Design and Delivery of a New Course of Information Technology for Small Business

Shouhong Wang
Charlton College of Business
University of Massachusetts Dartmouth
Dartmouth, MA 02747, USA
swang@umassd.edu

Hai Wang
Sobey School of Business
Saint Mary's University
Halifax, NS B3H 2W3, Canada
hwang@smu.ca

ABSTRACT

Many university or college business programs offer majors or concentrations of small business management, but few of them offer a course of information technology (IT) for small business, despite the fact that IT plays an important role in the management of innovative small businesses. While introductory information systems (IS) courses emphasize the general issues of IT/IS, IT solution services specifically applicable to small business are virtually missing in the curriculum of small business management. This paper applies the pedagogical design methodology, discusses advanced IT topics specifically for small business, provides a pedagogical outline of a new course of IT for small business, and presents an approach to delivering the course. The authors' preliminary experience indicates the usefulness of the new course for business majors.

Keywords: End-user, Pedagogy, Curriculum design and development, Special topics courses, Project-based learning

1. INTRODUCTION

Small businesses make significant contribution to the economy. In the United States small businesses with fewer than 500 employees account for more than half of the private gross domestic product (GDP) and provide around half of the private sector employment (Small Business Association, 2015). Many university or college business programs offer majors or concentrations in small business management and entrepreneurship ("List of Colleges with Majors in Small Business," 2015). Research into small business management (Fillis and Wagner, 2005; Dibrell, Davis, and Craig, 2008) has indicated that information technology (IT) adoption is one of the critical components of small business management. Furthermore, IT competence is a significant challenge for small businesses because of the resource constraints inherent in small businesses (Ashurst, Cragg, and Herring, 2011). To understand more about the role of IT education in small business management, the authors reviewed the curricula web sites of more than 200 small business management / entrepreneurship programs listed in ("List of Colleges with Majors in Small Business," 2015). They found that the majority of these programs offer introductory information systems (IS) courses that address basic knowledge and general issues of IT/IS, but few offer a course that covers the specific body of knowledge of IT/IS for small business. This paper explains that many important subjects of IT/IS beyond the scope of general introductory IS courses are crucial for small business management.

Naturally, the IS discipline would play a major role in developing a course of IT for small business. The IS community has curriculum guidelines, IS 2010 (Topi et al., 2010), for undergraduate degree programs in IS and IT in general. Whilst there is a wide range of adherence to the IS 2010 curriculum guidelines in business schools (Bell, Mills, and Fadel, 2013), the comprehensive list of the topics covered in IS 2010 provides the base for designing and redesigning IS courses for all non-IS students to make IS/IT courses more relevant to generic business education. The most notable trend in the IS curriculum renewal movement is to develop more new IS electives to meet the needs of the job market of post-secondary graduates (Drinka and Yen, 2008). Business students, the next generation of business managers, must acquire the fundamental theories of IT as well as the essential IT skills during their business education (Surendra and Denton, 2009). Technical skills should focus

more on problem solving and practical applications (Downey, McGaughey, and Roach, 2009). This paper reports how this challenge is met by designing the contents of a course of IT for small business for undergraduate business majors. The methodology used in this study is pedagogical design (van den Akker et al., 2006). Following the phases of pedagogical design as portrayed by (Reeves, 2006), the paper describes the development of curriculum and the initial implementation of the new course as follows. Section 2 provides an overview of the new course of IT for small business. Section 3 presents the rationale and considerations of the design of this course. Section 4 reports the authors' approach to teaching this course. Section 5 discusses the authors' experiences delivering this course. Finally, Section 6 concludes the study.

2. OVERVIEW OF THE COURSE

The selection of topics is a crucial task for the pedagogy design of a new course. Few discussions on a course of IT for small business can be found in the literature or on the Internet. The authors' determination of the components of a course of IT for small business is based on four considerations. First, the selected IT topics must be suitable for junior or senior business undergraduates at the university or four-year college level. The course should go beyond the basic IT literacy such as use of the Internet, mobile communication, and Microsoft Office as these bodies of knowledge have become the prerequisite of any high-level university course (McDonald, 2004). Second, the selected IT topics should be representative for small business practices, and should cover principal knowledge of IT for small business management. This consideration will be addressed in the next section. Third, the computing resources used for teaching and learning this course should be commonly available to ordinary small businesses. Fourth, the total workload for students should be manageable. Taking these factors into account, the authors have selected six topics for IT for small business, as listed below:

- End user computing and systems architectures for small business
- End user decision support systems
- End user business intelligence
- Social media for small business
- Cloud computing for small business
- Open source software for small business.

Each of the above IT topics represents a particular type of IT solution services. In this course, an IT solution service is a self-contained IT application unit of business functionality. The central teaching/learning methodology applied to this course is instructional IT planning for small business; that is, students learn IT solution services in the context of small business management through projects of small business IT planning.

The course described in this paper is entitled "Information Technology for Small Business," and is designed as an online elective course for majors in management of small business and entrepreneurship as well as other business majors who are interested in this subject. The prerequisite of this elective course is the introductory IS course that provides an introduction to essential issues of IT/IS for all business students. This course is to be taught over one semester with 3 credit hours. In its design, this course consists of two distinct modules: a teaching module and a project module. The teaching module provides a comprehensive overview of representative IT solution services for small business. The project module provides an opportunity for students to develop IT planning projects for real small business organizations.

3. JUSTIFICATION OF THE COURSE

3.1 Need for a Course of IT for Small Business

IT provides an opportunity for small businesses to level the playing field with the competition (Niehm et al., 2010). The small business owners' IT literacy is a determinant of effective IT strategic alignment in implementing the strategic goals for their small businesses (Chao and Chandra, 2012). The dissemination of advanced knowledge of IT for small business will broaden the visions of the next generation small business owners, business consultants, and the IT industry to develop innovative IT strategies that may have extraordinary impacts on the economy. On the other hand, the introductory IS course, which is commonly offered in many business programs, normally covers general concepts of IS and global issues of IT (Wang, 2007; Whelan and Firth, 2012). Hence, an advanced IT course designed specifically for small business management is needed in the business curriculum.

3.2 Important Key Concepts and Topics of IT for Small Business

This course should cover the key concepts and topics of IT for small business beyond the basic computer literacy and the general knowledge of IS/IT that business students have learned from other foundation courses. The key components particularly relevant to IT solution services for small business are identified for this course through literature surveys and curriculum surveys, as summarized below.

3.2.1 End user computing and system architectures for small business: End user computing is an organizational venture for small businesses (Lin and Wu, 2004). A small business should stablish its end user computing goals to align with the business strategy and to address a full range of potential organizational challenges. End user computing strategy is a key element of small business strategic management (Ilias and Razak, 2011). The course starts with small business strategies related to the use of IT services in the context of small business.

The technical subjects of this topic include design of end user computing infrastructure and architecture for small business, end user computing resource structure, and various types of end user computing software products for small business.

3.2.2 End user decision support systems: Decision-making is a crucial part of business. Nowadays an effective and efficient decision-making process must be supported by specific computerized decision support systems (DSS), given the competitive nature of the business environment. The topics of decision-making process and DSS are lacking in

many business programs, but are particularly relevant for small business management (Jamaluddin and Dickie, 2011). The definition and scope of DSS has been migrating over the past decades. Recently, DSS overlap with business intelligence systems, knowledge management systems, and organizational (or group) decision support systems. The fundamental theory of DSS (Sprague, 1980) applicable particularly to the end user computing environment is the focal concept of this topic, as small business end users often need to develop their own DSS for effective decision-making. Implementation of end user DSS in the end user computing environment is also covered in this topic.

3.2.3 End user business intelligence: The big data problem has become an important issue (Wolff, 2014). Big data are characterized by volume, velocity, variety, and veracity. Big data not only is a reality for large corporations for years, but also raises opportunities for small businesses. IT empowers small businesses to manage data resources to meet the challenges of big data. In today's global economy, small business managers count on business intelligence (BI) practices to maintain or increase business growth (Ortiz and Lombardo, 2009; Amabile et al., 2013). Due to the diversified characteristics and needs of small businesses, choices of suitable commercialized BI systems for small businesses are limited (Guarda et al., 2013). This course introduces the basic concepts of BI, and focuses on end user BI. To fit the context of small business management, the course covers the OLAP (online analytical process) techniques in the Microsoft Excel and Access computing environment. Although the traditional OLAP techniques are still the most popular BI tool for small business today, the accessibility of other BI tools for end users has grown rapidly over recent years. In the perspective of DSS, BI has become a synonym for decision support tools in the big data age. The integration of end user DSS and accessible end user BI tools enables efficient and effective decision making for small businesses.

3.2.4 Social media for small business: Social media or social networks continue to proliferate. Fastest growing small businesses are increasingly making use of social media tools to communicate with their customers, partners and vendors (Barnes and Jacobsen, 2013). Social networks are valuable and reachable to new entrepreneurs and small business owners because the ability to access information, advice, and necessary resources is vital to the success (Robinson and Stubberud, 2011). Small business owners often use different outlets of social networks to receive broad advices. The use of social networks for entrepreneurial learning practices enables small businesses to respond to the changing business environment rapidly (Peltier and Naidu, 2012). Social media generate massive unstructured data, and drive small businesses to engage in meaningful BI. The course covers the important concepts and practice guides of social media for small business in four aspects: marketing, customer services, recruiting, and business networking.

3.2.5 Cloud computing for small business: Cloud computing is a broad approach to implementing service-oriented architecture on the Internet (Wang and Wang, 2014). It allows customized platforms and networks to be used for small businesses to meet their special needs without a large computing capacity. Cloud computing enhances the capability, accessibility, measurability, and network effects for small businesses (Mladenow, Kryvinska, and Strauss, 2012). Cloud computing provides a means of partial IT outsourcing or IT "self-services" for small businesses to rent software systems and/or even computer hardware. Using cloud computing, small businesses are able to reduce investments and operational costs while improving productivity. Whilst various cloud computing technologies are available on the Internet for small businesses to choose, selecting right cloud computing products is a challenging task for ordinary small businesses (Tewari and Sharma, 2012). Through introducing deployment models and service levels models, this course emphasizes on public cloud services at three major levels: Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS). It also covers topics of selection and evaluation of cloud services at each level.

3.2.6 Open source software for small business: Open source software products are popular and have been widely used by all types of organizations. As small businesses typically have significant financial and human capital constraints, open source software is appealing particularly to small businesses (Macredie and Mijinyawa, 2011). However, open source software has several significant disadvantages for small businesses. There is no control over the evolution of an open source software product. A small business might have to find and hire developers or independent consultants for installation, training, or technical support. The quality and reliability of services could be unstable. Also, security could be a concern when using open source software. This course discusses the issues of open source software for small business, presents diversified types of open source software products for small business, and provides a guide of selecting open source software products for small business through a case study of open source ERP (Enterprise Resource Planning) systems.

3.2.7 Summary: The theme of this new course and its relationships with the prerequisite knowledge of IT foundations is depicted in Figure 1. The authors are confident that the selected IT topics are substantial for small business management and the business students who are interested in this elective course.

3.3 Value to Student Learning

This course is designed for students who are considering careers in the small business field. The central objective of the course is to add more value to these students' learning. The nature of this course is practice-oriented, and the course requires students to apply their learned knowledge of IT solution services to the real small business world. The ultimate learning deliverable of this course is a project report of comprehensive IT planning for a real small business organization.

The course applies the competency-based learning approach (Scholtz, Cilliers, and Calitz, 2012). Each of the six topics has its learning outcome, known as a competency. The competencies of this course are listed in the course syllabus (see Appendix for a sample course syllabus).

Students work on one competency at a time, which is a component of a larger learning goal of the course. Students might find some topics more difficult than others. The competency-based learning method allows a student to learn individual skills at her/his own pace.

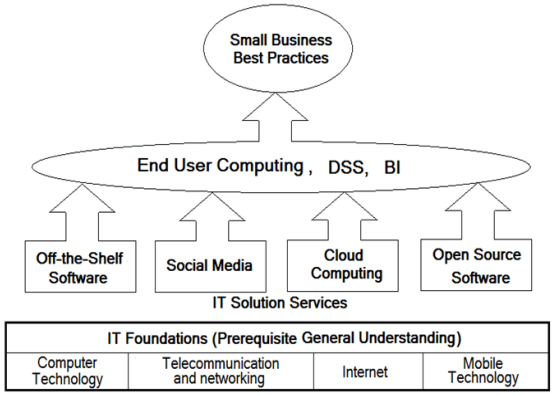

Figure 1. The Theme of the New Course of IT for Small Business

Given the diversified interests of students, individualization of learning objects, such as supplemental readings and video clips, is preferred. An online learning management system (Blackboard in the present case) is an ideal tool to post individualized learning objects to meet the diversified needs.

IT for small business is not a new issue, but the course is new to the business programs. The instructors of this course may not possess extensive small business experiences. Students in this course, on the other hand, might have first-hand knowledge about small business. In fact, the class for this course is a learning community of students who are interested in IT for small business. The instructor is the coordinator of the learning community. Student engagement in this collaborative learning environment in a variety ways would add great value to the learning community.

4. DELIVERY OF THE COURSE

The authors were unable to find a suitable textbook for the course. To give students a comprehensive guide for their studies, a new set of online teaching notes with nine chapters (available upon request) has been developed. The online course uses the flip teaching method, and encourages self-learning on the students' part. It consists of two modules: a teaching module and a project module. The online learning system is the Blackboard learning management system.

4.1 Teaching Module

The online course contents of the teaching module are organized into chapters with time schedules. Each chapter contains the following items:

- Learning objectives
- Task and activities
- Lecture notes of the chapter
- Chapter summary lecture video
- Key terms highlights
- Discussion questions
- Assignment
- Quiz.

Students read the online teaching material, including lecture PPT (Microsoft PowerPoint presentation), by themselves, and then participate in online class discussions. The discussion board is organized into chapters and provides students with forums to share learning experiences with the instructor and other classmates. Online discussions are graded to encourage participation. The assignment for each chapter is an intermediate proposal for a project topic related to the chapter, and is a part of preparation for the project module. Upon the completion of each chapter, students take a timed online multiple-choice test to demonstrate the understanding of key concepts covered in the chapter. The teaching module uses about 60% of the total contact hours.

4.2. Project Module

A commonly accepted teaching strategy is that IT competence can be developed only through hands-on practices (Guthrie, 2010). A project module is used in this course for students to develop practical IT competence through applying the knowledge learned from the teaching module. The project module concentrates on "action learning", and requires students to conduct their real-world projects. Each student selects a local small business organization for the project. The major task of the course project is to design a comprehensive business plan that recommends appropriate IT solution services for the selected small business organization to improve the business practice and to implement the business model (or business strategy). A project should include two parts: (a) a general plan of how various IT solution services can be applied to the selected small business organization in implementing the business strategy (or business model); and (b) detailed steps of implementation of one or two IT solution services.

The assignment for each chapter in the teaching module requires each student to relate the topic of the chapter to her/his selected small business organization. Upon the completion of all assignments, students should be able to develop the first part of the course project. Students then choose one or two topics to develop the second part of the project and conduct a detailed investigation. Students are allowed to make a good balance between the two parts of the project based on their own interests.

The course contents of the project module include the following items:

- Project guidelines and requirements
- Project rubrics
- Project discussion board
- Video clips of project for each topic of IT solution services, and overviews of good exemplar projects.

The videos in the project module explain the project requirements, and provide good examples of diversified topics of IT solution services for small business. The detailed project guideline, requirements, and rubrics are listed in the course syllabus (see a sample in Appendix).

5. DISCUSSION

This online course of IT for small business has been offered twice at one of the co-authors' universities. The course evaluations have shown that all students gave positive feedbacks of overall satisfaction with the course. According to the authors' observations of the learning outcomes as well as the comments from the students, students who were eligible to take this course have no difficulty in learning the material outlined in this paper and conducting projects. After the course, some students have demonstrated their abilities to participate in more formal projects of IT planning for small business.

As this course is an all-new course and few similar courses can be found in the literature or on the Internet, a comparative study for evaluating this course is unfeasible. Nevertheless, the following findings might be useful for pedagogical designers who are interested in this subject.

Overall, the students have received positive experiences from this course. A student who has worked in small business firms for many years wrote:

> *I would recommend this class to many majors in the business school as I think it is helpful to grasp the concepts. Understanding the decision making process in respect to IT architecture, software, cloud, etc. is essential for any small business owner. I am a business major, but my work experience has been in accounting. The use of these concepts can be very useful to any accountant in an environment that requires statistical reports. The accounting programs I have used do not offer those capabilities and the accountant is often the one called upon to run these types of reports. Having these types of tools is a plus.*

A student who is working at a small computer service firm as a technician made the following comment.

> *This course was very educational. I am studying information systems and have worked in the field for 10+ years. This course provided a great foundation for me to assist businesses in working more efficiently by converting manual business processes or poor information systems they use into better, more powerful information systems/solutions that provide real value and return to the business. The online format of this course great and the material was well constructed. I recommend this course to any business student.*

This course is designed primarily for business majors in management of small business and entrepreneurship. However, not all students in this course have the same level of experiences in small business. Some have worked for small business firms, others are just thinking about having their own companies. The authors' observation indicated that the students' performance in this course was highly correlated with their motivations to learn about small business, whilst first-hand experiences with small business were valuable. For example,

> *My project was based on the business my mom works for, so I was learning a lot about the inner workings of it from her throughout the course. It became clear that there was a lack of project management in the company so I was a bit excited to get to apply the knowledge I gained to a real life scenario that actually has an effect on my family. Whether or not the business will use and benefit from my ideas I can't say, but I've been passing on my ideas that could be beneficial to my mom and it'd be a neat feeling if I actually make an impact on the business.*

Generally, students embraced the challenge of end user DSS and end user BI for small business, and undertook deep thinking on decision making and data analytics in their own perspective of small business. The following excerpts of students' online discussions have proved the value of knowledge about decision-making process for ill-structured decision problems.

> ***Student A:*** *I think this course makes students change their way of thinking when working on the IT field. Now I see how my decisions can improve or hurt the business and I have a better understanding of the decision making progress.*
> ***Student B:*** *I think it is amazing all the steps a small business follows at the time of making a decision. Before taking this course I thought it was just matter of saying "yes" or "no".*
> ***Student C:*** *Great post. I am amazed at how much goes into some simple decision-making in small business ownership. Though I am towards the end of my college "career", I had thought I learned everything that was involved in the decision-making process.*

While many students were interested in the topics of DSS and BI, no project with detailed implementations of end user DSS or end user BI has been observed. Conceivably, DSS or BI projects demand more hard technical skills such as VBA (Visual Basic for Applications) and OLAP than other projects. The discussion board of the online learning system is an important forum for students to exchange learning experiences. However, similar to the authors' observation in their other online courses, not every student actively participates in discussions. The most effective method for learning experience sharing is the individualized video clips that provide specific examples of IT solution services for small business. The course site on the Blackboard learning management system is a digital book that integrates the teaching note, supplemental documents, and linked visual/audio artifacts.

Given the curriculum constraints in many programs, it is difficult to add a required course. Currently this course is offered as an elective course. In the future, it might be possible to merge these critical topics into the required introductory information systems course particularly for

majors in management of small business and entrepreneurship.

Clearly, this study has its limitations, and more investigations and innovative revisions to this online elective course are certainly necessary to improve the quality of the course. Future studies on this subject include the following investigation agenda:

- Use of non-traditional assessment techniques and tools such as Socrative (2015) to assess students learning on a real-time basis
- Exploring effective learning processes involved in this course
- More assessment tests based on a large student population
- More case studies that involve more instructors of the course
- Improvement of the contents of the course.

The current online education system of this course is not an open access system. This online course is able to become one of MOOC (Massive Open Online Courses) in the future to receive diversified opinions from experts in IT/IS, business education, communication science, and other related disciplines, and to collect qualitative as well as quantitative data from multiple-cases.

6. CONCLUSIONS

Although the design of this course is far from mature, the authors are convinced that knowledge of IT for small business will certainly be beneficial for the business program. Overall, the outcomes of the implementation indicate that the course discussed in this paper is a valuable component of curriculum renewal in business programs.

One of the most important aspects of effective business education is to help business students to develop problem-solving skills to meet the challenges of the fast changing business environment. Business educators need to have a greater understanding of problem solving schemes in order to design innovative curricula that emphasize students' practical skill sets. This study has made contributions to IT/IS education as it has initiated and implemented a course of IT for small business management. The summarized pedagogy of the course discussed in this paper can be applied by others to change the traditional way of teaching IT/IS for business students by shifting from general to business-major-specific. The most compelling implication of this study for IT/IS education is the recognition of the potentially positive effect of IT/IS pedagogical renewal to enhance the body of knowledge of IT for small business.

7. ACKNOWLEDGEMENTS

The comments of the Associate Editor and seven anonymous reviewers have contributed significantly to the revisions of the paper.

8. REFERENCES

Amabile, S., Laghzaoui, S., Peignot, J., Peneranda, A., & Boudrandi, S. (2013). Business Intelligence Practices for Exporting SMEs. *International Business Research*, 6(2), 101-111.

Ashurst, C., Cragg, P. & Herring, P. (2011). The Role of IT Competences in Gaining Value from E-Business: An SME Case Study. *International Small Business Journal*, 30(6), 640–658.

Barnes, N. G. & Jacobsen, S. (2013). Adoption of Social Media by Fast-Growing Companies: Innovation Among the Inc. 500. *Journal of Marketing Development and Competitiveness*, 7(1), 11-17.

Bell, C. C., Mills, R. J., & Fadel, K. J. (2013). An Analysis of Undergraduate Information Systems (IS) Curriculum: Adherence to IS 2010 Curriculum Guidelines. *Communications of the Association for Information Systems*, 32, Article 2.

Chao, C. & Chandra, A. (2012). Impact of Owner's Knowledge of Information Technology (IT) on Strategic Alignment and IT Adoption in US Small Firms. *Journal of Small Business and Enterprise Development*, 19(1), 114-131.

Dibrell, C., Davis, P.S., & Craig, J. (2008). Fueling Innovation through Information Technology in SMEs. *Journal of Small Business Management*, 46(2), 203-218.

Downey, J. P., McGaughey, R., & Roach, D. (2009). MIS Versus Computer Science: An Empirical Comparison of the Influences on the Students' Choice for Major. *Journal of Information Systems Education*, 20(3), 357-368.

Drinka, D. & Yen, M. Y. (2008). Controlling Curriculum Redesign with a Process Improvement Model. *Journal of Information Systems Education*, 19(3), 331-342.

Fillis, I. & Wagner, B. (2005). E-business Development: An Exploratory Investigation of the Small Firm. *International Small Business Journal*, 23(6), 604–634.

Guarda, T., Santos, M., Pinto, F., Augusto, M., & Silva, C. (2013). Business Intelligence as a Competitive Advantage for SMEs. *International Journal of Trade, Economics and Finance*, 4(4), 187-190.

Guthrie, C. (2010). Towards Greater Learner Control: Web Supported Project-Based Learning. *Journal of Information Systems Education*, 21(1), 121-130.

Ilias, A. & Razak, M. Z. A. (2011). A validation of the End-User Computing Satisfaction (EUCS) towards Computerized Accounting System (CAS). *Global Business and Management Research: An International Journal*, 3(2), 119-135.

Jamaluddin, A. & Dickie, C. (2011). Decision-Making Related to Business Growth: Malay Small Businesses in Selangor. *International Journal of Business and Management*, 6(10), 284-296.

Lin, F. & Wu, J. (2004). An Empirical Study of End-User Computing Acceptance Factors in Small and Medium Enterprises in Taiwan: Analyzed by Structural Equation Modeling. *Journal of Computer Information Systems*, 44(3), 98-108.

Macredie, R. D. & Mijinyawa, K. (2011). A Theory-Grounded Framework of Open Source Software Adoption in SMEs. *European Journal of Information Systems*, 20, 237–250.

McDonald, D. S. (2004). Computer Literacy Skills for Computer Information Systems Majors: A Case Study. *Journal of Information Systems Education*, 15(1), 19-33.

Mladenow, A., Kryvinska, N., & Strauss, C. (2012). Towards Cloud-Centric Service Environments. *Journal of Service Science Research*, 4, 213-234.

Niehm, L. S., Tyner, K., Shelley, M. C., & Fitzgerald, M. A. (2010). Technology Adoption in Small Family-Owned Businesses: Accessibility, Perceived Advantage, and Information Technology Literacy. *Journal of Family and Economic Issues*, 31, 498–515.

Ortiz, R. F. & Lombardo, G. F. (2009). Influence of the Capacities of Top Management on the Internationalization of SMEs. *Entrepreneurship and Regional Studies*, 21(2), 131-154.

Peltier, J. W. & Naidu, G. M. (2012). Social Networks across the SME Organizational Lifecycle. *Journal of Small Business and Enterprise Development*, 19(1), 56-73.

Reeves, T. C. (2006). Design Research from a Technology Perspective, in van den Akker, J., Gravemeijer, K., McKenney, S., & Nieveen, N. (eds.) *Educational Design Research* (pp. 52-66). London, UK: Routledge.

Robinson, S. & Stubberud, H. A. (2011). Social Networks and Entrepreneurial Growth. *International Journal of Management and Information Systems*, 15(4), 65-70.

Scholtz, B., Cilliers, C., & Calitz, A. (2012). A Comprehensive, Competency-Based Education Framework using Medium-Sized ERP Systems. *Journal of Information Systems Education*, 23(4), 345-358.

Small Business Association (2015). Retrieved January 31, 2015, from www.sba.gov.

Socrative (2015). Retrieved January 31, 2015, from http://www.socrative.com/.

Sprague, R. (1980). A Framework for the Development of Decision Support Systems. *MIS Quarterly*, 4(4), 1-25.

Surendra, N. C. & Denton, J. W. (2009). Designing IS Curricula for Practical Relevance: Applying Baseball's 'Moneyball' Theory. *Journal of Information Systems Education*, 20(1), 77-85.

Tewari, N. & Sharma, M. K. (2012). Popular Cloud Applications: A Case Study. *Journal of Information and Operations Management*, 3(1), 232-235.

Topi, H., Valacich, J. S., Wright, R. T., Kaiser, K., Nunamaker, J. F., Jr., Sipior, J. C., & Vreede, G. (2010). IS 2010: Curriculum Guidelines for Undergraduate Degree Programs in Information Systems. *Communications of the Association for Information Systems*, 26, Article 18.

van den Akker, J., Gravemeijer, K., McKenney, S., & Nieveen, N. (eds.) (2006). *Educational Design Research*. London, UK: Routledge.

Wang, S. (2007). An Examination of the Introductory MIS Course. *Journal of Information Technology Education*, 6, 135-152.

Wang, H. & Wang, S. (2014). Ontological Map of Service Oriented Architecture for Shared Services Management. *Expert Systems with Applications*, 41(5), 2362-2371.

Whelan, E. & Firth, D. (2012). Changing the Introductory IS Course to Improve Future Enrollments: An Irish Perspective. *Journal of Information Systems Education*, 23(4), 395-405.

Wolff, J. G. (2014). Big Data and the SP Theory of Intelligence. *IEEE Access*, 2, 301-315.

List of Colleges with Majors in Entrepreneurship or Small Business (2015). Retrieved January 31, 2015, from https://www.slu.edu/x17964.xml.

AUTHOR BIOGRAPHIES

Shouhong Wang is a Professor of Management Information Systems at University of Massachusetts Dartmouth. He received his PhD in Information Systems from McMaster University. His teaching and research interests include innovative teaching, semantic networks, knowledge management, and business intelligence. He has published over 120 papers in academic journals and several books in the MIS area.

Hai Wang is an Associate Professor of Computing and Information Systems at Saint Mary's University. He received his PhD from University of Toronto. He has published over 40 papers in academic journals and several textbooks. His teaching and research interests are in areas of big data, semantic web, and business analytics.

APPENDIX. SAMPLE COURSE SYLLABUS

Information Technology for Small Business
(Online Course)

Course Description:
A comprehensive overview of information technology methodologies that are widely applied in small businesses. Topics include small business strategies related to the use of information technology services, end user computing, end user decision support systems, end user business intelligence, social media for small business, cloud computing for small business, and open source software for small business.

Prerequisite: Information Systems, or permission.

Course Credits: 3 credits.

Textbook: (Omitted in this document. Available on request.)

Course Objectives:
Upon successful completion of the course, the student will be able to:

(1) Identify various information technology methodologies to improve small business management.
(2) Develop a comprehensive plan for a small business to use various information technology methodologies, including end user computing, decision support systems, social media, cloud computing, open source applications, and others, for marketing, recruiting, networking, customer services, decision making, and business intelligence.

Competencies and Contact Hours:
The student will be introduced to:

- End-user computing (2 hours)
- End-user software (2 hours)
- End-user decision support systems for small business (4 hours)
- Business intelligence for small business (2 hours)
- Social media for small business (2 hours)
- Cloud computing for small business (2 hours)
- Open source software (2 hours)

The student will understand:

- Design of end user computing architecture for small business (1 hour)
- Components and development of small business decision support systems (5 hours)
- OLAP for small business (4 hours)
- Applications of social media for small business (3 hours)
- Applications of cloud computing for small business (3 hours)
- Evaluate open source software (3 hours)

The student will be able to:

- Research into contemporary IT for small business (3 hours)
- Develop a business plan of use of IT for a small business (7 hours)

Communication Plan and Online Participation: (Omitted for this document)

Methods of Instruction:
This is an online course. We will apply the flip teaching approach to this course using the following methods.

(1) You read the textbook (including lecture PPT and summary videos) by yourself first, instead of lectures in face-to-face classes.
(2) You then participate in online class discussions and complete the assignment for each chapter. You may share learning experiences with the instructor and other classmates.
(3) Upon the completion of reading and comprehension of the textbook, you conduct a course project.

The general requirements are:

(1) Students are required to read the textbook and take a quiz for each chapter (9 quizzes, online, closed book, timed, 100 questions in total).
(2) Each student must complete a course project in order to clearly understand the concepts covered in course, and apply them to a practical scene. The assignments of individual chapters are actually used for you to prepare your course project as an integrated assignment.

Schedule:

Week	Topics	Online Activities
1	Chapter 1. Introduction	Assignment, Online discussion, and Quiz
2	Chapter 2. End user computing	Assignment, Online discussion, and Quiz
3	Chapter 3. End user software for small business	Assignment, Online discussion, and Quiz
4	Chapter 4. End user decision support systems	Assignment, Online discussion, and Quiz
5	Chapter 5. End user DSS implementation	Assignment, Online discussion, and Quiz
6	Chapter 6. End user business intelligence	Assignment, Online discussion, and Quiz
7	Chapter 7. Social media for small business	Assignment, Online discussion, and Quiz
8	Chapter 8. Cloud computing for small business	Assignment, Online discussion, and Quiz
9	Chapter 9. Open source software for small business	Assignment, Online discussion, and Quiz
10	Project proposal	**Project proposal**
11	Project Stage 1: Introduction	Online discussion, Project preparation
12	Project Stage 2: Overall plan	Online discussion, Project preparation
13	Project Stage 3: In-depth-1	Online discussion, Project preparation
14	Project Stage 3: In-depth-2	Online discussion, Project preparation
15	Project Stage 4: Write-up, Project Presentations	**Project report due**

Project Requirements:

The objectives of the course project are to be:

(1) Able apply the concepts learned from the textbook to the real small business you are familiar with.

(2) Able to design a comprehensive business plan for the real small business to use various IT solution services technologies to implement the business model (or business strategy) and to improve the business practices.

Each student will select a local small business organization for this study.

(Note: Students have the responsibility to get permission from an authority of the organization for the study. The organization's name may be disguised in the project report.)

General Guide:

The course project is a business plan of applications of IT for the concerned small business organization. This plan covers all aspects you learned from this course in general, and gives emphasis to one or two topics. In other words, the business plan should include two parts:

(a) A general plan of how various IT solution services can be applied to the small business organization in implementing the business model (or business strategy);

(b) Specific implementation of an IT solution service(s) to improve the management practice in implementing the business model (or business strategy).

Each chapter has an assignment. The assignment of each chapter allows you to learn specific types of IT solution services for small business discussed in the chapter. Upon the completion of all the assignments, you should be able to develop the first part of the course project. You then select some topics to develop the second part of the project and develop a detailed investigation on one or two topics. The videos in the project module provide good examples of these topics.

For the second part of course project, if you choose topic off-the-shelf end user software (Chapter 3), or social media for small business (Chapter 7), or cloud computing for small business (Chapter 8), or open source software for small business (Chapter 9), you need to cover end user architecture design (Chapter 2) first, in order to make your project meaningful. DSS (Chapter 4 and Chapter 5) or BI (Chapter 6) is rather technical, and could be a good topic for students who are interested in decision-making and business intelligence techniques.

You make a good balance between the two parts of the business plan of applications of IT solution services to meet your interests.

Format of Project Proposal and Project Report: (Omitted in this document).

Rubrics for Course Project:

(Project weights 70% of the Course)	**Learning Outcomes of Practical Course Projects**	**Performance** Poor Excellent 0 10
Managerial Significance (30%)	° Clearly defined objectives of the project ° Clearly developed and linked the business strategy and the end user computing strategy ° Excellent project scope/scale	
Analytical and thinking Skills (30%)	° Clear insight of IT for small business ° Excellent design thinking - Excellent selections of IT solution services for the small business; or - Excellent design and implementation of IT applications for the small business ° Value-adding business plan of use of IT	
Written Documentation and Oral Presentation (10%)	° Excellent documentation organization ° Rich support material ° Professional page/slides layout	

Academic Policies and Online Learning Resources: (Omitted in this document.)

STATEMENT OF PEER REVIEW INTEGRITY

All papers published in the Journal of Information Systems Education have undergone rigorous peer review. This includes an initial editor screening and double-blind refereeing by three or more expert referees.

ISSN 1055-3096