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Teacher Perspectives on Online Collaborative Learning: Factors Perceived as Facilitating and Impeding Successful Online Group Work

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Abstract

This study examined the factors perceived by in-service teachers as either facilitating or impeding successful completion of online group work in a virtual graduate school of education program. Based on a quantified qualitative data analysis of open-ended questions, five facilitative factors were identified as (a) individual accountability, (b) affective team support, (c) the presence of a positive group leader, (d) consensus building skills, and (e) clear instructions. There were also seven impeding factors perceived by the teacher participants. Although four of the factors described a lack of the aforementioned facilitative factors, another three broached new, problematic issues that need to be further considered in online teacher education programs. At the conclusion of this article, recommendations are provided that online teacher educators might consider as they initiate group projects in online environments.

Characterized as "anytime and anywhere learning," online degree programs are currently attracting an increasingly large number of in-service teachers who lack opportunities to attend traditional face-to-face classes during specific time periods (Belanger & Jordan, 2000; Birnbaum, 2001; Mehlinger & Powers, 2002; Schulz, 2003; Zern, 2001). Consequently, there has been much discussion regarding the most effective instructional approaches needed for meeting their needs.

Within the literature in this emerging field, there seems to be a consensus that online instruction needs to move away from teacher-centered models toward more learner-centered ones in which student collaboration is encouraged (Barab, 2004; Pierce, 2003; Weiss, Knowlton, & Speck, 2000). Yet, this emphasis poses challenges for online teacher education programs. In many instances, online teacher educators need to consider whether the inclusion of collaborative work can provide a positive learning experience and if it can be conducted in a manner that subsequently impacts the teacher participants' own beliefs about pedagogy (Pajares, 1992). This issue is important, given that in-service teachers are often required to implement student-centered learning in their own classroom practice (Kochan, 2000; Schultz, 2003).

Although a significant amount of research has cited the benefits of collaborative learning in face-to-face learning environments (Johnson & Johnson, 1989, 2004), there are only a handful of studies investigating how in-service teachers perceive online collaborative group tasks. As more in-service teachers enroll in online programs, this issue calls for the attention of faculty and instructional designers regarding the teachers' perceptions and viewpoints about group learning processes.

To better understand this dynamic, in a previous study we examined teachers' self-reported benefits while participating in an online group project (An & Kim, 2007). We found that the three primary benefits perceived as valuable by in-service teachers included the following: the development of their metacognitive knowledge; their recognition of the value of a supportive learning community; and their new understanding of the constructive use of online communication tools.

To further examine collaborative learning in virtual environments, the study reported in this article explored the specific factors teachers perceived as facilitating or impeding their successful completion of online group projects. Without a proper understanding of in-service teachers' viewpoints that come from their own group learning experiences in online environments, the implementation of a group project in an online teacher education program may not be successful. Thus, by analyzing the facilitative and impeding factors, this study has the potential to help online faculty in teacher education programs better design and facilitate group projects in online environments. The research questions driving this study were as follows:

- What are the factors in-service teachers perceive as facilitating their successful completion of online group projects?
- What are the factors in-service teachers perceive as impeding their successful completion of online group projects?

Conceptual Framework

Online Learning for Teachers

Distance learning has been utilized in educational settings for many years, taking on a variety of forms. With the advent of the Internet, online learning has been rapidly expanding into the realm of teacher education, since it provides a convenient means for fitting coursework into busy schedules (Belanger & Jordan, 2000; Birnbaum, 2001; Schulz, 2003; Zern, 2001). Further, online schools of education vigorously market their programs to attract teachers who want to attain recertification requirements and to update their knowledge and skills for teaching methods and new technologies (Belanger & Jordan, 2000; Birnbaum, 2001; Schulz, 2003).

Although earlier efforts at providing distance education were mainly based on a linear and behaviorist approach focusing on the transmission of predefined knowledge and skills, newer initiatives tend to encourage social interaction among participants (Vrasidas & Glass, 2003). Supported by computer-mediated communication (CMC) technologies (e.g., discussion boards, chat tools, etc.), many online courses have now adopted collaborative learning methods so that students experience opportunities for sharing and constructing knowledge (Dewiyanti, Brand-Gruwel, & Jochems, 2005).

Considering the popularity of collaborative learning methods in current online programs, educators must understand how participants experience their online learning so that more effective courses and activities can be developed. This understanding is particularly important for online teacher education programs, because the experiences and perspectives teachers obtain there will influence their willingness to implement this learning method in their own classrooms.

Collaborative Learning via CMC

Brown, Collins, and Duguid (1989) asserted that students need to be able to work with and listen to others and develop ways of dealing with complex issues and problems requiring different kinds of expertise. To bring out expected learning outcomes, each person's contribution needs to be respected, and the community as a whole should be able to synthesize diverse views (Bielaczyc & Collins, 1999). An emphasis on collaboration as an essential element of this process can strengthen group processing skills, subsequently enhancing citizenship in a diverse democracy (Cohen 2001; Dewey, 1902/1966). Within this framework, knowledge cannot simply be transmitted from teacher to student or from individual to individual. Instead, knowledge is developed through the synthesis of social experiences transpiring in the classroom. In other words, the goal of the collaborative learning is not merely "knowledge acquisition" and "participation," (Doolittle, 2001; Sfard, 1998), but "knowledge building" focusing on knowledge creation (Paavola, Lipponen, & Hakkarainen, 2004).

The terms *collaborative* and *cooperative* are often used interchangeably, even though they are considered as two different research fields. Throughout this article, we use the term *collaborative learning* and define it as a learning method that implies "working in a group of two or more to achieve a common goal, while respecting each individual's contribution to the whole" (McInnerney & Robert, 2004, p. 205).

Numerous studies have shown that learning through collaboration, as compared to competitive or individual learning, usually results in higher achievement, better psychological connections (caring, support, and commitment), greater psychological health, social competence, and self-esteem (Johnson & Johnson, 1989; Johnson, Johnson, & Smith, 1991; Smith, 1995). It has been also argued that incorporating well-planned collaborative activities into online teacher education benefits teachers as well as their students, since higher order thinking skills are more likely to be generated (Schultz, 2003) and to impact the learning process by improving socialization skills, as well as enhancing critical thinking (Jegede, 2002). Other benefits of online collaboration that have been cited include reflection, peer feedback (Ruhleder & Michael, 2000), and the reduction of anxieties in social situations (Gokhale, 1995).

However, simply assigning students into a group and asking them to work collaboratively will not guarantee that they will collaborate (Kreijns, Kirschner, & Jochems, 2003; Johnson & Johnson, 2004). Johnson and Johnson (2004) specified five basic elements needed for effective group collaboration: (a) positive interdependence, (b) promotive

interaction, (c) individual accountability, (d) appropriate use of social skills, and (e) group processing.

According to Johnson and Johnson (2004), positive interdependence, which is the heart of effective collaboration, transpires when each member in a group perceives that he or she cannot succeed unless the group does. Another element for effective collaboration is promotive interaction, which exists when group members act as trustworthy members by acknowledging and challenging each other's ideas and facilitating each other's efforts. To ensure each member's active participation in a group project, individual accountability should be taken into account. This accountability can be achieved when each group member's performance is assessed. Using collaborative learning requires group members to have social skills for trust building within the team, clear communication, and constructive conflict resolution. Group processing includes monitoring all members' work to ensure the quality of the work, facilitating social interaction, and ensuring reciprocal interaction so that group members can collaborate effectively.

With the advent of the Internet and communicative media, there have also been many attempts to incorporate collaborative learning methods in online environments. Hiltz and Turoff (2002) suggested that collaborative learning activities, which are well-suited for online environments, include debates, group projects, case study discussions, simulations, role-playing exercises, the sharing of solutions for homework problems, and the collaborative composition of essays, stories, and research plans. However, in reality, most online collaborative work is usually relegated to discussion board conversations, in which students merely generate a dialogue with their peers about the weekly readings. Although this type of activity can certainly be of relevance, the extent of actual collaboration is usually limited.

Similarly, there have been more critical views taken by several researchers. Dirks and Smith (2004) found that learners are often reluctant, frustrated, and dissatisfied with collaborative learning methods, especially when working within small online groups, because they "struggle with the development of a sense of interdependence and intersubjectivity within their online groups, but end up holding fast to subjective, individualistic conceptions of learning" (p. 134). They further asserted that these aspects can be exacerbated in online environments, due to the difficulty in providing the emotional dynamics, which are often cited as being a critical element of the collaborative learning process. Likewise, Birnbaum (2001) argued that difficulties might be more likely to occur when group members try to reach a consensus in online group work, since there are no verbal or facial cues to help resolve possible conflicts.

Although online learning environments equipped with communicative technologies improve upon distance-based collaboration in an asynchronous manner, computer-mediated communication puts other demands on participants (Hron & Friedrich, 2003). Hron and Friedrich argued that online participants need to possess or be trained to have enough computer literacy so that technology does not interfere with their communication. They also warned that less motivated participants may withdraw from active participation due to the extra steps involved in computer-mediated communication when reading and writing discussion board postings. Even highly motivated participants can be frustrated when they do not get timely feedback from group members. In addition, the accumulated messages on the discussion board may become overwhelming for participants to digest (Hron & Friedrich, 2003). Furthermore, unlike in face-to-face environments, an individual's actions or activities are not easily visible to others in online environments.

Several researchers have argued that an awareness of information, defined as an "understanding of the activities of others" (Dourish & Bellotti, 1992, p. 1), provides the groundwork for collaborative activities (Carroll, Neale, Isenhour, Rosson, & McCrickard, 2003; Dourish & Bellotti, 1992). Gunawardena (1995) pointed out that in computer-mediated collaborative learning environments failure is more likely to occur on a social rather than technical level, because computer-mediated collaboration is far more complex than face-to-face collaboration.

Currently, online collaborative learning tends to focus on the cognitive process by emphasizing task-oriented communication, while assuming that the social dimension will occur automatically via communicative technologies (Kreijns et al., 2003). However, individuals will not willingly share their tentative ideas or critically challenge others' opinions unless they trust group members and feel a sense of belonging (Kreijns et al., 2003; Rourke, 2000). Therefore, collaboration often remains shallow due to the lack of affective group support.

Given these critical viewpoints toward collaborative learning in online environments and the dearth of empirical studies on teachers' perspectives toward online collaborative learning, An and Kim (2007) examined the ways in which in-service teachers enrolled in an online master's program perceived their online group project experiences. They found that the teachers reported difficulties from participating in online group projects, yet the positive experiences outweighed the negative ones. Teachers reported that their participation in the online group project facilitated the following three benefits:

1. Their belief that such practices could develop their metacognitive knowledge, which was defined as knowledge about one's own cognition and the ability to monitor the assumptions and implications of one's activities (Cordero-Ponce, 2000; Flavell, 1979; Gagné, Briggs, & Wager, 1992).
2. Their recognition of the value of a supportive learning community.
3. Their new understanding of the constructive use of online communication tools.

Yet, the students also reported that difficulties in doing online group projects. Such issues included cognitive conflicts, individual differences, group grading, different time-zones, and the unique challenges caused by not being able to communicate face-to-face.

This current study builds on previous research by revealing the factors that facilitate or impede the successful completion of online group projects. The study was accomplished by analyzing the perspectives of in-service teachers.

Methods

Context and Participants

Twenty-four students (16 female and 8 male) enrolled in an instructional technology course during the summer 2005 semester at an online graduate school of education located in the southwestern U.S volunteered to participate in this study. The course was taught by the first author of this paper. The majority of participants were K-12 in-service teachers, except two participants (one participant was a technology coordinator, while another was an academic counselor at a K-12 school). Participants ranged in age from 29-56 years old and logged in to the course from locations throughout the U.S., in states such as Arizona, California, Colorado, Ohio, Missouri, New Jersey, Tennessee, Texas, Utah, and Washington.

The instructor randomly formed groups of three to four students, and each group was provided with a group discussion board situated in the Blackboard Learning System™. They were also welcome to use other types of communication methods, such as the phone or email, but most students reported that they primarily used the BlackBoard discussion board. The instructor did not intervene in any group processes, except for answering student questions in relation to the project. Student assessment was based on the group's work, rather than the efforts of any particular individual. A description of the 4-week group project can be found in [Appendix A](#).

Data Collection

The instructor invited class participants to fill out an online survey (see [Appendix B - PDF](#)) during the last day of the course on a voluntary-basis. Besides the participants' profiles and communication method questions, the survey consisted of open-ended questions, in an effort to better understand students' beliefs and perceptions regarding online collaboration (as in Ellis, 2004; Leow, 2000). The participants were asked to comment on the factors they perceived as important for the successful completion of the online group project. Similarly, there was a question regarding the factors believed to have hindered the successful completion of the online group project.

Data Analysis

We adapted a quantified qualitative data analysis of the open-ended questions (Chi, 1997; Creswell, 1994; Rourke & Anderson, 2004; Wilson, 2001). The literature suggests blending both qualitative and quantitative analyses in order to remove shortcomings of each method when investigating what a learner knows and how that knowledge influences the way the learner solves problems (Chi, 1997; Creswell, 1994; Wilson, 2001). In order to do this, coding schemes were developed, the raters were trained, and interrater reliability was established.

To begin with, two coding schemes (Facilitative and Impeding factors) were developed through an iterative process by identifying themes in students' written production and by referring to the literature (see [appendixes C and D](#)). The Facilitative Factors Coding Scheme consisted of five major categories, while the Impeding Factors Coding Scheme consisted of seven major categories.

Analysis of students' written protocols occurred at different phases. First, two coders segmented all the features in the students' answers using the coding schemes (Segmenting stage). This served as a preliminary data set. Following the preliminary segmentation, interrater agreement on the preliminary segmented units was determined. The interrater reliability reached 92% and 93% on the Facilitative Factors and the Impeding Factors, respectively. Interrater reliability for the analysis of the written protocols was computed by percentage agreement, set at the acceptable level of 85%.

Discrepancies were resolved through discussion. The two coders (the first two authors of this article) then individually coded the segmented units based on the coding schemes (Coding stage). Lastly, interrater reliability was again checked for all answers and discrepancies were again resolved by discussion.

Caution was taken to rule out the possibility that some students were simply more articulate or fluent in their written protocols. For instance, if a student described the same idea using different expressions, such as "being able to work together" and "cooperation from all parties" only one point was assigned to the answer. In a similar

manner, if one student combined a couple of ideas in one sentence, the sentence was divided into subcategories of those ideas. For example, one student wrote, "A leader who took charge in delegating roles as well as people within the group accepting those roles and completing their parts on time." This sentence was broken into three units: "A leader who took charge in delegating roles," "people within the group accepting those roles," and "...completing their parts on time."

[Appendixes B](#) and [C](#) show the examples of students' written protocols on two survey questions along with definitions of each category.

Results and Discussion

Through the data analysis process, we found a total of 68 units for the perceived facilitative factors and 51 units for the impeding factors. Table 1 lists, in order of percentage, the factors contributing to successful online group projects: individual accountability, affective team support, presence of a positive leader, consensus building skills, and clear instructions. Table 2 lists, in order of percentage, seven impeding factors indicated by the participants: lack of individual accountability, challenges inherent to virtual communication relying solely on written language, technology problems, unclear instructional guidelines, different time zones, lack of a positive leader, and lack of consensus building skills.

This study revealed many other insights regarding online group projects that need to be examined further. To begin with, among the factors that either facilitated or impeded progress, individual accountability was perceived as being the most critical factor. A lack of individual accountability is consistent with what Latane et al. (1979, cited in Levine, Resnick, & Higgins, 1993) referred to as "social loafing." This term was defined as meaning that when individuals think they are working in a group, they anticipate doing less work than when they think they are working alone. This decreased effort has been proven in various studies to occur on cognitive tasks, such as evaluating written materials and brainstorming (Levine et al., 1993). Johnson and Johnson (1989, 2004) also emphasized the importance of individual accountability by adding it as one of the five essential elements for successful group work.

Table 1
In-Service Teachers' Perceived Facilitative Factors

Category	Number of Units	% of Total
Individual accountability	27	40%
<ul style="list-style-type: none"> • Meeting the necessary due dates • Completing the assigned work • Participation /Feedback 	<p>(10)</p> <p>(10)</p> <p>(7)</p>	<p>(15%)</p> <p>(15%)</p> <p>(10%)</p>
Affective team support	17	25%
Presence of a positive leader	11	16%
Consensus building skills	9	13%
Clear instructions	4	6%
Total	68	100%

Table 2
In-Service Teachers' Perceived Impeding Factors

Category	Number of Units	% of Total
Lack of individual accountability	15	29.4%
<ul style="list-style-type: none"> • Not meeting the necessary due dates • Not completing the assigned work • Lack of participation / feedback 	(6)	(11.8%)
	(5)	(9.8%)
	(4)	(7.8%)
Challenges inherent to virtual communication relying solely on written language	10	19.6%
Technology problems	9	17.6%
Unclear instructional guidelines	6	11.8%
Different time zones	5	9.8%
Lack of a (positive) leader	3	5.9%
Lack of consensus building skills	3	5.9%
Total	51	100%

We surmise that the lack of individual accountability may be a more serious problem in online environments, since students are not always exposed to the pressures and responsibilities of group based work found in face-to-face environments. Therefore, online instructors need to provide mechanisms to foster individual accountability when designing collaborative learning activities. One way is to assess and provide feedback on the performance of each group member in terms of his or her level of commitment, responsibility, and participation. Examples include peer evaluation on other members' contributions or self-evaluation on their own contributions.

Additionally, students can share their work progress and obtain feedback from other members. To facilitate this feedback, online instructors can provide students with explicit guidelines on the group work process, while also asking each group to develop group rules and plans. Monitoring is also important for easing the negative effects of social loafing. That is, online instructors need to encourage students to ask questions and share their concerns regarding group work so they can take immediate and proper action to remedy problems regarding group dynamics.

It is also important to note that affective team support was the second highest (25%) of the facilitative factors. Besides individual accountability, which is directly related to the work itself, participants felt that affective team support was a significant factor in order for the group to complete the project successfully in an online environment. This finding supports Kreijns et al.'s (2003) argument that effective collaboration necessitates an affective structure. It also leads to some new questions: Is affective team support a more critical factor when the course is held in an online environment? Might gender play a role? What can be done to create an affective structure? These issues each require further examination.

Another noteworthy response is related to the perceived role of the group leaders. Having a positive group leader was recorded as the third highest facilitative factor (16%), while the absence of this factor was believed to have negatively impacted the completion of collaborative tasks (5.9%). For our study, it should be also noted that the course instructor merely suggested that each team elect a team leader, rather than making this a requirement. To avoid a confounding variable caused by the instructor's feedback, the instructor was not directly involved in any group communication, except during instances in which participants specifically asked for help. In line with this, the groups were not instructed to determine how the team leader was to be designated or what specific role the team leader was supposed to have. Some responses about the importance of leadership focus on these concerns. For example, the following statements were made:

- "A 'leader' who took charge in delegating roles..."
- "One person in charge of compiling,..."
- "Selecting a person to be the team leader and proving this person with the support he/she needs to organize everyone's submissions."

Although these three examples support the facilitative role of the group leader, some participants also indicated that there were problems in identifying an appropriate group leader. For example, one student said, "My experience in this course was horrendous because we had a control freak in our group.....our group leader really tried to manipulate other team members in order to get his way." Concerns were also raised about the group leader selection process. Another student said, "Since no one seemed to want to begin early, I ended up assuming the leadership role, which I really didn't want."

Since there was no instructor intervention on group communication processes (except in relation to the topic), students tended to look for a strong leader who could help organize the workflow. However, it cannot be assumed that adult learners (in this case, K-12 teachers) will be able to handle such group tasks in a proactive manner without the assistance of the instructor, especially when they need to take on a leadership role. Instead, appropriate instructor intervention may still be needed through the provision of guidelines and feedback on group-based communication (e.g., explaining the role of the leader, suggesting a new leader via group vote, giving the designated leader recognition,

and the provision of feedback regarding the way the leader and the group members are working). After all, participants need to know if their contributions are recognized, appreciated and verified by the instructor as well as the other group members.

Findings from Dewiyanti et al. (2005) also support this suggestion. They reported that students who received guidelines and feedback on their group process from their instructors actively planned and monitored their collaboration process more than those who did not, although there were no significant differences in participation and students' experiences with collaborative learning in these two instructional settings.

Participants indicated that the challenges inherent to virtual communication relying solely on written language was the second highest impeding factor (19%). Although online communities can provide a supportive context that makes new kinds of learning experiences possible (Bruckman, 1998), online faculty need to consider the inherent limitations of asynchronous, written communication. Because of the challenges of its usage (time lags, lack of spontaneity), and the dependence on the written word, a number of students indicated that they were overwhelmed, especially when they faced conflicts and when they felt isolated from the group. Using written communication as the sole

medium caused some students to seek out other communication tools. For example, one student answered,

Yahoo Messenger was used to assist in completing the group assignments. All students are not willing to use it, but I found it extremely helpful to recognize when students are online and to be able to real-time talk with them, without the cost of a telephone.

A similar approach to implementing alternative communication methods was found in another student's reflection:

We used both Group Discussion Board and the telephone equally. We used instant message the first half of the course because everyone felt comfortable with it. In the second half we used the Group Discussion Board and used the telephone only to confirm things.

Communication problems could have been reduced further if the instructor had encouraged students to use synchronous communication tools such as an instant messenger (IM) program or a built-in synchronous chat program within the learning management system. Furthermore, providing some techniques about writing effective online written expressions (e.g., utilizing emoticons or avoiding the use of capital letters, which can be interpreted as "shouting") might have also added value. Yet, the problems students faced with text-based communication may have still remained unless video-based synchronous communication tools were also utilized. For example, it could have been possible to have incorporated the use of webcams into the course.

Additionally, in regards to "consensus building skills," which was recorded as 13% of the facilitative factors and 5.9% of the impeding factors, we noticed that some students utilized a more passive strategy than others:

- "I feel sometimes you have to give in to some other people's ideas so that you can finish the project."
- "Learning to be patient with others who are against my ideas and opinions..."
- "Ensuring that personalities don't get in the way of accomplishing a task."
- "Sacrificing for the team and the benefit of others."

Additionally, some students viewed the consensus building process as being a unique opportunity to reflect on their own teaching:

- "I expect my students to learn to disagree and figure out how to still be able to finish a project."
- "Broadening my students' understanding of a subject by hearing what others have to say."
- "It [difficulty building a consensus] definitely made me think about my students and their complaints about group work."

In many circumstances, it seemed easier for the students to give up their original assertions in order to reach a group decision, in which every group member was willing to accomplish the task at hand. Nevertheless, it is also important to note that the group disagreements generated unique learning opportunities.

Overall, it appeared that individual accountability, affective team support, the presence of positive leadership, and consensus building skills were particularly critical for designing and facilitating online collaborative group tasks, as they seemed to be closely associated with the challenges of different time zones, as well as the challenges inherent to virtual communication relying solely on written language. After all, these two challenges sometimes made it more difficult for individual opinions to be heard, which led to more serious roadblocks, subsequently preventing group consensus.

Since the participants were unable to meet face-to-face, they felt emotionally isolated and became less likely to take on their responsibilities, such as meeting assignment deadlines. However, unlike these impeding factors, the challenges associated with individual accountability, affective team support, the presence of positive leadership and consensus building skills could have been addressed through better design and instruction. There is clearly a need for more in-depth research on each factor listed here, in order to better facilitate online group work for teacher educators.

Conclusion

Online learning can be an effective avenue for teachers to accomplish academic or external motivational goals such as salary augmentation or certificate maintenance, while also meeting various personal commitments (Ortiz, 2006). Using computer-mediated communication technologies in such online courses can be an effective means for facilitating collaborative inquiry within a group, since participants can process information, increase their knowledge, and conduct reflective thinking about their own and others' teaching practice (Branon & Essex, 2001; Dede & Kremer, 1999; Thomas, 2002). Yet, despite the popularity of online discussion boards and chat rooms, there needs to be a realization that merely putting students together in an online group does not mean they will engage in meaningful collaborative inquiry (Kreijns et al., 2003).

Similarly, there should be a realization that the attributes of online discussion (e.g., written, asynchronous communication) may cause different problems that might not surface during face-to-face group work. In order to generate more educative group learning experiences, it is necessary to reconceptualize the ways in which such online group projects transpire when utilized by in-service teachers. Additionally, online faculty should be prepared to recognize the aforementioned facilitative and impeding factors, so that they may anticipate the appropriate pedagogical strategies which may be needed during the online group learning process. A failure to do so might result in the perpetuation of ineffective and inefficient teaching practices (Parajeres, 1992; Wang, 2002).

Overall, when designing group assignments, it is important for online instructors to provide not only a clear description of the assignment itself, including the way the work will be assessed, but also guidelines for how the group work will be facilitated in order to meet the necessary goals.

The assessment of collaborative work should be designed to include both group and individual performance based tasks, in order to increase individual accountability. Positive and effective collaboration does not happen automatically. Students need to learn *how to collaborate* as well as to learn how to *collaborate to learn*. Group members must be able to collaborate and be willing to collaborate with others. Consequently, when group assignments are developed, instructors may want to consider adding an orientation component, providing guidelines in which students have the opportunity to learn about the group leader selection process, as well as each group member's expected responsibilities. Effective online writing strategies should also be discussed. These actions

will certainly help to facilitate collaboration and make each class member's online experience more meaningful.

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Appendix A

A Description of the Four-Week Group Project

Meet with your group to discuss a special interest project that deals with multimedia technology. Each member of the team should come up with one topic and provide a reason why this topic would be of interest to the team. After the discussion, all members should come to agreement in choosing one topic for the final paper. You will write a paper of interest to your team that deals with multimedia technology. (This topic can focus on discussions from the readings or articles in the class). You will expand on the topic of choice by discussing opportunities and challenges presented by multimedia technology and its equitable access to all students. Your paper should also discuss the latest trends in multimedia delivery for teaching and learning. The topic selection should also include an explanation as to why you chose the topic. The paper your group will write should be 8-10 pages in length, not including the title page, abstract, and references section, and should also adhere to the APA format of writing.

Appendix B

Please complete the following questionnaire. When finished, click on the "submit" button. Do not submit more than one survey. Your participation is greatly appreciated.

I. General information:

Please provide a response for each of the following questions.

1. What is your full name?

2. What is your gender? Female Male

3. What is your age?

4. What is your professional position? Please mark the choice that most closely fits your position.

- District or school-based technology coordinator / specialist
- Classroom teacher (Please provide the grade and subject you are teaching):
- Media specialist
- School administrator
- Government or industry representative
- Independent educational consultant
- Other (please specify):

5. If you are working at a school, where is it located?

City: State:

6. How many years have you been working in the profession you selected for question 4?

7. Why are you enrolled in this online instructional technology master degree program?


II. Questions pertaining to your online Collaborative Learning Community (CLC) experience:

For the following questions, please provide honest and detailed responses.

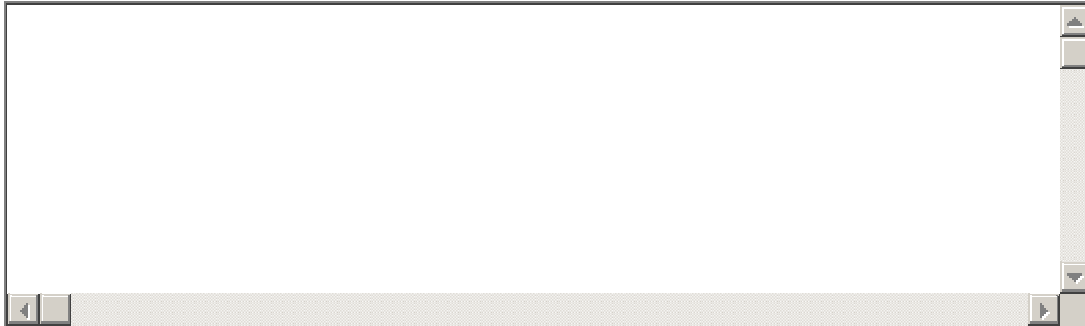
8. Please check all of the communication methods you utilized during the group assignments.

- Telephone
- Group Discussion Board
- Instant messaging or other types of synchronous chatting methods
- Email
- Other (please, specify)

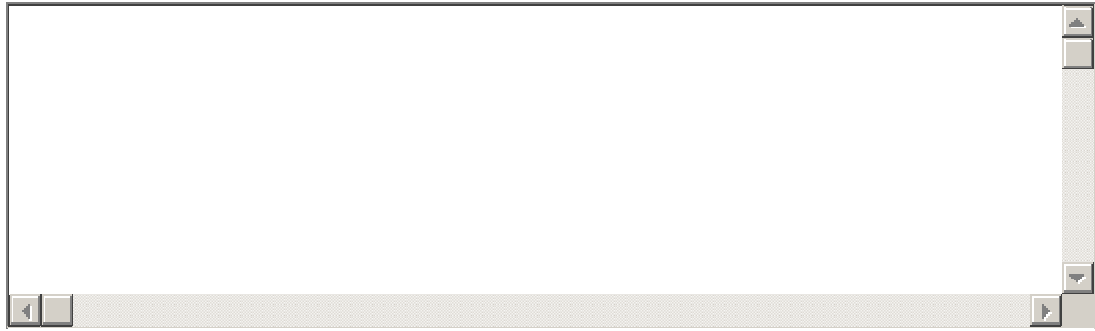
9. Which communication methods did you utilize most in completing the group assignments? Why?



10. List the factors, if any, that led to the successful completion of the "online" group assignments.



11. List the factors, if any, that impeded the successful completion of the "online" group assignments.



Appendix C

Coding Scheme for Facilitative Factors

Category	Subcategory	Definition	Example
Individual accountability	Meeting the necessary due dates	Each individual does his / her work in a timely manner.	- "Everyone was determined to get the assignment done on time."
	Completing the assigned work	Individual completion of the assigned task	- "Each person being responsible for parts of the assignment."
	Participation / Feedback	Participants support each other by responding to group members in a timely manner.	- "The feedback I received from my group members." - "Working together to brainstorm and complete the project."
Affective team support		The presence of team camaraderie.	- "Everyone has the team spirit to get the assignment completed." - "Everyone encouraging one another." - "Making friends with no faces."
Presence of a positive group leader		Presence of a leader who can play both functional and social / emotional leadership roles. Functional leadership refers to the necessary interventions to accomplish precise tasks within the groups. Social / emotional leadership refers to the facilitation of group dialogue (Hotte & Pierre, 2002).	- "Proactive group leader" - "A leader who sets appropriate timelines for completing a project."
Consensus building skills		Individuals are willing to reach agreement without sacrificing their own opinions.	- "Learning to be patient with others." - "Making decisions as a group."
Clear instructions		The instructor's clear guidelines about the group project and clarification regarding the questions.	- "Everyone understood the assignment clearly."

Appendix D

Coding Scheme for Impeding Factors

Category	Subcategory	Definition	Example
Lack of individual accountability	Not meeting the necessary due dates	Individual members' negligence in meeting the deadlines.	<ul style="list-style-type: none"> - "People who are lazy and are procrastinators." - "People who procrastinate because they are trying to be a perfectionist." - "A member not submitting his part of the work on time."
	Not completing the assigned work	Individual members' negligence in completing the assigned work	<ul style="list-style-type: none"> - "People who didn't do what they were supposed to do," - "Team members submitting poorly done work and not having the ability to work with others to improve the final product."
	Lack of participation / feedback	Not communicating with other group members' during the online discussions and not providing adequate responses to peers.	<ul style="list-style-type: none"> - "Not all members participate in group discussions on a regular basis."
Challenges inherent to virtual communication relying solely on written language.		Not being able to access methods of synchronus and spontaneous communication as well as the inability to access tones, facial expressions, pitch, volume, and other non-verbal elements of communication that help convey emotion and meaning in face-to-face learning environments.	<ul style="list-style-type: none"> - "I found it difficult to communicate with group members with only words. It is difficult to understand what tone is being used and when there is a disagreement, it can be frustrating." - "Inability to express yourself in written words." - "Facial expressions: not able to see what people mean when they are saying something." - "Not being able to communicate online immediately when I needed to."

Technology problems		Difficulties related to the use of technology	<ul style="list-style-type: none"> - "Poor or unavailable internet operation." - "Incompatibilities (file, web, technology)." - "BlackBoard access problem."
Unclear instructional guidelines		Insufficient and ambiguous instructor guidelines for the project.	<ul style="list-style-type: none"> - "The project itself was vague." - "Not completely understanding the assignment." - "Poor instruction and not being able to get clarification in a timely manner."
Different time zones		The difficulty of having online discussions at one designated time, across different time zones.	- "Different time zones would not have been an issue in a face-to-face group meeting."
Lack of a positive leader		The absence of a leader or the absence of a positive leader.	- "Not designating a group 'leader' because no one was responsive to the role."
Lack of consensus building skills		The absence of skills to reach consensus among group members	<ul style="list-style-type: none"> - "People who fail to 'work' with the group." - "Each member willing to take a back seat with their ego."