Teaching Project Management for IT Students: Methods and Approach

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Abstract. The importance of learning project management has been globally accepted by many higher institutions. Despite of its importance, there are challenges in educating the learners especially when they are from diverse area of information technology. The purpose of this study is to identify methods and approaches used by other educators in performing teaching and learning activities within this domain. Appropriate method and approaches were adopted and a study was performed. Feedback from students from a diverse area of specialization were captured and analyzed. Online survey is used to support the data gathering process. The result was then compiled and analyzed. The relationship between different methods and approach adopted and student perception towards its implementation is identified. The overall findings show that there is a relationship between the approach and methods where student found it beneficial and facilitate in completing the final year project. Finally the research draws conclusions and recommended multiple assessment and teaching approaches may help student to understand project management better.

Keywords: IT Project management

1. Introduction

Teaching project management is important for Information Technology students. The goal is for learners to discover ways to manage resources, schedule, and communications in producing project deliverables. At present, this course is offered to undergraduate and postgraduate level in faculties of many universities [1], [12]. Professional bodies and researchers recognizes the importance of teaching this course, as an example the ACM curriculum have acknowledged Project Management as one core area of technology [6]. In general, there are benefits of teaching this course as much as constant demand of graduates with project management knowledge and skills [1]. Consequently, academicians highlighted the importance of teaching this course to students as it embraces elements which support research processes. Overall, this positioned project management as a compulsory course in an institute of higher education [12]. Meanwhile, Chaos report by Standish group reveals the growing number of success rates on IT projects since 1994 and when they conducted a study which involving over 40,000 projects for 10 years to reach the findings. “People have become much more savvy in project management,” is a statement made by the Standish Chairman, Jim Johnson, as he mentioned people start up with zero knowledge and started to make a step forward and learned to make it right from the beginning [4]. This explains that there is a need in understanding the IT project management process and practice as this shall help learners to manage project better.

While what was reported by the Standish group is focusing on projects in the United States, the situation is somehow different on the other side of the country Malaysia. As project management practices was not prominently shared and imprecisely practiced by the government agencies. This leads to the inability of studying models of project management practiced in the country. As the Tenth Malaysia Plan was released in 2010, the education ministry together with the industry have highlighted that, the country is still scarce of graduates with a set of important skills. This includes communication, teamwork, decision making, leadership and soft skills [9]. Observing this issue, the list of skills and knowledge is available as in the project management syllabus thought at many higher institutions in Malaysia. When the importance of learning this course is continuously highlighted, it is very important that the content and method of delivery
is planned and performed accordingly, this is to achieve the maximum learning point. Realizing the importance of this situation, a study was conducted to learn from what was done by other academicians and list of methods and approach used in teaching project management is compiled and analyzed. The most suitable method and approach within the education and university scope and boundary is then adopted. The students’ feedback and overall performance is then captured and analyzed. The overall result is then shared, overall purpose of this study is to find out students perceptions towards the adopted methods and approach consequently search ways to further improve the current teaching method.

1.1. Background

This study was performed in University Kuala Lumpur (UNIKL) Malaysia Institute of Information Technology (MIIT). In this Information Technology faculty, project management is a compulsory course for undergraduate students. This includes the Bachelor in Information Technology (BIT) and Bachelor in Engineering Technology (BET) students. The BIT program is unique as there are four different specialization area, namely E-Commerce (ICB 41303), Entrepreneurial Management (IEB 40903), Systems Security (IKB 41403) and Software Engineering (ISB 41403). While the Bachelor in Engineering Technology students’ is specializing in the Networking Systems (INB 20430). In this particular study, the author discussed the overall method of teaching including syllabus content, teaching and assessment methods used in class. Feedback and overall students feedback was captured, then analyzed and discussed. A little bit background of the person teaching this course. Have eleven years of experience in the education industry. She has been responsible handling this course for three consequent years. She also experienced several system development projects as part of the consultancy assignment for the university. In addition she obtained the EC-Council E-Business Professional: Project Management professional body certification since 2009. Her focus area of specialization is management science and information system and web development and technology and project management.

1.2. Problem Statement

The project management syllabus is theory in nature. Challenges exist in teaching this course as it may be uninteresting when taught theoretically [6]. Obviously this course belongs to the area of Information System, where many of the courses are conceptual in nature. Many agreed that there are always challenge when it comes to teaching theoretical and conceptual courses. This statement is well supported by [1] as he stated that “the abstract nature of surrounding the management of IT systems makes the concept is hard to teach in classroom”. While Hosseini is referring to Piaget (1974) LMS model of “cognitive information processing”, this model helps to explain the difficulty of teaching IT Project management to students as there are many abstract related content discussed in the course [1]. In relation to the abstractness of the course content, it is important for the instructor to identify the right teaching method and approaches for students particularly when they are from various specialization area of information technology.

Based on the instructor knowledge and experience, it was discovered that students’ face difficulties understanding the theory and concept when the method of teaching is straight forward and monotonous. This was agreed by Grist and Myers when he describes that the traditional theory-based classroom approach is considered conventional and passive which may result to dullness. A study was performed to learn from others on what was practiced when teaching this course. A thorough study was performed by [3] who reviewed numbers of related teaching methods and approaches. The detail of different of each is demonstrated in Table 1.

<table>
<thead>
<tr>
<th>Author</th>
<th>Approach</th>
</tr>
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<tbody>
<tr>
<td>Murphy Jennings (1999)</td>
<td>Response interaction based on simulation project: provide rapid response in decision making</td>
</tr>
<tr>
<td>&amp; Jennings (2002)</td>
<td></td>
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<tr>
<td>Grenci &amp; Hull (2004)</td>
<td>Case based methods : less active but realistic</td>
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<tr>
<td>&amp; Munns (2001)</td>
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<tr>
<td>Ellen &amp; West (2003)</td>
<td>Action learning approach: emphasize on</td>
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However, some of the approach is practical while some may be otherwise. It could be difficult to apply all methods at once as there are pros and cons of each. Despite the level of success, final outcomes of each approach may vary [3]. Practically, [3] recommended a mixed of theoretical lecture and activity-based as the most suitable method for educators in teaching project management concepts and skills. It was highlighted that combining the approaches through Jennings found out that “various methods may complement each other to promote the development of a wider range of skills”. This is also supported by [1] who have completed a study and recommended several approaches in teaching Information System courses. This is planned by the instructor for the project management class in MIIT. The selected method includes lecture, question and answers related to the lecture, hands-on computer assignments using software, and a final project to practice the concepts and techniques learnt. All of these have been used to support the instructor in conducting the Project Management course. This is a combination of a multiple methods of assessments together with conceptual delivery through theoretical lecture in class with the computer lab and the hands-on approach is adopted. However the success of the methods selected may subject to various factors such as the number of audience, level of knowledge and experience of the learner and the instructor, the instructors approach, learning environment and many others.

For the purpose of this study, additional guideline is set by the instructor for the students as a preparation before they enroll to Project Management. The guideline stated that only students who have performed the industrial placement and in the final year should enroll to this course. This information is provided for each program coordinator as this is the ideal way of relaying the information to students of various programs. The intention of this guideline is to ensure students preparedness is well planned thus this shall facilitate the learning experience. On top of that, student academic standing and total number of credits carries for the semester should also be taken into consideration as this may affect the students overall performance. With this additional information, instructor expects students will perform well in both course and the final year project.

This project is a requirement for students who are in their final semesters. A completion of final year project is one of the requirements for student to graduate. It carries six (6) credits and should be perform in two consecutive semesters. Students are required to communicate with supervisors and discuss progress related to their final year project. The requirement of the first semester will have students to prepare a proposal and present in to panels for evaluation. Student is expected to complete their study, present the overall project findings and submit the thesis as final documentation by the end of their second semester of final year project. Through the instructor’s observation, many students found it difficult to perform the project as they may have no experience conducting research. Their study will depends on what directed by the supervisor. However, some supervisor may not be resourceful, thus student may face difficulties to execute their project and complete the thesis and comply with the graduating requirement. This is where project management comes into the picture, with the intention to provide an overall view of ways, tips and tricks to manage the final year project. This is the starting point for them to learn from other projects experience and this shall facilitate them in the execution of their final year project. Practically this is where the “win-win” situation occurs for students if they are registered to project management class and perform the final year project. The value of this idea was well supported by Holzbaur [12] as he stated that project is outcome based, hence in this case the project is equivalent to the final year project. Besides conducting a project, the project process contains research elements where leaning projects management processes may “lead to the methodology of research” [12]. By applying one of the seven Covey’s good habit, “Think win-win”, students will benefit of performing two different tasks in parallel. This includes the project management coursework and preliminary study for their first part of the final year project. Besides, the instructor determined that this a good opportunity for the student to obtain hands-on experience managing projects where they have to deal with real clients and perform the project processes learnt in class. Rationally, students may find it interesting when they know what to expect when working on their project. For the
instructor, this is an opportunity to examine and observe students capability in developing the project management process and provide consultation whenever required.

2. Research Methodology

To perform this study several steps were involved. Adopting the mixed method approach [6], primary and secondary data is compiled and analyzed. As a preliminary study what was done by other researcher was compiled and analyzed. Action research is performed by adopting selected method and implemented in class. Teaching materials and class assessments were conducted in fourteen weeks of study for January 2011 semester. At the end of the semester an online survey and interview session was performed from the sample population of the BIT and BET students in MIIT. The result of this is then compiled and analyzed.

2.1. Project Management Course Structure

In UNIKL MIIT, the class is delivered in two hours lecture and three hours of lab and tutorial session every week. The normal semester runs for fourteen weeks. The theory session is conducted in a class while the hands-on activity is performed in the computer labs. The numbers of hours spent in teaching this course represents the three credit hours which is a requirement in teaching core courses in MIIT. E-Learning approach is used to support the overall teaching and learning by having related course materials shared online. As part of the university practice and requirement, cooperative learning is embedded into the teaching approach. In class presentation, group work and in class contribution is counted as part of the assessment in the coursework. For the purpose of teaching this course, the instructor adopted the course syllabus from “Managing IT Projects, Sixth Edition” [8]. The lecture covers the following main topics.

- Introduction to Project Management
- The Project Management and IT Context
- The Project Management Process Groups
- Project Integration Management
- Project Scope Management
- Project Time Management
- Project Cost Management
- Project Quality Management
- Project Human Resource Management
- Project Communication Management
- Project Risk Management

Although most of the course content involves many project management theories and concept, in this paper, the instructor highlights the part of the subject which relates to assessment and project deliverables which defines the hands-on experience for the students.

2.2. Assessments

The assessment for this course is divided into two main parts. The first part carries sixty percent (60%) of the coursework while second part carries forty percent (40%) on final exam basis. E-learning portal is mainly used as a medium to deliver assessment questions and other related learning materials to students. The detail of coursework performed is divided as follows:

- Project Proposal
- Project Folio
- Final Project Presentation and Final Report
- Assignments
- Test

2.1.1. Project Proposal and Presentation: Groupwork (10%)

Students were to prepare a project proposal related to their final year project and present it in class. Since the students are of many programs therefore the projects was made into different categories to suit the student specialization and preference. The category of projects includes information system development, Prototype modeling or business plan and development and pure IT and business related research. Students
should identify real or potential client to perform the user requirements and they must the literature review to support the content of their study. Student is required to present and submit the hardcopy of their proposal by week seven. Assessment will be based on the thoroughness of their preliminary study and the proposal submitted.

2.1.2. **Project Folio: Groupwork (10%)**

There are nine areas of knowledge and five processes involved in project life cycle in Project Management (PMBOK Guide, 2000). However this activity is overlapping and is not in a step by step sequence. The five project processes are initiating, planning, executing, controlling and closing [8]. In each of these processes students are required to prepare the key deliverables, this includes project charters, scope statements, project plan, Gantt chart, budget and cost estimate, priority risk list. All of the documents were compiled into the project folio and updating is required on weekly basis.

2.1.3. **Final Project Presentation and Report: Groupwork (30%)**

By the end of week twelve, students are required to prepare a presentation slides and present the overall project progress and deliverables as update their achievement status. Final and complete project report should be submitted to support the detail project process and activities and act as the key deliverables of the project. The assessment is based on the overall presentation, the percentage of project achievement and the final report.

2.1.4. **Assignments: Groupwork and Individual (10%)**

Microsoft project and Microsoft Excel are the tools used in developing the project schedule and project cost estimation and baseline. Students were to prepare a project plan using Microsoft Project and develop the Gantt chart to show the overall project plan. Student were to calculate and identify the critical path of their project propose the plan to overcome the situation. Microsoft Excel is used in developing the cost budgeting and estimation, they are required to develop the detail cost budgeting and estimation. They must ensure that both budget and estimation appropriately balance to produce an ultimate cost baseline. Seminar and reports is required as part of the assignment. Students are required to attend seminar arranged by the instructor. The objective of this seminar is to help students to better understand the real project implementation through information shared by the invited speaker from the industry. The content of the seminar involve the implementation of Enterprise Application from the project management perspective. The speaker shares his experience on the implementation of project processes and highlights the importance of acquiring soft skills and consistently adhere positive attitude to sustain a successful career. The speaker shared the working environment, the skills required by many employers in the industry and job prospects available for IT graduates.

2.1.5. **Test: Individual (10%) and Final Exam (40%)**

Online test is performed through the e-learning portal. Short answers and essay questions were posted. The tests coverage is from chapter one to seven of the syllabus. Students were to answer our questions within one hour. The tests were manually assessed and marks were given based on the average percentage of the correct answers. Overall findings from the test have shown that, there are difficulties in controlling the test when it was online. Plagiarism is the culture what assessment was performed online. Instructors have to take a control measure to minimize plagiarism throughout the session. While final exam was perform at the end of the semester. The final question comprise of eighty percent of the content discussed in class. Open ended and case studies questions were prepared for the students to evaluate their overall understanding.

3. **Results**

At the end of week thirteen, an online survey was performed, using the Kwiksurvey.com. This online survey is used as it is free and the data is easily managed, converted and cleansed. The survey contains eight questions with Likert scale responses ranging from Highly Relevant to Very Irrelevant and four open-ended questions. The feedback of the survey is then compiled and converted into the MS Excel spreadsheet. The data is then preprocessed to get a better reading. A total number of ninety three (93) students participated in the survey. These includes fifty two (52) Bachelor in IT (BIT) and forty four (41) Bachelor in Engineering Technology students. The group of student involves six (6) of the E-Commerce students, thirty one (31) Entrepreneurial Management students, ten (10) System Security students, five (5) Software Engineering
students and forty four (41) Networking System students. Finally, student perception and opinion towards the teaching methods and approach is captured. The results demonstrates students acceptance of the teaching and learning approach applied by the instructor. Refer to detail results in TABLE 2.0.

Open ended question was used to identify ways to improve current teaching approach. Overall result shows that students preferred the lecture to be conducted in a smaller group instead of in a mass lecture. It was interesting to discover their opinion towards the Cooperative Learning (CL). Since this is the first semester CL is implemented, many students still preferred the conservative in class lecture contrary to the cooperative learning approach. It was learned that performing in class presentations is not appropriate. In addition the students require more examples of case studies based on various project and related to each of their area of specialization. While some student suggested the mind mapping approach when delivering content in class.

<table>
<thead>
<tr>
<th>Questions</th>
<th>% Highly relevant</th>
<th>% Relevant</th>
<th>% Satisfactory</th>
<th>% Irrelevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you think the content of the syllabus and teaching method used is relevant?</td>
<td>28%</td>
<td>48%</td>
<td>22%</td>
<td>2%</td>
</tr>
<tr>
<td>Hands-on and lab session facilitate project process?</td>
<td>47%</td>
<td>46%</td>
<td>7%</td>
<td>0%</td>
</tr>
<tr>
<td>Do you think that implementing the IT project management processes into the Final Year Project is relevant and suitable as part of the coursework?</td>
<td>37%</td>
<td>41%</td>
<td>20%</td>
<td>2%</td>
</tr>
<tr>
<td>Level of instructors knowledge</td>
<td>57%</td>
<td>31%</td>
<td>12%</td>
<td>0%</td>
</tr>
<tr>
<td>Overall rating of the course</td>
<td>61%</td>
<td>29%</td>
<td>10%</td>
<td>0%</td>
</tr>
<tr>
<td>How this course prepares for the final year project</td>
<td>59%</td>
<td>27%</td>
<td>14%</td>
<td>0%</td>
</tr>
<tr>
<td>How relevant is cooperative learning as an approach of teaching</td>
<td>24%</td>
<td>33%</td>
<td>37%</td>
<td>6%</td>
</tr>
<tr>
<td>Is what you learned from the IT project management class helps you to manage your Final Year Project?</td>
<td>42%</td>
<td>33%</td>
<td>23%</td>
<td>2%</td>
</tr>
</tbody>
</table>

TABLE 2.0: Results of the survey

4. Conclusion
The overall process of this study has been describe and performed. Appropriate methods and approaches was adopted and implemented. The objective of this study was achieved and the results of the study were shared and briefly discussed. In a nutshell, teaching project management is important to IT undergraduates as this knowledge should be shared among educators. The approach applied show a positive impact as majority of the feedback is skewed towards a positive response. Overall comment from students shows that they appreciate the knowledge that act as a guideline in developing project processes. It is anticipated that student will be more proactive and get involved in the project activities while learning project management. The ultimate goal is to provide student the experiential exposure for their own benefit. Finally, this study proves that combining multiple methods and learning approaches could be considered by instructors as it does facilitate the process of teaching and learning.

5. References