Virtual Teams in the Classroom: A Case Study

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VIRTUAL TEAMS IN THE CLASSROOM:  
A CASE STUDY

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I. INTRODUCTION

With the increase in technology and globalization, virtual teams are to the new century what self-managed work teams were to the past. Virtual teams are "cross-functional teams that operate across space, time, and organizational boundaries with members who communicate mainly through electronic technologies" (McShane & Von Glinow, 2000, p. 271). A virtual team is a tool that the organizations can employ to make quick decisions in a complex environment, especially, in an environment where employees are spread across the globe (Duarte & Snyder, 1999; Manz & Sims, 1987; McShane & Von Glinow, 2000).

Both traditional and self-managed work teams have long been used in organizational and educational settings. Research on virtual teams in organizational settings has increased as virtual teams are becoming more widely utilized. Virtual teams are also being utilized in higher education. We know little, however, of how virtual teams function in higher education. It is the purpose of this paper to initially determine the development of the team and the impact of leadership in virtual teams in higher education and to determine how they differ from co-located teams in higher education. Secondly, we would like to determine how to increase the success of virtual teams in higher education. These questions will be addressed by drawing upon and integrating literature and anecdotal evidence.

II. LITERATURE REVIEW

1. VIRTUAL TEAMS

Virtual teams are "cross-functional teams that operate across space, time, and organizational boundaries with members who communicate mainly through electronic technologies" (McShane & Von Glinow, 2000, p. 271). There are several types of virtual teams based upon task, membership, and role (Duarte & Snyder, 1999). For example, one type of virtual team is a project of product team. This type of team has a defined but non-routine task, they work over an extended and predetermined length of time, and the team has the authority to make decisions regarding the task. Virtual teams in higher education would most closely match this definition of a project or
product team. However, membership on teams in higher education is typically fixed whereas membership on project teams is often fluid. Therefore, virtual teams in higher education do not exactly meet the characteristics of any of the defined types of virtual teams but they most closely match the definition of a project team.

Virtual teams are more complex than regular teams because they cross boundaries of time and distance and because communication relies entirely on technology (Duarte & Snyder, 1999). Interactions between virtual teams can be categorized as same time, same place; same time, different place; different time, different place; different time, same place (Duarte & Snyder, 1999). Interactions between regular teams can be categorized only as same time, same place or as different time, same place since the team members are all co-located.

Duarte and Snyder (1999) identify seven critical success factors for virtual teams; we will try to relate these to the classroom environment. First, human resource policies must support the use of virtual teams. Educators must make sure that technology, resources, and reward systems are aligned with the virtual team environment. Second, training must be provided for team members. This would include instruction on how to use WebCT or other technology and would include training on teamwork. Third, standard operating processes and procedures should be developed. This might include predetermined guidelines regarding the task to be accomplished, meeting days or times, number of meetings, interim reports, resources to be used, or guidelines for handling nonproductive members. Fourth, it must be determined what technological resources will be needed for each part of the task and ensure that they are equally available to all team members. Fifth, the organizational culture should promote the free exchange of information, shared leadership, and collaboration. Instructors can promote a classroom environment that supports these elements. Sixth, leadership must support the virtual environment. Both instructors and team leaders should be open and supportive to the teams engaged in virtual teamwork. Leaders must also establish clear guidelines and expectations. Seventh, specific competencies are necessary to be successful. The team leaders must be able to manage without face-to-face communication and with limited feedback, they must select and use appropriate technology, assist team members, create a supportive and trusting environment, lead a cross-cultural group, network across boundaries, and shape processes and procedures as needed by the team. The team members must also have specific competencies. Members must have project management skills, be able to network across boundaries, use the technology, manage their time and set boundaries, and have interpersonal awareness.

Technology is either synchronous or asynchronous. Synchronous technology is simultaneous, like chat rooms or video conferencing. Asynchronous technology is not in real time, like email and bulletin boards. Duarte and Snyder (1999) identify the
types of technology that are appropriate to different tasks. For example, in generating ideas, e-mail and bulletin boards are an appropriate technology. Conversely, in attempting to solve a problem without answers or in situations in which there is conflict, e-mail and bulletin boards are poor choices of technology.

2. TEAM PERFORMANCE

There are a number of theories that discuss the developmental stages of team performance. One of the most widely used team performance theories, advanced by Tuckman (1965) and Tuckman and Jensen (1977), is comprised of five stages: forming, storming, norming, performing, and adjourning. Initially, during the socialization phase of team formation, members are just beginning to learn about one another. The group then moves into the storming stage, where members become more proactive and take on specific tasks and roles. The storming stage is also the period in which group norms are being established. A real sense of cohesion in the group develops in the norming stage. During the performing stage there is an increase in task performance as deadlines approach. Relationship issues that were of initial importance in the beginning of the group development cycle are of less importance as task objectives consume members' time. Finally, like most teams, the task ends and the team adjourn.

Lacoursiere (1980) developed a five-stage model that portrays the group as being a living organism that responds to stresses in the environment and either matures as a result of the stress or dies. Lacoursiere's (1980) model states that teams progress through orientation, dissatisfaction, resolution, production, and termination stages and the model shares many similarities with Tuckman (1965) and Tuckman and Jensen's (1977) model. The first stage, orientation, is similar to Tuckman (1965) and Tuckman and Jensen's (1977) forming stage. In Lacoursiere's (1980) orientation stage the group first forms. During this stage, members are determining what the task will involve and how they will fit into this new environment. Once the roles of individual members are established and the task is clarified, the group moves into the dissatisfaction stage. In this stage, initial enthusiasm of group members diminishes and most members face disappointment at the reality of being a group member. If group members are able to overcome this stage, however, the third phase of resolving differences and gaining back initial momentum takes over. Typically, members become more productive and morale significantly improves. In the fourth stage, production of the group increases as team members begin working more effectively. Finally, as with the above model, the team's task is complete and the group is disbanded. This period will be met with mixed emotions, depending on the cohesiveness of the group and their ability to meet their objectives.
Both of these theories were initially applied and tested in traditional team settings. However, Lau, Sarker, and Sahay (1999) designed a team development model for virtual teams. They propose that virtual teams progress through four stages of development: initiation, exploration, integration, and closure. The first stage, initiation, is similar to the first stage of other models and describes the period during which the group forms. During the exploration stage, team communication is of paramount importance. Communication can be either uni-directional or bi-directional. Teams that communicate uni-directionally tend to operate in a sporadic manner and are unable to communicate content between group members. During the integration stage, members involved in bi-directional communication relationships respect each member's abilities and have open and meaningful interactions. Finally, the group reaches the closure stage. Once again, depending upon the performance level, group members may face a number of different emotions.

The traditional and non-traditional team research relies heavily on the developmental stages of team performance. A team's success hinges on a thorough understanding of this literature. The type of leadership a team embraces also influences a team's success. The following section discusses the elements of effective leadership in a team environment.

3. LEADERSHIP IN TEAMS

The purpose in using a self-managed work team or a virtual team in an organization is similar, both offer approaches that enable organizations to deal with complexity in the environment (Manz & Sims, 1987; McShane & Von Glinow, 2000) and allow for a more participative or democratic approach (Bass, 1990; Kimball, 1997). Organizations of the future will be those that find "new ways of working across boundaries, through systems, processes, technology, and people" (Duarte & Snyder, 2000, p. 4) and that develop teams which allow more efficient means of allocating resources (Manz & Sims, 1987).

To better understand the workings of the various types of teams, Banker, Field, Schroeder and Sinha (1996) created a team autonomy continuum (Figure 1). Traditional work teams at one end of the continuum are described as having low team autonomy whereas self-managed or empowered teams at the opposite end of the continuum are described as having high team autonomy. Leadership thus plays a very different function or role in these diverse team environments. In traditional work groups, team members have no management responsibility, whereas in self-managed teams, team members are responsible for the management and leadership of the team and for planning and executing tasks. Their placement on the continuum, and the degree of autonomy and internal versus external leadership, depends upon the definition of the task of the team.
Figure 1

Team Autonomy Continuum

Traditional Quality High Semi- Self- Self-

Work Groups Circles Performance Autonomous Managing Designing

Work Teams Work Groups Teams Teams

4. LOW TEAM AUTONOMY HIGH TEAM AUTONOMY

A vast amount of the literature on virtual teams discusses the critical role of the team leader and assumes that a leader is already appointed and acts as a facilitator for the team’s development (Duarte & Snyder, 1999, Lau et al., 1999; Manz & Sims, 1987; McShane & Von Glinow, 2000). No research has been conducted to address the role or emergence of a leader in a virtual team environment, although some research does point to the participative or democratic nature of a successful virtual team (Lau et al., 1999).

Though virtual teams resemble self-managed or empowered teams in issues of complexity and productivity, they seem to more closely resemble a traditional work team in terms of the importance of leadership. Virtual teams rely heavily on the leader, one typically outside of the group, to assist members in achieving a high degree of coordination, a shared understanding among members of the overall goals to be achieved, and an understanding of individual members’ values and belief systems (Lau et al., 1999). If virtual teams in education resemble traditional teams, then we can rely on traditional team theory as a model for our understanding of virtual teams in an educational setting.

Hersey and Blanchard (1977) stress the importance of using directive leadership early in the group’s development and then employing more participative leadership for the group as it matures. Since virtual team formation is relatively new, and few people have had experience with it, we could also rely on material from research on substitutes for leadership (Howell, Bowen, Dorfman, Kerr, & Podsakoff, 1990). This research recognizes that there are certain attributes of the follower, organization, or task that can negate the leader’s ability to enhance or decrease a follower’s performance. A leader may be able to enhance follower performance if the leader chooses a directive style and provides initial guidance for the employee. The leader can possibly adopt a more participative style as the follower gains expertise.
Researchers interested in virtual teams have developed managerial actions that managers or leaders should follow if they are to assist in the development of a virtual team. Lau et al. (1999) studied undergraduate business students from two universities in Canada and the United States who worked as virtual teams on a systems development project. The primary purpose of this research was to facilitate the development of virtual teams. These researchers found that communication is a key ingredient to a successful virtual team. Team members must be educated in the stages of team development and the importance of bi-directional communication. Leaders must move team members to the integration stage as quickly as possible, encourage socialization and relationship building to create a cohesive work unit, and monitor the pattern of team communication to ensure timely progression through the stages. When appropriate, leaders should interact directly with the team members by initiating discussion and responding to questions in a timely manner. Leaders should also anticipate and prepare the team for the closing stage and celebrate the completion of the project.

Another team of researchers also stresses the importance of the leader’s role in a virtual team environment. Duarte and Snyder (1999) emphasize that although many traditional leadership theories and practices can be applied in a virtual team environment, virtual team leadership will experience unique situations and challenges. They find that a successful virtual leader will understand the fundamental principles of team output and accountability. The team leader will not allow time and space to modify the importance or completion of task goals. Autonomy, participation, and empowerment are important objectives, but the team must not lose sight of the task. The team leader must be able to match technology to the task, the team life cycle, and the team members’ backgrounds. Leaders should recognize that team members are diverse in their knowledge of various technologies; they will benefit from having video and desktop video conferencing early in the team’s development. When managing across cultures, the leader must not only be aware of obvious differences such as language, but also be aware of the more subtle ways in which culture affects the way in which people work. Leaders must assist team members in keeping on the career track. Many individuals are afraid that being on a virtual team may preclude them from pursuing their career objectives. Team leaders should build and maintain trust between team members. Lastly, team leaders should lead in an adaptive manner and ensure that the team is aware of the uncertainty and nonroutine nature of their work.

This research seems to indicate that a virtual team leader plays a very important and directive role in the success of the virtual team. The next section will describe the virtual team project conducted at two universities during the spring semester of 2000. We offer our observations of the virtual teams’ performance and leadership.
III. THE VIRTUAL TEAM PROJECT

A class of 35 junior and senior management students at New Mexico State University and a class of 18 junior and senior management students at Lewis Clark State College participated in this project. Both classes were studying principles of management. This project was conducted as a vehicle to collect data on virtual teams for a third instructor at University of Indiana Purdue-Fort Wayne. The three instructors had never met and correspondence and planning between the three was done via email and one phone call.

The two classroom instructors randomly assigned the 53 students to teams. The teams naturally had a predominance of New Mexico students. Eight teams were named alphabetically from A to H. The assignment given to the teams was to complete a 4-6-page paper on a management topic. The teams were to communicate through WebCT using the bulletin board and chat room features. Photos of all students and the instructors were posted on WebCT. There was a deadline established for logging onto the system for the first time and there was a deadline for completing the paper at the end of the semester. After the project began, the instructors decided that a deadline for a paper topic was also necessary.

The New Mexico students used Certo's (2000) textbook. The virtual team project was required for the students. Students were graded on completion of a 4-6-page paper written by the virtual team and they were graded on their participation in the virtual team project. The paper accounted for 2% of their overall course grade and quality and quantity of participation in the virtual team accounted for 10%.

The Idaho students used Robbins' (2000) textbook. The virtual team project was optional for the students. Students were to participate in the project if they wanted at least a B in the course. Students were to have the paper graded if they wanted to work toward receiving an A in the course. Students turned in the paper to both instructors for their respective grades.

IV. OBSERVATIONS

1. TEAM PERFORMANCE

The virtual team project provided an excellent vehicle for observing the team performance models in action. Tuckman (1965) and Tuckman and Jensen's (1977) team performance model was observed through the postings of students on the WebCT bulletin board. The instructors assigned team membership. In the Forming stage, the team members were cordial and polite in the beginning and they shared personal details about themselves as they tried to get to know each other. One student
posted, "Hi, my name is Erik. I'm a junior here at NMSU. GO AGGIES!!! I'm also an AFROTC cadet."

In the Storming stage, the Instructors took a democratic approach, establishing team membership and setting two deadlines, one for the due date of the paper topic and one for the due date of the completed paper. All other decisions were left up to the team to become self-managed. The teams struggled with trying to determine rules and leadership. Team members quickly became frustrated and enthusiasm diminished. "I really do not have a preference on the topic that we choose. I think we need to get started on this as soon as possible" (Christi R.). "I really have no preference on the topic. But I would like to get started soon!" (Stephanie C.)

During the Norming stage, those who were going to participate in the project had emerged. Several students failed to contribute throughout the semester. The teams began trying to determine meeting times for the chat rooms. The team members made numerous suggestions on a paper topic but little action was taken during this time. The Instructors finally set a deadline for the topic decision and this forced the teams to advance and become more productive. "OK is anyone else but me going to post to this forum? Geesh. Well anyways...how bout a topic to get this thing rolling? Any ideas...here's mine...WOMEN IN THE MILITARY?...how bout that? Well guess I've posted mine for the day is anyone else?" (Erik S.). A posting by Deann L. states, "Where is everyone? Motivation/organizational behavior is a topic Suzanne and I have agreed on so far. Any one else have any input. We have a deadline remember." Susie G. wrote, "Since we have a deadline of the 16th to come up with a topic, my suggestion would be the following. If the other team members have not logged in by Friday the 11th and given input regarding their topic choice, then the three of us will pick our topic and get started." Jonathon B. wrote, "What is going on with everyone? What happened to our group meeting in the chat room on that Tuesday night? Chad and I were on it waiting for over half an hour before we left because nobody showed up. If we want to get started, we have to do it soon."

During the Performing stage, students began trying to develop an outline for their papers. They came to some agreement about the paper content and responsibilities were divided. Team members began to work fairly independently and group involvement was minimal. James P. wrote, "Hey team, I think we should all come up with an outline and then break the paper up."

Once the papers were completed and turned in, the teams were at the Adjourning stage. Frustrations were high and there was little enthusiasm. The night before the paper was due, one student wrote, "OK I don't mean to be rude but the rest of you need to get your asses to work this is due in less than 24 hours and we are not close to a consensus. I am sick of groups so forgive my bitchiness but the rest of you work
with what we have and get something on here within the next few hours. In case the others of you had problems (since no one felt to write me and say whether or not they got what I wrote or if they did write back aside from Heather) here it is in here for those who may not have gotten it. Please don't leave all the work to Heather and I" (Trisha O.). The consensus among the students was that they were glad this project was over.

The student WebCT bulletin board postings also allowed us to observe Lacoursiere's (1980) model of team development. Initially, the students were very enthusiastic about the project. The virtual team concept was exciting and novel and students looked forward to working with students at another university in another state. In Lacoursiere's (1980) model, enthusiasm is high at the beginning of the project whereas productivity is low. Enthusiasm quickly plummets but gradually increases over the semester as productivity increases. During the first week of the project, one student posted to the bulletin board, "Hi: My name is Linda and I am a senior at NMSU. This seems like it will be really interesting, and I am looking forward to working with this team." Another example of the enthusiasm shared by students is in the following posting, "I am sure this will be an experience to remember!!! Let's go Team C!!!" (Tanya M.). The next day, another student wrote, "Hi my name is Brake H. and I am a senior at NMSU. This seems this is going to be a pretty neat way of doing a project." Yet another student wrote, "Hi My name is Albert B. I am a senior at NMSU. I am looking forward to doing the virtual team I hope we have fun." These comments are reflective of Lacoursiere's (1980) Orientation stage.

By the second week of the project, frustrations had already developed and enthusiasm was decreasing, and teams were entering the Dissatisfaction stage as observed in the following posting. "I have not received any feedback from my team! And I am wondering if I am doing something wrong? Are you guys getting my messages?" (Tanya M.).

Resolution occurred as teams began to overcome differences and regain some momentum. Suzanne S. writes, "Okay everyone! Guess I'll take the leadership role here. But, I need some help in deciding how to go about this topic. I've already decided to e-mail it to each instructor on Fri. by 3pm Pacific time." This posting demonstrates a student taking the initiative to regain momentum in the team productivity.

During the Production stage, the teams increased their productivity. Paul C. wrote, "I hope that everyone found the chat room discussions useful in getting closer to composing an online paper as a group." This team had been holding chat room meetings to discuss their topic and they were beginning to formalize some ideas for the paper. Productivity was increasing.
The Termination occurs as the group disbands following completion of their assignment. Erin J. wrote, "Thanks SO much buddy! It was a pleasure working with you and I am glad it is over! Have a good week and rest of the semester! Bye Garden team...it was ummmmm...GREAT! Good luck to everyone!"

Throughout the semester, we observed that team development, bonding, and identity formation took a long time or didn't happen at all. Students stated that it took a long time to get organized. One student stated "I felt that there was no team development. It was more of an independent project" (Martha C.). Another student stated that "there was minimal working together. I don't think this helped me with team development" (Carrie S.).

"Because scheduling times to meet are difficult, the process of team development is slower or in some cases the team never really develops. I think the lack of face-to-face communication is a factor that slows the process down" (Lidia S.).

"...you can't really show your team members what research you found unless you type it all out" (Stella C.).

"I feel we still have yet to feel like a team. Everything we communicated to each other was in bits and pieces and was usually group maintenance issues, when can we meet, who will do what" (Anonymous).

"Coming together as a team requires communicating effectively. This to me means both verbally and nonverbally and in a timely manner. It is possible to get your message across in writing but because there is no physical contact between members, the true meaning and its feeling become obscured or lost" (Daniel G.).

These statements from students show how difficult it was for their virtual teams to communicate, to bond, and to establish a group identity. The students felt that the process was frustrating and that they never formed a cohesive team.

2. LEADERSHIP

Around the middle of the term, one instructor wrote in an email to the other instructor

"My students (the vocal ones anyway) are frustrated with the lack of involvement on everyone’s part. It is still an interesting study. Once again, it seems that serious direction and structure and details and governance get the job done. When left to their own devices, how many teams really get the work done? What are the substitutes for leadership? Interesting conversations.”
The next day the same instructor wrote

“I do not know if the literature supports the synonymous use of virtual and democratic, however there certainly is some current conversation to suggest that. If that is the case, we certainly have had some issues in our experiment. Every time you and I back out of the autocratic or structured mode, our “groups” fall apart. Does this state the point of view that virtual/democratic groups will not work? Or is it that some hybrid is needed. Or are there conditions under which they will work. Or is there certain structural elements that must be in place (like due dates, and forced communication times).”

These emails show that we were observing that the teams didn’t work well with self-managed or democratic styles. They seemed most productive when we intervened and became autocratic. Is autocratic the best leadership style with virtual teams?

In some teams a leader emerged, in other teams no leader emerged, and in yet other teams everyone shared leadership. In those teams where a leader emerged, that person was able to assign tasks and set deadlines. “I think that in virtual teams a leader is much more important than in regular teams. This is to ensure that all parts of the assignment are assigned so things can actually get done” (Cathy S.). In a team where no leader emerged, one student stated “…it is difficult to get a true feeling for one’s leadership ability or potential when you are not face-to-face with those people” (Daniel G.). Leadership was a critical element for the teams.

V. DISCUSSION AND IMPLICATIONS

Student comments support the earlier research conducted by Duarte and Snyder (1999) and Lau et al. (1999) that infer virtual team leaders must have direct involvement with virtual team members. Groups that are not provided direct guidance by the leader are unable to complete the task without undue stress. Student recommendations include assigning team members to specific teams, setting deadlines, assigning work tasks, assigning a team leader early in the process, supporting the communication process by having frequent communications between students, eliminating procrastination on the task, creating an equal reward system, and scheduling mandatory meetings. Students appear to be adverse to ambiguity in the environment, which has implications for the leader.

Previously we discussed the role of the leader in traditional teams versus self-managed or empowered teams depending upon where the team falls on the team autonomy continuum. Our results support the literature that stresses the importance of a virtual team leader’s involvement early in the team’s life cycle.
Virtual teams will pass through various levels of autonomy according to their developmental stage, similar to co-located teams. This has implications for leaders in both organizations and higher education in that the leader may have to match their leadership style to the developmental stage of the virtual team. Instructors will have to give direct guidance and reduce ambiguity early in the process, but relax this leadership role as the team develops and communicates on a more regular basis, supporting Hersey and Blanchard’s (1977) theory.

The success of a virtual team in an educational setting should utilize earlier research by Lau et al. (1999) and Duarte and Snyder (1999). The task in the current study was too open-ended and was poorly defined. Virtual teams need a highly defined task, such as solving a case. Virtual teams in educational settings seem to need more guidance and directive leadership than virtual teams in organizations. This is probably due in part to the inexperience of students. Many students are still unfamiliar with the technology that is required to be a member of a virtual team. For many students, working as a member of a team is also a new experience. Any ambiguity in the environment creates problems.

Further findings of this study indicated that students had communication and motivational issues. We found that communication entirely by asynchronous electronic means was difficult and slowed down productivity; feedback and the development of ideas took a very long time. Synchronous communication was difficult to coordinate across so many member schedules and across two time zones. Students felt that the lack of face-to-face communication hindered team development. The inability to communicate directly with other students required a paradigm shift on the part of the participants. This experience working in a virtual team was very different from the typical team experience. Students were uncomfortable with the ambiguity of the task and the virtual environment. Some teams had an emergent leader to assist in eliminating ambiguity.

The experiment had some interesting implications for the motivation of members in virtual environments. Students strongly indicated that equity was an important component in a virtual team exercise. Reward systems have to be the same for all participants, that is, both groups must have the project and participation weighted equally. With an unequal system, many students were not motivated to perform and lack of participation was the number one complaint.

VI. CONCLUSION

Our research indicates that virtual teams will pass through developmental stages commonly associated with co-located teams. Virtual teams have potential for use in higher education but the instructor must accept a directive leadership role in the early
stages of team development. The instructor can change to a more democratic or participative leadership style as students gain more experience and comfort with their task assignment and with their individual roles as members of a team. In addition, the instructor must assure that tasks are highly defined for the teams and that the technology complements the complexity of the task. Furthermore, equal reward systems between virtual teams is critical to motivation of students.

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