO.

The last line of questions focused on the outcomes attained with the use of the two DSSs in relation to the purposes for which they were put in place. As expected, each of the hospitals had a feedback system with which employees and patients reported to managers of the decision support tools. From the hospital using DiagnosisOne, the overall impression deduced from the feedback received from the employees was that the tool was very relevant in helping speed up the work of diagnosis and doctor interactions with patients. The employees also expressed that their levels of physical involvement with delivery of healthcare was minimized. By implication, efficiency was guaranteed with the use of DignosisOne because the speed of healthcare delivery was enhanced.

Similarly, the effectiveness with healthcare delivery was also enhanced leading to minimal cases of adverse medical error since the physical involvement of health workers was reduced. For the hospital using Archimedes IndiGO, the feedback received showed that the tool had indeed improved the quantum of work delivered, which was an evidence for efficiency. In terms of effectiveness however, there were some lapses. That is, even though much volume of work was added, patients did not really report of experiencing improved outcome with the care they received.

## SUMMARY AND CONCLUSION

The findings deduced above help to draw conclusion on the use of DSS within the healthcare sector. First, it can be concluded that the introduction of DSS as part of HIS is needed within the healthcare setting. However, different tools may be used to achieve different outcomes. This conclusion is made as the hospitals used two different tools when they had the need to achieve two different outcomes or purposes. The second conclusion is that DSS may lead to both effectiveness and efficiency with the delivery of healthcare. However, the attainment of these outcomes is directly determined by the extent to which best practices are adhered to. These best practices included training and development of HIS users, enhanced service user interactivity, constant monitoring of HIS outcomes, and effective hospital leadership and managements. The basis for this conclusion is that when the best practices were holistically adhered to because of the independent running of the IT department, it led to the achievement of both effectiveness and efficiency with healthcare for the hospital. Because the hospital had a goal of minimizing adverse medical error and achieved it, it will be concluded that the null hypothesis will be rejected. This is because effective and efficient implementation of DSS has been found to minimize adverse medical error. The recommendation that will be made from the study is that hospitals should not see it as enough in introducing decision support tools. Rather, they have to ensure that best practices that go with the implementations are adhered to. Future researchers are admonished to conduct quantitative research so that the scope of data collection and number of respondents included can be increased.

## REFERENCES


Berner, E.S., Detmer, D.E., & Simborg, D., (2005) Will the wave finally break? A brief view of the adoption of electronic medical records in the United States. *JAMIA, 12*(1), 3-7.

Bernhardt, J.M., (2010). Health education and the digital divide: Building bridges and filling chasms. *Health Education Research, 15*(2), 527-31.

Davison, R.M., Martinsons, M.G., & Kock, N., (2004). Principles of canonical action research. *Information Systems Journal, 14,* 65-86.

Deshmukh, P. & Croasdell, D., (2011). HIPPA: Privacy and security in healthcare networks. *Information Ethics: Privacy and Intellectual Property.* Hershey, PA: Information Science Publishing

Elder, N.C., & Hickner, J., (2005). Missing clinical information: The system is down. *JAMA, 293*(5), 5.

Eysenbach, G., Powell, J., Kuss, O., & Eun-Ryoung, S., (2012). Empirical studies assessing the quality of health information for consumers on the world wide web. *JAMA, 287*(20), 46-67.

Gostin, G.L., (2011). Health information: Reconciling personal privacy with the public good of human health. *Health Care Analysis,* 9, 321-335.

Hevner, A.R., March, S.T., & Park, J., (2004) Design science in information systems research, *MISQ,* 28(1), 75-105.

Kaplan, B. (2014). Evaluating informatics applications, *IJMIA, 64,* 39-56.

Klein, H.K., & Hirschheim, R., (2011) Choosing between competing design ideals in information systems development. *Information Systems Frontiers*, 3(1), 39-44.

Kohli, R., & Kettinger, W.J., (2004). Informing the Clan: Controlling physicians' costs and outcomes. *MISQ, 28*(3), 363-394.

Kreps, G.L., (2002). *Enhancing Access to Relevant Health Information.* Shaping the Network Society: Patterns for Participation, Action, and Change. CPSR, Palo Alto, CA.

Kumar, R. (2005). *Research methodology: A step-by-step guide for beginners*. London: Sage

Lindgren, R., Henfridsson, O., & Schultze, U., (2004). Design principles for Competence Management Systems: A synthesis of action research study. *MISQ, 28*(3), 435-472.

Markus, M.L, Majchrzak, A., & Gasser, L., (2012). A design theory for systems that support emergent knowledge processes. *MISQ*, 26(3), 179-212.

Oddo, A.R. (2011). Healthcare ethics: A patient-centered decision model. *Journal of Business Ethics,* 29(1). 125134.

Picano, E. (2004). Informed consent and communication of risk from radiological and nuclear medicine examinations: How to escape from a communication inferno. *BMJ,* 32(9), 849-851.

Potter, S. (2006). *Doing postgraduate research*, 2nd ed. London: Sage.

Roscam A. H. (2000) Internet, the patient and the right for health. *European Journal of Health Law,* 7, 221-228.

Ross, S.E. and Lin, C., (2003). The effects of promoting patient access to medical records: A review. *JAMIA, 10*, 78-90.

Rothman, D.J., (2011). The origins and consequences of patient autonomy: A 25-year perspective. *Health Care Analysis, 9,* 255-264.

Smith, R. (2013). Closing the digital divide. *BMJ, 326*(238), 12-43.