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The Stresses and Politics of Project Management: A Systems Analysis and Design Simulation

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ABSTRACT

This paper describes a systems analysis and design project that simulates the difficulties of project management within an information systems environment. This website construction project is typically implemented within the business core's management information systems class, although it could also be used within the IS major's information systems analysis and design course. The project requires the teams to play roles both as developers and as managers and uses an innovative circular class structure to simulate three levels of management. In addition to the project implementation, an unusual project grading schema is described, which alleviates many perceived grading inequities that plague group projects. Students' class comments are also examined to determine the final effectiveness of the project in communicating the difficulties of management politics and stress.

INTRODUCTION

Teaching the difficulties of project management has recently received much interest within business schools [1,2,3,4]. Ironically, while business schools have begun paying attention to the desirability of project management skills, the engineering disciplines can trace its use of project management techniques back to the Polaris submarine project in the early 1960's [5]. Why the new interest in project management in information systems? Poor past performance may be one reason. Over half of all information systems projects cost two to three times the original projected cost and take two to three times longer to implement than originally forecasted [6]. New emphases on such complex undertakings as business process reengineering (BPR) and total quality management (TQM) have increased in companies as competition increases. In addition, managers are increasingly expected to do more with less [7]. These forces require managers to monitor their technological, human, and financial resources more carefully to achieve ever-increasing management expectations.

Given the traditional focus of the information systems discipline, the teaching of project management skills should not be surprising,. In contrast with computer science, the information systems discipline differentiates itself by concentrating on solutions that involve changes in attitudes, management and organizational policy, and behavior [8]. Knowledge of how such factors as upper management support, involvement of users, and project risk level could affect the success of a project is critical for all project managers. Emphasizing project management skills not only fits within an information systems course, it may very well enforce the core knowledge of the field that instructors wish to convey.

One concern often raised is that by teaching the "softer side" of project management within systems analysis and design, the students fail to learn important technical skills that they need. There are technical aspects of SAD, without a doubt, but I would argue that these tasks are routine compared to the difficulties of managing a project to its completion. In a recent article, one IS manager stated, "Technical skills are easy to obtain and fluid by definition because technology is changing so fast" [9]. Instead, he advocates hiring individuals with the knowledge and savvy to manage projects, facilitate communication, and build consensus. Supporting a classroom simulation approach, Thamhain [10] found that of the many different methods of teaching project management (e.g., literature reading, observation of other managers, professional conferences, and seminars and workshops), the most popular was experiential learning.

The conclusion appears to be that while establishing a core set of technical skills is indeed important, so is teaching students the difficulties of managing a project to its completion. Moreover, students take business core courses to learn the important concepts specific to each business discipline. I would argue that development methodologies (e.g., prototyping) teach critical skills in the structuring and managing of projects, regardless of the student's field of study [4]. The stresses of absentee team members, the difficulties of changing project requirements, and the politics of consensus-building all are realities in the management world that can be simulated with an SAD project within the classroom environment.

Following that philosophy, this article describes the implementation of a systems analysis and design project. While the included project description could be implemented within the IS major's systems analysis and design course, I implement the project within our business core's management information systems course. Finally, while this article emphasizes the SAD project and the resulting website deliverable, it should be stated that the pro-

ject integrates many aspects of my management information systems course. I will discuss how the project affects the other parts of the course in the conclusion of the paper.

TEAM FORMATION

My management information systems class typically consists of forty students, and I divide the class into eight teams. I allow students to select their own teams, although I use icebreakers to allow students to meet and learn about each other. Five students per team are ideal because the team is large enough to create tensions and communication difficulties without making these difficulties unmanageable.

Early in the semester and before the SAD project starts, I have found that some initial team building improves a team's chances of working together effectively. The initial stages of team development are incredibly important and often set the tone for the remainder of the semester. For this reason, the teams' initial assignment is to "have as much fun together as possible." The only requirements of the assignments are that all team members attend and that the team meets off-campus. I believe this assignment is critical to the team's chances for success. Teams must go through a period of development where they learn about each other. Each member must decide what role he or she will play within the team. This assignment allows students to learn about each other in a relaxed environment. Since they must go to the trouble of meeting off-campus, there is an additional buy-in by team members. Teams are required to report back their adventures over email, which familiarizes them with our campus email system early in the semester. I then grade the assignment based on "the amount of fun that they had." In practice, all students receive an "A" for the assignment, which is a small percentage of their final grade.

Approximately one week after the social event, the teams are required to select officers. Each team has a team leader, who is responsible for all aspects of the team; a communications representative, who facilitates intrateam and interteam communication; and a technical leader, who oversees the project's website construction. I have discovered that these roles assist students by structuring their initial roles within the team. As the project progresses, however, the importance of the roles tends to diminish as the teams become more comfortable with the task.

After the team roles are established and to further encourage team unity, the team is then required to create a team website. The website must contain the team's homepage and links to a homepage for each team member. The team homepage reflects the team's name and history, as well as its area of expertise. The information on the team homepage may be fictional, and I encourage students to use their imagination. Most create a consulting company reflecting their roles on the team. The individual homepages are factual, however, and I use this opportunity to learn more about the students early in the semester.

There are a number of benefits to having the students create their website early in the semester. In addition to becoming familiar with the idiosyncrasies of webpage development (e.g., uploading pages to a server and learning the webpage editor), students have time and the understanding to tackle more difficult webpage concepts later in the semester (e.g., frames). In addition, at least one student on the team usually has some webpage construction experience. Since all team projects receive one team grade (the grading of the project is covered later in this article), it benefits the more experienced webpage developers to assist the other team members on the intricacies of webpage construction. Since the impending SAD project will require them to manage another team, mastering the technical aspects of webpage development early in the semester enables me to concentrate later on the intricacies of project management and group dynamics.

TEAM STRUCTURE

Since the purpose of the assignment is to simulate the difficulties of technology management, the assignment does not emphasize technology per se. Instead, the task involves website development within the prototyping methodology, although the assignment could easily be adapted as a database development project using Access or spreadsheet development project using Excel. It should be stated that the nature of website development does offer the student an opportunity to learn more about some technical information systems environment.

Each team plays both management and developer roles in the SAD project. In its management role, the team supervises the construction of a resource website by a development team. The website topic is an important issue in information systems (e.g., the year 2000 problem or electronic commerce). The management teams are considered "the experts" on the chosen topic, but--in their roles as managers--know nothing about website development. The other role each team assumes is that of a website development team. Within this role, the team is an independent contractor hired by one of the management teams. My role within the SAD project is that of Vice-President. As Vice-President, I supervise the management teams, while each management team supervises its developers. Using this structure, three levels of management (developer, middle management, and senior management) are simulated.

The class' team structure, therefore, is a circle, with Team 1 managing Team 2, Team 2 managing Team 3, and so on with the last team managing Team 1. Team 3, therefore, develops the website for Team 2, who develops the website for Team 1. To succeed in its role as a management team, each team must hire and successfully manage a development team who will complete a resource page on the management team's chosen topic. To succeed in its role as a development team, each team must develop a website that satisfies the requirements of its boss, the management team.

THE SAD PROJECT

The SAD project begins shortly after the completion of the initial team homepages. To add structure to the assignment, I introduce students to the prototyping methodology. The stages of prototyping are requirements definition, prototype development, management feedback, and completion of the final deliverable. Students are required to submit deliverables for each stage of development. These deliverables are not graded until the end of the project, and I am purposely vague on the contents of the requirements document, because I want students to experience the ambiguity, stress, and difficulties of a poorly-defined project. Vague requirements also encourage interteam communication. With the exception of actual webpages, the management team may submit

anything to communicate its vision of the final website. In previous semesters, students have constructed written mockups, Word documents, and PowerPoint slides. After the requirements document has been submitted to the development team, the development team has the option of accepting the requirements as written, or negotiating (usually to reduce the scope of the project). Once the development team and the management team reach a consensus, I encourage the management team to get a signed contract to commit the development team to the project.

Approximately one week later, the development team is responsible for translating the written requirements document into a functioning prototype. I keep the time period between the completion of the requirements document and the prototype fairly short, since the prototype should not be a completed website. The extent of the prototype, however, is determined by mutual agreement between the two teams.

The management team then submits the feedback document to the development team. The feedback document is essentially an exception report, detailing where the prototype needs to be improved or enhanced to reach the stated requirements. The management team often realizes at this time that its sketchy requirements have resulted in an extensive feedback document.

It is important to realize that all characteristics of the deliverables are open to negotiation between the teams. With the exception of the due date for the final deliverable (which has been dictated by the Vice-President), even the interim due dates can be changed, given that the development team receives approval from the management team.

The project is completed when the management team accepts the final deliverable. For acceptance to occur, however, the development team must transfer the final website to a management team member's server account and the management team must agree that the web site satisfies requirements. To complete the project, the management team evaluates the performance of the development team by completing a developer evaluation form. In addition, each development team evaluates the performance of its supervisors by completing a management evaluation form. These forms will be used in the calculation of the team's final grade, which will be described in the next section.

CLASS AND PROJECT GRADING

The first step in determining the SAD project grades is the assessment of each team's performance. To increase the validity of performance assessment in the business world, companies are moving away from the supervisor-centered concept of evaluation to a multi-rater framework, commonly called "360 degree evaluation." In that spirit, SAD teams are assessed from three different perspectives-management, developer, and customer. Each perspective counts one-third of the team's final SAD grade.

The management and developer perspectives result from evaluation forms that are completed at the end of the project (see Appendix 1). Each management team evaluates its developers, and each development team evaluates its managers. Scores are entered on a seven point Likert scale. Within each of the two roles, teams receive feedback on team organization, attitude, reliability, and communication, as well as the quality of the project deliverables. I collect these evaluations after the final deliverables are completed. For each category (e.g., attitude), the average scores are calculated for the team's performance both as managers and as developers. I then rescale the final averages into percentages. While the scaling differs slightly each semester, average scores from six to seven typically result in A's, scores from five to six result in B's, and so on.

As the Vice-President, I determine the customer perspective by reviewing the final website for content completeness and visual impact. The criteria I use for the customer perspective are listed in Table 1.

TABLE 1: Criteria Used to Evaluate the Team from a Customer Perspective

Technical Quality
- Links and graphics work
- Graphics load quickly

Overall Appearance
- Site is aesthetically pleasing and easy to read
- Site conforms to layout in requirements document
- User interface allows site to be navigated easily

Sophistication
- Frames
- Image maps, forms, other advanced techniques

Content
- Appropriate given the requirements
- Text is grammatically correct

The customer grade is different than any other grade that students will receive. In the business world, a manager's performance is highly dependent on the performance of his or her employees. Similarly, the team's customer grade on this project results directly from the quality of the work performed by its development team: in other words, the team's customer grade is determined not by the quality of the work that the team completes, but by the quality of the work that is completed for the team. This mechanism increases the importance of management team supervision; management teams also realize it is in their own self-interest to motivate their development teams.

Weighing the developer, manager, and customer perspectives equally, I then calculate the composite team grade. The final step is to then assign grades to individual team members. Within a group, feedback can be an effective mechanism to encourage team performance and to motivate errant team members. The problem that all faculty members face in grading team projects, however, is grading each team member equitably. Giving everyone on the team the same number of points is rarely equitable, since team members rarely contribute equally. Moreover, awarding the same grade both to strong and weak performers demotivates the true contributors. Another approach, anonymous student feedback never completely satisfies me, because anonymous feedback lacks accountability. In recent semesters, therefore, I have adopted a grading schema which accomplishes the difficult task of perceived equity on the students' part and fairness on my part.

Since only the team knows how its members performed, the obvious answer is to let the members allocate the individual grades. Each team multiplies its composite team grade by the

number of team members. The team then discusses each individual's contribution, reaches a consensus, and divides the available points. This zero-sum scenario forces students to base grades solely on the merits of their work; i.e., students cannot reward themselves without penalizing others. In addition, accountability is achieved because all discussions are conducted openly with all team members present.

CONCLUSION

The most obvious result of the SAD project is that students better understand systems analysis and design, office politics, and project management. But the experiential nature of the simulation allows me to integrate other aspects of the course. To reinforce the team concept, I have moved away from classroom exams to team-based take-home tests. Exams are largely short answer and essay, and questions require discussion among team members. I ask students to apply the concepts from the text to the project they have just completed. Questions from previous semesters have included:

- Instead of developing your web site project using prototyping, consider end user computing. Discuss the benefits and problems of applying end user computing to the development of a web site. Would you recommend prototyping or end user computing? Why?
- Compare and contrast the systems development life cycle with the prototyping methodology. When should each methodology be used? Why did we use prototyping on the class project?
- Consider the various types of project conversion. Which conversion strategy do you recommend for the web site systems analysis and design project? Discuss why your recommendation is superior by contrasting your choice with the alternative strategies.

The above questions require the teams to apply what they have experienced in the SAD project to the theories covered in the textbook. In addition, I believe requiring students to differ, discuss, defend, and integrate concepts into a final answer increases learning.

As described earlier, team members allocate grades for all class assignments. By requiring that process, students also experience many of the difficulties of management. In a recent example, an obviously upset student stopped by my office for advice. He had worked hard on the final exam, and his team was meeting in a few minutes to allocate the points. He was concerned about one team member who had contributed little to the final product. The dilemma he faced was that the slacking team member was also a brother in a fraternity that he was pledging. By weighing fraternity membership against personal pride, the student understood more about the difficulties of company politics.

More informally, I have observed a number of positive effects not mentioned directly by the students. Teams seem to be more cohesive, with fewer loafers. This effect may be attributable to a number of factors on the project. Team members not performing receive almost immediate feedback on this lower performance through lower grades on projects. In reviewing the individual grades, many teams grade each team member differently on the first few assignments. By the end of the semester, however, almost all team members are receiving equal grades on the projects. There is--in effect--no way to loaf without being penalized by your teammates.

While I have been pleased with the overall project, it should be noted that this project can be highly stressful for both the students and the instructor. Students are unaccustomed to evaluating team members, especially with the team members present. Also, since one-third of the students' grade result from the work performed by other students, they are often uncomfortable trusting the performance of others. I have found it helpful to conduct a class discussion on the relevant criteria for evaluating managers. The list usually results with such factors as organizational and communication skills and reliability. Students often pick up the fact that because managers must delegate to complete their required tasks, they are frequently evaluated not only on the work they do, but the work that they supervise. These observations segue nicely into the description of how their performance on the project is evaluated.

It should be noted that I did not mention formal project management tools, such as Gantt charts and PERT/CPM or project management software, such as Microsoft Project. Given the amount of time within the core management information systems course and the available space for this article, I have decided to omit the details of how these tools could be implemented within the project. The project lends itself well to the use of these tools however, and I would encourage faculty members to integrate the use of these tools throughout the assignment.

Since I structure the course around the SAD project, I always administer an open-ended student feedback form directed specifically at the project after all web pages have been completed. Students seem to agree that the project simulates management experiences in the business world. "We were able to look at different aspects of the organization--management and development. We were forced to learn both sides [which] allowed us to see difficulties in both departments." Another student commented, "I think this [project] simulated real-world management situations because of the difficulty of meeting with group members, reaching consensus on ideas, and motivating the development team to do effective work....It was more fun, interesting, and involved than simply reading the text." With regard to teamwork, one student commented, "more than anything, [the project] taught me how to work with people and to compromise. We learned a lot about teamwork, and more importantly, learned how to be patient and deal with conflict with the other group." In summarizing his feelings about the project, a student commented, "This was the closest assignment to 'the real-world' that I've ever done." The general consensus is that students consider the project to be a rewarding--but stressful--experience. I consider the parallel between those comments and today's management careers to be the project's strongest gauge of success.

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APPENDIX 1: Management and Developer Evaluation Criteria

ASSESSMENT OF ABILITIES

Organization Skills

- The degree of organization within the management/development team was (1=Low; 7=High)
- The amount of time that the management/development team gave us for incorporating changes was (1=Unacceptable; 7=Acceptable)

Attitude

- The attitude of the management/development team was (1=Belligerent; 7=Cooperative)
- The management/development team was pleasant in its dealings with us (1=Never; 7=Always)

Reliability

- Whenever the management/development team promised to have something completed, how often was it completed on time? (1=Never; 7=Always)
- The management/development team completed tasks when it was supposed to have them completed. (1=Never; 7=Always)

Communication

- The amount of feedback we received from the management/development team on our development/management team's progress was (1=Low; 7=High)
- The degree to which the management/development team involved me in this project was (1=Insufficient; 7=Sufficient)

Overall Evaluation of Performance

- Would you work for this management/development team in the future (1=Never; 7=Gladly)
- Overall, my rating for this management/development team is (1=Poor; 7=Excellent)

QUALITY OF THE DELIVERABLES

Extent Requirements Were Met (Evaluation of Management Team Only)

- Consider the detail of the initial requirements document. Consider also the amount of latitude you team desired in creating the team's website. The amount of agreement between these two factors was (1=Very Low; 7=Very High)

Feedback Document (Evaluation of Management Team Only)

- The feedback document detailed exactly what needed to be accomplished to finish the final deliverable (1=Absolutely Not; 7=Definitely)

Quality of the Initial Prototype (Evaluation of Development Team Only)

- The amount of work completed on the prototype was (1=Very Low; 7=Very High)

Extent Requirements Were Met (Evaluation of Development Team Only)

- The accuracy (what was delivered versus what was requested in the requirements) of the final deliverable was (1=Very Low; 7=Very High)

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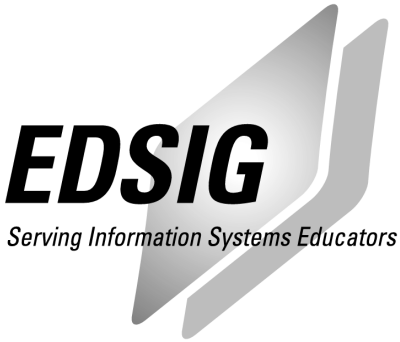

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