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Launching The Project: An Exercise For Demonstrating The Impact Of Team Communications On Project Success

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Abstract

Research amply demonstrates that communication is an important determinate of project team success. Teaching team communication skills can be difficult, however, as team assignments are typically completed outside the classroom. Team communication education generally focuses on team dynamics or the interpersonal communication among team members, leaving aside some of the most important elements of project management communication in the development of information systems: task definition and assignment, project documentation, and integration of new members into the ongoing communication process. A self-contained learning unit was designed to introduce a class of senior-level information systems students to these group communication issues and show their importance to the successful completion of a project.

Keywords: Project documentation, group communication, project teams

1. ELEMENTS OF SUCCESSFUL TEAM COMMUNICATION

The use of teams in the implementation of a systems project is well established, and research demonstrates that communication is an important determinate of project team success, including such elements as

- the ability of team members to appropriately assign and complete tasks,
- the quality of the design and implementation plan developed by the team, and
- the quality of the design documentation.

(Jiang, Klein, and Balloun 1996; Martinez 1994; Pinto and Slevin 1987; Schwalbe 2000)

In some industries and business functions, workers can expect to participate in large projects; many different individuals contribute and the composition of the group working on the project changes over time. In these contexts especially, team success depends on the quality of the project documentation. Written documentation must include information about the task itself as well as information about the management of the project.

The complex communication processes needed for a successful team are legitimate learning objectives for both project management and business communication courses, but the pedagogical task is not a simple one. Most programs of study in information systems cover the development of documentation specific to the design and implementation of the system, but written documentation is generally characterized as a "final" step in a project, rather than an on-going part of the development process. Typically, documentation is taught in an unrelated course in technical writing and the requisite communication skills are not integrated into the overall project management curriculum. Some business communication courses address team communication, but seldom have time available for more than a quick overview of interpersonal dynamics. A manageable, semester-long team project typically found in a business communications course generally does not present the documentation requirements of an authentic team situation, and careful feedback and coaching are nearly impossible when much of the team project must be completed outside the classroom. Further, business communication courses tend to focus on *either* written documentation *or* interpersonal team dynamics, leaving aside the complex issues of using written communication forms to better manage a project

management team. In short, business communication courses cannot fully develop the communication skills necessary for information systems majors to be successful. Information systems courses using groups to complete projects need to look for opportunities to integrate this knowledge and skill development into the curriculum.

This exercise was originally designed for a multiple section, senior-level course in information systems development. Students are involved in a live systems development project and work in groups of 3 or 4 to develop or update a system for a client, usually a local business. This provides students an opportunity to use information systems skills developed in previous courses, to actively apply project management techniques within a systems development life cycle, and to work with system users. Emphasis is placed on the management of systems projects and the project management techniques useful for managing those projects.

Previous experience teaching this class and its prerequisites gave impetus for finding a way to jump-start student teams as they engaged in the initial communication tasks of defining tasks requirements and creating project documentation. Documentation in the systems environment includes both technical documentation, such as study and evaluation reports, data flow and ER diagrams, and managerial documentation, which includes Gantt charts, meeting notes, and task assignments. A review of conflict situations arising in previous group projects suggested that many of the problems occurred as a result of poor project management documentation. The instructional goal was thus to introduce students to the communication needs of a large project very early in the semester, using a minimal amount of class time, in a way that did not depend on familiarity with a specific project. In addition, the professors wanted to start the semester with an interactive activity that could facilitate the team building necessary to negotiate what is typically a long and frustrating semester.

This Space Station exercise was developed for use within the first week of the course to provide a compelling basis for discussing key project communication behaviors:

- the importance of assigning specific tasks to members and documenting those tasks,
- the issues, behavioral and technical, that arise when the composition of the team working on a project changes, and
- the role of documentation in helping new team members become productive on a new project to which they have been assigned.

The exercise also provides an opportunity to discuss the behavioral and communication issues that frequently appear in real-world systems development project teams, including the emotional aspects of changing projects and changing project team members. The exercise simulates the communication problems associated with distributed work teams and demonstrates the importance of including effective communication procedures in project planning.

2. THE SPACE STATION PROJECT

On the very first day of class, students are placed into teams and given a brief outline of the client project to which they had been assigned for the semester.[1] Each team is given a handout (see Appendix A) describing a space station contest. When asked about the purpose of the exercise, the instructors respond that it is designed to be a fun way to start the semester that provides an opportunity for team bonding. The project is framed as a competition: teams from all course sections compete to design and build the best space station, and prizes are awarded. Each space station is judged for creativity displayed in the structure, quality of construction, complete use of scarce resources, and degree to which the final project conforms to design specifications. Students in this and other information systems classes vote to determine the winning team.

Each team is asked to design a space station that will be built during the following class period. Various materials will be provided by the instructors, including aluminum foil, pipe cleaners, a clothes hangar, construction paper, string, and Cheerios. To reflect the reality of working with scarce resources, teams receive a limited amount of foil, pipe cleaners, and hangars; they are also required to use all of these limited resources in the final design. The other resources are not limited. Each team is asked to provide its own display base for the space station, bonding materials (glue, tape, etc.) and cutting tools (scissors, knives, wire cutters, etc.), and a shoebox for storing any remaining limited resources.

On the day of the implementation, written design specifications and building plans are submitted to the instructor, and the teams begin building their projects. To reflect the difficulty of communicating with team members in large, far-flung organizations, students are not permitted to communicate orally once implementation begins. After about ten minutes of construction, the instructor announces that a workforce reorganization is required. One person[2] from each team is reassigned to a different team. That member is allowed limited communication with the other members of his or her new team. Each person who is moved is given three small sticky-notes that can be used to ask three questions of the other team members and receive

[1] Due to the integrated nature of the university's MIS major, project teams are created, clients assigned and team leaders designated during faculty meetings prior to the start of the semester. While this allows the exercise to begin on the first day of the semester, the exercise would be appropriately begun as soon as class teams are assigned, regardless of method.

[2] Except that no designated team leaders are moved, the transferred students are selected at random.

answers. The notes must be added to the shoebox as they are used. The groups are then told to continue.

After another thirty minutes, each person is given a survey to complete, which begins a debriefing session regarding the communication aspects involved in the exercise. Teams that have not completed construction are allowed to complete the space station outside of class, with all projects delivered to a central location for judging the next morning. The entire exercise and debriefing discussion can be done in a single seventy-minute class period. Instructors who teach in fifty-minute sessions can complete the exercise and survey but need to conduct the debriefing discussion during the first few minutes of the next class. Typically, teams spend about three hours outside of class to design their space ships and produce the project documentation. Most teams complete the project within the allotted fifty minutes, needing only a few extra minutes to attach bases, labels or the last couple of Cheerios.

3. PROJECT DEBRIEFING

The exercise debriefing is an excellent opportunity to discuss project communication with attentive and engaged students. (Appendix B is provided as a guide for the debriefing session.) Students enjoy the exercise and see the relevance of it, especially when they can draw on involvement with previous work groups. The conversation provides an opportunity to compare the problems the teams experience in this exercise with problems they can expect during the client project.

During the first semester in which this exercise was used, a formal debriefing survey was conducted. The data collected with the survey instrument was evaluated using simple t-tests for differences in the mean where appropriate between groups. Pearson's R also provides a correlation analysis. It must be stressed that the results provided here are tentative, as this was a pilot study designed to test the exercise as a learning tool. A number of changes will be made to the survey instrument when the experiment in conducted again, and an in-depth analysis will be made of team dynamics and communication effects at that time. However, the survey responses reflect team and documentation principles that had been found in the literature of team communication, suggesting that the exercise provides a bona fide team experience, despite its short time frame. The results provide support for a continuation of the experiment and for its potential as a learning exercise in the classroom.

Role and Task Responsibility

The debriefing responses seem to indicate that both a leadership role and the assignment of tasks impact satisfaction with team composition for the Space Station project. While the research seldom distinguishes between leaders and non-leaders, a "most important" attitude in the eventual success of a group is "a sense of responsibility for the success of the group" (Brilhart and Galanes 1995 119). A related factor involves a sense of personal contribution; groups are most successful when each member perceives him or herself to have a meaningful, functional role (1995 137). The designated leaders were the only individuals in these groups with a designated responsibility, and these individuals appear to be the most satisfied with their teams ($p = .004$). It also appears that members who felt they could make a contribution to the team felt more accepted by that team, in spite of limited ability to communicate with the other team members ($p = .009$). This appears to support the generally assumed trait-nature of team skills, which are conceived of as intrinsic abilities carried by individual team members as they move from team to team (Brilhart and Galanes 1995 115; Larson and LaFasto 1989 59-72).

Team Productivity and Satisfaction

Unsurprisingly, reassigned team members reported more satisfaction with the composition of their new teams when they perceived acceptance by the new team ($r = .567$, $p = .022$), but students might find the complicated relationship between group cohesiveness and perceived success to be less intuitive. Team "satisfaction" can be based on either a sense of cohesiveness or perceived productivity, and the direction of any cause/effect relationship is unclear. Team success and performance rewards are two factors that seem to lead to group cohesiveness (Thompson, 2000 p.80), but satisfaction with a team's dynamics also lead to a perception of productivity, independent of objective outcome measures (Gladstein 1984; Wheelen, Murphy, Tsumura, and Kline 1998). Reassigned team members appear to report more satisfaction with the composition of their new teams when satisfied with the project outcome associated with the new team ($r = .855$, $p = .000$).

Project Documentation and Internal Communication

No explicit instruction is given with respect to documentation format, content or style. The assignment is merely to produce a "plan" of the completed Space Station and "documentation" to explain its construction. Most students will submit a drawing of their proposed station and an outline of the construction steps. Often the teams' documentation proves to be insufficient to guide them when members suddenly lose the opportunity for continuous communication, and most do not specify construction steps in terms of specific duties so that a new team member can easily take over for his or her predecessor. Teams' difficulty in the exercise leads to a realization that clearly articulated goals and detailed operational steps are communication elements that materially affect project success.

Perhaps even more usefully, this exercise highlights the value of good documentation as a basis for satisfying team dynamics. Reassigned team members report more satisfaction with the composition of their new teams and with the project outcome when they find the new team's documentation to be useful ($r = .856$, $p = .000$). Research shows that group participants do find it difficult to separate

task difficulties from interpersonal communication difficulties (Di Salvo and et al. 1989), and this exercise can be useful to demonstrate the interrelationships between task success, task communication and interpersonal relationships in a work group.

New Team Members

The Space Station project was originally designed to demonstrate the emotional impact of membership change on a group, but the students also find that clear documentation minimizes the trauma. It appears that if students find the design specs to be useful, they report little impact on the outcome of the project due to the change in team membership ($r = -.366$, $p = .011$). In even this short project, better and more detailed plans seem to reduce the impact of changes in team composition. The usefulness of the sticky note communication system is questionable, but students find the topic to be a starting point for discussion. Comments from students suggest a high frustration with not being allowed to communicate during the exercise, but those with "real" jobs comment that the limited communication reflects their experiences on the job. It is not always possible to contact another team member or the team leader when a decision point is reached or a problem occurs. Even when group membership does not change, it is necessary for plans to be as detailed as possible to decrease the probability of such delays.

4. CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the surveys, as well as student comments during the debriefing session, we believe the Space Station exercise provides an opportunity for demonstrating and discussing project management and team management problems and issues. Further, the pilot study results indicate that further development of this exercise as a basis for experimentation should take place. With the development of an improved survey instrument, the exercise should prove useful in statistically validating hypotheses related to role and task responsibility, team productivity, and team communication with respect to design documentation quality.

For a faculty member using a team-oriented pedagogy, it appears that this exercise is well worth the class hour, even in an intensive and time-constrained course. The exercise allows the instructor to introduce important project management success factors to the students in a non-threatening manner. One aim of such an exercise is to prevent some of the team and project management problems that occur in team-based student projects. The exercise is not limited to IS courses, but applicable to any functional area where there is great emphasis on the successful completion of a task-oriented project. The project also functions well as a team bonding exercise, generating positive responses to a survey question concerning team satisfaction. This is an important advantage in a course guaranteed to put stress on even well functioning student teams.

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7. APPENDIX A

Student Instructions for the Exercise

BUILD A SPACE STATION CONTEST

Purpose
In the time between this class and the next class period, each team is to develop the design specs and building plan for constructing a structure that represents the team's ideal space station of the future. Each team will take the plan that it develops and build its space station during the next class period. Each structure will be displayed in the ISRL (CBB 238) and all students taking 150:125 and 150:112 will vote on the winning structure. Prizes will be awarded to the top team from each section. A special prize will be awarded to the team that receives the most votes.

Rules
1. All "scarce" resources (foil, hanger, pipe cleaners) must be completely used in the structure or placed in the shoe box provided by the team.

2. A copy of the design specs and building plans must be given to the instructor before the team starts to build its station. The team will retain a copy for it to use during construction.

3. The entire class period may be used for building the structure.

Evaluation Criteria
The Space Station will be displayed with design specifications and a shoebox containing all the scarce materials NOT used in the space station. Space Stations will be judged on

Creativity displayed in structure

Quality of construction

Complete use of scarce resources (foil, hanger, pipe cleaners)

Degree to which the final product conforms to design specifications

Materials Provided
1 - 18" x 24" sheet heavy-duty aluminum foil
1 - metal coat hanger
20 pipe cleaners
String
Construction paper
Cheerios

Materials Provided By Student Teams
1 - Base for displaying structure
1 - Name/display card
Glue
Tape
Scissors
Utility Knife
Ruler
1 empty shoe box
Wire cutters (if you wish to change the shape of the hanger)

8. APPENDIX B

Debriefing Discussion Notes

1. Discuss the usefulness of design specs and building plans:

Were the specs and plans useful?

Were they complete enough to be useful?

Could everyone on the team interpret the plans? Why or why not?

Could the new team member interpret the plans? Why or why not?

2. Discuss the problems with converting the plan to a real structure:

What materials gave you the biggest problems? Why?

Did you experiment with the materials anytime before this class? What did you learn?

Since the students do not receive their materials until the second class section, only limited experimentation can take place during the design phase. Students will often find that they have anticipated short, white pipe cleaners, but receive fat, fuzzy craft style pipe cleaners in neon colors. Similarly, the wire hangars that students receive do not always support the designed space station. These problems afford an opportunity to discuss problems with systems testing, materials procurement and design contingencies, as well as the communication needed to address those problems.

3. Discuss the feelings of emotional attachment to other group members:

What was your personal reaction to a team member being replaced?

If you were the member who was moved, what was your reaction?

As a team member who remained on the team, was your reaction different?

Did you find yourself disappointed in the performance of any other member of the team?

Did you find that you did not know how you were supposed to contribute toward completing the project?

4. Discuss the emotional attachment to a project:

For students who were moved, did you find you had more interest in the outcome of the project you designed than the outcome of the second project to which you were assigned?

For those not moved, did you get any feelings of resentment that someone new was now working on "your" project?

5. Discuss difficulties associated with new team member:

   What did most of the questions asked relate to?

   Did the new person need to know what took place in previous planning meetings to contribute to the process?

   Where is this information supposed to be stored?

   Could the new person decipher the design specifications and building plans? Why or why not?

6. Discuss similarities between this exercise and real-world system project teams:

   Team composition changes over time.

   Team members sometimes feel emotional attachments to the other team members and to the project itself.

   New team members do not initially know what is expected of them.

   More is accomplished if all team members know and understand their task assignments/requirements.

   Standards for displaying design specifications decrease learning required of new member.

   Project portfolios help new members understand the purpose of the project, its background, and previous decisions concerning the project.

   Frequently, projects are designed without the designers fully understanding the properties of the software being used for the implementation.

   Limited communication simulates the communication problems associated with work teams, which might be geographically, temporally or organizationally separated.

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