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5-20-2011

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ABSTRACT

This paper reports on the use of two activities in a project management class to enhance student learning. One activity employees Second Life to create the experience of managing a project from beginning to end and the other activity simulates the types of decisions required during project execution. A survey of the students at the end of the course finds that students perceived that these activities improved their abilities with the subject matter of the course.

Keywords

Project Management, Instruction, Games, Engagement

INTRODUCTION

Boring, theoretical, dry, not realistic: Words that represent the Project Management Body of Knowledge (PMBOK) as viewed by students. Additionally, Barron (2005) suggests that learning effective project management skills is difficult and that the subject is not as straightforward as is generally thought. While students can adequately understand the theoretical aspects of the PMBOK well enough to pass a course, many fail to understand the application and importance of the principles embedded in the details. This problem has not gone unrecognized and many articles have reported on approaches to enhance project management knowledge through the use of games and/or experiential learning (Zwikael & Gonen, 2007). Barron (2005) also suggests that the learning environment must provide engagement and experience with complicated processes to be effective. This paper reports on both an experiential learning activity and a game used in a project management course to enhance understanding of the PMBOK principles and their importance.

IMPORTANCE OF PROJECT MANAGEMENT

Projects, especially IT projects, have a poor reputation for on-time, on-budget completion and even outright failure (Johnson et al., 2001; Zwikael & Globerson, 2006). The application of project management principles to IS development has been found to one of the most important factors to project success (Nah & Delgado, 2006). These principles are being widely adopted by business and been promoted for years through certification, books, training, and college education (Nicholas & Hidding, 2010). However, for college education in project management to be successful, students must go beyond the textbook and develop an understanding of their importance and application (Barron, 2005).

ENGAGEMENT

Business games have been used for decades to engage students enhance student learning of the subject matter (Faria, 1998). These games have been used across many business disciplines including, more recently, project management and have been effective learning tools (Zwikael & Gonen, 2007). Games are effective because they engage students at a deeper level than lectures or assignments, force students to attempt to apply the concepts in a relatively risk free environment. business the field of project management allows the student to go beyond the textbook and engage in real-life challenges and problems. This paper presents the use of two activities in a project management course and reports on the student's perception of their learning through these activities.

THE COURSE

The course is a project management course in the undergraduate business curriculum at a comprehensive university. The course is required of Information Systems majors but open to all students at the junior level or higher. Typically only about 15% of students in the course are not IS majors. The course covers all nine project management body of knowledge (PMBOK) areas (Integration, Scope, Time, Cost, Quality, Human Resource, Communications, Risk and Procurement Management) as well as the five process groups (Initiating, Planning, Execution, Control and Closing). Students complete assignments and exercises on the class material and three exams. The fundamentals of Microsoft Project are also taught and students are required to use it in the term project that is described below.

THE ACTIVITIES

Two activities were introduced into the course to attempt to develop a deeper understanding of the PMBOK topics and the importance of these items. The first of these was a term project in which students, in groups of three, had to build a house in Second Life. The objective of this project is to help integrate understanding of the PMBOK with project work in a quasi-realistic setting. The specific goals of the exercise were to facilitate understanding of project plan development and estimation, scope management, time management, cost management, and risk management. Students were provided with tutorials to learn building in Second Life on their own. The project was carried out on an island in Second Life that is owned by the university. Prior to beginning building the house, students were required to get plan approval from the project sponsor (the professor). Two interim reports and a closure reports were required. Interim project reports required a progress report based on Earned Value Analysis and a memo indicating any corrective actions that needed to be taken. Two weeks prior to the project due date a change in specifications was handed out and students were instructed to follow project management principles to handle the change. If a group followed proper scope management procedures and provided an assessment of the impact of the change on schedule and budget to the sponsor, the change was rejected and those students were asked not to tell other students. Students who did not do this had to perform the modification to the project. Over the three semesters this course activity has been included in the course only about 25% of groups perform a change request. On the day the closure report is due all students are informed of the impact of not following proper scope management.

Activity two is a simulation exercise focused on project execution and control. In this activity the students are competing to complete the implementation of an ERP system on time and on budget. Prior to the exercise, students are provided with a work break down structure, network diagram of the activities involved in the project and their mandatory dependencies, a description of the project resources (people), their capabilities, availability, and cost, an MS project file with the project set up with both mandatory and discretionary dependencies and initial resource assignments, and a set of rules about how they can adjust the project to correct for any problems encountered during execution.

The exercise begins with the professor running the simulation and providing the whole class the simulated progress of the project at the first status review point. The project in the exercise had five status review points embedded in it. Students entered the progress into Microsoft Project and then used project to determine if they were on target or not. At this point the students could make any, or all, of the following adjustments to the project: adding or removing resources from a task, splitting tasks, adjusting start dates of tasks. All adjustments had to meet project requirements such as no over allocation of resources, no assignment of resources to tasks they were qualified for, and no violation of mandatory task dependencies. While students are evaluating progress the professor makes copies of the spreadsheet for each student group. From this point forward different groups will take different actions and their simulation results have to be specific to their actions. The students then bring their adjustments (if any) to the professor and the simulation is run to the next status review. This process is repeated until the simulated project reaches completion. After all students have executed the project to completion a class discussion allows students to share their strategies, frustrations, and results.

THE ASSESSMENT

A survey was given to students at the end of each of the three semesters the two activities were used to determine if the exercises were having an impact on student learning. The survey results are presented in Table 1 for the Second Life activity and in Table 2 for the execution simulation.

Question (Strongly Disagree=1, Strongly Agree=7)	Mean	Std. Dev.	Z	*p*
The project improved my ability to plan a project.	5.16	1.35	6.86	0.00

The project improved my ability to execute a project.	5.25	1.31	7.64	0.00
The project improved my ability to control a project.	4.94	1.28	5.80	0.00
The project had **no** impact on my understanding of how to plan a project.	2.52	1.41	-8.28	0.00
The project had **no** impact on my understanding of how to execute a project	2.39	1.43	-8.88	0.00
The project had **no** impact on my understanding of how to control a project	2.48	1.39	-8.66	0.00
The project was very important in my understanding of how to apply project management principles.	4.62	1.37	3.58	0.00
The project helped me understand the importance of project management.	4.83	1.50	4.43	0.00
My knowledge of Scope Management was enhanced by the project.	4.91	1.41	5.14	0.00
My understanding of the importance of Scope Management was enhanced by the project.	5.05	1.33	6.31	0.00
My knowledge of Time Management was enhanced by the project.	5.23	1.23	8.02	0.00
My understanding of the importance of Time Management was enhanced by the project.	5.41	1.23	9.14	0.00
My knowledge of Cost Management was enhanced by project.	4.00	1.63	0.00	0.50
My understanding of the importance of Cost Management was enhanced by the project.	4.17	1.51	0.91	0.18
My knowledge of Quality Management was enhanced by the project.	4.13	1.57	0.64	0.26
My understanding of the importance of Quality Management was enhanced by the project.	4.20	1.64	0.99	0.16
My knowledge of Risk Management was enhanced by the project.	4.20	1.47	1.05	0.15
My understanding of the importance of Risk Management was enhanced by the project.	4.34	1.57	1.76	0.04

Table 1. Second Life Project Survey Results

Question (Strongly Disagree=1, Strongly Agree=7)	Mean	Std. Dev.	Z	*p*
The simulation improved my understanding of the application of *Earned Value Analysis* during project execution.	5.26	1.39	7.54	0.00
The simulation improved my understanding of the application of *SPI*.	5.29	1.33	8.06	0.00
The simulation improved my understanding of the application of *CPI*.	5.33	1.31	8.43	0.00
The simulation improved my understanding of the use of project buffers.	4.23	1.54	1.25	0.10
The simulation improved my understanding of the application of *crashing*.	5.33	1.35	8.22	0.00
The simulation improved my understanding of the application of *fast tracking*.	4.99	1.47	5.57	0.00
The simulation improved my understanding of role of the project manager during project execution.	5.52	1.13	11.16	0.00
The simulation improved my overall understanding of the process of project management.	5.57	1.22	10.67	0.00

Table 2. Simulation Exercise Survey Results

The test statistic examines the probability of examining the observed mean is the true mean of the population was four (4). The results indicate that students perceived that the Second Life project had a positive impact on their understanding and ability with project planning, execution, and control. They also perceived the project to have improved their understanding

of the knowledge and importance of Scope and Time management. They did not perceive an improved understanding of Cost, Quality and Risk Management and did not perceive an increased understanding of the importance of Cost and Quality management but did perceive an increased understanding of the importance of Risk management.

The results for the project execution simulation were more positive overall. The targeted goals of improving the understanding the tools used during project execution were all perceived by the students to have occurred with the exception of the use of project buffers.

DISCUSSION AND CONCLUSION

Engaging students with projects and games appears to lead them to perceive that they have learned the subject matter better than they could have if they'd only done assignments, lecture, and reading. However, it appears that a more targeted approach may be more effective than a big overarching project. The Second Life project tried to enhance learning in multiple PMBOK areas, but appeared to only succeed in a limited number. Explanations for the limited value of the project in enhancing Cost, Quality, and Risk management likely vary by area. Cost management may have been limited by the fact that the costs were not real and had little meaning to the students whereas Time clearly was limited. They had to finish by the deadline because the class would end. Quality management clearly was also not a big factor in the project. There were no inspections, no testing, and no need to produce multiple versions with the same qualities. The house only had to conform to the plan. Thus quality was not an issue they concerned themselves with. Finally, risk management also was not a real issue. The primary issues students identified in the project plan were other students not doing their work and access being limited to Second Life by server and platform problems. The former risk is something they deal with in almost every course so they likely had built in strategies for dealing with the problem and the latter risk was viewed as largely out of their control. Future versions of this course will attempt to include activities targeted directly at these aspects of project management.

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