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The Growth of Self-Efficacy through Exchange Learning with Cambodian Primary Schools

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After the COVID-19 pandemic, the use of ICT has been promoted, and improvements in network infrastructure in developing countries are making effective international exchange learning increasingly possible. There has been an increase in cases where educational institutions, including schools, use ICT and online tools to implement collaborative programs, such as exchange learning. However, few studies describe and analyze the processes by which these programs are designed and how collaboration occurs. In collaboration with a local primary school in Cambodia, this study designed international exchange learning in the context of high school inquiry-based learning, using the Collaborative Online International Learning (COIL) and incorporating authentic activities. By describing and analyzing the collaborative process, this study captures the transformation of students and clarifies its significance. The results show that, through exchanges, students heard direct feedback, confirmed that the videos they created were used in the local context, and received feedback from the local community. Through these authentic activities, the students' awareness of "confidence," "sense of achievement," and "contribution" increased, thereby fostering their sense of self-efficacy.

Keywords: exchange learning, self-efficacy, inquiry-based learning, qualitative research

Introduction

There are high expectations for utilizing information and communications technology (ICT) in learning about the Sustainable Development Goals (SDGs) through inquiry-based education. However, learning through ICT is limited to activities such as teleconferencing for lectures and creating and presenting slides for research and study. International exchange programs are expected to take advantage of the features of ICT while achieving "sustainability"; however, activities using ICT are restricted to a typical pattern, such as "learning about the culture, summarizing, and presenting," which often results in a transitory process. Murata et al. (2022) pointed out that "Most online collaborative programs focus on interactions and end up with superficial discussions on bland topics" (p. 28). Naruse and Nagayama (2006) revealed that:

> Exchange learning will not be successful unless both schools and teachers are interested in the content of the exchange and motivated to put it into practice. For this purpose, it is necessary to have sufficient discussion among teachers and to create an effective learning plan to achieve a highly sustainable exchange. (pp. 19–20)

According to Sato (2022), "In a rapidly changing society, it is important to enhance self-efficacy in high school students to help them realize their potential and grow as creators of a better society and a fulfilling life" (p. 232). Students are provided concrete facts and develop a strong interest and curiosity in the subject while gaining information. Through experience, investigation, and trial and error, they see the subject as their own, which fosters their self-initiative to learn. Through learning activities in which students solve problems that they have independently set, they can develop confidence in what they have worked on and a sense of self-efficacy. This leads to such beliefs as "I was able to solve the problem by myself" and "What I learned has helped the community" (Tamura, 2017; Sato, 2022).

Therefore, in addition to "ICT for knowledge acquisition," this study aims to develop an exchange learning model that incorporates ICT to enhance self-efficacy through task-based activities grounded in a sense of social responsibility and conducted within the framework of sustainable international exchange. This study focused on Collaborative

Online International Learning (COIL; SUNY COIL Center, 2019), which has been adopted for co-learning between universities in recent years.

In this study, we attempted to integrate COIL into inquiry-based learning in high school. We designed and practiced exchange learning with four local primary schools in Cambodia as practice partners. In contrast, Japanese students took the lead in "identifying issues in education while connecting with the local community through ICT, exploring these issues, and planning and implementing solutions to these issues." We qualitatively analyze how students' awareness and behavior change through practice, focusing on their improved sense of self-efficacy. Based on these findings, we provide suggestions for more effective implementation of exchange learning and examine challenges that need to be addressed in the future.

Murata et al. (2022) observed that the COVID-19 pandemic led to an increase in educational institutions implementing online collaborative programs. Although overviews of the process implementation have been disseminated, few studies have examined the collaboration process, including how educational stakeholders designed the programs and how they collaborated (Murata et al., 2022). According to Murata and Sato (2020), research on the process based on concrete interaction data on how the students engaged with each other is limited. Investigating students' collaborative processes is crucial in capturing their transformations. Incorporating such a framework of process-oriented analysis into the analysis of international collaborative learning is essential (Murata & Sato, 2020). Based on this discussion, it is meaningful to capture and analyze the collaborative process through practice and qualitatively evaluate exchange learning as it provides insights into how students develop intercultural understanding and engagement. Understanding these processes helps educators design more effective and sustainable exchange programs that foster meaningful international collaboration.

Literature Review and Designing the Exchange Learning

Service Learning

Service learning is an educational approach in which students engage in social contribution activities, reflecting continuously (through introspection) in the process of alternating between theory and practice. This experiential learning method is recognized as one of the most effective forms of active learning. Service learning involves a mutually beneficial collaboration among students, faculty, and community organizations, where students apply the knowledge they have acquired academically, actively participate in community activities, and reflect on their experiences. This distinguishes it from volunteering or internships (Yamashita, 2021; Cress et al., 2013).

Collaborative Online International Learning

Collaborative Online International Learning (COIL) is an educational approach leveraging online technologies to support the internationalization of curricula and has been widely adopted by universities worldwide. COIL enables students to enhance their intercultural competencies while remaining at their home institutions, providing an opportunity not only for those who participate in study abroad programs or overseas internships but also for all students (Rubin, 2017; Hackett et al., 2023). Furthermore, traditional online meetings and exchange activities often result in one-off "enjoyable exchanges." However, COIL emphasizes collaboration (collaboration and cooperation). Furthermore, the connected partner is considered a "peer" across the seas; this idea can be transformed into "active learning" for collaboration and a joint project (Ikeda, 2016).

COIL is a relatively new approach, and its literature and research are still in a developmental stage. As a result, experimental studies investigating the effectiveness of COIL are limited (Kastler & Kyle, 2020; Hackett et al., 2023). According to Hackett et al. (2023), an empirical study involving 108 undergraduate students selected from two universities in the Netherlands and the United States demonstrated that COIL contributes to the enhancement of students' intercultural competencies, particularly cultural intelligence.

The educational method of service learning is highly compatible with COIL activities that focus on sustainable development goals (SDGs) across countries, making the introduction of service learning into COIL highly effective. In COIL, to deepen intercultural understanding through collaboration between individuals from different cultural backgrounds, it is necessary to critically reflect on the experiential knowledge and perspectives gained from the collaborative experience. For these reasons, the introduction of service learning, which emphasizes the reflection of

experiences in COIL, holds significant value (Yamashita, 2021, p.106). Therefore, Yamashita (2021) introduced service learning into COIL between graduate students in the United States and undergraduate students in Japan. The study demonstrated an increase in students' motivation to learn in four categories: "English communication experience," "service-learning activity experience," "creation of self-introduction videos," and "online communication experience."

Kolb's Experiential Learning Model

Kolb (1984) defines learning as "the process of creating knowledge through the transformation of experience," and his experiential learning model is based on the idea that individuals learn by repeating a cycle of four stages. This process is divided into the following four stages:

1. Concrete experience (Experiencing)
2. Reflecting on the experience objectively (Reflective Observation)
3. Applying the lessons learned from the experience to abstract concepts or hypotheses (Abstract Conceptualization)
4. Practicing with awareness of the concepts learned from the previous stages (Active Experimentation)

In Kolb's experiential learning model, the goal is not only to "experience" but also to "learn through experience," which makes reflection or the interpretation of experience essential (Kolb, 1984; Mizumatsu, 2017, pp. 116-117).

Mizumatsu (2017) established the following learning environments to enhance learners' self-efficacy: (1) courses involving students from diverse cultural backgrounds, (2) Project-Based Learning (PBL) methodologies, and (3) courses conducted in English. To promote an environment conducive to autonomous learning, group work, discussions, and presentations were actively incorporated into the curriculum. Particularly, Kolb's experiential learning model, which consists of a cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation, was emphasized to deepen learners' thinking through project-based activities. International collaborative learning programs were designed to allow learners to repeatedly engage in this experiential learning cycle. The findings revealed significant improvements in learners' self-efficacy. Furthermore, it was noted that constructing course content based on theoretical frameworks and providing an environment rich in practical experiences are effective strategies for deepening learners' understanding.

Building on these theoretical frameworks, this study examines how authentic activities in international exchange learning can enhance students' self-efficacy.

Designing the Exchange Learning

Naruse and Nagayama (2006) revealed that "effectiveness" and "sustainability" are important factors in exchange learning. In this study, we focus on COIL (Collaborative Online International Learning), which is widely adopted by universities and other higher education institutions worldwide to support internationalization. COIL has been primarily implemented and tested in higher education institutions, with various studies indicating its positive impact on intercultural understanding and the enhancement of students' motivation to learn. Based on these findings, we propose that COIL has the potential to bring significant educational benefits in high schools as well. Therefore, based on Yamashita's (2021) practice of incorporating service learning into COIL, a collaborative learning program with a Cambodian elementary school will be designed with the theme of "ICT Learning Content Creation" for Cambodian children. Regarding the learning materials that were created, the students worked on creating and distributing video materials (periodic video newsletters) that could be used for English speaking and vocabulary practice. To ensure that students "do not let the experience fade away as a transitory one" (Murata & Sato, 2020, p.6), we focused on Kolb's (1984) experiential learning model. Applying this experiential learning model, we designed the class such that students could consistently practice the learning cycle of "Concrete experience," "Objective reflection," "Conceptualization," and "Practice" (Figure 1) to ensure a fulfilling inquiry-based learning experience for the students to enhance their self-efficacy (Figure 2).

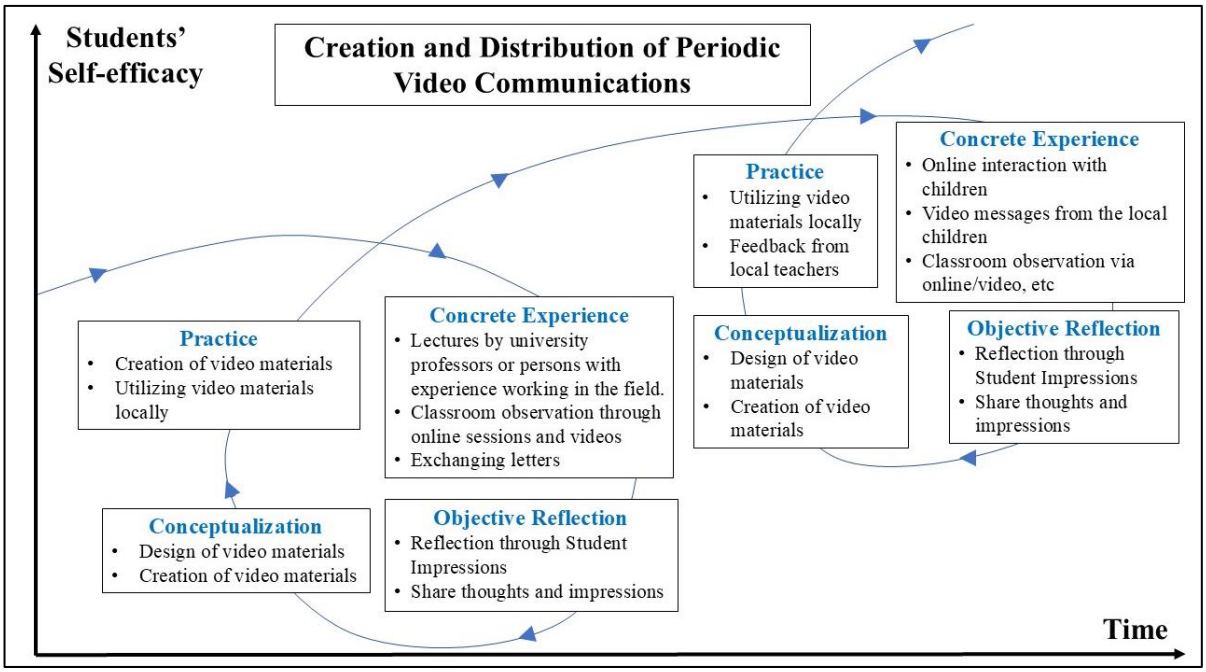


Figure 1. Framework created using Kolb's (1984) experiential learning model.

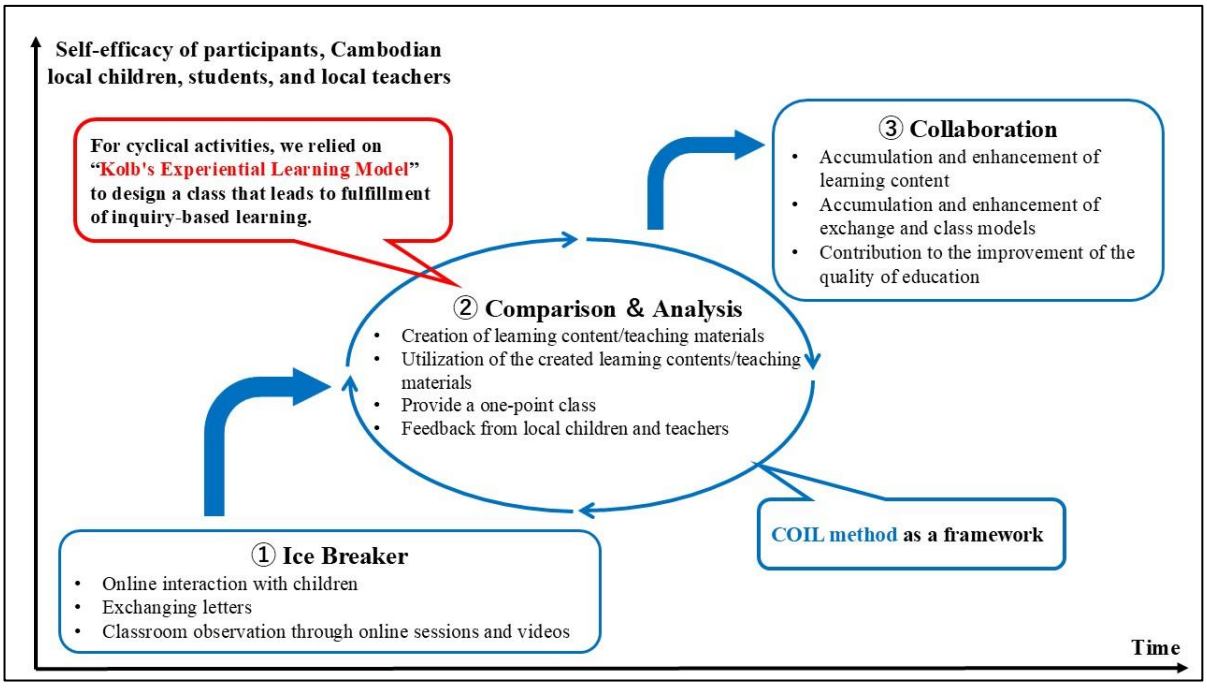


Figure 2. Design of the class/exchange learning model and images of the practice.

Research Objectives

Considering Murata et al.'s (2022) point that "few studies that describe and analyze the process of collaboration," the following two points are clarified about exchange learning with the local primary schools in Cambodia with reference to Murata et al.'s (2022) perspective on analysis.

(i) Collaborative process: How did the students collaborate with each other by utilizing ICT?

(ii) Reflection: How did the students perceive the exchange learning program, and what did they learn?

Considering the significance of exchange learning that emerges from the analysis of the above two points, we aimed to qualitatively evaluate the exchange learning outcomes. Moreover, we considered which activities with the partner

schools ultimately affected the students' self-efficacy based on the evaluation of the exchange learning. Bandura (1977) proposed the concept of self-efficacy. It is described as the feeling of confidence that a learner has in their ability to successfully solve a problem using their knowledge and skills when faced with a particular challenge (Morimoto, 1998; Ozeki & Handa, 2023). This study used this definition of self-efficacy.

Methodology

To establish an environment conducive to interaction, exchange learning with a local Cambodian primary school was gradually initiated in the 2021 academic year. This study derives its findings and discussions based on various data collected over two years, specifically during the 2022 and 2023 academic years.

Research Cooperators and Participants

The four primary schools in Cambodia that partnered for this initiative are located in Siem Reap City and are attended by four graduates of the Siem Reap Provincial Teacher Training College (PTTC). Close communication was maintained with these four graduates to advance collaborative learning activities. In the 2022 academic year, collaborative learning was carried out as part of an inquiry-based learning program with 26 third-year high school students from the Global English Course and the Humanities Track of the Humanities and Sciences Course. Similarly, in the 2023 academic year, the program was implemented with another group of 26 third-year high school students from the same courses.

Analysis Method

Referring to Sato's (2022) point, we classified the data into the following categories: "Awareness: facing concrete facts," "Ownership: coming to see it as my own business," "Ability to empathize: having a strong interest in the subject while obtaining various information," "Confidence: was able to solve the problem independently," and "Contribution & accomplishment: what we have learned has been useful to the local community in Cambodia." Moreover, we identified the transformations in the Japanese students' (participants) consciousness (how they felt and what they learned) through their productions and responses to the questionnaire surveys. Based on these analyses, we qualitatively evaluated this exchange learning and considered the effect it had on students' self-efficacy. Referring to the definitions of self-efficacy by Morimoto (1998) and Ozeki and Handa (2023), as well as the observation by Sato (2022), we considered self-efficacy from the results of the analysis of the evaluation axes, that is, confidence and contribution & accomplishment, of the exchange learning program. Furthermore, quantitative text analysis was conducted on the data using the KH coder (Higuchi, 2016) where necessary.

Results

Collaborative Process

We had extensive consultations and information-sharing sessions with the local teachers, with the support of a facilitator who traveled to Cambodia. However, we adjusted the method and timing of using the learning contents (teaching materials) created by the students and the class progression in a way that provided autonomy to the local teachers, taking into account the local situation and emphasizing continuity. Furthermore, for the COIL method and experiential learning cycle to function effectively, we emphasized the sharing of feedback to the extent possible, such as videos of the learning content (video of the class), photos (of the class), and observations and comments from the local teachers. Therefore, we distributed student-created learning content (videos) once a month while accounting for the time constraints of the local teachers.

Connecting with the Cambodian schools.

In this study, class participation and observation sessions were conducted with primary schools in Cambodia via Zoom meetings (Figure 3). Students deepened their understanding of the differences and characteristics between Japan and Cambodia by confirming and sharing their "awareness" through interviews with the local teachers after their observations.

Figure 3. Online classroom visits.

Multifarious exchanges not relying solely on ICT.

"We want to place importance on exchanges that are not biased only to ICT. For example, by sending letters and real objects to each other, the exchanges will be more fulfilling" (Ukari et al., 2006, p. 155). In this exchange learning, we used Zoom and other ICT-based platforms and conducted exchanges through handwritten letters in English (Figure 4) with the support of a facilitator traveling to Cambodia.

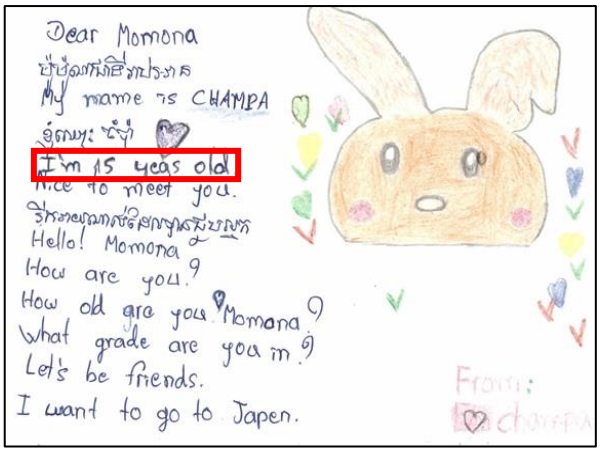


Figure 4. Letter from a Cambodian child.

Creation of the learning content (video newsletters).

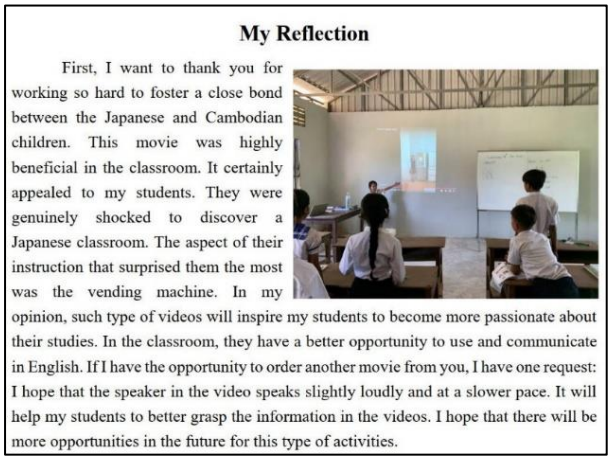
Through frequent exchanges with the local primary schools, the students focused on the fact that limited teaching materials in Cambodia can be used for home study. Using the high penetration of smartphones in developing countries, they created "video newsletters" or online materials that can be accessed anywhere. The students hoped that the Cambodian children would "imagine what learning will be like in the future" through these video newsletters. Therefore, they carefully chose the locations for filming and English vocabulary. (for the videos created by the students, please refer to the QR code in Figure 9.)

Feedback from the local Cambodian students.

According to the feedback (Figure 5) from Cambodian teachers regarding the learning content (videos), "They were genuinely shocked to discover a Japanese classroom. The aspect of their instruction that surprised them the most was the vending machine. In my opinion, such type of videos will inspire my students to become more passionate about their studies." This feedback indicates that the learning content enhanced the students' motivation to learn.

Improving the video newsletters by utilizing generative artificial intelligence (ChatGPT).

Based on the reflections from the Cambodian teachers, the students improved the video newsletters to make them more "convenient to use as teaching materials" and "easier for the children to understand." In this practice, the aim was to improve the cohesiveness of the video newsletters by utilizing a generative artificial intelligence (ChatGPT) to "rewrite the English used in the videos using simpler expressions" and "create scripts in Khmer," the local native tongue (Figure 6).


My Reflection

First, I want to thank you for working so hard to foster a close bond between the Japanese and Cambodian children. This movie was highly beneficial in the classroom. It certainly appealed to my students. They were genuinely shocked to discover a Japanese classroom. The aspect of their instruction that surprised them the most was the vending machine. In my opinion, such type of videos will inspire my students to become more passionate about their studies. In the classroom, they have a better opportunity to use and communicate in English. If I have the opportunity to order another movie from you, I have one request: I hope that the speaker in the video speaks slightly loudly and at a slower pace. It will help my students to better grasp the information in the videos. I hope that there will be more opportunities in the future for this type of activities.

Figure 5. Feedback from the local teacher.

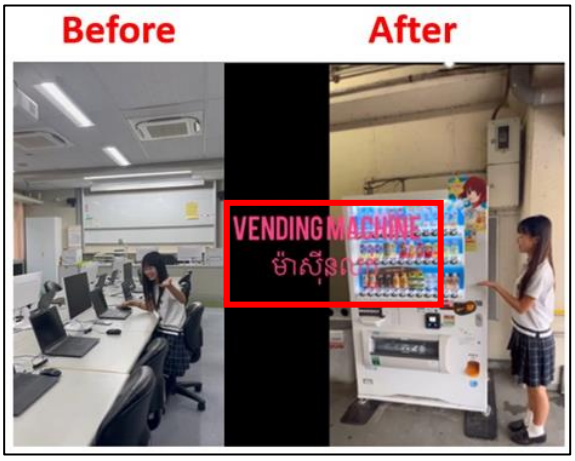


Figure 6. Participant-created video newsletter.

Utilization of student-generated video newsletters in Cambodian schools.

Cambodian teachers not only shared written and photographic feedback but also recorded and shared videos of their classes using the student-created learning content (Figure 7). After receiving the video feedback, the participants expressed: "I'm happy that everyone sent us videos of what they learned in English," "I will speak a little slower and louder from now on. Please share what you want to see in Japan," and "I want Cambodian children to learn not only vocabulary but also conversational sentences. I thought that adding subtitles to the videos would be helpful since I was only orally practicing the pronunciation."

Figure 7. Classroom instruction using student-generated video newsletters.

Students' Reflections The FY2022 questionnaire survey.

The researchers conducted a quantitative text analysis of the student reflections on "'Awareness' (descriptive) through interaction with the local site" of 26 students in 2022 using the KH coder to understand the students' "awareness" through the exchange learning, which resulted in the co-occurrence networks shown in Appendix 1. The students' "awareness" was classified into 11 main themes that were identified. These included "(iv) the large number of students," "(viii) the lack of teachers," "(ix) the low school attendance rate," and "(xi) the presence of primary school children close to our age," which confirmed that the student's awareness enabled them to "identify the issues in Cambodian education." In addition, we conducted computational text analysis of the student's reflections on their activities, "Summary (descriptive)," using the KH coder. Figure 8 shows correspondence distributions arranging the relationship of the vocabulary described in the student "Summary" with self-evaluation of accomplishment: "I was able to gain a sense of achievement for this activity" (5 levels of accomplishment: 5=most positive, 1=most negative). The keywords "myself," "letter," and "understand" were placed away from the origin in the direction of "Accomplishment Level 5" in the top right-hand corner of Figure 8. This indicates that these keywords were characteristic of the statements in Accomplishment Level 5 (83.3% of the students responded with 5 or 4). Through the student descriptions with the keywords "myself," "letter," and "understand," the following themes emerged.

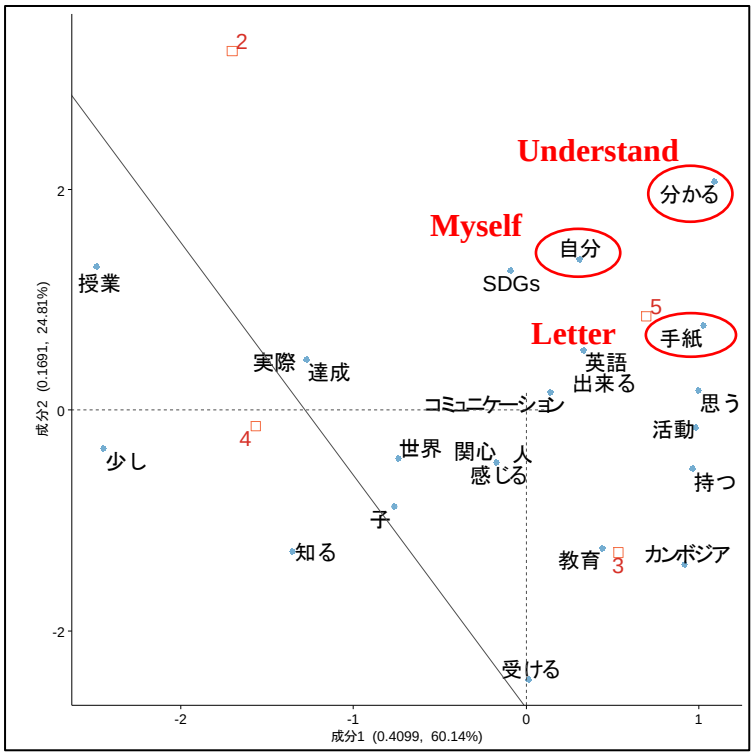


Figure 8. Correspondence distributions of the vocabulary described in the activity reflection "summary" (minimum number of occurrences: 3).

1) From the descriptions related to "myself," such as, "From now on, I want to acknowledge it as something that is not someone else's problem but my own and do what I can do," and "From now on, I want to reflect on what I can do, investigate the situation, and take independent actions," highlight that gaining a sense of ownership led to a sense of accomplishment.

2) From the descriptions related to "understand" and "letter," one student remarked, "I noticed differences in the ages of the students by the content of their letters." Another respondent expressed, "I could see that the educational activities in Cambodia are less developed than those in Japan." One student shared, "We were able to bond more through not only online correspondence but also exchanging letters." The use of various means of communication and exchange was effective in fostering the ability to empathize with others and positively impacted the students' sense of accomplishment.

The FY2023 questionnaire survey.

A questionnaire survey was conducted in late October using Google Forms with 34 students from the 2023 school year who were involved in our practice to understand the transformation of their consciousness, with the keywords "confidence," "accomplishment," and "contribution." The questionnaire items and survey results are presented in Table 1. More than 85% of the students responded positively to all the items, confirming the increased awareness of "confidence," "accomplishment," and "contribution" through the exchange program.

In the descriptions of these three keywords, the students provided the following comments:

1) They provided feedback on how the classes were progressing, which made me feel a sense of accomplishment knowing that they were utilizing it in this way.
2) The feedback gave me a sense of accomplishment and helped me understand my contribution by seeing how the videos we created are being used in class.
3) Watching the videos of the children learning from our content made me feel that our efforts were worthwhile. The fact that I was able to contribute even slightly to solving the issue of the educational gap made me feel accomplished and confident.
4) By creating the learning materials that helped the students, I believe that I gained confidence in being able to help with issues that appeared enormous to me.
5) When the feedback we received from the Cambodian teachers recognized the value of our learning materials, we gained a sense of accomplishment and felt that we were contributing to Cambodia.

Table 1
Transformation of the Students' Consciousness in Terms of "Confidence," "Accomplishment," and "Contribution"

For global issues represented by the SDGs, you have gained confidence as a solver of social problems			You have gained a sense of accomplishment from this activity			You have gained a sense of contribution from this activity		
n=34	frec.	relative frec.	n=34	frec.	relative frec.	n=34	frec.	relative frec.
Strongly agree	4	11.8%	Strongly agree	12	35.3%	Strongly agree	16	47.1%
Agree	25	73.5%	Agree	17	50.0%	Agree	13	38.2%
Neither	5	14.7%	Neither	4	11.8%	Neither	4	11.8%
Disagree	0	0.0%	Disagree	1	2.9%	Disagree	1	2.9%
Strongly disagree	0	0.0%	Strongly disagree	0	0.0%	Strongly disagree	0	0.0%
Total	34	100.0%	Total	34	100.0%	Total	34	100.0%

The students gained a sense of "confidence," "accomplishment," and "contribution" through a series of interactions in which they saw the videos that they had created being used in the local field and received feedback from the local community about the videos. This improved consciousness is also reflected in the videos that were created. The feedback from the local community, such as "The children want the students to speak louder," along with the students' realizations through the feedback, including "pronounce clearly and insert pauses between repetitions," and "start the subtitles from the beginning of the speech and display them in a larger, more readable font," show that the students reflected on the requests from the local community and their own insights. This suggests that they reflected on the feedback and used self-realization to improve the content and make the material easier for the local community to use, increasing their confidence levels (Figure 9).

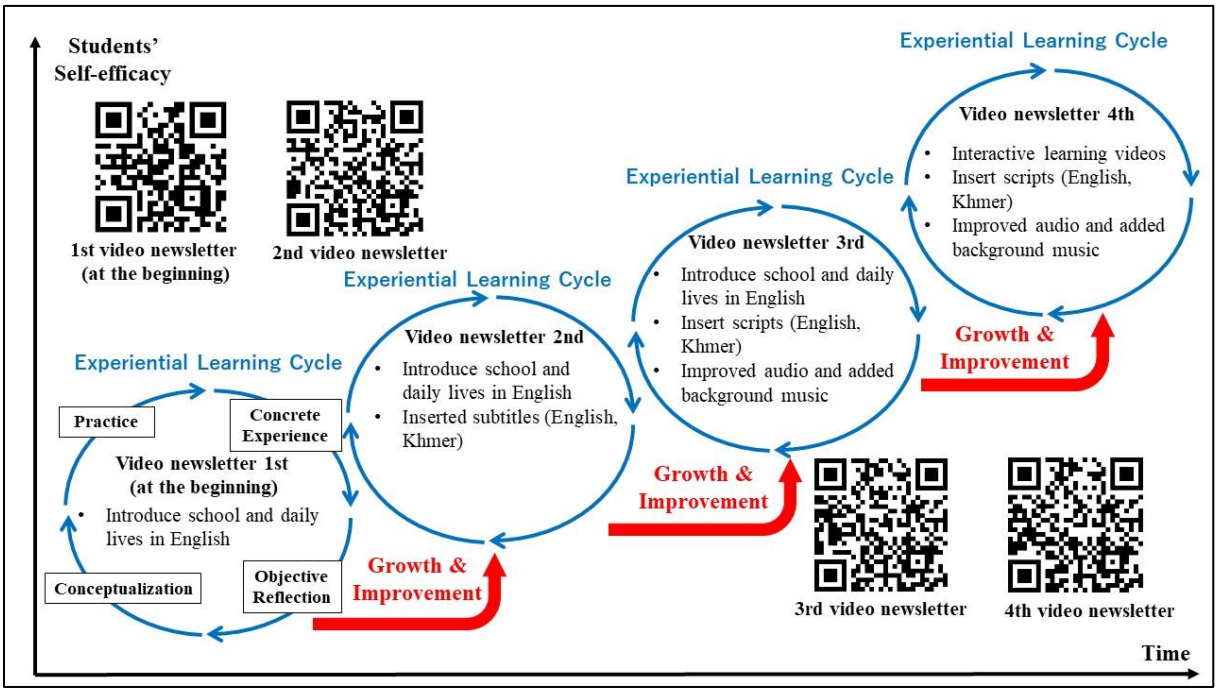


Figure 9. Transformation and growth of video newsletters through the experiential learning cycle.

Discussion

Awareness

Through the co-occurrence network of student comments (Appendix 1), it was confirmed that even in ICT-centered exchanges within the COIL framework, the students were able to identify issues in Cambodian education and expressed concern for the local children, deepening their "awareness." In addition, exchanges that did not rely solely on ICT, such as handwritten letters, enabled the students to gain first-hand information (Figure 4), such as "there are variations in age even within the same grade." This demonstrates a deeper understanding of the current state of educational inequalities that are challenging to see through ICT-only exchanges. The use of various means of communication enriched the students' awareness, as the students stated that "through not only remote communication but also through exchanging letters, they were able to deepen their bond."

Ownership

Emphasis was placed on receiving maximum feedback from the field, including videos of the use of the learning content (videos of classroom scenes), photographs (classroom scenes), and observations and comments from local teachers. Therefore, the learning materials (video newsletters) were developed as a regular monthly distribution, considering the time constraints of the local teachers. This approach was successful and led to various feedback being delivered from the local area. Feedback from the local community through various media showed that "the videos were motivating local children to learn," "there were requests for the videos and areas for improvement," and "how they were being used locally." In response, the students reflected on the requests from the local community and their awareness and used ChatGPT to improve the ease of use of their videos (Figure 9), which confirms their increased ownership.

Empathy

Based on the feedback from the local community and observation of the student's efforts, it can be confirmed that with each session, the students became more considerate of others, more willing to deliver well-crafted comments and videos, and their ability to "empathize" with others increased. Moreover, the students noted that "they were able to bond more with the local children not only remotely but also through letter exchanges." The use of diverse means of communication led to an increase in their level of empathy toward others.

Contribution & Accomplishment

Table 1 indicates that more than 85% of the students reported that this exchange learning improved their sense of achievement and contribution. Through the students' descriptions, we can confirm that "seeing the videos that students have created being used in the local community" and "the parts that the students had creatively worked on were positively evaluated as strengths" led to an increased sense of accomplishment and contribution. Based on the results obtained through correspondence distribution (Figure 8), it can be confirmed that taking action with a sense of ownership positively impacted the students' sense of accomplishment.

Confidence

Table 1 shows that more than 85% of the students reported that their confidence level increased. The students' descriptions suggest that "seeing the children watch and learn from the videos that students have created a sense of helping to solve issues, which leads to increased confidence. The videos also indicate increased confidence while reflecting on the feedback received from the local community and their awareness and making improvements to improve the usability of the learning content (Figure 9).

Based on the above findings, we discuss the following observations on exchange learning and self-efficacy. Students worked on creating learning content that is easy for others to use while reflecting on their "awareness" gained through frequent communication. Through a series of interactions in which the students listened to real voices through exchanges, saw the videos they created being used locally, and received feedback about their videos from the local community, they developed "empathy." They increased their "confidence," gaining a sense of "accomplishment and contribution." In the student questionnaire survey, the high achievement levels of "confidence," "sense of accomplishment," and "contribution" exceeding 85% indicate that the students gained a sense of self-efficacy. The student's statement, "I gained confidence in being able to help with problems that seemed too big for me," suggests that the students developed a stronger sense of self-efficacy.

Conclusion and Future Challenges

We designed an exchange learning program by combining Kolb's (1984) experiential learning model and the COIL to achieve sustainable international exchange learning. Using multiple means of communication and exchange AND not relying solely on ICT was effective in enhancing students' "awareness" and developing a sense of "ownership" and "empathy." The students developed self-efficacy while increasing their "confidence," "accomplishment," and "contribution" through authentic activities, such as listening to real voices, seeing their videos being used locally, and receiving feedback about their videos. The students' reflections indicate that this experience positively impacted their learning effectiveness.

This study was based on survey data from students in a specific school/course, and it evaluated and discussed the transformation of students' consciousness. Therefore, the sample size was limited, and whether the results apply to students in general is not definitive. The discussion is also guided by feedback and interviews with four local teachers with whom we already have a close relationship and who are our partners in practice. Therefore, although we have endeavored to share frank opinions, it is assumed that they tend to be favorable opinions, and the objectivity of the evaluation needs to be kept in mind. In the future, we would like to conduct further comparative verification beyond the constraints of region and target group. While transcending the constraints of region and target group, we would like to focus on the qualitative analysis of the transformation of consciousness and the quantitative analysis of learning effectiveness to examine the process of students' development.

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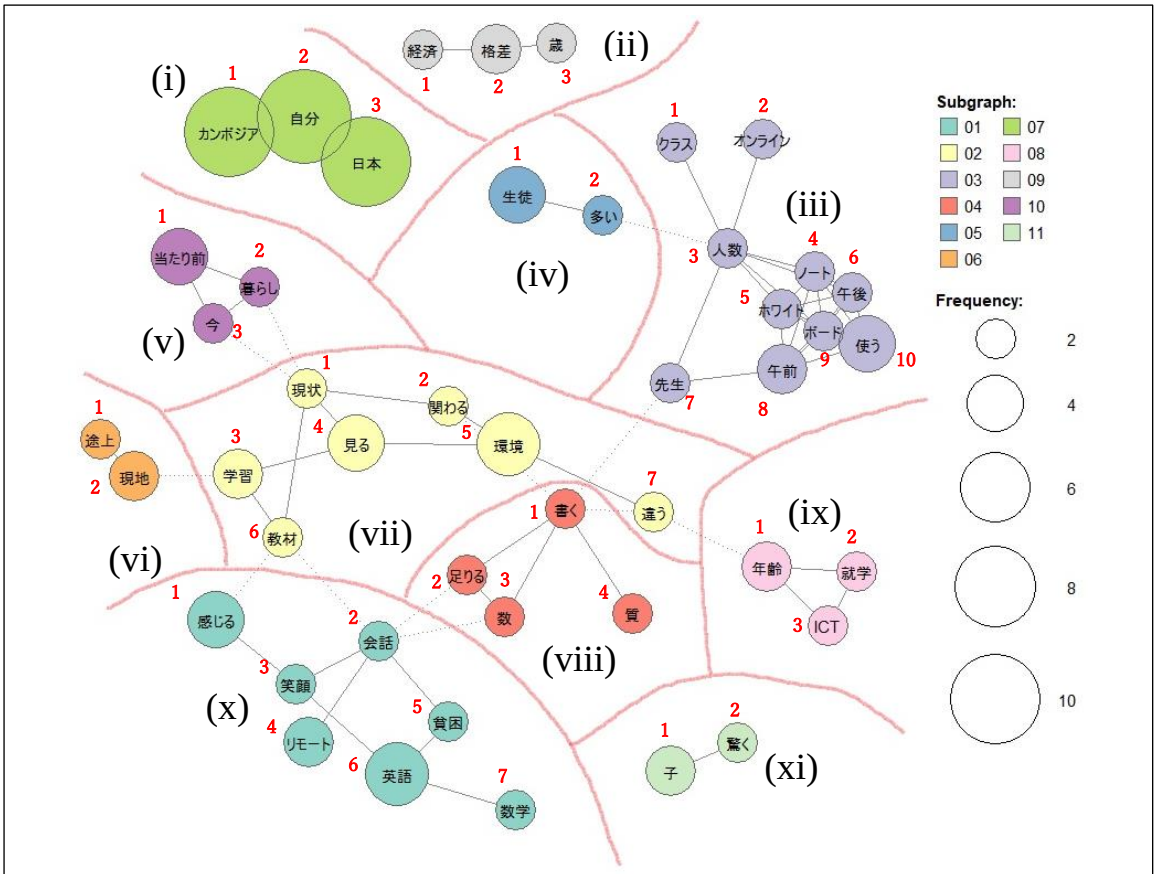
Appendix 1. Co-occurrence Network for "Awareness (Descriptive)" through Interaction with Cambodian Locals



(i) Comparison between Japan and Cambodia (ii) Economic disparity

(iii) Teaching and learning environment (iv) The large number of students

(v) Our own lives (vi) Life in developing countries

(vii) Environmental differences that can be identified through involvement

(viii) The lack of teachers (ix) The low school attendance rate

(x) Situation of the exchange learning program

(xi) The presence of primary school children close to our age

The English translation of each word included in areas (i) to (xi):

(i) 1. Cambodian 2. Myself 3. Japan (ii) 1. Economy 2. Disparity 3. Age

(iii) 1. Class 2. Online 3. Headcount 4. Notebook 5. White 6. Afternoon 7. Teacher 8. Morning 9. Board 10. Use (iv) 1. Student 2. Many (v) 1. Ordinary 2. Life 3. Now (vi) 1. Developing 2. Local (vii) 1. Current 2. Involved 3. Learning 4. Observe 5. Environment 6. Teaching materials 7. Different (viii) 1. Write 2. Enough 3. Quantity 4. Quality (ix) 1. Age 2. School attendance 3. ICT (x) 1. Feel 2. Conversation 3. Smile 4. Remote 5. Poverty 6. English 7. Mathematics (xi) 1. Child 2. Surprised