

Using Project Deliverables and Project Management for Timely Completion of Student Projects

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Abstract

Project management is an increasingly important aspect of an employee's skill set. As students work their way through the undergraduate curriculum, there needs to be a process for them to learn more project specific skills, as most will work on some form of project in their post graduation careers. This paper outlines a method of incorporating the stages or domains of the project management life cycle into the requirements and deliverables of a student project in upper level business courses. The focus is on utilizing the stages of project management (Initiation, planning, executing, controlling, and closing) to enable students to have a more successful learning experience. Students working through this type project found that the structure and requirements in place forced them to stay on task throughout the semester, and prohibited them from falling behind, as a schedule was established in the planning stage that had to be adhered to. Through completion of projects as part of the classroom learning experience, students are better prepared to handle project activities in their careers, and are better able to blend into a team based project management effort. Feedback from students working in this learning format support the idea that using project management concepts within the semester project both enhances the learning experience and provides them with an improved skill set for future employment, even though the sample is limited and small.

Keywords: project management; education; deliverables; planning; management

INTRODUCTION

The ability to effectively transfer concepts from education and training environments to business applications is critical for future success. Business schools need to improve the methods of teaching and transferring instructional learning to real work applications. Bennis and O'Toole (2005) cautioned that business schools were placing more emphasis on research and rigor, and less on relevance and practicality. They warned that the trend leading away from using practical case approach to learning leads to a decrease in the ability of students to make pertinent decisions. In response to these warnings, more recent published works recognize and emphasize the needs to use real-world cases and projects, connecting business students with real businesses, with projects presented in the form of a client/consultant relationship (Heriot, Cook, Jones, and Simpson (2008); and Maleki (2009)).

Business school students need more exposure to realistic problems and examples to better prepare them for careers in decision making roles. Cordoba and Piki (2012) studied the effects of group structure in learning project management skills, concluding that by focusing on group based activities and real world aspects of project management the learners benefited by gaining a better understanding of their roles within the group, and how it would apply in real

projects. Assigning students in upper level courses real world based projects, including the use of project management concepts of Initiating, Planning, Executing, and Controlling/Closing, can help better prepare students for the real life project management environment that most future decision makers will face. By utilizing project deliverables in both individual and group projects, students are taken through the stages of project management, without the formalization of project management training.

Most upper level undergraduate and graduate courses include learning objectives related to the students' ability to apply the learned material to real world type problems and situations. In order to teach students to gain such a level of understanding of the material, educators have looked at different methods of instruction, including activities and project based learning. Higher education has recognized the need to develop and incorporate alternative methods of learning and teaching into the overall curriculum (Weast, 1996). Providing more realistic classroom situations through activity-based learning like games, on-the-job-training and performance assessment is an attractive method of teaching (Gloeckner, Love, & Mallette, 1995).

While the level of learning in introductory level courses tends to rely more on the lower levels

(knowledge and comprehension) of Bloom's Cognitive Domain (Bloom, Englehart, Furst, Hill, & Krathwohl, 1956), the level of learning and understanding required at the upper levels is more associated with the higher levels (analysis, synthesis, and evaluation) of the Cognitive Domain. Incorporating more action based learning into an upper level course allows students to learn at a higher level of understanding, and also requires students to bring a higher level of action and effort to the course (Reynolds & Vince, 2004).

LITERATURE REVIEW

The sharing of experiences that relate to the learning activities is an essential element of learning (Margaryan, Collis, and Cooke, 2004). Students in the classroom and employees in the training room exhibit better learning when the teaching approach incorporates activity based learning (Gloeckner, Love, & Mallette, 1995). Heineke (1997) recommends that classroom activities can be used to motivate learning, to provide a common experience, and to demonstrate concepts. Batley (1991) proposed the use of computer simulation for activity based learning of aggregate planning, using a spreadsheet model to simulate activities such as generating forecasts, recording stock levels, and considering labor capacities and resourcing. While simulation might provide some benefits to activity based learning, Hodgson and Burke (2000) warns of possible pitfalls of using simulation and suggest that those using simulation should take precautions so that the activity is well planned and thoroughly assessed to assure that it has in fact provided the learning desired.

Using project management concepts in the classroom has gotten more popular. Damnjanovic and Rispoli (2014) proposed using case studies as a means of teaching engineering students the Earned Value method of project management. Rich and Valle (2012) provided a classroom exercise for teaching quality control tools in the application of project management concepts in accordance with a set standards. Hartman, Watts, and Treleven (2013) used a simulation exercise to expose students and better prepare them for understanding the execution stage of project management. Alam, Gale, and Brown (2013) even studied the return on investment for project management training, finding a qualitative value in the training, though a quantitative measure was too difficult to determine a measureable value.

Chow, Howard, and Lambe (2009) provide an example of project-based learning with an example where students are sent to visit local businesses with the emphasis on observing the actual business process, inquiring about the operational aspects of the business, and recommending solutions to issues found during the investigation. In this type of

project, students are exposed to the actual workings of the local business, and can see first hand what the operation is doing. This allows students to experience actual, real-world business situations, and provides them with a deeper understanding of the true operation of the business than can be gained by simply reading a text and listening to a lecture.

While Lewis and Maylor (2006) found that the majority of Operations Management based games tended to be complex, they cautioned that the complexity of games may be merely based on a presumption that more complex games would better represent the real situations students will face later in application. Heriot, Cook, Jones, and Simpson (2008) provide the example of activity and project based learning through the case approach with students taking on the role of student consultants in real-world business projects with real business. They conclude that students gain a higher understanding of operations management when they are required to apply their learning through the business consultation project.

Chow, Howard, and Lambe (2008) utilized the concept of pitching pennies as an instructional game to teach the concept of variation. This interactive game can be used in courses ranging from introductory statistics to more advanced operations and quality management courses. Kim and Fish (2010) provide a teaching brief on using a realistic project approach to giving students an experiential exercise in an introductory entrepreneurship course.

THE PROJECT ASSIGNMENT

Students are provided with a description of the project requirements at the beginning of the semester. In the description of the project requirements students find that the project will consist of a well-defined problem related to realistic business situations. During the course of the project, four or five intermediate deliverable reports or activities provide the student with both a working timeline for completing the project, and ongoing feedback on their performance to date.

The deliverables also provide the students with the experience to incorporate aspect of project management as described by the Project Management Institute in the Project Management Body of Knowledge (PMBOK®, 2010). Students are tasked through the project and its deliverables to follow the five domains or stages outlined in the PMBOK®: Initiating, Planning, Executing, Monitoring and Controlling, and with the final report and presentation, Closing the Project.

The final report is expected to be the culmination of the work. If students do a good job with the five intermediate elements, they should have a solid base

for their final report. Along with the final report students make a presentation to the class which provides them the opportunity to show what they've learned about their particular process and how to approach improving it. This professional presentation is often attended by members of the department faculty, administrators, and members of local industry. The authors have found that this type of assignment with intermediate deliverables can successfully be used for both group projects and individual projects. However the examples that follow are based on applications of the Project Management Body of Knowledge to a group project.

THE DELIVERABLES

Initiation of the project

The first domain, initiating the project, leads the students through the process of identifying what the project is, as well as what it is not. Students, knowingly or not, work their way through this domain completing a number of tasks. These tasks likely include performing a project assessment to determine the feasibility and viability of the project. Tools that may be used in this task could include a project feasibility study or review or the use of business case development.

Students also should conduct a key stakeholder analysis, determining who is tied into the project, and who has the ability to make or break the project. Tools that students might use in completing this task include brainstorming and other data gathering techniques to that all interested parties are identified in order to get critical support for the project.

Groups generally are required to develop a written project scope, where they would create the objective of the project and the scope of their investigation. Students would also identify the initial requirements, an outline of a potential solution, and what other resources or training/learning may be required.

In addition to identifying the scope of the project, students must also begin to identify any risks, limitations, and other assumptions that may arise as part of the project. In determining these factors, students may rely on requirements management as an approach to identifying and documenting key concerns. This could result in the creation of requirements prioritization and the development of a requirements traceability matrix.

The final task the groups should undertake in the initiation of their project is the creation of the project charter. The charter would document and identify the scope of the project, any key milestones that need to be completed, and the remaining deliverables of the project. This task would result in a formal written project charter, which would become the first deliverable, though in some foundation-level courses

an intermediate deliverable addressing the project scope may be beneficial.

Planning for the project

The second domain or stage is the planning of the project. In this stage, students work through a number of tasks that result in the development of a well thought out plan for the execution of the project. Students should identify all details of work that must be completed in the project (in industry we call this a work breakdown structure, though the student groups typically will not).

All costs should be budgeted during this stage so that costs for the project can be accurately assessed and planned for (many of the projects related to University students will not have "costs" and "budgets" available in the traditional sense that an industrial project would, so students often must estimate these items). Students may develop a cost management plan to help identify the costs required as well as to provide a means of justifying the need for each cost.

The planning stage is also where students should create the schedules required for completing all remaining tasks and aspects of the project. In creating the schedule, the group should include a schedule management plan for managing and controlling the schedule, as well as providing a method of changing the schedule when required. By requiring students to develop an set a schedule for the project, students learn a valuable, practical skill that will help them in other classes, as well as in the work world.

The group must also develop a resource plan for the project. This resource plan should include the necessary personnel, equipment, and materials needed to complete the project. Included in the resource plan would be any training and development needs that are identified as part of the project plan. Procurement of any needed equipment and materials should be planned in this stage.

Other plans necessary in the planning stage are a communication plan, a quality management plan, and a plan for identifying and making any needed changes once the plans are agreed upon and the project is started. The communication plan is simply the method of how the group will communicate throughout the project, and any items that they agree will be needed. This could include email, phone calls, or in typical student fashion, text messaging. It also provides a means of tracking who is responsible for what tasks.

The quality of the project activities and the expectation of the group should be identified in the quality management plan. It does not need to be a

very formal plan, just a means of identifying and documenting the expectations of the group, so that each member knows what they are expected to do and how elaborate it needs to be.

In group projects, the change management plan is simply a way for the group to identify at the onset how they will make changes to schedules and deliverables of the group if changes are required (e.g., if a member of the group drops the class). This is a way for the group to plan for and be ready to adapt to changes that might come about as a result of some unintended event during the completion of the project.

The next deliverable is the planning documentation. This documentation may include any and all of the mentioned plans, as well as others not mentioned here. The group would turn in their plans to the instructor for evaluation and feedback. Based on the instructor's comments, the group either is ready to move forward in the execution of its project, or the students might need to spend more time in the planning stage if key aspects are missing.

Executing the project

In the third domain, the group will implement the project plans and execute the project. In this part of the project, the student group will do the work of the project, following the plans developed in the planning stage. The tasks of this stage rely on the actual project itself, though some generalized tasks may include getting the group to work to their highest potential. This may require some of the team to implement team building and motivating skills to get other members up to speed. Skills that may come into play include leading, communicating and negotiating.

During the execution of the project, the group may take advantage of continuous improvement and process management tools. These tools may include the use of brainstorming, problem solving, cause and effect analysis and Pareto analysis. In some situations, process control methods may be implemented during the execution stage in order to monitor and maintain the level of performance desired by the group.

During the execution stage, the student group should provide the instructor with a deliverable that identifies any problems that arose during the implementation of the project plans, and a status of any changes that were needed as a result of the implementation. This deliverable is loosely defined by the instructor, as each project will have different outcomes related to the implementation and execution of the project plans.

Monitoring and controlling the project

The fourth domain as defined by the PMBOK® is the monitoring and controlling stage. While some include this as part of the execution stage, the PMBOK® identifies it as a separate project management stage. In this stage, the group will monitor its performance to plans, identifying any deviations from the plans, and making corrections to get themselves back onto the previously identified plans.

The group will assure that the results of the project - those items that were originally determined to be delivered at the completion of the project - meet or exceed the expectations of the group (and those of the instructor). In this stage, the group might utilize performance measurement and tracking methods such as earned value, CPM, and PERT.

The group should also make sure that the project is being completed within the established budgets. They might implement some cost analysis techniques in performing this task, or use variance and trend analysis. The group will also need to document any changes to the original plans that occurred during the execution of the project.

This domain or stage may not have a specific deliverable. In some projects, there will be a deliverable that would include documentation of the changes that occurred during the execution of the project plans. It may include measures of cost performance to cost plans, and may include schedule deviations that occurred during the project. In more simplistic projects, these items may not be necessary so that a deliverable may not be needed.

Closing the project

The final domain or stage of the project cycle is the closing stage. In this stage, the group will complete the project and deliver the final project paper and/or presentation. Included in the final paper and presentation would be all of the pertinent elements of the project. The paper should include the final outcome of the project-- the results. This would provide details as to what was accomplished and what the team did in completing the project. The preliminary deliverable should provide a basis for the writing of the main paper, as each deliverable would be included within the main paper.

Most business schools have a verbal communication skill learning objective which should be incorporated. Also as part of the completion of the project, generally in a group, a presentation is made that describes and summarizes the project. This is a professional presentation that is graded for both content and the group's ability to adequately present their story. The grade on the presentation is not inconsequential, since the ability to communicate

project results is a necessary skill for any business school graduate. Students are expected to be able to not only deliver a professional presentation, but also to be able to handle rigorous questions from the audience (the instructor makes sure to ask the difficult questions to see how well students think on their feet) to show knowledge of the material as well as some critical thinking skills.

Examples of Student Projects

In the years that these projects have been implemented as part of the learning for upper-level management courses there have been many different and interesting projects provided by students. While many tend to be related to students working for their current jobs, others relate to extracurricular activities that students participate in as well as opportunities to find activities and projects related to things on campus which need improvement. One of the most common types of service industry projects is has been restaurants. Most students are familiar with various types of eating establishments in the area.

While most of these projects focus on generic aspects of delivering better service, one project took on a systematic problem at a restaurant where a student worked as a server. The problem identified by the student group was that orders taken by the server had to be input into two different order taking electronic systems within the restaurant. The food orders were input into one system that relayed the information to the kitchen so that the cooks could prepare the food items. Drink orders had to be input into a separate system at the bar so that the bartenders could prepare the beverages for the table's order. As part of the evaluation the student group found an improved method which would include purchasing and implementing a single ordering system for the restaurant. As part of the project the student who worked at the restaurant discussed this new system with the managing partner of that restaurant who investigated further and found that it was cost-effective to implement that system in his restaurant. The result of the project overall was an improved system in the restaurant which in turn improved the order taking process for the restaurant.

When students are assigned to project teams the members of the team are likely to experience periods characterized by excitement, conflict, camaraderie and empowerment. The instructor needs to be prepared to coach the student team through these stages. If the student teams are organized using a student team leader the instructor also needs to be aware that the team leader's role in each stage differs from the role of the team member. (Fitzsimmons and Fitzsimmons 2011). Fortunately, Tuckman (1965) recognized that as teams develop they pass through four sequential stages: Forming, Storming, Norming and Performing.

As the semester progresses and the assigned deliverables reach their due dates the student teams will be passing through these stages. For example, when the instructor assigns a project and the teams are formed the students will usually be eager but unsure of their individual roles. The instructor should be encouraging the project teams to focus on their individual roles and responsibilities. The team leader should be providing direction and structure. When the project team reaches the final stage of performing the instructor can recognize and congratulate the team for their accomplishments.

When the student graduates and begins a career in business they can make use of their experience as a student team member or team leader. For many of business projects employees will need to work as a member of a project team. Students will take their success or failure in a class project team to their careers in business. To the extent that the instructor has succeeded in coaching the student to be an effective member of a class project team they will also be learning how to be a successful employee in a real world business project team.

Student Feedback

Customer or student satisfaction and feedback are important aspects of measuring any method of teaching or training. Ojiako, Ashleigh, Chipulu, and Maguire (2011) focused on student perception of the learning, finding that future efforts in teaching project management should focus on pedagogically centering on the customer. It also should acknowledge the "softer parameters such as empathy and emotion."

Students who completed these projects over the last several semesters were surveyed to get specific feedback on their perspective of the project itself. While the sample of those responding was relatively small (n=21), several of the students were contacted directly to provide a small focus group (n=4) for their evaluations.

While the survey results were positive in regard to the student perception of the value of the project and its format (all responding felt that having preliminary deliverables as part of the overall project was helpful), a deeper investigation was possible through the focus group. Students in this group expressed their overall opinion that one of the more important elements of their university experience and preparation was the application of projects and activities directly related to real world situations that they will face in their careers. They suggested that this type project gives the student a working example of situations that they will have to work through later, including delivery of project related reports and materials, and working with others in group formats.

Two-thirds of students responding to the survey felt that the overall project had educational value, and over 80% felt that they learned more from the course by having the project than they would have without the project. The students in the focus group felt that their specific project, with deliverables at regular intervals, helped them to work through the project throughout the semester, and did not allow them to wait until the last minute. They felt this provided focus to the project that made it more realistic, as managers and executives would expect updates on all ongoing project activities.

Over half of the students responding to the survey had some level of interest in their project topics, supporting the idea that using activities that are interesting to the students will help keep them interested and improve their performance. Two-thirds of students suggested more deliverables be included in the project, and half suggested that more points should be assigned to each deliverable. All responding felt that having preliminary deliverables as part of the overall project was helpful. These findings support the focus group's opinion that having the deliverables throughout the project contributed to their ability to complete the project without having to rush near the end of the semester to complete tasks that may have been put off. This opinion is in line with the idea of using the deliverables to prepare students for project management, even if not directly emphasizing the elements and applications of project management.

DISCUSSION AND CONCLUSION

The results of the projects, including the oral presentations and the written reports, suggest that students have higher levels of commitment and activity in working through projects that have timelines and deliverables throughout the semester. Knowing that a portion of their overall grade relies on the intermediate deliverables, students seem to put more consistent effort into the project throughout the entire semester, rather than waiting until the latter part of the term to do the majority of the work.

Based on the feedback provided by students in both the survey and the focus group discussions, it seems reasonable to conclude that students see value in realistic projects based on real situations they are likely to experience in their careers. Students also recognize that the use of the intermediate deliverables enhanced the project by providing them with check points along the way so that they can stay focused to assure their project is thorough and complete in the time table provided for completion. The student feedback supports the original theory that providing a realistic project with activities and intermediate deliverables imbedded in the project time line will require the students to maintain focus on the project activities for a longer period of time and that the

overall results (student learning and understanding) will be greatly improved. This also supports their idea that using deliverables will both expose students to the working aspects of project management and that they will finish with a better understanding of time and project management through direct application.

The implementation of learning based activities, including semester projects that incorporate the learning objectives of the course, have proven to be a useful and important part of student learning. Auster and Wylie (2006) suggested that students who are exposed to activity based learning in the classroom through a systematic approach will become more interested, enthusiastic, and motivated to participate in the learning activities than those who are merely exposed to traditional methods of instruction. Our analysis supports this concept that using real-world projects to teach students business applications with intermediate deliverables does keep students actively working and focused on the project throughout the semester and indirectly teaches them project management skills that they will need in their careers.

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