

## Analysis of an International Project-Based Learning Collaboration Using the Community of Inquiry Framework

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*This study analyzes an international project-based learning (PBL) collaboration among Asian university students to help enhance the future implementation of such international collaborative projects. In international collaboration, students have opportunities to use foreign languages in practical settings and to utilize various Web tools. The authors hosted an international PBL conference called the World Youth Meeting (WYM) to provide such opportunities to students. A core activity of the WYM is joint presentations conducted in English, in which participating students from several Asian countries collaborate in both online and face-to-face settings. This study focuses on online collaboration, and analyzes the activities of the WYM using the Community of Inquiry (CoI) Framework to elicit insight into the effects of collaboration on learning.*

*Keywords: project-based learning, community of inquiry, social media, international education, collaborative education*

### Introduction

In this global era, the ability to work collaboratively, both face to face and online, is important. Team collaboration has been designated a 21st century skill (Griffin, McGaw, & Care, 2012), and as of 2015 is assessed by the Programme for International Student Assessment (PISA). Aiming to foster such skills among students, the authors have hosted an international project-based learning (PBL) conference called the World Youth Meeting (WYM) annually for more than a decade.

A core activity of the WYM is joint presentations conducted in English, which participating students from various Asian countries collaborate to prepare, in both online and face-to-face settings. In recent years, students have mostly used popular social media tools, such as Facebook and Line, without teachers' supervision, as part of their online collaboration, and teachers sometimes lack information regarding what occurs during this collaboration. To foster students' online collaboration skills, knowledge regarding the use of social media tools is important; hence, this study aims to clarify students' use of social media tools, and analyzes their communications during online collaboration using the community of inquiry (CoI) framework proposed by Garrison (2011). This study also discusses some principles of effective online collaboration and instructional design.

### Previous Studies and Theoretical Background

PBL helps students to develop flexible knowledge, problem-solving skills, self-directed lifelong learning skills, collaboration skills, and intrinsic motivation (Hmelo-Silver, 2004). In international projects, students also have the opportunity to use foreign languages in a practical setting and to utilize various online tools—important skills in the 21st century. Students should therefore benefit greatly from involvement in international collaborative projects. The authors have practiced PBL on the basis of certain theories to help students achieve fulfilling learning outcomes. For example, the experiential learning model proposed by Kolb (1984) provides a foundation to design a whole project, from preparation at the beginning to reflection at the

end. Kageeto (2007) proposed an instructional design for international collaborative learning focusing on communication, in which he insisted on the importance of both face-to-face and online communication and of setting definite goals. Kageeto, Sato, and Kirkpatrick (2012) point out the importance of facing the inevitable conflicts that occur in international collaboration, and cite the dual concern model (Rahim, 2002) as a conflict resolution model that is suitable for international collaborative projects. In this model, five approaches to solving conflicts are introduced, examining both concern for self and concern for one's partners on a scale from high to low. Kageeto et al. (2012) also maintain that it is important to construct positive relationships for the overcoming of conflict, through such casual exchanges as sightseeing together.

The importance of casual exchange was explored from the perspective of social presence, using the CoI framework proposed by Garrison (2011). CoI incorporates the notion of three presences: social presence, cognitive presence, and teaching presence (Table 1)

Table 1

*Three Presences in the Community of Inquiry Framework (Garrison, 2011, pp. 23-24)*

|                    |                                                                                                                                                                                                                              |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Social presence    | The ability of participants to identify with a group, communicate purposefully in a trusting environment, and develop personal and affective relationships progressively by way of projecting their individual personalities |
| Cognitive presence | The extent to which learners are able to construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry                                                                         |
| Teaching presence  | The design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes                                                  |

Garrison claimed that all these presences, including social presence, are important for a fulfilling learning experience; however, he also notes that excessive emphasis on developing interpersonal relationships may have deleterious effects, and that identification with the purpose of the group in an educational context has a strong influence on academic behavior. An effective project design should consider such observations. CoI has been used to understand learning in a collaborative educational environment (e.g., Garrison & Vaughan, 2008; Ling, 2007), and seems to be an effective reference for the design and achievement of successful higher education experiences.

The online learning environment is also an important factor in collaborative project-based learning online. When information and communication technology (ICT) was less widespread among students, teachers sometimes prepared environments for online collaboration, such as bulletin board systems (BBSs) or customized class-specific social networking sites (SNSs). However, most students now use various social media tools in their daily lives, and generally have no trouble finding ways to communicate online with foreign students. In addition, students can engage in quick, timely message exchanges because of these tools' push delivery function. Furthermore, students tend to exchange a much larger number of messages using these tools than using tools prepared by teachers or universities (Sato, Kageeto, & Kirkpatrick, 2013). Other studies claim that teachers should further consider how to use social media in their classes. For example, Blackmore (2010) indicated that universities should consider the connection between formal instruction and students' informal activities on SNSs in order to develop an environment in which student-centered learning can be practiced effectively. Somewhat similarly, Bowen (2012) indicated the importance for teachers of being connected with students on social media for the achievement of high-quality education and better understanding of students.

An online learning environment is expected to affect the quality of posts and exchanges on it. Sato and Kageeto (2013) observed a difference in quality between posts on their campus SNS and on Facebook. Posts on the campus SNS were rather long and reflective compared to posts on Facebook, although the latter were much more frequent. However, these authors described only a general tendency in their use of SNSs during the project, and did not focus on the concrete nature of the collaboration. It thus remains important to better understand the details of how students collaborate online to fulfill a concrete task.

## Research Questions

Considering the earlier studies described above and the current use of social media in education, the following research questions were formulated:

1. How do students communicate online during a collaborative activity?
2. What educational meaning does student behavior in online collaboration have in relation to CoI? What would constitute a situation of students' social, cognitive, and teaching presence?
3. What should teachers focus on if they wish to foster better online collaboration in the social media era?

Although the CoI framework has been applied in various educational practices, less is known about its applicability to PBL facilitated by commercial social media tools such as Facebook and Line. By tackling these research questions, the authors seek to establish some guidelines or tips for better instructional design for online collaboration in PBL including the use of commercial social media tools.

## Methodology

### Target Activities

This analysis focuses on an online collaboration to prepare a presentation for an event called the World Youth Meeting (WYM). The faculty that hosted the study offers a formal class that aims at preparation for the WYM (Kageto, 2007; Kageto & Sato, 2009). Students enrolled in this class prepare all the necessary materials for the WYM. In 2014, these students were divided into 12 groups: leaders, presenters, master or mistress of ceremonies (MCs), opening session organizers, music session organizers, workshop organizers, proceedings organizers, hall-keepers, foreign affairs officers, accommodation officers, food organizers, and public relations/media officers. Some groups were further divided into subgroups. To make the event successful, students need to tackle many tasks collaboratively. Among the various roles represented, the present authors focus on those involved in group presentation activities, because those who are conducting presentations need to collaborate online with international partners toward a joint presentation (of which approximately 20 are given in the WYM).

The WYM takes place at a Japanese university, and non-Japanese or overseas participants include students from Cambodia, South Korea, Malaysia, and the Philippines. To investigate the details of this online collaboration qualitatively, five groups containing Japanese members from the authors' university were chosen as the survey targets. Table 2 provides details of each target group's members.

Table 3

#### *Target Groups' Members*

|         |                                                                                                                                   |
|---------|-----------------------------------------------------------------------------------------------------------------------------------|
| Group A | Japan: One second-year student (female), two first-year students (female)<br>Cambodia: Two second-year students (male and female) |
| Group B | Japan: Three fourth-year students (two male and one female)<br>Korea: Two second-year students (male and female)                  |
| Group C | Japan: One second-year student, one first-year student<br>Malaysia: Two second-year students (male and female)                    |
| Group D | Japan: One second-year student, two first-year students<br>Philippines: Two third-year students (male and female)                 |
| Group E | Japan: One second-year student (female), two first-year students (female)<br>Philippines: One third-year student (female)         |

*Note:* Students were all between 18 and 22 years of age

### Collection and Analysis of Students' Online Communication Methods

The authors focused on how students communicated across languages, cultures, and physical distance in order to construct their joint presentations. Previously, in preparing for the WYM, the Japanese students had communicated with overseas students in an ICT environment prepared by their teachers. However, as

commercial social media have become widespread, students have come to use popular social media tools such as Facebook, Skype, and Line. Thus, in recent years, students have seemed to communicate more on these popular platforms; what is not clear, however, is whether these platforms allow, foster, or hinder effective online collaboration. In particular, because students use systems outside their teachers' scope of management, it is impossible to collect communication log data. Hence, the authors adopted semi-structured interviews to reveal how their students collaborate online. The basic question items are exemplified below:

- What kind of online communication tools did you mainly use?  
(email, Facebook, Line, Skype, etc.)
- Why did you choose such tools? (Why did you not choose other tools?)
- How and for what purposes did you use such tools?
  - Alone or with other group members
  - Discussion of the presentation, as well as small talk
- How did you share resources and/or draft presentation files?
- How do you evaluate your own group's online collaboration?

All the question items except the last one were set to obtain information about how students communicate online during a collaborative activity (research question 1). The last question item aimed to obtain hints to consider a situation of students' social, cognitive, and teaching presence (research question 2). Through the consideration about the results of research question 1 and 2, teachers' expected focus for better online collaboration (research question 3) would be discussed.

The authors have conducted this project as part of the university's official curriculum in Japan and have aimed to improve the curriculum of the university; therefore, as a first step of this research, the authors decided to conduct an analysis from the perspective of Japanese students. Both authors conducted interviews with the students in each group and all 14 students of the target groups were interviewed in total. Students were interviewed in their groups. An interview lasted for approximately 30 minutes for a group. One author presided over the interview and the other typed students' answers and stored them on a laptop computer. After the interviews, both authors confirmed the definition of each CoI presence together, as defined in Table 1, and discussed the state of each student's presence based on the interview transcripts until they reached agreement.

## Online Collaboration in the WYM

### Outline of Collaboration

Table 3 shows the general schedule followed to produce English presentations for the WYM

Table 3

*Schedule of English Presentations for the WYM*

| Timeline                       | Outline of activities                  |
|--------------------------------|----------------------------------------|
| Beginning of April             | Start of the semester                  |
| April to early May             | Overseas participants are selected     |
| Early May                      | Students are divided into 12 groups    |
| May to late July               | Each group proceeds with its own tasks |
| Early August to the event days | Face-to-face collaboration             |
| Event days                     | English presentations                  |

Once the overseas participants arrive in Japan, they have less than a week to prepare for their presentations. In addition, during this time, several activities are organized for them, such as a courtesy call, a cultural tour, and time with their host family. Hence, pre-arranging sufficient online collaboration to finish the presentations before their visit is crucial even though they will also work together in a face-to-face setting after their arrival in Japan.

Once students meet face to face, their relationship tends to become very close. Even after overseas participants return to their home countries, they often keep in touch with their counterparts from other

countries through social media tools. One of the challenges adopted by this project was how to vitalize the online collaboration that occurs before these face-to-face meetings.

### Online Conferencing in a Classroom

Internet infrastructure has greatly improved in recent years, and connections among Asian countries are of high quality. In recent years, the authors have hosted videoconferencing sessions in a classroom, beginning soon after the overseas participants are selected. These sessions are not limited to members of the presentation group. These sessions were held with one overseas student (sometimes with some local staff or teachers) and approximately 80 Japanese students and teachers. One of the purposes of this session is to help Japanese students to develop a feeling of intimacy with the overseas students. Doing so is expected both to motivate Japanese students to help their overseas partners have a fulfilling experience in Japan and to promote student efforts in ensuring a successful WYM. Presentation group students are expected to collaborate effectively with overseas students, while students in the other groups are expected to work harder to host them.

### Online Communication in Each Presentation Group

Once the overseas participants have been selected, the teachers forward their information to their Japanese collaboration partners. Generally, students open up communication by email and exchange SNS information, after which they communicate via the SNS. Table 4 shows how members of each group in the present study communicated.

Table 4

#### *Result of Interviews*

| Group | Question item        | Student responses                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A     | Tools                | Facebook message, Skype                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|       | Reason               | All members already had Facebook accounts. On the basis of the videoconference organized by the teachers [which used Skype], we also came to think of Skype as an effective communication tool.                                                                                                                                                                                                                                                                 |
|       | Uses of the tools    | We discussed on a one-to-one basis via Facebook message, and shared discussion content with other members in a face-to-face setting. We had Skype discussions approximately once a week. We did not communicate on Facebook.                                                                                                                                                                                                                                    |
|       | Sharing of resources | After making tentative presentation slides, we shared them via email once. We never updated the slides during our online collaboration. We started to update the file once the overseas students had arrived in Japan.                                                                                                                                                                                                                                          |
|       | Evaluation           | We felt too busy after the overseas students' arrival in Japan. We should have confirmed what we had discussed and shared an updated version of the presentation file. The second-year student [was the main student who engaged in discussion] with the overseas students, [but] the first-year students wanted to be more involved. We think we should have prepared a group on Line, to which all members belong; but this was inconceivable at that moment. |
| B     | Tools                | Line, email, Skype                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|       | Reason               | All members already had Line accounts. Asking the teachers' advice, we decided to use a Line group for casual and/or quick communication, email for the description of one's own ideas about the presentation, and Skype for interactive discussion.                                                                                                                                                                                                            |
|       | Uses of the tools    | We used the tools as planned [above]. We [also] sometimes "liked" and posted comments on each other's Facebook walls.                                                                                                                                                                                                                                                                                                                                           |
|       | Sharing of resources | We regularly exchanged up-to-date presentation files (approximately once a week).                                                                                                                                                                                                                                                                                                                                                                               |
|       | Evaluation           | We are generally satisfied with our online collaboration. To discuss this in more detail, we feel that we need to learn more about general academic knowledge rather than [this] method of collaboration.                                                                                                                                                                                                                                                       |

|   |                      |                                                                                                                                                                                                                                                                                                                                                                         |
|---|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C | Tools                | Facebook message, Line, Skype                                                                                                                                                                                                                                                                                                                                           |
|   | Reason               | All members already had Facebook and Line accounts, so we communicated with each other [on a one-to-one basis] according to each [student's] preferred method. We prepared a Japanese-members-only Line group to discuss [the presentation] in detail among Japanese members and to share the contents that one Japanese member then discussed with overseas member(s). |
|   | Uses of the tools    | We discussed on a one-to-one basis via Facebook message, and shared the content of the discussion with other members face to face and on Line. We sometimes "liked" and posted comments on each other's Facebook walls.                                                                                                                                                 |
|   | Sharing resources    | We regularly sent up-to-date presentation slides via email (once or twice a week).                                                                                                                                                                                                                                                                                      |
|   | Evaluation           | One first-year student feels that he relied on a second-year student too much. We [now] think we should have prepared a group on Line or Facebook to which all members would belong; but we did not come to think in that way at that moment.                                                                                                                           |
| D | Tools                | Email, Facebook message, Skype                                                                                                                                                                                                                                                                                                                                          |
|   | Reason               | It is easy to communicate via Facebook message. We can communicate in an impromptu manner.                                                                                                                                                                                                                                                                              |
|   | Uses of the tools    | A second-year student discussed [the presentation] with an overseas student via Facebook message. She shared [the content of the discussion] later in face-to-face meetings. We became "friends" on Facebook; but rarely had any exchange on it.                                                                                                                        |
|   | Sharing of resources | We regularly sent up-to-date presentation slides via email (once or twice a week).                                                                                                                                                                                                                                                                                      |
|   | Evaluation           | A second-year student was the main person to engage in discussion with overseas students; first-year students wanted to be involved more. It might have been a good idea to set up a Line group, but this did not occur to us because of our lack of ICT skills.                                                                                                        |
| E | Tools                | Facebook message, email                                                                                                                                                                                                                                                                                                                                                 |
|   | Reason               | It is easy to communicate via Facebook message. We can communicate in an impromptu manner.                                                                                                                                                                                                                                                                              |
|   | Uses of the tools    | A second-year student communicated with overseas students via email, and sent notifications by Facebook message. He later shared the content of reply emails in face-to-face meetings. We did not communicate on Facebook.                                                                                                                                              |
|   | Sharing of resources | We sent up-to-date presentation slides via email (in total three times) when we made major changes to them.                                                                                                                                                                                                                                                             |
|   | Evaluation           | We mainly discussed [the presentation] only with Japanese members. We should have discussed it more with overseas students.                                                                                                                                                                                                                                             |

In most groups, students communicated more frequently by Facebook or Line than by email. However, they did use email to exchange longer messages and to share presentation files. Some members also enjoyed casual communication on Facebook, by "liking" each other's posts and posting comments on them. However, most first-year students mentioned that they had not communicated with overseas students on Facebook or Line. The exception was a first-year student in group C, who happened to be hosting an overseas student from his group in his home. He mentioned that he might not have had this casual communication with the overseas student otherwise.

Apart from group B, groups did not establish or consider establishing an online locus where all members could communicate together, such as a Facebook or Line group. Group D members mentioned an awareness that they were not proficient at ICT, and that they simply communicated as they could, without considering setting up a more sophisticated system.

All groups were generally satisfied with the fact that they had managed to prepare and deliver English presentations; however, most groups regretted the process used for online collaboration. Although all second-year students in each group (except group B) had given joint presentations the previous year, they felt that they were still not sufficiently skilled to manage the online collaboration process. The second-year

students also mentioned that they tended to be self-absorbed and failed to involve the first-year students as much as they could have. Some first-year students mentioned in this regard that they had wanted to contribute more but did not know how.

## **Discussion**

In this section, students' online collaboration is considered in terms of the CoI framework. Social presence is affected by how students (of all countries) communicate and use media, and often fostered by students' informal discussions, which lead to mutual understanding and positive relationships. The goal of the collaborative work (the presentation) was very clear, indicating a high cognitive presence, under which students construct and confirm the meaning of their collaboration. Finally, teachers developed and designed this project, and supported students' activities (with their teaching presence). This section looks in detail at how these presences were achieved and how each could be improved. As a limitation of this study, the authors relied on empirical analysis. It would be useful to assess the status of each presence more objectively, for example, by using the instrument proposed by Arbaugh et al. (2008) in the future.

### **Social Presence**

Some students enjoyed casual communication, and exchanged messages more frequently by Facebook than by email. Students' voluntary use of social media seems to have been effective at enhancing social presence (in the CoI framework) among group members. Group B frequently exchanged messages on Line and collaborated effectively in this medium, because they could communicate in a casual manner without close supervision by their teachers, thus achieving high levels of social presence. It would be preferable for teachers to rely on the students' self-initiative and try not to interfere excessively.

However, other groups did not communicate in this way. Although the authors did not assess students' degree of each presence in the CoI framework, the social presence of first-year students seems to have been low. Except for group B, the groups were composed of both second- and first-year students, and it was generally second-year students who took the initiative to communicate with overseas students. Hence, first-year students missed opportunities and lacked the imperative to engage in casual discussion on social media, leading to low social presence. Only one first-year student in group C whose family hosted an overseas student, engaged in casual conversation with that student via Line. However, most first-year students later engaged in casual conversation on Facebook and/or Line with their overseas partners, and tended to regret not having done so during the initial online collaboration. Although commercial social media tools are effective in building relationships, it would not be expected for students' social presence to be automatically enhanced, particularly in a limited time period of online collaborative project works. It is crucial to determine how teaching presence manifests under such circumstances; teachers should show strong teaching presence and encourage students to communicate informally to enhance social presence among group members.

### **Cognitive Presence**

Cognitive presence seems to have been high, because the goal of collaborative work was clear and it would not have been difficult for students to construct and confirm the meaning of their collaboration. In fact, however, only a limited number of Japanese students communicated with overseas students; other group members' roles shrank and their cognitive presence decreased. Most groups did not prepare an environment such as a Facebook group, Line group, or mailing list to share information with all group members. Instead, students tended to communicate on a one-to-one basis, and first-year students tended to complain that they wanted to be more involved.

As team collaboration is a designated 21st century skill, methods of online collaboration might also be considered a skill that students should obtain. In this context, students' cognitive presence might be low, because, in the interviews, they did not provide a well-considered reason for the tools they had used. It would be necessary for students to reflect on their online communication methods to obtain a higher cognitive presence. Teachers could have placed more emphasis on the importance of thinking about online communication methods to increase students' awareness that developing such methods are also one of their learning outcomes.

### **Teaching Presence**

When social media was less widespread, teachers prepared ICT environments, such as exclusive bulletin board systems (BBSs), to promote international collaboration for the WYM. At that time, teachers instructed

students in communicating online with overseas students and managed their communications. With the popularization of social media, however, students have come to communicate with overseas students independently, and teachers do not need to monitor or receive detailed reports on students' online communication. However, considering the findings on students' social and teaching presence discussed above, teachers should consider how to assess students' communication for collaboration and how to provide instruction or comments or demonstrate ways of using social media that can improve their experience.

Some students mentioned that they used Skype because the teachers had used Skype in class and they felt it was an effective way to engage in discussion with overseas students. That is, students' collaborative behavior seemed to be affected by teacher activities; hence, it is important for teachers to show students how to use social media tools in the context of collaboration. Students are already very familiar with the use of social media to communicate with their friends; however, they seem to lack knowledge regarding its uses in collaboration—or they may tend to use social media without in-depth consideration of effective ways to use it for collaboration. Teachers could have set a certain level of requirement for online collaboration and clarified the procedures of communication for them, in addition to demonstrating more teaching presence for the instruction of online collaboration itself.

## Conclusion

This paper analyzed an international collaborative PBL based on the CoI framework. The authors interviewed students to reveal how they used social media during this collaboration. The data analysis provided some insights. Although students are familiar with social media tools and have no technical problems in using them, in most cases this ability did not enable them to enhance their social presence with their overseas partners. In particular, first year students' presence does not seem to have been enhanced successfully. Besides conducting joint English presentations, obtaining knowledge and methods for effective online collaboration should also be considered a learning outcome. The necessity to enhance cognitive presence in this context was also implied. It was shown that the nature of online exchanges was affected by teacher guidance, that is, their teaching presence, and that teachers have an important if indirect role in shaping students' online communication methods. In this study, the authors relied on empirical analysis, and have not assessed the status of each student's presence objectively; this remains as a future challenge.

Finding more effective ways to support students' online collaboration via off-campus SNSs and other tools will also be important future work. Determining student characteristics in an online environment, such as the *cyberasociality* proposed by Tufekci and Brashears (2014), may provide a clue to how teaching presence should be manifested in this social media era. The authors would like to continue to support students' online collaboration and pursue more effective ways of conducting this collaboration.

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