Integrating ERP Project System into IS Project Management Curriculum

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Abstract

The project management course is one of the most important IS core courses in the Information Systems (IS) curriculum. It is widely taught as a capstone course in the major, and teaches not only the project management related processes and body of knowledge, but also the practical tools that help organizations manage their IT projects effectively. Although Microsoft Project is widely adopted in IS project management courses for project planning and scheduling, it is relatively difficult to track the actual project cost and to manage the complete project life cycle because it is not integrated into ERP systems. Recognizing the limitations of Microsoft Project as a project management tool, the authors proposed a comprehensive framework to incorporate ERP SAP Project Systems into the project management course in addition to Microsoft Project. We believe this approach enhances students' understanding of the project management body of knowledge, as specified by the Project Management Institute (PMI) as well as the IS 2010 Curriculum Guidelines. This paper provides the course design, course materials, delivery method, and preliminary student learning outcomes assessment. The data analysis of the course assessment indicates significant improvements on student learning outcomes and positive learning experiences. The purpose of the paper is to provide a guideline for those who seek to incorporate ERP technology in the IS project management curriculum.

Keywords: ERP, Enterprise Resource Planning, SAP, IS curriculum, Project Management

1. INTRODUCTION

Organizations increasingly invest in information technology (IT) to gain operational efficiency and competitive advantage. In the US, companies spend more than $250 billion each year on IT projects. On average, IT investment accounts for about 40 percent of a company's annual capital expenditure. Despite the large investment, the majority of IT projects failed to achieve development goals on time and within budget (CHAOS Report, 1995). Effective management of IT projects is a serious organizational challenge. IT project management knowledge and skills have been identified as one of the most important competencies for today's IT professionals.

As illustrated by the recent research within the IS Education field, IS Project Management is ranked as the third most popular among the seven IS core courses in 2010 (Huang, Ma &

Wang, 2014). The survey indicates the course is offered in 261 out of 394 (66.2%) IS programs in the United States, slightly below widely covered Data and Information Management and System Analysis and Design courses. In addition, an IS Project Management course is core in both IS 2010 Curriculum Guidelines (Topi, et al., 2010) and the proposed IS 2015 Curriculum Guidelines (Rosenthal and Dhariwal, 2015). Both Guidelines recommend that the IS Project Management course should address the following perspectives:

"This course discusses the processes, methods, techniques and tools that organizations use to manage their information systems projects. The course covers a systematic methodology for initiating, planning, executing, controlling, and closing projects. This course assumes that project management in the modern organization is a complex team-based activity, where various types of technologies (including project management software as well as software to support group collaboration) are an inherent part of the project management process. This core course is primarily focused on initiating, planning, executing, controlling, and closing information systems projects. Implementation of ERP project management software in the course will provide students hands-on experience on all the project development phases."

As an important software tool specializing in project management, Microsoft Project is widely taught in an IS project management related curriculum. The software is easy to use and sufficient for project planning and scheduling purposes, but it is difficult to implement the entire project management lifecycle as specified in the above course description defined in IS 2015 Curriculum Guideline (Rosenthal and Dhariwal, 2015). For example, Microsoft Project is stand-alone, single-user software, and it is difficult to share and update in a team setting. Because it is not integrated in any ERP systems, it is not sufficient to calculate the actual project cost in real time due to missing financial accounting, managerial accounting and human resources data in the enterprise system (Franz, 2015). Even though including Microsoft Project in IS curriculum is convenient and necessary, it cannot replace the power of ERP project management tools. In addition, it is possible to integrate Microsoft Project with the SAP ERP system (Microsoft White Paper, 2012). Students who learn both tools could potentially experience managing the entire project lifecycle (as illustrated in Figure 1), taking advantage of

ease-of-use planning with Microsoft Project, and powerful project execution with actual cost and schedule tracking and reporting using the SAP ERP system. This paper provides a new framework of integrating the ERP project system in a Project Management course using SAP University Alliances Project System curriculum materials (Wassmann and Wilder, 2012). Figure 1 shows the full project management cycle in SAP ERP.
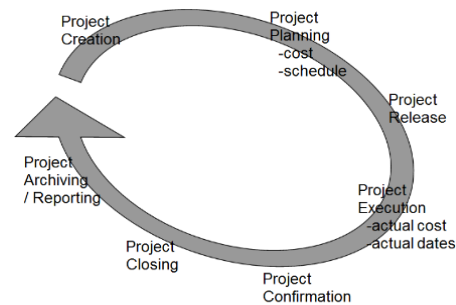

Figure 1 Project Management Cycle

This proposed approach will spinally provide students with in-depth IS project management knowledge and extensive skills which they will need for their project management career development. Specifically, the course examines the unique characteristics of IT projects and introduces the student to a variety of project management techniques that can be applied in an IT project management context. This paper is intended to serve as a useful teaching resource for IS educators who seek to teach ERP systems in a college of business. The remainder of the paper will specify how to integrate SAP ERP to the IS project management course in the proposed framework in the following four sections: ERP Project management systems, proposed ERP project management framework, assessment of learning outcomes and conclusion.

2. ERP PROJECT MANAGEMENT SYSTEM

SAP ERP systems are generic, packaged software systems that provide comprehensive functionality and business processes integration across the enterprise e-business platform with its centralized data repository shared by all the business processes. Unlike other project management software, the SAP ERP Project System has the multidisciplinary scope of enterprise system that requires internal cross-disciplinary coordination (Anderson, *et al.,* 2009). According to Franz (2015), SAP ERP Project System is one of the few project

management tools that are able to completely map the entire life cycle of a project, and closely integrate with accounting, materials management, sales, production, human resources, and finance accounting and controlling modules of SAP ERP system. Those project managers who rely on project management tools without such integration features often have to enter project data, such as cost information or time data several times, resulting in inefficiency and project failure. SAP PS is able to effectively carry out project planning, execution, and control processes, improving the chance of project success by appropriately managing scope, time and cost of an enterprise project. Figure 2 illustrates how the SAP ERP Project System is integrated to Financial Accounting (FI), Controlling (CO), Project System (PS), Sales & Distribution (SD), Material Management (MM), Production Planning (PP), & Plant Maintenance (PM), Human Resources (HR).

Figure 2 PS and SAP Application modules

3. PROPOSED COURSE FRAMEWORK

The proposed IS Project Management Course introduces students to fundamental project management principles, theories, and best practices as described in the Project Management Institute's PMBOK Guide. "Information Technology Project Management" (Marchewka, 2012) is used as the textbook to help students understand the unique characteristics of IT projects and major project management knowledge areas, including how to effectively manage project scope, time, cost, quality, and risk under IT project context. Besides project management-related concepts, this course employs hands-on exercises and tutorials to introduce effective project management tools, including Microsoft Project

and SAP ERP Project Systems. In addition, this course also address the specific challenges associated with ERP software implementation, open source software adoption and outsourced IT projects through group case analysis and presentations.

SAP ERP project management knowledge and SAP ERP Project System activities are introduced in the second part of the project management course after students have hands-on experience in Microsoft Project.

At the end of the course, students will be able to:
- describe the role of PS in SAP ERP System
- identify differences between SAP PS and MS Project
- explain the reasons to use SAP PS for Project Management
- describe SAP PS Structure, SAP PS Data Integration and Process Automation
- Create the Work Breakdown Structure (WBS) of a Project
- Plan cost and dates using Cost Models
- Post actual costs and dates for WBS elements
- Create reports on project plan and actual data analysis

SAP Project System course materials and the manual of hands-on activities are based on the SAP Project System curriculum developed by the SAP University Alliance, which provides free curriculum access to faculty of its member universities. The course materials have been reviewed and based on A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)

SAP Project System knowledge and skills are delivered with lectures, followed by hands-on experience. The laboratory manuals focus on step-by-step instruction on task completion of seven modules of hands-on activities. The combination of hands-on laboratory learning and project management process concepts learning via reading, discussion, and case study is a powerful and effective approach to learn SAP ERP Project System. It is a challenge to balance the two streams and relate the hands-on learning with project management major body knowledge areas in the course. But these learning by doing activities really help students to integrate theory with practices of effective project management.

4. LEARNING ASSESSMENT

In order to verify the effectiveness of the developed framework, authors developed a SAP Project System (PS) Survey instrument based on SAP (PS) learning objectives for two metropolitan public universities. The survey includes assessment of student SAP Project System knowledge, skills and learning experiences. The pre-survey and post-survey were conducted in the two sections of IT Project Management classes in the spring semester of 2015. Among the 66 enrolled students, 45 (68%) of them are undergraduate seniors major in Information Systems from the College of Business, and 21 (32%) of them are graduate students major in Computer Science and Software Engineering from the College of Engineering. The questionnaire survey measures students perceived SAP ERP PS knowledge, skills and learning experiences using a Likert scale from 1 to 5.

Sixty-five out of 66 students who took the IS project management course participated in the pre-survey. Fifty-one students participated in the post-survey. The rating scale is from lowest to highest. The post survey includes students learning experience category in addition to knowledge and skills. Descriptive analysis was performed on the collected data. Figure 3 in the Appendix shows the result of the SAP PS Knowledge Pre-Survey conducted on 65 students. Question 2 and Question 3 ratings in Figure 3 are higher because the pre-survey was conducted after students received an introduction to the SAP PS lecture before the hands-on SAP PS exercises, and students had already experienced utilizing Microsoft Project. Because the lecture covers the overview of SAP PS and some of its main differences from Microsoft Project, it is not surprising that students were clearer on concepts related to Question 2 and Question 3. It also implies that hands-on experiences are required for better understanding of the rest of the five questions.

Figure 4 compares the pre-survey and post-survey results regarding students' perceived SAP PS knowledge. As illustrated in Figure 4, student ratings in the seven areas of SAP PS are increased by at least one point in the post survey. However, the overall post-survey ratings of the seven survey items are between 3 and 3.5, this indicates that using SAP PS to manage projects effectively requires a comprehensive understanding of ERP business processes integration. The learning experience could be overwhelming for students who take an IS Project Management class without taking the ERP business process class first. Therefore, there is room to improve the ratings in the future.

Figure 5 shows significant improvement in SAP PS related skills after hands-on SAP PS exercises. Project Releasing achieves the highest rating among the other skills. This suggests students understand the importance of the concept of project releasing—which is a milestone activity that ends the project planning stage and starts the project execution stage within the project management lifecycle.

Figure 6 shows students learning experience ratings are very positive in all eight areas. The ERP PS hands-on experience helps them gain confidence in their ability to solve problems, and contributes to their positive experiences in learning IS project management. Problem solving receives the highest rating because students have to learn how to view error message, trace, and fix errors in SAP PS. Unlike Microsoft Project, there is no undo-button in SAP PS.

5. CONCLUSION

The authors proposed a comprehensive framework to introduce an ERP-based project management tool in the project management course, and also assessed student learning outcomes from the course using survey instruments. The contribution of the paper is to provide IS educators an innovative approach to integrate SAP ERP Project System into an IS project management course, as defined in the IS 2010 Curriculum Guideline. The study introduces course design, course material, and delivery methods. The data analysis of the preliminary surveys indicate successful learning outcomes and positive learning experiences as result of learning SAP ERP Project System in the IS project management course. Some students also received internships and full time positions in SAP ERP client companies after taking the course.

6. ACKNOWLEDGEMENTS

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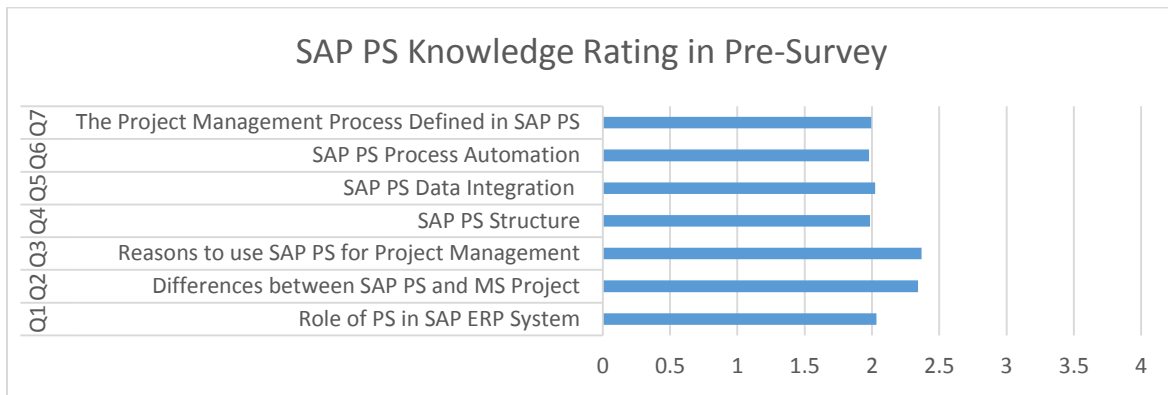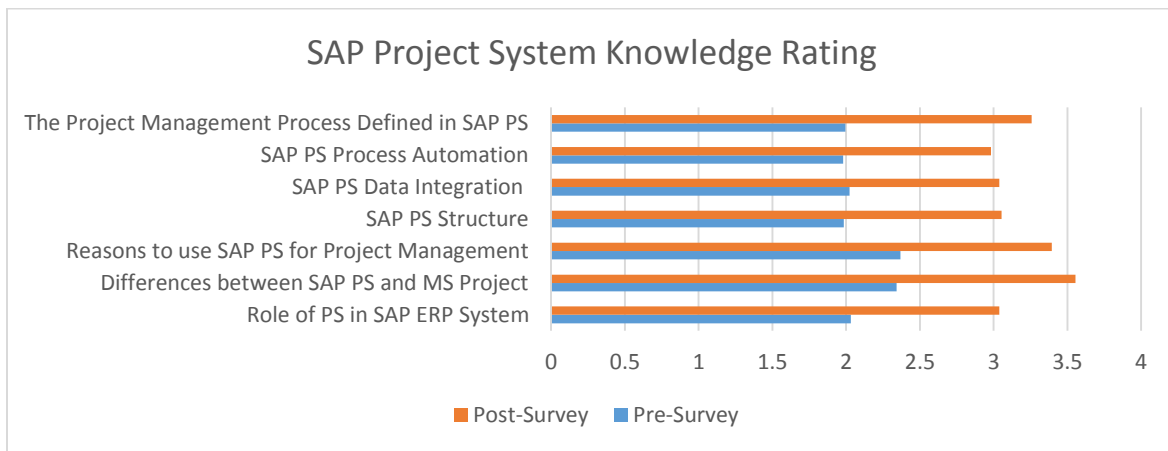
APPENDIX

Figure 3 SAP PS Knowledge Pre-Survey

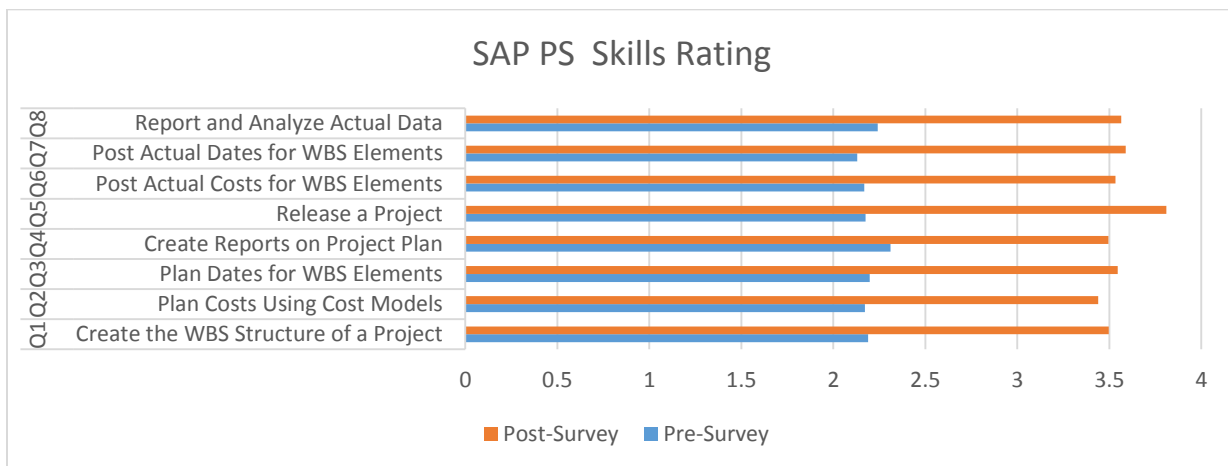Figure 4 SAP PS Knowledge Pre-Survey and Post-Survey

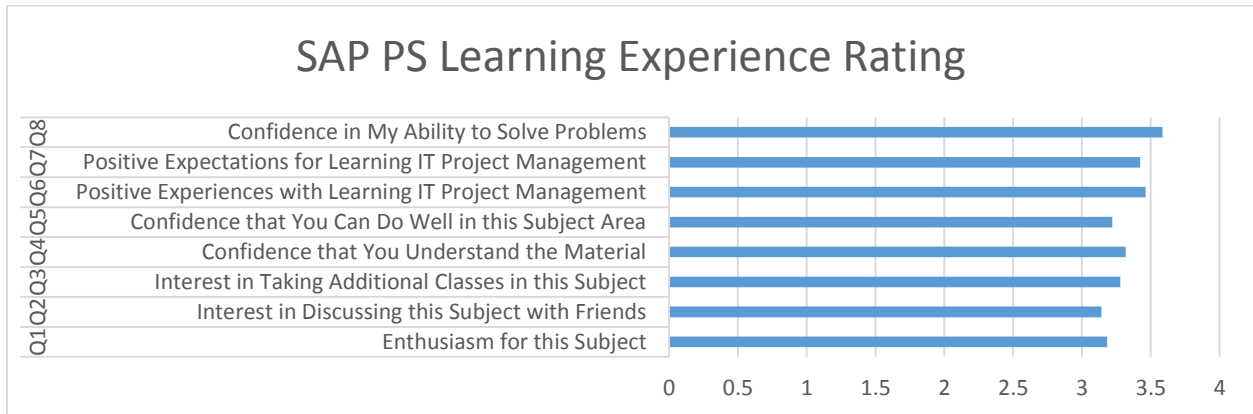_____

Figure 5 SAP Project PS Skills in Pre-Survey and Post-Survey

Figure 6 SAP PS Learning Experience Post-Survey

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