Issues and Best Practices of Virtual Teamwork in Online Learning Environment

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Introduction

Background

Nowadays, online learning or e-Learning is developing a unprecedented prevalence. Growing with the number of the online courses that have been offered is the number of online instructions that involve team projects. The increasing reliance on technology opens more possibilities for teams to meet virtually (Criffith & Neale, 2001). Especially in recent years, the increase of virtual teams used in both academics and business are explosive (Fiol & O'Connor, 2005; Piccoli, Powell, & Ives, 2004). Virtual teams overcome the limitations of time, space and organizational boundaries that traditional teams faced. But they also face obstacles that traditional face-to-face teams do not have, such as the limited technical abilities to work on virtual teams and lack of collaboration skills in a distributed environment.

Purpose of Research Study

The purpose of this research study is to explore the issues and best practices related to virtual teamwork and propose suggestions for improvement on the effectiveness of virtual teamwork.

Research Questions

The research study is seeking to answer the following three questions:
1. What are the issues and challenges faced by students working in virtual teams?
2. What are the best practices and strategies for student's learning through virtual teams?
3. What are the best practices and strategies for the instructor to facilitate student's virtual teamwork?

Review of Literature

According to Lipnack and Stamps (2000), a virtual team is defined as a group of people who work interdependently with a shared purpose across space, time and organizational boundaries using technology. Fiol and O'Connor (2005, p20) further defined *virtualness* "as the extent of face to face contact among team members." They also differentiated teams into three categories: pure virtual, hybrid and face-to-face teams. For the purpose of this study, we consider both pure virtual and hybrid as virtual teams. Given virtual teams are a relatively recent phenomena, there are major discrepancies between the available resources to increase the effectiveness of teachers who teach online and the resource available to instructors who teach face-to-face (Napier & Waters, 2001). Similar discrepancies also exist between students who work in virtual teams and those who work in traditional face-to-face teams.

Dede (1996) claimed that collaborative online learning can help get acquisitions of complex and higher level concepts and skills that have been a weakness of traditional non-interactive distance education. Slaven (1990) recommended using collaborative learning to develop an online community. Collaborative learning should include sharing learning task, combining expertise, knowledge, and skills to improve the quality of learning process. Virtual teams are just like a vehicle to achieve collaborative learning in distance education.

The review of literature revealed a number problems and issues related to virtual teamwork in distance education. For example, Shin (2005) states that either limited or no face-to-face interaction, make it difficult for team members to receive guidance or instructions from supervisors or team leaders. Moreover, it gives fewer opportunities to clarity role assignments. Therefore, virtual team members are more likely to get into ambiguity.

Another problem may be generated by culture difference. People from different cultures and different backgrounds vary in terms of their communication styles. They also differ in personality, which may cause communication conflicts in virtual teamwork. Hofstede (1980) maintains that people from individualistic cultures emphasize on the need, values and goals of the individual than those of the group. Virtual teamwork implies that people from different background work together and they might have different perspectives to solve the problems, so how do team members get a consensus? Alpay (1998) demonstrates that if team members fail to at least negotiate

some common ground, their problem-solving process will close down. However, Kirschner and Bruggen determined "in education, such cognitive conflicting is seen a stimulus for knowledge negotiation and construction. Argumentation among participants in a collaborative learning situation is therefore stimulated. Yet, the balance between maintaining common ground is a delicate thing" (Kirschner and Bruggen , 2004, p136).

In sound virtual team environments, assignments and projects can be worked out through self-direction and collaboration. However, putting students into teams does not guarantee collaboration. Kerr & Bruun (1983) identified the "free-rider" in virtual teams. The free- rider exists when some team members feel that the team is doing enough and they do not need to contribute. In addition, "sucker effect" arises when the team members exert less effort as they become awared of the peer members' increased free-riding.

Another problem addressed by Jansen,Van Laeken & Slot (2003) is that virtual team members tend to concentrate on project work and neglect their learning tasks. He stated that learners pay more attention on how to finish their assignment and neglect tasks such as reflecting on process feedback from others.

Successful virtual teams have certain characteristics and features that we will explain and to give some guidance on how to effectively work in virtual teams. Based on a case study of collaboration in virtual team, Lewis (1998) identifies key factors for ensuring effective virtual teamwork, including: a) social interaction to build trust and maintain motivation; b) sharing tacit knowledge to build and maintain common understanding, again building trust and reducing feelings of exclusion; c) leadership styles that change according to different situations; and d) explicit member roles and responsibilities. Lewis (1998) also states that trust is a crucial element in developing effectiveness in virtual teamwork. He suggests in order to creating a good start for a virtual team, members need to trust each other and they need to meet in person at first. Alternately, Hackman (1990) described the effectiveness in virtual teams in three criteria: deliver on objectives, meet the psychological needs of its members and work together in the future.

Lack of feedback or delays in receiving feedback from instructors may cause students frustration or anxiety which affects the team effectiveness (Hara & Kling, 2000). Team members and team leaders also need to work together in sharing resources, helping each others solve problems, providing encouragement, and responding to requests promptly. Establishing effective communication is essential for learning in virtual teams. There are some recommendations for effective online communications: a) team leaders should specify clear role assignments and requirements before starting the project; b) ask questions when messages are unclear; and c) encourage open communication which means we can incorporate informal communication, humor and honest communication.

Methodology

Research Settings/Context

This qualitative research study, a collaborative work of three researchers, focuses on individual experiences in the hope to identify the common issues and best practices of virtual teamwork in online learning environment. This study is also seeking any suggestions and personal opinions toward successful virtual teamwork from the participants. The study was conducted within the College of Education at a south-eastern state university. Most of the participants are graduate students in the Instructional Technology program. They all have some experiences of taking online courses and working in virtual teams.

Sampling Strategies & Sample Size

In total, nine participants took part in this study. Criterion sampling strategies were employed for this study. Participants with virtual teamwork experience were recruited among the graduate students from the College of Education at the university.

Data Collection

Interview was the method used in this study for data collection. Each interview took 25-35 minutes depending on the participant's involvement. Offices, conference rooms and student labs were used as the interview site. Digital voice recorders and notebooks were used to assist data collection during the interviews. Before the interviews, informed consents were collected from the interviewees. Right after each interview, the researchers worked out the transcriptions with Microsoft Word and added notes for improvements on next interview. The recorded interviews were kept until the end of the study. After all the interviews were done, the researchers brought all the transcriptions together and co-worked on data analysis.

Data Analysis

The transcriptions of interviews were initially loaded into Atlasti for coding. The quotations and codes were then outputted into a Microsoft Word document and categorized into eight categories. Each researcher worked

individually on the output document to find emerging themes, then, they sat together to combine their individual findings for deeper analysis. The final findings are based on the agreements of all researchers.

Use of Validity Strategies & Potential Threats to Validity

To promote the validity of the research, researchers applied the following strategies:

1. Prolonged engagement and persistent observation: All researchers are current doctoral students and they all have experienced virtual teamwork. The researchers have been in the environment for a long period of time, and have built trust with research subjects. They are also very familiar with the culture of the environment.
2. Triangulation: The research involves three investigators with different background and perspectives over the topic.
3. Member checking: Researchers have shared interview transcripts and analytical thoughts to make sure they are representing the participants' ideas correctly.

In spite of the validity strategies that the researchers incorporated in the study, there might be potential bias that would possibly threaten the validity of the research since all researchers are studying in the same environment with the research subjects and may have built strong trust or distrust with the subjects.

Results and Discussion

Research findings will be reported under the following eight categories obtained from the available data.

Guidance for virtual teamwork

Generally speaking, students received very little guidance regarding how to work in a virtual team from the instructor. One respondent said: "We had from our instructors suggestions for how to meet or how often to meet, we got some tips, little, not anything." Another one said: "There's not been a formal unit or lesson on proper practices or best practices for teamwork."

In summary, guidelines mentioned by one or other respondents included how to use the chat room, how to make the team visible by creating a team homepage, how and how often to meet, and what communication tools to use. However these guidelines are far less than enough for students to have effective virtual teamwork. The even worse situation is that some respondents didn't remember to get any guideline from the instructor or anyone else. Obviously, instructors neglected the importance of the instruction of teamwork guidelines to students and were reluctant to spend time on it. It is probably because instructors take it for granted that students have acquired sufficient skills for virtual teamwork, or because they think the guidelines are common senses, or because they don't regard it as their responsibility. In addition, one respondent said: "We actually had the guidelines on how to work on teams, but we need to find it from Internet resources." Compared to those receiving very few or no guidelines, student who are required to find the guidelines by themselves are in a better condition, for they are at least aware of the need to search for the guidance of teamwork.

The findings of the study by Napier and Waters (2001) indicate that educators who teach online graduate courses and assign online teaching projects should consider integrating online teambuilding instruction into their coursework. So, instructors should implement teambuilding instruction which is beneficial for student teamwork.

When asked about what guidelines to expect from instructors, one respondent expressed his desire to know something about conflict solving and hoped instructors could raise his awareness of the possible conflicts by showing some examples.

I personally feel that the instructor should first of all tell us how to avoid the conflicts and divergent opinions in teamwork. If he can show us some relevant examples of the conflicts and their consequences, we may get ready for the conflicts that could happen later in our teamwork.

Some respondents emphasized their expectation of instructors' help with technology tools, which corresponds to the statement by Duarte and Snyder (1999) that teamwork training should also include technical support and technology training on the hardware and software used to support online teamwork. There were also some respondents who said they didn't care about the teamwork guidance. Since not all the students need it, instructors could conduct optional teamwork training.

Team formation

Based on respondents' reply, teams are usually formed in two ways: instructor's assignment and student's free choice. In most cases, students are allowed to choose their team members by themselves and some are prone to work with acquaintances or someone they have worked with before. If they don't know anyone in the course, they would like to know something about the others before forming a team. It seems that some instructors would help them to get to know each other:

At the beginning of the course, the instructor suggested posting brief descriptions of ourselves especially related to strengths and weaknesses. So when you make a team, you have to get others who have strengths that you don't have. So you make a balance in your team.

In my mixed mode class, we had a face-to-face meeting at the first class. We saw each other and talked about our similarities and differences and tried to form a team.

Requiring students to post a description of themselves with their strengths & weaknesses and setting a face-to-face meeting at the beginning are both good strategies to help students form a balanced team. In addition, it is very common among instructors to request students to introduce themselves on bulletin boards and respond to others at the beginning of the course. Some respondents supported the use of bulletin boards for getting acquainted with each other and considered mental contact more important than physical contact, while others still preferred a face-to-face meeting at the beginning: "It's sometimes best to have them around and you can observe them and see them in a natural setting, then that will give you an idea what they work like."

Regardless of which strategies are adopted, instructors should provide students opportunities to know each other before asking them to choose their partners. As for the preference of team formation methods, one respondent said that she didn't like random assignment: "In my opinion, it is not a good idea for the instructor to put students randomly into groups, because you don't know what strengths each student has." Some respondents articulated they did not have preference for a particular team formation method, because both random assignment and free choice had their own advantages and disadvantages.

People get a habit of working with the same people. I would like to mix up the groups sometimes, so I think the only way this might happen is we were assigned. So it might be ok to be assigned sometimes. But I like being able to choose.

I like random assignment, because there are students from different countries in the school, but sometimes American students would more like to work with American students and Chinese students will prefer to work with other Chinese students.

Apparently, random assignment ensures group diversity and enables students of different ethnicities to work together. But at the same time, respondents expressed their concern of being assigned to a "bad" team. When doing team assignments, instructors should try to make a balanced team based on students' backgrounds. One respondent shared her favorable experience of being assigned to a team: "In that class we were assigned to teams. We had students of different years in the program. And she tried to pair some of the more experienced team members with some of the less experience students."

Team size usually depends on the project. For the project of a course, most respondents said 3 or 4 was their ideal number of people in a team, because larger size would lead to more conflicts and smaller group would not have enough collaborative thoughts.

Communication

The collaborative tools used by respondents include email, discussion board, chat room, instant messenger, and telephone. Just like one respondent said, every tool is suitable for certain tasks:

I think email is good for just sending information. And bulletin board is good for response because it allows you to see multiple people's responses. Chat room is good for discussion. So I think each form of communication has its value.

Although a variety of tools are used, asynchronous tools such as email and bulletin board play a dominant role in students' distance communication.

In spite of the fact that a lot of communication tools are available, students still feel the necessity of occasional face-to-face meeting when the task is difficult or has technology components:

It depends on the difficulty of the project. One of the assignments was a statistic class that requires use of software, the SPSS software, so we'd usually meet to put together the actual paper aspect and that was more involved project. When there was a smaller project, we didn't meet face to face. But I guess for a large project.

Additionally, some respondents had face-to-face meeting sometimes because of the downsides of email:

Sometimes, the information that you try to convey via email or other electronic tools will deviate from what you really want to say. The interpretation of certain words will vary from person to person.

I think sometimes email cannot convey like emotions, or can't convey like expectations. So I think that the very first face-to-face meeting, even if it's the only one is very vital. We level the ground so we are all on the same level so we can work from there.

Aside from individual preferences of meeting face to face, when the problems can not be solved solely by written communication, none of the respondents mentioned the use of synchronous audio/visual communication

tools. The needs of having face-to-face meetings could be a result of lacking the capability and skills of using such tools.

Team Leader and Roles

In our interviews, all of the participants agreed that there should be a team leader to guide the process along. The team leader was identified as someone who can assign the roles, initiate the discussion, mediate the conflicts, remind the deadlines and compile each member's work to get the whole project done. Respondents expressed the necessity of the team leaders and a good leader "makes an effective team":

I think there should be a team leader who will be in charge of assigning tasks, initiating discussion. If there is no team leader, team members will have different opinions and may have conflicts.

I think in classroom setting, it helps to guide the process along and probably it is because we so used to have an instructor. When you get into a team, you are still looking for some person to play the role.

Respondents also noted that in virtual teams "the role of team leader is more dynamic, the responsibility rotate, each member will lead on one of the assignments." In their responses to the way the team leaders were selected, four of the nine respondents claimed that the team leader emerged during the process; three students reported that their team leaders were volunteers; and two interviewees said they took their turn to be the team leader.

Team Conflicts

Based on our literature review, a lot of studies suggested that, with no or limited face-to-face interactions, students in virtual teams were more likely to get into ambiguity. In order to better understand the students' social interaction, respondents were asked questions regarding if they ever experienced any team conflicts, how they usually come to a consensus, and how they deal with slackers.

From the answers of the respondents, a few common team conflicts arise: different opinions, blaming each other, hard to get consensus and, lagging behind or no contribution to the teamwork. In response to the question on how they come to a consensus, the interviewees addressed the following solutions: "go to the most popular one"; "take advantages of everyone's strength"; and "compare pros and cons." One of the interviewees mentioned a very good point:

People have different strengths; we need to get use of this kind of strength. If someone is very good at web design, let him do your team presentation page; if someone is very good at editing, let him go through the final copies; if someone is very good at doing research, let him guide the research process. Let people feel they are very unique in the team and they do some contributions.

A slacker is identified as one of the team conflicts. Slacker refers to someone who does not contribute to the team project and counts on others to complete assignments. Some interviewees addressed their solutions to this problem:

When you have some person lagging behind or did not work on the project, you need to contact him/her using a nurturing way, email or call them and say 'what's going on?' 'Are you OK?' Try to get them to work with you. Let them feel as a part of the team. They need to be concerned with getting to the work done.

Some respondents mentioned that they "would let the team leader talk to the person nicely, if still no response, (they) will make up that work for him/her."

Based on the interview responses, it was found that team conflicts did not arise from task difficulty but usually from a lack of motivation to participate, inappropriate communications, and different opinions.

Feedback

Virtual teams have unique features compared to traditional teams in terms of the team interaction. Team members collaborate from a distance through technology. Research suggested that instructors providing constructive feedback to students have a positive impact on students learning outcomes and problem solving skills (Bjorklund, Parente, Sathianathan, 2002). In virtual teams, students are told to work together on their assignments or projects. However, whether or not collaborative learning actually occurred depends on what happened in the team. In online collaborative learning environment, the role of instructor is more likely to be the facilitator. In order to determine the relationship between the feedback of the instructor and the students team work performance, we asked students about their experiences of their instructor's feedback on their teamwork. The response shows that the feedback from instructors is helpful on their product, but there is lack of the feedback on the team process (how well the team work together). The students' responses for this question are listed below:

I think feedback is really helpful to us to understand the project and assignment. Normally instructors provided feedback through email or rubrics. With rubrics, they will highlight the aspects that they think team had met and at the bottom they provided comments regarding the overall project.

"Generally, the instructor seems to create one template to use on all of the teams. Adding points or removing points to fit each team, to personalize each team report."

"The virtual teams I worked with, instructor gives us some feedback which is helpful for our product, but he did not give us feedback on the teams."

"Most of time, I think instructors go through the whole group work but they don't know much about each member's contribution."

When researchers asked the question: "how would you like the feedback to be." one student said she really liked constructive feedback which instructor addressed problems and specific points on how to improve the project. Another student mentioned he liked the way that the instructor met with each team member to talk about the project and got to know what's going on.

It appears that students have realized the importance of the feedback from the instructor and instructors should provide feedback on two levels- content (product quality) and team performance (how well the team worked together).

Comparison with Face-to-Face Teamwork

On one side, compared to traditional face-to-face teams, virtual teams can be more effective and efficient in some situations because of the flexibility and timeliness of online communication, but on the other side, communicating through instant messengers or emails can be extremely ineffective. One interviewee specifically pointed out that "with face-to-face we can brainstorm and within an hour we could have more than what we can get from chatting online for three hours." Most of the interviewees did agree that the overall virtual teamwork effectiveness depends on the types of the project and the personalities, skills, and experiences of the team members. Although technologies such as synchronous audio/visual communication tools might remediate this situation, acquiring the technology and skills of using the technology is a challenge to team members with different technical background.

General Perspectives on Virtual Teamwork

Although people's perspectives toward virtual teams differ from one to another, some of them have found working in virtual teams "rewarding" and "more productive". It "has always been a good experience", team members can "get more things done" and "get very quick response". Even those who "generally do not like them" acknowledge that there are "practical benefits of having virtual teams" because of the flexibility that allows them to meet with their teammates anywhere and anytime. It is especially helpful around assignment's deadline. Team members who have difficulties to meet frequently can "talk every night" over instant messenger "when the deadline approaches soon" so that they can finish it on time.

There are also some issues that most of the interviewees experienced in virtual teams. One of the problems or frustrations that they often have is with team members who lack technical ability. It is also hard to work with somebody that you never met before and to establish personal connection through online communication due to the lack of facial expression and body languages. It is suggested that web cam and video conferencing can be used to complement instant messaging and emailing to convey non-verbal cues and promote personal connection.

Conclusions

This study pinpointed some problems hindering the smooth flow of virtual teamwork and brought forward some best practices for instructors as well as students summarized as below.

The problems identified with students in virtual teamwork include: 1) a lack of motivation to participate on virtual teamwork, 2) a lack of specific guidelines on technology use and how to collaborate in virtual teams, 3) limited use of synchronous, audio, visual communication tools, and 4) difficulty in establishing personal connection via text-based tools such as email and instant messenger.

Some of the best practices and strategies for students encompass: 1) keep the technology in align with project and team needs; 2) clearly identify the team roles and timeline for the project; 3) respect individual team members; 4) shift the role of team leader to each member who has different strengths; 5) communicate with members frequently and clearly; 6) approach as a team and kindly remind the person who is not contributing.

Best practices and strategies for instructors generated from this study consist of : 1) Conduct optional teamwork training including technology instruction; 2) Encourage students to work with different people; 3) Take students' background information into consideration when assigning students into teams; 4) Assign students into

teams of 3 or 4; 5) Provide opportunities for students to know each other before team formation; 6) Encourage students to use audio and visual communication tools; 7) Provide team member evaluation forms to encourage students involvement in teamwork; 8) Keep an eye on each team's progress to facilitate and motivate students learning in virtual teams.

The outcomes of this study have very practical significance. Those best practices for instructors and students will definitely improve the effectiveness of virtual teamwork.

Future Research

"Virtual teamwork" in this study refers to students' teamwork in traditional face-to-face class, mixed mode and totally online class as long as it involves online collaboration. Future research may just focus on virtual teamwork in totally online course.

Among the 9 participants of this study, the majority of them are Americans and 2 are Asians. The data collected indicate they have somewhat different opinions over a few aspects of virtual teamwork. Future research study could compare the differences between Americans and students from other countries in virtual teamwork.

Additionally, this study found that students lack the motivation to participate in virtual teamwork. In future research, researchers may search for the reasons behind it.

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