Project Planning Techniques for Academic Advising and Learning

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Abstract

Similar to a traditional business project, managing an academic degree is associated with the triple constraints of time, cost, and scope. It is proposed that by applying project management concepts, tools, and techniques, undergraduate degree program advising and planning can be improved. After comparing the planning aspects of a conventional business project with the planning of an academic degree, this paper will present the application of project-planning techniques to manage the multiple constraints and the complexity associated with academic advising and planning. Furthermore, the paper will discuss the beneficial results of a pilot study in the context of teaching and learning opportunities in adopting this advising approach.

Key words:

Project management, undergraduate degree program, academic planning, project planning tools, Academic advising, Gantt chart, Network, Work Breakdown Structure
Project Planning Techniques for Academic Advising and Learning

Introduction

The purpose of this study is to apply project management concepts, demonstrate the usefulness of project planning techniques in improving the process of advising, and then increase the effectiveness of academic advising and planning. Motivating factors for this study are three-fold. First, past research has shown that project management concepts have not been used in academic advising and planning. Second, applying these concepts in an academic environment will demonstrate the immediate usefulness of what we teach in management curriculum. Finally, students will receive a first-hand learning experience in practical use and application of these management concepts during the period of study and beyond.

This paper begins with discussion, using literature review, to underline the importance of academic advising as a background for this study. Then a comparative analysis of concepts associated with a traditional business project planning and academic advising are presented to identify and discuss similarities and differences. In the next section, relevant project-planning techniques are presented to demonstrate the applicability of project management concepts for academic advising. For illustration purposes, these techniques are discussed in the context of an undergraduate degree major. Finally, the paper concludes with a summary analysis and recommendations for applying project management concepts to academic advising and study planning.

Background

Academic advising develops a comprehensive study plan for college studies that enhances the learning experience for students. Poor academic advising is also a major source of student discontent (Freeman, 2008). Research (Metzner, 1989) suggests that high-quality advising reduces attrition because
it engages a student in learning and a plan (Campbell, 2008). Academic advising plays a significant role in encouraging students to take advantage of learning opportunities that are designed to challenge their intellectual and their social development (Campbell, 2008). Also, good advising is the forte of a good faculty. Therefore, academic advising deserves more attention because of its impact on student life and student performance.

Advising began in the nineteenth century and by the late 1930s, nearly all the institutions of higher education had started formal advising systems (Raskin, 1979). Research has shown that early academic advisors limited their involvement in the process to providing information about courses and registration (Moore, 1976). However, academic institutions and faculty advisors are increasing their involvement in response to evidence that quality advising is a possible solution for student attrition and degree completion (Wilder, 1981; Metzner 1989).

**What is a Project?**

Project is a term that is commonly used in a business context. The Project Management Institute’s (PMI) publication, *Project Management Book of Knowledge* (PMBOK, 2004) defines “project” as a temporary endeavor to create a unique product, service, or result. From research and pragmatic perspectives, Gray and Larson (2005) defines project as a complex, non-routine, one-time effort limited by time, budget, resources, and performance specifications designed to meet customer needs. We define “project” as a distinctly different time-bound effort that has a definite beginning, definite ending. A project could have several related and interdependent tasks to create a unique product or service. Additionally, a project is usually associated with uncertainties and unknowns. The term time-bound does not mean that project duration is short; it means that there is a target date specified for its completion. From a student perspective, pursuing a college degree fits the definition of a project; it is a time-bound effort as the majority of students attempt to complete this project in four years. The academic degree has a definite beginning and a definite ending with a desired outcome of graduation.
Project Management

Formalized project management is concerned with completing a project on time, within budget, and according to the project specifications while satisfying both the customer and project team expectations (Jugdev and Müller, 2005; Anantatmula, 2006). PMI defines project management as the application of knowledge, tools, and techniques to project activities to meet project requirements (PMBOK, 2004). Project management is the application of specific procedures, tools, and skills that are used to achieve the goals of the client in terms of the project objectives. Project management consists of various phases as shown in figure 1.

![Project management life cycle diagram](image)

Figure 1: Project management life cycle

Reasons for Undertaking a Project

Projects are created and managed to fulfill an organization’s objectives or strategic needs and market demands (Birk, 1990; PMBOK, 2004; Anantatmula, 2008). In terms of undergraduate education, the objective is to complete the degree on time, within budgeted amount for the study, and to fulfill professional, and personal goals.
Project Selection

A project selection involves analyzing various alternatives to meet a specific need. A formal project selection method is employed to select the project that meets the needs effectively and efficiently. The selection of a college degree major follows a decision-making process that is similar to a business project selection because both projects can be guided by an informal and intuitive prioritization model.

Academic Degree Constraints

Managing a college degree is very much akin to managing a project in that it is constrained by schedule (number of years and number of credits), cost (of tuition, books, room, and board), and scope (the chosen degree academic requirements). These constraints will be addressed when planning techniques (academic advising) adopt a systematic approach that will maximize the likelihood of successful completion of the degree.

Summary

Table 1: Comparison between traditional project and the academic program

<table>
<thead>
<tr>
<th>Traditional Project</th>
<th>Academic Program</th>
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<tbody>
<tr>
<td>Project is distinctly different time-bound effort that has a definite beginning,</td>
<td>Distinctly different</td>
</tr>
<tr>
<td>definite ending. It could also have several related and interdependent tasks to</td>
<td>Time-bound (four years)</td>
</tr>
<tr>
<td>create a unique product or service.</td>
<td>Definite beginning and ending</td>
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<td></td>
<td>Interdependency of courses</td>
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<td></td>
<td>Unique product (personalized diploma)</td>
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<tr>
<td>Project Justification</td>
<td>Be more intellectually polished</td>
</tr>
<tr>
<td>Projects fulfill organizational objectives or strategic needs such as operational</td>
<td>Improve the ability to make more money</td>
</tr>
<tr>
<td>necessities, technological advancements, legal requirements, customer, and market</td>
<td>Be Involve in a certain sets of job or</td>
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<tr>
<td><strong>Project Planning/Advising</strong></td>
<td></td>
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<tr>
<td><strong>Professional Endeavors</strong></td>
<td></td>
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<tr>
<td>Demand.</td>
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<tr>
<td>Translated at operational level, projects are used as means to accomplish various business results such as the implementation of new processes, capital expansion, and new product or service.</td>
<td>Have the opportunity to make professional endeavors</td>
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<td></td>
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<td><strong>Project Initiation</strong></td>
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<td>A formal project selection method is employed to select the one that meets the need effectively and efficiently while fulfilling the project selection criteria.</td>
<td>Evaluate the suitability of various degree programs and universities</td>
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<tr>
<td><strong>Project Constraints</strong></td>
<td></td>
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<tr>
<td>Project is concerned with completing a project on time, within budget, and according to the project specifications while satisfying both the customer and project team expectations.</td>
<td>Complete within time frame</td>
</tr>
<tr>
<td></td>
<td>Complete within budget</td>
</tr>
<tr>
<td></td>
<td>Meet academic course requirements and policies</td>
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<td></td>
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<tr>
<td><strong>Project Execution</strong></td>
<td></td>
</tr>
<tr>
<td>Projects are executed in teams as they are driven by the need to integrate multiple disciplines and diverse skills to meet project objectives successfully.</td>
<td>Characterized with increasing complexity and requires involvement of several people in managing a student’s study plan</td>
</tr>
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</table>
Applying Project Management to Academic Advising and Learning

Conventionally, managing a college degree does not require the use of all the project management processes as is true with a typical business project. Nevertheless, academic program requirements involve several people and the project management concepts, tools, and techniques used for the purpose of managing complexity and improving planning, organizing, and self-motivating.

Work Breakdown Structure

Work Breakdown Structure (WBS) is an important project-planning tool for defining and managing the project scope. WBS uses hierarchical breakdown of the project scope into deliverable work elements such that it facilitates managing these work elements effectively and developing an optimum project schedule at the work element level (Rad & Anantatmula, 2005).

WBS Development Process

A simple way to develop a WBS is to list what is delivered after the project completion and use those deliverables at high level. It is a process of grouping all project elements into several major categories based on these major deliverables or level 1 of WBS. Each one of these categories will contain several sub-categories or lower levels of WBS. More accurately, development of a WBS involves dividing the project into many parts that will make the project deliverable. This process of dividing the deliverable items is continued until the project has been divided into manageable, discrete, and identifiable items that require simple tasks to complete. A rule of thumb is to keep dividing the project until the elements cannot be divided realistically anymore (Rad and Anantatmula, 2005).

WBS should eliminate the possibility of omission of key project elements. Additionally, well-developed WBS will improve the accuracy of the project schedule. To illustrate the concept, WBS for a traditional project (home construction) and an undergraduate degree program with a major in management at a public university in North Carolina are shown Figure 2 and 3 respectively.
As shown in Figure 3, an individual course will be the lowest level work element for academic project.

WBS and the higher-level elements will be foundation of knowledge courses, liberal studies courses, major area courses, and general electives. From a student perspective, Figure 3 serves well in informing...
the student about which courses are required and which are optional. Additionally, it will identify which courses require prerequisites, and how many courses are required within each category. These prerequisites can be courses or number of credit hours or both. Sequence constraints can be presented in the project schedule, which uses the course sequence logic.

**Project Schedule**

Project scheduling process assigns calendar dates of starting and ending for all project activities. Using logical sequence of executing each activity, we can also estimate the total duration of the project, allocate resources, and if required, adjust the allocation of resources. Scheduling tools and the associated information can be used for making decisions such as optimizing project duration, minimizing cost, and making effective use of resources. In the context of academic planning, scheduling techniques can be used to develop study plans for each semester. Software applications such as Microsoft Project are useful and easy to use in developing project schedules with tools such as Network and Gantt chart.

**Project Network**

Project network is a graphical representation of interdependencies of all tasks associated with the project. It illustrates the workflow of a project. Network diagrams are standards for building project schedules because of their emphasis on depicting dependency relations at different levels.

Network diagrams can be used to represent the complete project, or a part of it. Project activities usually have predecessor and successor relations whereas, in contrast, activities associated with processes often use feedback and feed-forward loops. It is crucial to avoid building loops into the network. If an arrow can never proceed to the left, no loops can be built into the network. It also turns out to be true that if arrows cannot proceed to the left, it is much less likely that arrows will cross each other within the network. Thus, unnecessary confusion can be eliminated. The network diagram must use only one starting point and only one ending point. It is common practice, therefore, to add start and end additional nodes to symbolize and highlight the highly emotionally charged milestones of starting the project (going to college) and completing the project (graduating). The duration of both the start and end nodes will be of zero duration, because they are milestones. Figure 4 below illustrates the concept of
developing a network diagram based on the information provided in figure 3. Using network diagram concepts, we captured the recommended and required course sequence for an undergraduate degree program. Here, the underlying assumption is that the activities proceed from left to right and no activity will proceed from right to left.

![Network Diagram](image)

Figure 4: High Level Course Sequence Network

With the network shown in Figure 4, students can plan their course load for each semester and select the appropriate courses in the correct sequence. This high-level course sequence network provides necessary information about the management major. For instance, students can take any general elective course or liberal study course in the first semester of the freshman year and they are allowed to attempt any of the foundation of knowledge courses only after completing 30 credit hours. As a consequence, management majors are restricted from taking any of the foundation of knowledge courses during the first year of their undergraduate program.

Being at higher level, the network shown in Figure 4 does not show actual conditions, constraints, and predecessor and successor relations that exist at course level only. To illustrate, students cannot register for foundation knowledge course QA235 without completing QA135 course. Understanding these
predecessor and prerequisite relations is important for planning a semester course load. To address this need and to demonstrate the usefulness of this technique, Figure 5 is developed to show the course-level (lowest level) relations for a Bachelor of Science degree in Management.

![Figure 5: Detailed Network for Management Major](image.png)

Figure 5 lays out a clear picture of prerequisites, conditions, courses, and their sequence. It is easy to understand the relations among courses and a quick glance will give the total picture about all the major area courses and foundation of knowledge courses. For the student, the graphical representation academic plan is clear and easy to understand compared to reading a document of instructions and mapping out the sequence for themselves. This approach is especially beneficial to the students who are visual learners. Figure 5 also expands a student's planning time horizon. For instance, one can notice that QA135 is a prerequisite to QA235, which in turn is a perquisite to QA305. Further, a student must complete QA305 before becoming eligible to take MGT402. Therefore, a student must plan at least three semesters before she earns the eligibility to register for MGT402. Therefore, a student must plan semesters ahead of each other before she earns the eligibility to register for higher level courses.
Moreover, we can use the network (Figure 5) to include detailed information such as duration of each course, and possibly the completion time of each course and the degree itself by recording planned semester and year for each course. Planning courses on time makes for graduating on time. To further explore the academic planning on a time scale, Gantt charts will be used.

**Gantt Charts**

The Gantt chart is often considered the visual symbol of a project schedule. Often it is used in traditional business projects to communicate with the key stakeholders and senior management. A Gantt chart provides a graphical demonstration of a schedule that can be used to plan, coordinate, and track specific tasks in a project. It is usually drawn with activities on Y-axis and time scale on X-axis. Gantt charts can be easily developed using MS Project or similar software application package. With this tool, we can schedule courses for every semester in a linear format, mimicking the time frame it takes to complete the task of completing the degree program (Figure 6).
Figure 6: Gantt chart for the undergraduate program

Figure 6 shows a list of courses and the semester they are planned. Each course is assigned a start date and end date, and its total duration is 12 weeks. A variation of Gantt chart is a time-phased chart where only the major milestones of the project are plotted. This chart is suitably called a milestone chart. Gantt charts and milestone charts are often used in conjunction with a network diagram to show a
comprehensive suite of project information for baselines, schedule computations, and adjustments (Rad & Anantatmula, 2005).

The distinction between the Gantt chart and the network diagram is that the former is always drawn on a time scale, allowing students to easily understand and use it. Using this project-planning tool, a student can develop a course schedule for one year at a time or even for the entire four-year degree program as shown in figure 6. It is not only used for planning but also for monitoring the progress graphically using a different color bar. In the figure, blue color bars are used to show completed courses and green color bars depict courses yet to be completed.

Research Method and Results

To examine usefulness and effectiveness of the models presented in the previous section for academic advising, our research focused on using a pilot study consisting of fifteen undergraduate students majoring in Management from a state university and who were seeking academic advising for the 2008 Fall semester. The feedback from these students was collected using a structured and open-ended questionnaire. All the undergraduate students interviewed welcomed the idea of these visual aids and indicated that they have a clearer understanding of the requirements of the major. Most importantly, all of the students agreed strongly that this is a user-friendly tool that is easy to understand.

In terms of communication, the students agreed that these models have helped them understand the requirements of the major study without ambiguity. In addition, 60% of them indicated that they expect to spend less time with their advisors because of this tool. About half of the students who participated in the study have adopted these tools to develop their study plan for all the remaining semesters, thereby increasing the planning horizon. Furthermore, students indicated that they are likely to use project planning techniques in their professional lives.
Discussion

Our research results from the academic advising study are not surprising as all these students belong to the Generation Y (born between 1980 and 1994). Generation Y is characterized as being technical, adaptable, and learner-centered (Deal, 2007; Dobbs et. al, 2007). Generation Y students are visual learners because they have had exposure or owned a computer at a young age which has allowed them to have experience with the Internet and new technology. This particular generation can find most needed information in seconds (“Generation Y: The Millennial”, 2006).

This study argues that academic advising is an integral part of teaching and learning process. In fact, the use of technology is considered a form of teaching (Campbell, 2008), which will support our approach to applying the project management concept tools to help develop and articulate the curriculum requirements for current students. As they are visual learners, engaging these students with the visual forms of academic advising can increase intellectual development. The management tools can help students to plan their careers and improve academic performance.

We should recognize that course requirements and course offerings continue to change. Such flexibility can be built into project planning tools and techniques. In conventional project management, the plan can change according to a new end result. Therefore, project management is designed to meet changing requirements. So, advisors must remember that the planning diagrams such as Gantt chart and network should not be treated as if they are inscribed in stone.

Undergraduate advising requires in depth understanding of what alternate courses can be used as substitutes, how students can be brought back to the right track if they are off track, or if special conditions apply. Knowledge about advising in these circumstances is most often resides as tacit knowledge with some experienced advisors. Project planning tools and techniques, if applied appropriately, can capture at least part of the tacit knowledge and make it available to less-experienced advisors thereby saving the time and involvement of experienced advisors.

Again, past research has shown that academic advising plays an important role in student retention (Campbell 2008) and these planning tools will help the cause.
Limitations and Suggested Future Research

Results of the study, using a pilot study of 15 students to assess the usefulness of applying project planning tools for academic advising and planning, is limited in terms of number of students who participated in the study. Although project management processes and tools are widely used in the industry for more than four decades, project management profession is still in search of establishing its value (Thomas & Mullaly, 2007). It is reasonable, therefore, to employ a comprehensive research effort to validate the usefulness of applying project planning tools to improve the value of academic advising and planning. The study should include wider group of students from different universities. Efforts are in place to develop an elaborate research study involving a large number of students assess the value of the proposed models and validate the pilot study results. Another research study can be considered to apply project management concepts for planning course work and team assignments and for immediate application of these concepts for teaching and learning.

Conclusion

Our results also show that project management tools and techniques can be effectively used for teaching and learning although it requires further validation by extending the study to a much broader group of students pursuing other management studies as well. Discussions about various project-planning tools, which are demonstrated using various models have underscored the utility and effectiveness of applying project planning techniques for academic advising and learning. As is evident from the discussions and both studies involving students from a public university in North Carolina, application of project management techniques improves the understanding of course sequence, clear understanding of all prerequisites, and other constraints. Advisors are able to provide better support to study plans by developing specific plans according to the student’s major and educational needs. This approach will expand the planning horizon of students and encourage them to continue project planning skills for life after college.
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