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Exploring Students' Communication and Project-based Learning Experience in an International Distance Course

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Abstract

Previous research in distance education points out that improving depth and quality of communication and interaction is of utmost concerns. This study intends to explore students' communication and project-based learning experiences in an international distance course conducted by three universities across Japan and Taiwan. This paper first describes the rationale of the study, and how it was designed and implemented. Results of the study showed that students of different countries actually demonstrated different degrees of perception of how useful technologies were in their learning experiences. Also, both main and alternative information communication technologies adopted by students groups were different. Moreover, students of the three participating universities possessed different perceptions of the project-based learning curriculum implemented in the international distance course. This paper further discusses implications of results of the study and suggests that more future research is needed to advance understanding of learning and communication in distance education.

Keywords: communication, information and communication technology, international distance education, project-based learning

1. Introduction

International collaboration efforts among countries emerged from the needs of extensive and global competence. With the geographical and historical accessibility, Asian countries have developed cultural, societal, and economic interactions, and many of them continue to cooperate more closely to build a prosperous neighborhood in the last few decades. To be able to cross the lingual and geographical borders to better approach each other, governments of Japan and Taiwan have devoted great efforts to support and encourage international education programs such as foreign studies, exchange visit and distance courses (MOE, Taiwan; MEXT, Japan). On the basis of shared societal perspectives and commonly recognizable writing systems, universities in Taiwan and Japan endeavored to promote cross-disciplinary collaboration in research as well as in formal education.

Although distance education methodologies have come into prominence for decades, however, communication as the prior challenge encountered in these distance contexts calls for serious and continuous concerns theoretically and practically. For instance, the competitive development of the information infrastructure in Taiwan and Japan is convincing, but it has also developed the emerging needs for college students and faculty members to quickly be adapt to the current widespread technology integration. Many problems associated with distance education are reported in related studies regarding the technological obstacles, teacher commitment, as well as student engagement. These problems found in previous practices served as important references to the current study. Besides, critical issues such as motivation and interaction have been evolved and culturally diverged. Therefore, this case study presents a culture-specific and pedagogy-focused approach to communication and team learning issues in distance education, which intends to provide experimental evidence to the design and implementation of project-based distance education practices.

2. Literature Review

Recent and rapid technological developments raised questions of whether or not distance educators could align instructional theories and affordable applications of information

communication technologies with educational needs. More challenges are exposed with transactional issues (i.e., teaching and learning) in distance education context based on structural constraints (Garrison, 2000) of the spatially and temporally separated classrooms. For example, the physically distance can distract a teacher's awareness of what is going on at other sites at all times, and the asynchronous nature may delay his/her communication of this awareness with students particular at distant. Meanwhile, spatial distance creates damage to the perception of classroom as a whole. The feature of separation deteriorates the relationship between the teacher and student behaviors, and makes students' motivation unlikely to be sustained in class.

Additionally, the decomposed classroom developed the feelings of alienation among students, which could hinder their incentive to participate and engage in learning. Research efforts (Osman & Herring, 2007; Pea, 1993; Stefanou, Perencevich, DiCintio & Turner, 2004; Zurita, 2007) were made to approach this problem by making use of learning activities that encourage students to join and focus on classroom instruction. Unfortunately, evidence from the distance education studies (Hillesheim, 1998; McPherson, 2004; Nichols & Levy, 2009; Romano, Wallace, Helmick, Carey & Adkins, 2005) indicated that students do not necessarily perform higher level tasks with long-termed academic motivation. Although these activities call for students' immediate attention, they are insufficient for students to keep up without an achievable goal of vision. Also, learning activities implemented by teachers without strong connections to essential learning may reduce students' self-reliant of their responsibilities for their own learning.

Another critical problem in distance education that demands instructor's attention is classroom management, which possesses substantial influence to teaching and learning effectiveness in the distance education context. Although a sound classroom management is viewed as a condition for student learning (Emmer & Stough, 2001; Palaigeorgiou, Siozos, Konstantakis, & Tsoukalas, 2005), it is difficult to achieve and especially requires practices even in traditional face-to-face meetings. From the viewpoint of polymerization, on the other hand, a real-time broadcast distance education requires a number of classrooms be linked together at the same time. This analogical connection of classrooms results in a sudden growth of class size within the limited time span, where the momentum between teacher and student behaviors is more likely to be disrupted rather than to interact. Related research in distance education and classroom management has considered technology support as a solution to the interaction problems (McCaslin and Good, 1996; Yueh, Lin, & Chung, 2005). Nevertheless, without a systematic view to approach the interaction problems in distance education, results from the previous studies suggested limited insights under their conditioned contexts.

In addressing these problems, another strand of research sought for improving the interaction between teacher and students, as well as among peer learners in distance education. To this end, the student-centered curriculum design has been promoted (i.e., Halpin, Scheer & Lockee, 2004; Rodriguez, Zamorano, Rosales, Dopico & Pedraza, 2007; Tuckman, 2007; Zepke & Leach, 2002). For example, project-based learning has been viewed as an important strategy with student-centered approach to facilitate collaborative learning and collaborative problem-solving activities (Romiszowski, 1997). It allows students to work collaboratively over an extended period of time to solve an authentic and challenging problem, which results in an end product (Moursund, 1997). While project-based learning curriculum encourages learners' cognitive involvement and entails the use of higher-order thinking skills, it next calls for a careful consideration of technology infusion. Jonassen, Peck & Wilson (1999) have argued that the integration of technology in learning can enhance students' construction of knowledge, and Yueh, Lin, Kakusho, & Minoh (2006) also have recognized the significant impact of task-oriented support on student performance in learning, interaction and collaboration.

With project-based learning as a core strategy to scaffold the classroom management, however, students of the same group that are located at different sites in distance learning context may encounter difficulties of communication and team work. Information communication technologies are accordingly becoming an inevitable and critical interface to facilitate students' teamwork in project-based distance learning. There generates important issues to be explored such as students' preference of communication tools that they believed to be useful in their learning, the strategies they adopted for effectively communicating among each other, as well as whether or not the project-based learning approach has positive impact on students learning in distance education, which are of main concerns in the current study.

Therefore, the purposes of this study are: (a) to understand to what degree students perceived different information communication technologies as useful in distance learning; (b) to explore how students actually used varied information communicate technologies to interact with each other within project-based learning groups in distance learning; (c) to investigate students' perceptions of project-based learning curriculum and how they reflected on their intercultural project-based learning experience. Accordingly, the overall results are expected to reflect the effectiveness of implementing the project-based learning curriculum as the classroom management strategy and its effect on facilitating students' communication and learning in international distance education.

3. Research Methodology

3.1 Study Context

An international distance course with focus on e-Learning theory and practice has been investigated. This course was delivered by synchronous video conferencing weekly, and with the course website where online supplement materials and tools such as forums, blogs and chat rooms equipped to facilitate mutual communication. Sixty-three students from two universities in Taiwan and one university in Japan were enrolled in this elective course. (See figure 1)

Figure 1 Video-conferencing with three university classrooms

The curriculum design of this international distance course followed the principles of project-based learning to support learning by scaffolding instruction. Learning activities were centralized in group projects and involved student tasks to explore technologies in educational contexts along with the instruction of weekly lectures (Yueh & Minoh, 2006). Students were assigned to work in autonomous groups of 6-12 cross-country, cross-school members; which required them to conduct discussions and participate in peer evaluation of individual and group works together. Student projects must focus on emerging technologies for education. Project-based learning approach would involve students in collaborative work for data gathering and analysis, local and international cases and examples examination, as well as technologies applications including web-based and telecommunication media. Besides, students should obtain information and share their findings with others after class. Furthermore, all groups were required to present the project artifacts to the class in the midterm and at the end of the semester, and all students had to complete self- and peer- evaluations to gain feedbacks for modifying their works.

To cooperate with students' projects, contents of weekly lectures were given in the designate order of introductory content, example explorations, and emerging problems in the future. A series

of communication technologies, including web forums, blogs, emails, instant messaging, mobile facilities, as well as online supplementary materials were all available to sustain student motivation and to support their learning and team work during the various phases of project works. (See Figure 2)

Figure 2 Supplementary materials and technologies for communication and project-based learning

3.2 Methods and Instruments

Case study method was adopted and many sources of evidence were used in this study. The case is rich in accounts of the relationship among communication technologies, instruction and learning in distance education. In addition, the survey method was conducted to collect participants' experiences, attitude and perceptions. The questionnaire developed by the researchers of this study included three parts of questions for different study purposes. The first part contained eight six-point, Likert-scale items to understand students' preferences for information communication technologies that they believed to be useful in their learning. The second part contained eight items to understand students' actual use of communication tools for group project works. And the third part contained eight items to investigate students' perceptions of the project-based learning curriculum, and one open question as well to gather their reflections on the PBL experiences. The reliability of the PBL curriculum perception survey questionnaire obtained from internal consistency analysis was 0.883 (Cronbach's Alpha value), which is at high reliable level. Also, the system logs and students' posts on blogs and forums were gathered for analysis as the supporting evidence to represent user interaction with the technological supports.

4. Result and Discussion

4.1 Participants

Participants of this study were 63 students from the three collaborative universities (KU, NTU, and CCU) enrolled in the international distance course. There were 25 male students (39.7%) and 38 females (60.3%). Most of them were undergraduates (57 persons, 90.5%), and six graduate students also took this course for specific learning interests (9.5%). Their majors could be categorized into Social Science (43 persons, 68.3%), Science & Engineering (13 persons, 20.63%), and Liberal Arts (7 persons, 11.1%). Every group had about 6 to 12 members from different universities, different majors, and different academic capacity toward the project topics. Table 1 summarizes details of student compositions in this distance course of the current study.

Table 1 Background data of the participants (N=63)

Variables	Category	Frequency	Percentage (%)
Gender	Male	25	39.7
	Female	38	60.3
Universities	KU	12	19.0
	NTU	18	28.6
	CCU	33	52.4
Grade	Undergraduate	57	90.5
	Graduate	6	9.5
Major	Social Science	43	68.3
	Science Engineering	13	20.6
	Liberal Arts	7	11.1
Groups	G1	10	15.9
	G2	10	15.9
	G3	8	12.7
	G4	7	11.1
	G5	6	9.5
	G6	10	15.9
	G7	12	19.0

4.2 Students' perceived usefulness of information communication technologies

To better clarify the effect of project-based curriculum, firstly whether the cultural differences affect students' preferences for information communication technologies (ICTs) is explored. This study compared the perceived usefulness of ICTs of students from two Taiwan's universities and those of one Japan's university. As seen in Table 2, students had varied degrees of perceived usefulness of different ICTs. For Taiwanese students, the top three useful ICTs were instant messaging (Mean=4.39, SD=0.979), weekly video-conferencing (Mean=4.06, SD=0.802) and forum (Mean=4.06, SD=0.998); and for Japanese students, the top three useful ICTs were weekly video-conferencing (Mean=3.70, SD=0.675), Email (Mean=3.70, SD=1.252) and course website (Mean=3.60, SD=1.075). Furthermore, the results showed significant differences in students' perceived usefulness of forums and instant messaging. This finding reflected a fundamental difference in user habits, and might imply that technology prevalence in different cultures and societies would affect students' preferences for those used in educational context. So that resulted in how they perceived differently for technologies' usefulness in their learning.

Table 2 Results of differences of students from different countries in their perceived usefulness of information communication technologies in learning

	All Mean (S.D.)	Taiwan Mean (S.D.)	Japan Mean (S.D.)	t
Weekly Video-conferencing	3.93 (0.766)	4.06 (0.802)	3.70 (0.675)	1.405
Handout	3.68 (0.945)	3.83 (0.707)	3.40 (1.265)	1.371
Online Content	3.75 (0.928)	3.89 (0.963)	3.50 (0.850)	1.135
Course Website	3.50 (0.839)	3.44 (0.705)	3.60 (1.075)	0.215
Email (Mailing list)	3.43 (0.997)	3.28 (0.826)	3.70 (1.252)	1.159
Forum	3.71 (1.182)	4.06 (0.998)	3.10 (1.287)	4.793*
Blog	3.54 (1.170)	3.78 (0.878)	3.10 (1.524)	2.258
Instant Messaging	3.82 (1.492)	4.39 (0.979)	2.80 (1.751)	9.617*

*at significant level of $p < 0.05$

4.3 Students' actual use of information communication technologies in groups

With the second research objective mentioned earlier, a brief survey by questionnaire was conducted at the end of the semester to understand the kinds of ICT that students groups actually

used. Accompanied with the survey, qualitative resources such as researchers' (also the instructors) observations, interviews with students in class, and system logs were referred. The findings suggested that regardless of the equal availability and accessibility of the ICTs in this course, groups adopted different kinds of alternative tools in support of their communication and team works. Furthermore, students performed obvious tendency in relying on one main tool among all alternative technologies they adopted. As seen in Table 3, forum, blog, and BBS (Telnet) were the three most used main tools the groups adopted, and one group used instant messaging as their main communication technology.

Table 3 Results of students' actual use of information communication technologies in groups

Tools	G1	G2	G3	G4	G5	G6	G7
Face to Face	O	O	O	O			
Email			O	O	O		
Forum	O	Main	O	Main	O	O	O
Blog	Main	O	Main	O	O		
Instant Messaging	O	O	O	O	O	Main	
BBS (Telnet)	O				Main		Main
Wiki		O	O				
Cell phone Messaging	O			O	O		

* Main: Main tool for group communication; O: alternative tools adopted during PBL practice

4.4 Students' perceptions of Project-based Learning curriculum

To answer the third research question regarding students' perceptions toward the project-based curriculum implemented in the international distance course, an end-of-semester curriculum evaluation sheet was conducted. As seen in Table 4, "our project theme fits the course nature" and "I enjoyed the collaborative learning in this course" were perceived highly by all the three university students. Additionally, KU and NTU students reported high ranks on "PBL motivates international distance learning" but CCU students did not concord with this item. On the other hand, CCU students ranked "our project teamwork is successful" as the second high item, yet NTU students responded to it as medium positive and KU students viewed it as medium-to-low on their rankings. These findings were possibly related to students' roles and functions in groups which resulted in different perceiving responsibility to project works. Another finding which supports this inference is that all three university students responded negatively to the item of "all members actively

participated in group PBL"; and both KU and CCU students ranked "I made a high contribution to our project-based learning" as the lowest item. Despite the overall appraisal toward the PBL curriculum is positive (KU, 4.31, NTU, 4.24 and CCU, 3.99), this varied perceptions of different university students still worth of notice.

Table 4 Results of differences of students from different universities in their perceptions of Project-based Learning curriculum

Items	All Mean (S.D.)	KU Mean (S.D.)	NTU Mean (S.D.)	CCU Mean (S.D.)	F
PBL motivates international distance learning	4.21 (0.932)	4.57 (0.787)	4.60 (0.598)	3.87 (1.024)	4.923 *
Group project-based learning is helpful	4.13 (0.715)	4.50 (0.756)	4.35 (0.606)	3.90 (0.700)	3.80 *
Our project theme fits the course nature	4.54 (0.571)	4.88 (0.354)	4.47 (0.624)	4.48 (0.570)	1.693
The project demonstrated our group learning performance	4.09 (0.695)	4.13 (0.835)	4.06 (0.748)	4.10 (0.651)	0.028
All members actively participated in group PBL	3.55 (0.829)	3.88 (0.835)	3.41 (0.870)	3.55 (0.810)	0.845
I enjoyed the collaborative learning in this course	4.43 (0.68)	4.63 (0.518)	4.65 (0.493)	4.26 (0.77)	2.261
Our project teamwork is successful	4.28 (0.76)	4.00 (1.41)	4.29 (0.69)	4.34 (0.57)	0.625
I made a high contribution to our project-based learning	3.69 (1.08)	3.88 (1.13)	4.09 (0.71)	3.42 (1.18)	2.372
Average	4.11 (0.42)	4.32 (0.36)	4.23 (0.40)	3.99 (0.42)	3.13*

* at significant level of $p < 0.05$

Accordingly, to further examine whether there were effects of university to on their perceptions of project-based learning curriculum, this study conducted comparison analyses to explore the possibilities. Results revealed that there were significant differences existed in students' perceptions of "PBL motivates international distance learning", "group project-based learning is helpful", as well as the average of total perceptions. For those items, KU and NTU students perceived significantly higher than CCU students did, which suggested that CCU students could not perceive or recognize the value of PBL in their learning in groups as well as in the international distance learning context.

4.5 Students' reflections on their project-based learning experiences

While students of this international distance course had showed positive appraisals toward the project-based learning curriculum (Average mean= 4.11, SD= 0.42, see Table 4), it demonstrated that students in general could recognize the value of the group project works and the project-based learning approach. Besides, they may find the PBL as the conduit that enabled multiple perspectives from different countries, cultures, ages, and universities to communicate. As students reflected: “I was surprised to learn that members from different countries could have such various interpretations toward the same problem” (case 20); and “The project let us in depth explored the topic of our interests, and we learned from each other's different cultural experiences” (case 14) that showed their appreciations of this PBL learning experience. Additionally, the improvement of inter-cultural understanding was also promising as some student mentioned: “Interaction and communication with Taiwan students have been very influential to me. It significantly changed my view on Taiwan and now Taiwan seems so close” (Case 22).

On the other hand, collaboration was not always the scene as expected in this course with students bore high heterogeneity, the awareness of competition was also reported within and among groups, such as “I was impressed that all the other groups could come up with so many brilliant ideas in such a short period” (Case 7); and “Through the activities in class and in our own group, you could tell the difference between NTU and CCU students (us). I think there are still many we can learn from them” (Case 28). This sense of competition actually leveraged students' motivations and efforts devoted during the project-based learning, and they were stimulated to excel at the individual learning while working together to meet the shared objectives of the group projects.

With implementation of project-based learning, instructors should perform well as facilitators to help and scaffold students' group learning throughout the project process (Yueh, Lin, & Chung, 2005). Aside from the PBL facilitation strategies, as in the specific context like this study that all students were not native English speakers yet they must communicate in English, instructors had to manage this issue carefully to ensure students would proceed with efficient communication during the PBL process. In the course of this study, instructors as well as teaching assistants (TAs) planned in advance with attempts to manage the encouraging atmosphere of taking part in classes. A great variety of communication media were provided for students to access flexibly and conveniently. As a result, students showed their appreciation of the supportive environment the instructional team provided, such as some student reflected: “I am glad that in the beginning the teacher always told us "don't panic, we are here to help" when I had no idea what was going on, also TAs were so quick

and responsive that I was never afraid to ask questions" (Case 12). Besides, with proper design and enthusiastic facilitation, the individual efforts on learning and teamwork were also converged by the project-based learning approach. One student mentioned his progress that was benefited from this approach: "I thought it would be difficult for me with poor English proficiency when I was registered in this course, but it turned out to be achievable and exciting with those partners who worked together with me" (Case 40).

Not only beyond the barrier of language, as observed by instructors and teaching assistants, students' needs for interaction and communication increased with the desire to accomplish the project works had been clearly demonstrated. One student reported: "Because of the project, we need to have the group meetings via the instant messenger every week, and it gave us many opportunities to talk to students from other universities" (Case 33). And another student mentioned: "While it took much of my time away, it was definitely worth it. Now I had a clearer picture of e-Learning and all the meetings were meaningful and fun" (Case 22). In general, the frequency, time, and autonomy of student discussions increased, and the course culture of active participation was nurtured little by little.

5. Conclusions

While interactivity has long been a critical issue in distance teaching and learning, this current study reports an effective design with project-based learning curriculum implemented in an international distance course involving three universities in Japan and Taiwan. The arrangement of international and interscholastic aspects of the project-based learning groups provided students with a relatively challenging learning context that required them to devote efforts to achieve effective communication and team work. As a result, all groups of students had accomplished the tasks and demonstrated different strategies in adopting information communication technologies and practicing their project-based learning.

This study explored students' perceptions of the usefulness of the various information communication technologies available to them in this international distance context, and results found that students of different countries actually demonstrated a difference in what technology were perceived as useful in their learning experience. The results implied that different technologies may have varied levels of availability in different countries that would affect students' familiarity and willingness to use. Therefore, international distance educators have to consider cultural-specific

issues while deciding what technologies to adopt in managing international distance courses. On the other hand, different groups of learners would negotiate and come to consensus of which technologies would benefit their group communication and team work. As evidenced in this study, different groups of students did adopt various alternative information communication technologies in support of their interaction at a distance, and the main communication technology used also differs among groups. This result also suggested that distance educators should provide more alternative technologies that allow flexibility and autonomy to individual learners and the learning groups.

This study proved that the project-based learning approach had served as the conduit for effective intercultural collaborative learning, and could help decrease the communication difficulties among international student groups to a significant level as well. In this special case, although students needed to communicate in English, which was not a native language for any of them, they conquered language barriers to achieve successful project work. As observed from the process, students in groups discussed their projects and also created something special that they could share, which was in the spirit and the genuine attitude of cooperation regardless of language and distance. The results implied that project-based learning could be a good strategy for classroom management and collaborative learning facilitation. Project-based learning instructors should nurture an environment that encourages students' effective communication and better quality of interaction especially within the international distance learning context.

While this study was conducted in a specific environment of an international distance course, cautions should be taken while making inferences from this study. It is hoped that more studies will continue to explore communication behaviors and technological adoptions of project-based learning groups in similar international distance contexts, which would help contribute to a better understanding of learning and communication in distance education.

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摘　要

過去有關遠距教育的研究皆提出如何提升溝通與互動為最重要的議題，本研究即以一個跨國開設課程為例，嘗試探究學生在國際遠距課程中的溝通與專題式學習經驗。本論文首先描述研究背景原理以及研究設計與實施方法，研究結果顯示，不同國家的學生對於資通訊科技是否對其遠距課程學習有所幫助有不同的評價，而不同學習小組的學生也選用不同的主要及其他科技作為小組溝通與專題式學習之媒介工具。此外，本研究也顯示三個參與學校的學生對於在國際遠距課程中導入專題式學習的策略有不同的態度評價。本論文進一步對於研究結果進行討論與應用建議，同時也提出未來研究建議，希望能有更多的研究投入與遠距教育中之學習與溝通互動議題的探究，也希望本研究成果能提供相關研究與遠距教學應用實務等之參考。

關鍵詞：溝通、資通訊科技、國際遠距教育、專題式學習