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Deng, Liping; Shen, Ying Wang; Chan, Jackie W.W.

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Supporting Cross-cultural Pedagogy with Online Tools: Pedagogical Design and Student Perceptions

Abstract

This paper reports a case of cross-cultural online collaboration between two cohorts of pre-service teachers in Hong Kong, China and an American university in St. Paul, Minnesota. It explicates the pedagogical design and implementation of online tools for group collaboration and students' perceptions of the benefits and challenges. Multiple web-based tools (e.g. Slack, Zoom) were selected and recommended to the students to facilitate resource sharing, communication, and artefact construction. Overall, students valued the experience of collaborating in a global virtual team in spite of some challenges encountered. Findings from this study indicated that the merits and perils of cross-cultural online collaboration coexisted and centered on three aspects: cross-cultural communication, group collaboration, and technological tools. The students greatly appreciated the values of online tools and manifested the ability to appropriate the tools to fulfill the needs of group work. The implications for pedagogical design are also discussed and technological tools supporting cross-cultural online collaboration are recommended.

Keywords: Cross-cultural collaboration; online collaboration; instructional design; cross-cultural pedagogy

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Introduction

Accompanying the emerging trend of globalization, higher education institutions have started to embrace internationalization (Altbach et al., 2019) and seek ways to integrate intercultural exchange into curricula (Svensson & Wihlborg, 2010). There is an increasing emphasis on developing university students' intercultural skills and global competencies. For pre-service teachers, it is especially critical to cultivate cross-cultural awareness in view of increasingly diversified classrooms (Merryfield, 2003; Wach, 2017). It then becomes critical for teacher education programs to provide opportunities for meaningful cross-cultural experiences to pre-service teachers (Spooner-Lane et al., 2013). In this respect, instructors play a critical role in designing and implementing cross-cultural pedagogy (Hur et al., 2020; Lee, et al., 2014). However, the scholarly work on the design and implementation of cross-cultural online collaboration is still limited. There is also a lack of rich description of student experience and understanding on how to best support such initiatives (Hur et al., 2020).

This paper reports a project of cross-cultural online collaboration between two cohorts of pre-service teachers in Hong Kong and America with focus on pedagogical design, implementation of technological tools, and students' experience and perceptions. Through providing the students with authentic opportunities for collaboration within a global virtual group, we were aiming to develop their abilities in utilizing technological tools for online collaboration and promote cross-cultural communication and understanding. Specifically, the study addresses three research questions:

1. What are students' perceptions of the main benefits and challenges of online cross-cultural group collaboration?
2. How do American and Hong Kong students differ in their perceptions?
3. How did students use various online tools for group collaboration?

Literature Review

In this section, we will first synthesize the benefits and challenges of cross-cultural collaboration, then discuss the cross-cultural pedagogies that informed our pedagogical design.

Benefits and challenges of cross-cultural collaboration

A considerable amount of literature has revealed the positive implications of cross-cultural experience on students. Commander et al. (2016) explicated that the online discussion among American and Chinese students contributed to joint knowledge construction. Merryfield (2003) reported the positive effects of online asynchronous forums in promoting reflective and in-depth discussion between students and consultants from various countries. Hur et al. (2020) joined university students from US and Korea in online collaborative project and noted students' growth in communication and collaboration skills. Kumi-Yeboah (2018) maintained that a cross-cultural collaborative framework motivated and supported students in their knowledge construction and learning. In specific, a collection of scholarly work highlights the values of international collaboration for fostering cross-cultural awareness, understanding, and communication (e.g. Deng, et al., 2017; Lee & Markey, 2014; Shadiev, et al., 2015). However, some studies have reported inconsistent results. For instance, in Kang and associates' (2018) study involving Korean and US students, only the latter demonstrated any significant development in their intercultural

communication skills. In another study by Hur et al. (2020), American and Korean students in an intercultural collaboration project did not show growth in their intercultural sensitivity.

On the other hand, a global virtual team also faces major challenges such as language barrier and miscommunication. For example, Wang (2011) identified language barrier and time differences as the main challenges in collaboration between American and Taiwan students. Other studies have noted the same language issue in students from Taiwan (Deng, et al., 2017), Korea (Hur et al., 2020; Kang et al., 2018; Kim & Bonk, 2002) and China (Yang et al., 2014). Nevertheless, the language issue also has a positive side in motivating some students to participate out of the desire to improve their language competency (Wang, 2011; Yang, et al., 2014). The other challenge associated with cross-cultural group work concerns communication in general. Zakaria, et al. (2004) stated that a mixed-cultural virtual team was more likely to encounter miscommunication and misunderstanding, which can result in prolonging the decision making process and heightening stress and conflict. Furthermore, compared with group work within a local context, global collaboration requires more time and effort of both students and instructors (Hur et al., 2020; Zaugg et al., 2015).

Cross-cultural pedagogy

Instructional design and facilitation strategies are critical to ensuring a meaningful and valuable cross-cultural educational experience (Hur et al., 2020). In a general sense, there are two aspects to cross-cultural pedagogy: (1) designing teaching and learning activities, (2) selecting and using online tools to maximize cross-cultural learning (Merryfield, 2003). Scholarly work in this area has produced guidelines and recommendations in these two areas.

Design of teaching and learning activities

To enhance intercultural learning, it is important to provide students with authentic opportunity to gain first-hand experience in interacting with people from different cultural backgrounds (Lee, et al., 2014). Merryfield (2003) maintained that it was critical to allow participants to reflect on their culture and lived experiences. Similarly, Kumi-Yeboah (2018) recommended cultural awareness activities through which participants could learn about their cultural backgrounds and experiences. Wang (2011) compared the effects of different group sizes on cross-cultural collaboration and recommended a smaller group of 3 to 4 members for more group interaction.

Further, a number of scholars stressed the importance of social aspects of cross-cultural collaboration. Zakaria, et al. (2004) espoused that group relationships, mutual trust, social bonds, and leadership were crucial elements in building a successful global virtual team. Yang et al., (2014) identified social interaction and cultural exchange as the foundation for collaboration. Along the same lines, Popov et al. (2013) advocated the introduction of a socialization protocol in the early stage of forming a mixed-culture group. Shadiey, et al. (2015) summarized five aspects that warrant attention in supporting cross-cultural projects - providing structure, content, training, introducing technological tools, and monitoring process.

Technological tools for cross-cultural collaboration

There is a line of empirical work that has focused on the design and implementation of technological tools for cross-cultural collaboration. In this respect, a wide range of technological tools have been employed such as discussion forums (Commander et al., 2016; Kim & Bonk, 2002; Merryfield, 2003; Yang, et al., 2014), video conferencing tools (Kim & Bonk, 2002; Wang, 2011), email (Wach, 2017), instant messaging (MacLeod et al., 2017), and Web 2.0 technologies such as

social networking websites (Deng, et al., 2017; Wang, 2011), wikis (Ertmer et al., 2011), and blogs (Lee & Markey, 2014). Merryfield (2003) contended that the selection of digital tools should take into account different affordances of online technologies, learning goals and the nature of assignments. It is pointed out that asynchronous discussion tends to encourage more equal participation, in-depth and extended discussion (Merryfield, 2003) as it allows the opportunity and time for students to read posts, deliberate and respond meaningfully (Shadiev et al., 2015). Synchronous communication tools, on the other hand, are more efficient in facilitating small group collaboration and discussion (Merryfield, 2003). In particular, real-time video conferencing tools have an edge in fostering social bonding (Sherman et al., 2013) and the convergence of ideas within a group (Rutkowski, et al., 2008).

Furthermore, synchronous and asynchronous communication tools can be supplementary to each other. Kim and Bonk (2002) denoted that small group video conferencing could provide personalization, motivation and casual conversation that asynchronous discussions lacked. However, scholars have different opinions on when to use the tools. Shadiev, et al. (2015) recommended asynchronous tools to jump start communication (e.g. self-introduction) and reduce anxiety when participants were not acquainted with each other. However, Wang (2011) stated that the use of self-introduction videos and video conferences at the outset of virtual collaboration were an ideal way to enhance social presence and establish a sense of community. Still, there is a dearth of studies on how to combine synchronous and asynchronous tools in support of the collaboration of virtual teams.

Methods

Study context and participants

A total of 67 undergraduate students from two mid-sized comprehensive universities in Hong Kong and St. Paul at Minnesota participated in this project. The students and the courses involved had several characteristics in common. The students were all sophomores in teacher education programs and the courses were related to educational technologies. The classes were similar in size with 30 students from Hong Kong and 37 American students. Hong Kong students were all local Chinese aged 19 to 21 years and majored in English language teaching. The majority of American students were in their Sophomore or Junior year in college of the age between 19 to 21 with one older student (Male) at the age of 31. Most of them were female and White/Caucasian with four Asian and one Latino. They were majored in various teacher education licensure programs, including Early Childhood Education, Elementary Education, English as the Second Language Education, Mathematics Education, Physical and Health Education, and Communication Art and Literature/English Education. The cross-cultural collaboration project ran for 7 weeks, during which students formed culturally mixed groups, conducted research on a self-selected topic, and constructed a website to present their findings.

Pedagogical design and implementation

The instructors from both universities worked closely on the pedagogical design, which was informed by theoretical and empirical work in the related field. Scholars investigating this area have pinpointed technological and social infrastructure as fundamental pillars of support for an online group (Preece, 2000; Rheingold, 2000). Zakaria, et al. (2004) also drew attention to cross-cultural elements in global collaboration. Therefore, our pedagogical design and support for students centered on three aspects: technology, sociability and cultural orientation.

Technological tools selection and implementation

Based on the dimensions of group collaboration identified by Deng, et al. (2017), we selected multiple web-based tools and recommended to the students to facilitate resource sharing, group communication, and artefact construction within groups. First, we recommended Slack as an unified platform for communication and resource sharing. As shown in Figure 1, Slack combines the features of instant messenger (IM) and threaded discussion forum. As an IM tool, it offers the advantage of affording informal and near-synchronous communication that facilitates group coordination and social bonding (Nardi et al., 2000). As such, Slack is well-positioned to engage millennial and post-millennial students who are accustomed to communicating through IM (Ross, 2019). The thread structure of the messages also allowed for the extended discussion of a specific topic. In addition, Slack had the capacity to facilitate resource sharing due to its feature of file sharing and integration with Google Docs. Finally yet importantly, the instructors can join the groups on Slack so as to monitor group progress and provide help and feedback when necessary (Teckchandani, 2018). Slack also enabled cross-platform accessibility including web browsers, desktop, and smartphone. Second, given the unique advantages of video conferencing for small group collaboration (Kim & Bonk, 2002; Merryfield, 2003; Wang, 2011), the students were required to have two real-time group meetings via Zoom (see Table 1). As to the artefact construction, Google Docs was regarded a suitable tool as it is commonly used in group collaboration.

[Insert Figure 1 about here]

Support for sociability and communication

In accordance with the recommendations and findings of previous work, we incorporated various strategies to foster sociability and inter-group communication. First, following Wang's (2011) recommendation that group size is best kept small, we targeted the group size at 4 or 5

comprising 2 Hong Kong students and 2 to 3 American students. Since self-introduction is considered a vital starting point for building social connection and trust within a group (e.g., Kumi-Yeboah, 2018; Liu, 2007; Shadiev, et al., 2015; Wang, 2011), each student was asked to post a self-introduction video in their Slack group. Further, each student shared a self-evaluation of their ability in terms of their strengths and weaknesses in group work, which was intended to assist with work allocation and collaboration.

Additionally, Popov and associates (2013) asserted that it was essential to establish a socialization protocol to build rapport and group dynamics in a mixed-culture group. Preece (2000) further identified three components of sociability as purpose, roles of group members and policy. In our guidelines for students, these issues were translated to the agenda for the first group meeting including: (1) deciding on group topic, (2) specifying roles and work allocation, (3) laying out group rules including tools for collaboration, frequency of meetings, and internal deadlines. Table 1 presents the procedures and milestones in the group project.

[Insert Table 1 about here]

Cultural orientation

We also provided explicit training to increase students' awareness of cultural differences and better prepare them to work in a culturally diverse group setting. To this end, several models of cultural differences were introduced during the classes including Hofsteds' (1980) cultural dimensions, Hall's (1989) model of low and high-context cultures, and Lewis's (2010) cultural types. In order to cultivate cross-cultural competency, several scholars (e.g. Dai, 2019) recommended making deliberate efforts to prompt students to reflect on their own culture and compare with foreign cultures. Thus, we integrated such comparative reflection in the second

group meeting by having the students interview members from the other culture. For instance, one group working on the topic of mental health interviewed each other on related situations, issues and policies in Hong Kong and American schools.

Data collection

A questionnaire and students' reflective essays comprised the main source of data in this paper. At the end of the semester, the students were asked to fill out a questionnaire to provide a general overview of their learning experience and perception of the project. The questions covered their technology self-efficacy, perceived usefulness of technological tools, cross-cultural understanding, and general perception of the project. The questionnaire mainly consisted of Likert-scale questions on a scale of 1 to 5 (1= strongly disagree and 5 = strongly agree) with two open-ended questions prompting participants to compare the cross-cultural group collaboration with their previous group work and share their suggestions for improvements. A total of 57 students (27 Hong Kong, 29 American), completed the post-project questionnaire. The descriptive analysis was conducted with the questionnaire data to provide a broad view of students' perceptions.

The students were also required to submit the final reflective paper at the end of the semester. The reflection focused on what they had learned and the most challenging as well as rewarding aspect of the project. This final reflective essays provided rich data on students' experience, feelings and perceptions. We collected 67 of these, averaging 740 words. Using Nvivo, content analysis was conducted on the answers to open-ended questions and the reflective papers. Constant comparison technique was used to develop and refine the hierarchical structures of the codes inside NVivo (Leech and Onwuegbuzie 2011). One of the advantages of Nvivo was that it

provided clear view of each code together with the number of sources and references (coded segments). This allowed us to identify the patterns and main themes arising from the data easily.

Results

Descriptive data of students' perceptions

At the end of the project, 51 valid responses to the questionnaire were analyzed and the descriptive data is presented in Table 2. The overall response was quite positive. As shown in Table 1, 51% of students either agreed or strongly agreed that the collaborative learning project was a positive experience. 66.7% of students acknowledged that they learned how to collaborate with others from a different culture. Only 7.8% of respondents showed negative views on the value of the project. As to the question whether the project was enjoyable, nearly half of students selected either “agree” or “strongly agree” with 15% of students showed disagreement. However, this first experience of cross-cultural project was posed great challenges for students which will be discussed next.

[Insert Table 2 about here]

Challenges of cross-cultural collaboration

When pondering on the main difficulties, nearly 60 students identified the 13 hour time difference as a great challenge, especially when scheduling synchronous video conferencing. Typical was this response from an American student: *“One of the challenges that I came across was getting everyone’s schedules to match up. This was especially hard because of the time zone differences and we had many different schedules to juggle.”* Further, 15 students considered communication the most challenging aspect of the project. Often, the communication problem is attributable to language barriers and cultural differences. One American student described the

problem thus: “*Students from Hong Kong seemed reluctant to say much in the meetings. I’m guessing that this was at least partially because English is their second language.*” Another American student shared a similar view: “*It was way harder for me to interact with our partners from Hong Kong than I had originally anticipated and I think that it is partially due to how little I knew about their culture and the language gap.*” Seven Hong Kong students acknowledged their difficulties in communicating in English as follows: “*It is hard to find words to express what I actually mean when discussing*”; “*I acted very shy and was unwilling to speak up.*” However, not all groups viewed language as a problem, as is demonstrated by this comment from an American student on their Hong Kong teammates: “*They were very fluent in English, so the communication went smoothly.*”

Another source of the communication problem relates to online asynchronous communication with 11 students mentioning it. As one American student wrote, “*it was hard to communicate and get ideas across when we were just messaging back and forth*”. The frustration over the lack of social presence online is palpable through comments such as: “*There were no visual cues to help people understand each other*” and “*you cannot hear the tone of voice someone is using.*” The different time zone also “*prolong[ed] the responding time*” in communication as one Hong Kong student put it: “*We cannot get instant reply from members due to different time zones*”. Such delays in response were perceived by some students as the most challenging part of the project.

Seven students also reported the demand on time and project management. One Hong Kong student pointed out “*it takes lots of time and planning*”. Another Hong Kong student observed that it was “*hard to keep track of one another’s working progress*” and “*getting everyone on the same page*”. Difficulty was also encountered in negotiating and reaching

consensus due to cultural differences. As one Hong Kong student stated: *“It may take more time to fully understand each other's expectation for the work because we are raised differently under different education systems”*. Another Hong Kong student shared a similar outlook: *“Lots of time and patience were needed to resolve the conflicting ideas so as to achieve consent”*.

Lastly, five students reported some problems in relation to assessment. Although the instructors from both sides set the deadline on the same day, the issue of time difference was not taken into account. As one Hong Kong student reported: *“Two of the groupmates from the US side did not show up until their very last few hours. As the deadline of their side should be 12 hours later than us, they showed up a little bit after our deadline.”* At last, different expectations regarding time and effort to be invested in the project may be attributed to different credit weight in the respective universities. The US course had only one credit, whereas the Hong Kong one was a three-credit course. This, to some degree, explains the complaint from some American students that the project and/or their teammates were *“too demanding”*.

Benefits of cross-cultural collaboration

In spite of the challenges, the student felt they learned a lot from the experience as one student remarked: *“The benefits far outweighed the challenges”*. There are four main values of the project emerged from their reflective essays namely communication, intercultural understanding, social relationships, and online collaboration.

Communication

While communication was perceived as a major challenge, it was also regarded the main area of growth. About half of students (30) came to the realization that *“communication is everything”* and showed the appreciation of the importance of *“listen to people of another culture”*

and “*not making assumptions about what they are thinking or wanting*”. American students learned how to better communicate with non-native-English-speakers: “*I learned to slow down and clarify what we were saying so that everyone had opportunities to participate*”. They also paid more attention to “*choosing the words that you say very carefully*” and avoiding “*using slang or weird expressions*”. Additionally, the American students demonstrated an increased sensitivity to non-verbal cues as one pointed out, “*it is important to pay closer attention to their nonverbal language, especially if they come from a culture that uses an indirect communication style*”.

Hong Kong students regarded the project as a great opportunity to “*practice listening and speaking in English with native-speakers*”. One stated: “*I have become a more confident and proficient English language user*”. Throughout the project, the Hong Kong students learned to be “*straightforward*” and “*responsive*” in their interaction with their American counterparts. One Hong Kong student remarked that it was essential “*to be very specific when communicating the details and making decisions*”.

Cultural understanding and differences

Other than communication, the most talked-about achievement was the increased cultural sensitivity and awareness with 26 students mentioning it. One American student remarked that the project provided: “*a peek at another culture and opportunities to grow in our understanding of our own culture*”. Another peer reflected thus: “*I realized that I have been fairly sheltered all of my life. I was completely unaware of the similarities and differences between countries like America and China.*” The students from both sides noted salient differences in their educational systems, culture and lifestyle. For instance, one American student observed that “*academics are very competitive and challenging in Hong Kong*”.

Online collaboration

The students also demonstrated a deepened understanding of the nature of collaboration. One student reflected thus: *“A group project is not a product of putting individual parts together. It is about helping, discussing, reviewing and working together”*. In the process of collaborating online, American and Hong Kong students learned what makes a good team player within a culturally mixed group. Some students mentioned that they became more *“flexible”*, *“open-minded”*, and *“learned to accommodate and adapt to each other”*. One American student remarked: *“Reaching a consensus requires us all to be considerate and attentive”*. Further, several students also highlighted the importance of planning for online meetings. Since the video meetings were very difficult to schedule, therefore *“pre-preparation for the meetings is really important”*. Additionally, the students considered it important to *“make sure everyone understands their role and what they supposed to do”*.

Relationships

For some students, the most rewarding part of the experience was the friendship and personal relationships they built with their foreign teammates. One Hong Kong student said: *“The friends I made in this project is the most valuable and rewarding aspect”*. One American student stated: *“I really enjoyed learning about my group members’ hobbies”*. Some students connected through Facebook which allowed them to *“see a little more about [each other’s] personal lives”*. Further, such social bonding enhanced group collaboration, as is apparent in this remark: *“Getting to know them on a friendship level helped lessen the pressure of this project dramatically”*.

Comparison of Hong Kong and American students

Hong Kong and American students exhibited salient differences in their attitudes, expectations, and styles in collaborative work. As one Hong Kong student noted, there were *“obvious differences in working styles, interpretations of roles, and requirements of the product”*. Another Hong Kong student exemplified the different collaborating styles thus: *“The Hong Kong students prefer finishing everything together while the US students like to work independently.”*

Further, the students manifested different communication dispositions. Hong Kong students considered their American counterparts *“more direct in sharing their opinion and directing the group on what we should do”*. The American students shared the similar perspective such as: *“American culture is very explicit and direct compared to Asian culture”*. Several American students observed that Hong Kong students were more passive as per the following comment: *“Hong Kong students were less likely to insert their opinions, may have avoided/felt uncomfortable with arguing or conflict”*. Notwithstanding this, the different dispositions were considered complementary and conducive to group work, as is evidenced in the following observation from an American student: *“conformity was perhaps the major strength from our Hong Kong friends who integrated our team on a single track”*. Another American student commented that the Hong Kong group members *“were very accommodating to the different needs and perspectives of group members”*.

Both sets of students also showed marked disparity in what they perceived as rewarding. The vast majority of American students looked on the group artefact – the final website - as the most rewarding part of the project with the following comment being typical: *“The most rewarding experience of the project was seeing the end project come together”*. Surprisingly, none of the

Hong Kong students mentioned the website as their rewarding experiences. The aspects of the project they valued most were the opportunities for cross-cultural communication, getting connected with students from another culture, and practicing their English.

Uses of technological tools

One of the main objectives of the project was to provide the students the first-hand experience of using various online tools for group collaboration. According to the questionnaire data, the students showed positive attitudes to the use of three online tools - Slack (M=3.19, SD = .917), Google Drive (M = 3.41, SD= .677), and Zoom (M=3.05, SD=.941) on a scale of 4 (1=not useful; 2= slightly useful; 3= moderately useful; 4= very useful). Overall, each group combined multiple online tools to support group collaboration. The following comment provides a succinct summary of how they used multiple tools in combination: *“We needed a means to communicate about meeting times and project ideas, a video chatting tool for meetings, and a way to collaborate on our work”*. It appears that the students had clear ideas of the affordances of each technological tool and how to appropriate them in support of their group collaboration as one student put it, *“we figured out what worked best for our group’s needs”*.

Slack

Slack was recommended as the central platform for group communication and sharing of resources. Ultimately, 13 out of 15 groups used Slack for communication and 10 groups also used it for sharing resources and files. Many students acknowledged that Slack was an *“easy-to-use”*, *“helpful”*, *“versatile”* and *“convenient”* tool. One American student stated: *“Slack was incredibly helpful. It was amazing how it could be accessed on any device and used for texting, calling, and sharing complex files—all in one simple forum”*. The integration with third-party

tools such as Zoom and Google Docs was another salient advantage of Slack, as students could “*open Google drive directly from Slack*”. Other Slack features students considered helpful included “*tagging people*” to prompt “*those less involved members*”, and “*star messages*”. One student also found profile information on Slack helpful for cross-cultural collaboration, stating “*when you click into the profile of a particular member, you can see his or her local time*”. Some students commended on Slack’s capacity to protect their privacy as one Hong Kong student noting that “*only email addresses are needed so our personal information would not be exposed to others easily*”.

However, the students pointed out several limitations and constrains of Slack, the most commonly mentioned being the lack of immediate response and ineffective notification feature. The students were recommended to install Slack apps on their phone so that they could receive notification when new messages came in. However, several students reported the problem of not receiving notifications even though they turned on the notification on their phone. This made “*the flow of information slow as we (they) easily miss out important group messages*”. Another problem was that the use of Slack was not widespread among the students as one pointed out, “*we seldom use Slack in our daily life, therefore we usually check our Slack once a day or even less*”. Indeed, for that very reason two groups switched to Facebook Messenger which they used on a daily basis.

Synchronous tool – Zoom or Skype

We introduced Zoom as a video conferencing tool and 12 groups selected it, while the remaining 3 chose Skype. The students were required to have two online video conferences in the second and third week. The affordances of face-to-face video conferencing for clear

communication and immediate feedback were highlighted by several students. One Hong Kong student remarked: *“Video-conferencing is better than instant messaging because it is more instant and immediate”*. An American counterpart stated: *“Zoom allowed us to talk in person and see each other. It created authentic conversation and clear communication”*. Another student observed that video chat provided opportunity to *“examine facial expressions in order to gain a better understanding of what [other students] were trying to say”*.

In addition to having immediate responses, one student reported that she *“felt more personally connected to other group members”*. An American student preferred communicating via Zoom because *“seeing everyone’s face was more enjoyable”*. In particular, the synchronous video tool was found to be *“more effective for making decisions than texting”*. Further, several students appreciated the chatting feature on Zoom, since it allowed them to exchange text messages and files during the online meetings. The commonly mentioned downside of using Zoom was the technical problems such as *“noisy echo”*, *“audio cutting out”*, *“blacked-out images”* and *“delays in conversation”*. One group chose Skype over Zoom on the basis of user-friendliness: *“After the first group online meeting, we all agreed that Zoom was rather complicated”*.

Google Docs

Additionally, 12 groups utilized Google Docs for collaborative writing and note-taking. As each group needed to work on constructing website content, they found Google Docs had an edge in allowing *“everyone work(ing) together”* and *“putting together our thoughts”*. One student explained the rationale of using this Google tool thus: *“Slack does not allow more than one person to edit a document at the same time”*. Google Docs also assisted the students in taking notes and brainstorming. As one Hong Kong student remarked, *“we use it to brainstorm*

our ideas and mark down key points that we mentioned". Several groups found the tool useful *"to record the details discussed in each meeting"*.

Discussion

This paper has reported on a cross-cultural online group collaboration project between pre-service teachers in America and Hong Kong. On the whole, the student teachers valued this first experience of working within a global virtual team despite a number of challenges encountered. We have identified three inter-locked dimensions where merits and perils co-exist (see Figure 2): cross-cultural communication, group collaboration, and technological tools.

[Insert Figure 2 about here]

Firstly, communication was shown to be the most problematic area for cross-cultural group work. Consistent with previous work (e.g. Wang, 2011), the challenges our students encountered were partly associated with cultural differences and language barriers, and partly with the web-based tools for group communication. Slack, as a text-based asynchronous communication tool, gave rise to a range of issues, such as lack of social presence and immediacy in response. However, we have revealed that challenges and learning opportunities go hand-in-hand. Consistent with the findings of Hur et al. (2020), our students manifested remarkable growth in cross-cultural communication and understanding. American students learned to be more attentive, considerate and patient and strived for clear communication. Hong Kong students are arguably in a disadvantaged position in online communication due to the language issue and their background of high context culture that favors subtle and indirect communication styles (Zakaria, et al., 2004).

Throughout the project, Hong Kong students became more capable in speaking out and voicing their opinions in more direct and explicit ways.

Secondly, the virtual teams with members across different time zones encountered great challenges in collaboration and project management. It is regarded formidable to keep track of the progress of each member, ensure everyone was equally informed, negotiate and reach consensus through online platforms. On the positive side, the students learned to be better team players with the qualities such as being open-minded, flexible, respectful and patient. Consistent with the study of Rutkowski et al. (2008), our students also highlighted the importance of preparation for synchronous online meetings to achieve efficiency and desirable outcomes.

Thirdly, the virtual teams greatly appreciated the values of the online tools and manifested the ability to select and appropriate technological tools to meet various collaborative needs. It is heartening to see that the students showed deepened understanding of the affordances and constraints of multiple online tools and were able to figure out which tools were a best fit for their group. Our findings align with previous findings (e.g. Kim & Bonk, 2002) that asynchronous and synchronous tools can be complementary. Slack offered a flexible and unified platform for asynchronous communication and resource sharing. This newly introduced platform was well accepted by most of the groups. On the other hand, synchronous online tools such as Zoom are critical for group decision-making, negotiation, and the social and affective aspect of group formation. However, an asynchronous tool was needed to facilitate the logistical issues such as scheduling meetings. In our project, the students also employed Google Docs as a supplementary tool for collaborative construction of group artefacts.

The main challenges in relation to technology use centered on the lack of immediate response in Slack, which are arguably inherent in asynchronous communication (Dennis et al.,

2008). Ironically, we selected Slack over online forums on account of its instant messaging and notification features, which should have reduced the lag between messages. Although we urged the students to install the Slack app on their smartphone, not all complied. Some who did install Slack on their phone reported the problem in receiving notifications. We presumed that it might be due to the improper setting of notifications.

Regarding the second research question on the differences between American and Hong Kong students, the participants in our study generally manifested cultural characteristics in line with the related literature (e.g. Hall, 1989; Hofsteds, 1980). We noted differences between the two sets of students in communication, collaboration, and perspectives. Hong Kong students from the collectivist culture showed the inclination towards indirect communication, conflict avoidance, and teamwork, which is in line with Zhu's (2012) study. In contrast, American counterparts appeared more independent, straightforward and direct in communication. One of the most striking findings of the study is the marked difference in students' perspective regarding the most rewarding aspects of the project experience. Almost all the American students regarded the group website, the final group artifact, as the most rewarding, yet none of their Hong Kong counterparts mentioned it. Rather, the Hong Kong students attached more value to their growth in areas such as communication skills and social relationships. These findings lend strong support to the different orientations of the two cultures as reported in other scholarly work: Americans tend to be task-centered and attentive to goals, Chinese relation-centered and attentive to group process (MacLeod et al., 2017; Yang, et al., 2014; Zakaria, et al., 2004).

Conclusion

This study contributes to the body of scholarly work on cross-cultural online collaboration by highlighting three inter-locked dimensions - technological tools, cross-cultural communication, and group collaboration. The findings give rise to several implications and recommendations for educators and instructional designers on how to better design and support group work in cross-cultural settings. In terms of technological tools, we strongly recommend Slack as a flexible and powerful online tool for group communication and resource sharing. Another advantage of using Slack is that the instructors could monitor students' interaction and group performance and provide assistance or intervene when necessary. One of the lessons we learned from the implementation of Slack is that measures should have been taken to ensure all participants installed the mobile app and set the notification features properly in order to fully unleash its potential as an IM platform.

Additionally, in line with previous work (Hur et al., 2020), we concluded that it was critical to combine multiple online tools – synchronous and asynchronous - to support the diverse needs of online collaboration. We recommended Zoom as the videoconferencing tool, as it can be easily integrated with Slack. Our students greatly appreciated the value of synchronous online meeting for group discussion and decision-making. In order to ensure effective online meetings, guidelines and support should be provided to ensure proper agenda setting and preparation before the meeting. To conclude, Slack coupled with Zoom and Google Docs constitutes a well-rounded package in support of online group collaboration.

As to cross-cultural communication, we found the related training on cultural differences useful in preparing the students for the project. However, we noted the students still had great difficulty in problem-solving and conflict resolution. In our next round of projects, we plan to incorporate the authentic scenarios of group conflict into the training materials. We will use some typical problems the students encountered to elicit discussion and reflection, for example: during

the video-conferencing your Chinese teammates are very quiet. What will you do? Furthermore, more structure could be offered to team building and project management, such as how to plan for meetings, and how to establish the team's norms. Another lesson we learned is that more attention should be directed at better aligning the project requirement, assessment rubrics and guidelines. In particular, time differences should be taken into consideration when setting deadlines.

Although our study has yielded valuable insight on cross-cultural collaboration, it has several limitations. First, the questionnaire only provided the descriptive data on students' experience and perceptions. To enhance the quantitative rigor, the future work will use scales to measure students' growth in the three aspects identified by the study - technological ability, cross-cultural communication, and group collaboration. Second, students' reflective essays, as the main source of the data for this paper, are self-reported in nature. The future research can incorporate learning artifacts to provide a more substantial evidence of students' improvement and the actual usage of the tool.

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