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CAN ONLINE INTERNATIONAL EXCHANGES EFFECTIVELY SIMULATE SHORT-TERM STUDY ABROAD EXPERIENCES? THE DESIGN OF POST-PANDEMIC CROSS-BORDER COLLABORATIVE LEARNING PROGRAMS

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This design case describes the design of a multimodal learning environment that took place in the context of a funded study on the development of an online, multimodal, and tangible cross-border exchange program aimed at creating experiences that closely simulate face-to-face study abroad (SA) experiences in the post-pandemic context. Although online learning surged during the pandemic, learning is now gradually returning to face-to-face formats, and there is thus a growing need to design flexible learning environments that integrate both online and in-person elements. The design incorporated various semiotic modes—media, speech, writing, pictures, and text—to enhance learners' engagement and facilitate material-rich interactions. In our design, we adopted the symbol grounding problem as the theoretical framework, strategically emphasizing the integration of both linguistic and material elements. Additionally, the selection of tools that facilitate information exchange was prioritized to encourage authentic interaction and foster shared understanding among learners. This design case demonstrates how intentional design decisions contributed to integrating the strengths of both online and face-to-face learning, leading to the development of a flexible, post-pandemic, cross-border educational program.

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INTRODUCTION

This design case describes the design process of a multimodal and tangible online learning environment to simulate an educational environment that is as close as possible to face-to-face study abroad (SA) experiences.

The COVID-19 pandemic has transformed education significantly, leading to the widespread adoption of online learning and language exchange programs. SA and cross-border international programs, which traditionally involve physical travel to foreign countries, have also partially transitioned to online platforms—commonly referred to as "online SA" in higher education. However, these online SA programs, which mainly comprise virtual classrooms and interactions, often lack the physical and sensory experiences associated with studying in a foreign country. Furthermore, there has been a gradual return to face-to-face formats without thoroughly reviewing how educational designers and instructors designed online platforms to replicate the experiences of face-to-face SA.

Addressing this limitation, we aimed to demonstrate the design process by incorporating the advantages of online learning that emerged during the pandemic while also considering how cross-border online exchanges could be

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developed in the post-pandemic era. Specifically, our design approach focused on integrating multimodal and tangible elements into online platforms to enhance learners' engagement with physical and material environments, bringing the experience closer to that of physical SA programs.

The Importance of Designing A Multimodal/Tangible Environment for Future Online Learning/Language Exchange

By incorporating diverse semiotic modes—such as visual, auditory, and material elements (Lim, Towndrow & Tan, 2022)—we aimed to recreate aspects of the physical and environmental experiences learners encounter during SA. Simultaneously, we aimed to address the limitations of screen-based interactions and bridge the gap between online and physical learning. This approach addresses the lack of sensory engagement in virtual exchanges, which has been linked to lower satisfaction among learners seeking cultural immersion (Glenn et al., 2023).

To fully understand how learners engage in these multimodal and tangible online interactions, our system needed to provide control over the online international exchange environment. This design decision was driven by the need to gather a richer and more comprehensive dataset than previous studies in the field. Specifically, while designing our online learning platform we simultaneously designed a system to document and record the process of learners' interaction during their out-of-class activities to observe their learning attitudes and behaviors.

While online learning provides convenience and efficiency, it poses challenges in accurately observing participants' physical cues, environment, and activities within a non-face-to-face group work setting. By identifying the setup requirements for effective online learning, the data that can be obtained from students' activities, and the barriers encountered during data collection, our design case aims to assist designers in developing a tangible online learning environment that enables students to engage in immersive cultural experiences similar to SA.

THE DESIGN CONTEXT

One of the primary considerations in developing the collaborative online exchange between Ritsumeikan University (RU) and the National University of Singapore (NUS) was to create a structured learning environment that aligned with the institutions' shared approach to foreign language education. Another essential factor influencing the design was the shift in classroom formats necessitated by the pandemic. Furthermore, securing a research grant at RU to study the internationalization of education provided an opportunity to implement and refine this structured approach. To provide a comprehensive understanding of the design process, we will outline our roles in conceptualizing, developing, and refining this learning environment.

Design Team

I (the first author) became interested in online international exchange when I was confronted, in 2020, by both the convenient and inconvenient aspects of online classes implemented as an alternative to face-to-face classes during the COVID-19 pandemic. As a contracted lecturer at RU, I was teaching classes based on the Project-based English Program (PEP), wherein students learned English as a tool. The PEP class that I was teaching at the time also had to change its format to hybrid or entirely online, depending on the number of people affected by COVID-19.

During the pandemic, with travel restrictions and quarantine requirements, SA programs shifted to online exchanges with partner colleges. This raised debates surrounding the term "online SA," prompting me to reconsider its meaning. While questioning this concept, I explored how technology could enhance online learning in the PEP classes to better simulate SA. Around that time, I came across an invitation to a language exchange with NUS students and reached out to Yoko Morikawa to observe her project in January 2022.

Yoko Morikawa was in charge of a Japanese language education class at NUS and was looking for first-language Japanese students who could help students practice Japanese outside of the classroom. There was no stable network in Singapore to ensure the availability of Japanese students at all times. Morikawa thought that it would be possible to find many target students online, capitalizing on the opportunity presented by the pandemic to try to organize online language exchanges.

Following my observation of out-of-class group activities online in Morikawa's project, I decided to collaborate with Morikawa in implementing a multimodal, tangible-based online international exchange as part of our regular PEP classes, first on a trial basis and then as a project.

At that time, in 2022, my university was seeking applicants for the International Joint Research Promotion Program—a grant aimed at internationalizing education and research in response to the Japanese government's policy (Ministry of Education, Culture, Sports, Science and Technology, 2023).

Since the grant required collaboration with a foreign university, I saw it as an opportunity to initiate a project replicating SA experiences online. I consulted Tsukasa Yamanaka, a specialist in applied linguistics who seeks to integrate AI into university English education and leads the PEP of our university. He agreed to contribute to the project design.

Yamanaka and I then discussed what we could work on in this project, as well as the possibility of incorporating some of Morikawa's online exchange initiatives into our PEP classes. Morikawa subsequently agreed to implement this collaborative project with us as part of the out-of-class activities for her Japanese language classes at NUS.

The three authors have all taught project-based classes in the past, emphasizing not only learning foreign language skills but also the opportunity to put them into practice—one of the key factors in planning and executing the project.

DESIGN DECISIONS

The design and development process began with identifying the challenges and constraints faced in our previous courses. Our design decisions were made by reviewing the structure of each class, including which shared concepts from our language learning courses should be incorporated, what instructional strategies to apply across two different universities, and what technologies to use to bridge cultural differences. The design constraints included limitations such as differing class schedules and variations in course formats (e.g., online synchronous formats and differing syllabi). These

DESIGN IDEA	RATIONALE FOR CHANGING/SETTING THE IDEA	IMPLEMENTATION TIME	MEETING WITH RESEARCH MEMBERS
Zoom Meeting for synchronous out-of-class interaction between NUS and RU students	• Create a more cross-border, authentic transmission forum in Project-Based English classes • Consider how visual and verbal information is used in synchronous interactions • Consider the theoretical framework to implement the project	1st Project (2022)	March, 2022 April, 2022 July, 2022 August 2022
Provide a platform on the web for asynchronous out-of-class interaction between NUS and RU students	• Create a more cross-border, authentic venue for the dissemination of Project-Based English. • Observe how visual and verbal information is used in asynchronous interactions		
Include videos taken by the students themselves in the assignments they produce.	• Ensure physicality and materiality in order to make the online exchange of the post-pandemic more like a physical SA experience • Reaffirm theoretical concepts in language negotiation		
Actively engage students in the use of AI translations such as DeepL in both asynchronous and synchronous communication	• Explore the level of technology, visual, and verbal information that language learners use. • Make students aware that visual information is also necessary for communication.		
Implement Telegram to facilitate out-of-class interaction between NUS and RU students	• Improve convenience and encourage students to interact with each other outside of class. • Make it easier for researchers to obtain data. Promote independence of interaction among students.	2nd Project (2023)	November, 2022 December, 2022 March, 2023 August, 2023
Show students videos from the previous year to help them understand what 'self-taken videos' means in the assignments they produce.	• Familiarize students with the definition of self-taken videos • Let students model with each other to facilitate learning		

TABLE 1. The idea, purpose, and timing of the design and the design decisions

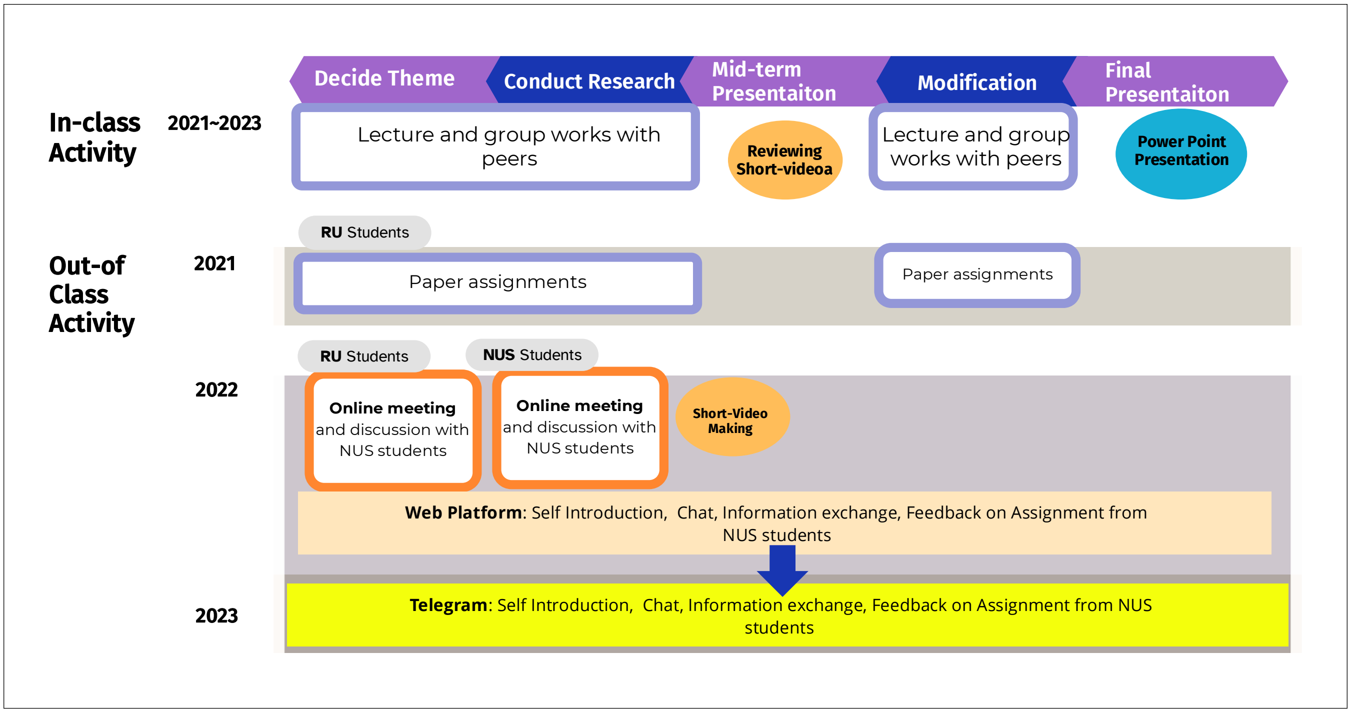

FIGURE 1. The design of the conventional project-based English class (~2021) and its design for 2022 and 2023.

constraints required careful consideration and planning during the design phase.

This section introduces four key points that played a pivotal role in shaping our approach: 1) the challenges identified in our prior language courses, 2) the potential role of technology in addressing these challenges, 3) the establishment of shared theoretical concepts to guide the design process, and 4) external factors that facilitated the implementation of the design. These key points were identified during several conversations with the authors. Table 1 shows the purpose and timing of the design and the design decisions.

Challenges in Class: Limitations of Student Experiences

For the project design, we carefully considered how to develop the online interaction context as a tangible environment to simulate the experience of SA while being online, rather than merely acquiring knowledge. This approach aimed to address the issue identified in our previous courses—specifically, the lack of authentic communication opportunities for students. By creating an environment that facilitated more realistic and meaningful exchanges, we sought to enhance learners' engagement and provide a context that better reflected real-world interactions.

My initial discussion with Yamanaka took place in March 2022, when we were both members of a research group investigating the integration of English education and technology.

Previously, our class design required students to conduct research as an out-of-class activity and present their findings during class sessions (see Figure 1). However, students lacked opportunities to test whether their English was understandable to other English speakers or to assess whether their project outcomes were being effectively communicated in English. Meeting with Morikawa in March 2022 also revealed that her previous course faced the same issue—a lack of authentic practice opportunities.

To overcome this limitation, we considered incorporating an online exchange with NUS as an out-of-class activity. This addition aimed to provide students with a more immersive and interactive language learning experience, ensuring that they could engage in meaningful communication and refine their ability to convey ideas effectively in each other's target language.

Exploring the Role of Technology in Language Learning

As the second discussion theme, instead of simply connecting via the internet (as in the past), Yamanaka and I considered how technology could be utilized in our online exchange settings in this technologically advanced age. We discussed the extent to which technology can be utilized in online screen interactions, which areas technology cannot cover, and the individual language skills to be determined. Since this would be an exploratory design, we wanted students to see what their choice of tools would be to some extent, which was also a consideration in the project design context. Therefore, we decided to allow students to utilize translation tools or communicate using information from the internet.

Subsequently, I contacted Morikawa, explaining the focus and direction of our design, and asked her, in April 2022, to collaborate on the program. At the same time, the three of us engaged in a series of meetings and email discussions on the following further theoretical considerations as to how visual information, "physicality" and "materiality," could bring about an experience more akin to that of SA.

Theoretical Framework: Addressing the Symbol Grounding Problem

Our discussion on the theoretical framework emphasized the role of the symbol grounding problem (Harnad, 1990) in designing effective language learning environments. This concept highlights the necessity of physicality and materiality in language acquisition, ensuring that "symbols" (e.g., words, concepts) are connected to real-world experiences through learners' engagement with physical and material elements. When learners use a foreign language to communicate across cultures, their understanding is influenced by how well these symbols are anchored in their sensory and material experiences (Imai & Akita, 2023).

Building on this concept, we aimed to create a material-rich environment in which learners engage with visual materials such as text and images, thereby simulating the cultural experiences of their exchange partners. This approach led us to explore and incorporate material environmental factors into our learning design.

Subsequently, based on the theoretical framework, we applied for a grant from our university in June 2022 and were awarded the grant in August 2022.

Convenience in Coordination

The fourth main discussion regarding the project design was the convenience for both universities in implementing this joint project, which facilitated the implementation of the design. Since there are many Japanese language learners in Singapore and English learners in Japan, it was convenient for students to communicate with little time difference between the two countries. Although online international exchanges have been conducted by many higher education institutions in the past in Japan, there have been obstacles in coordinating schedules between countries with widely different time zones when they try to organize synchronous exchanges. In this respect, the time difference between Japan and Singapore is only one hour, reducing the burden on the students and making it easier to implement the project.

Additionally, the schedules of course offerings at both universities were aligned successfully. In the PEP, which is run by myself and Yamanaka, the autumn semester starts in late September, and students are required to submit the output of a small project that they have launched as an interim presentation during the sixth or seventh class out of a total of 15 sessions. As the final presentations are due at the same time in the class that Morikawa runs, we were able to run this project without having to adjust the class schedule between the two universities, which was also a major advantage. The task content, in which students set and performed their research tasks, was also in line with the classes at both universities, meaning that no major readjustment was necessary.

The project started in September 2022. In contrast to pre-pandemic online exchanges, the project's imperative nature emphasizes an exploratory design approach within a technologically advanced society, necessitating updates to its online theoretical framework and recognizing the value of online communication in the post-pandemic era.

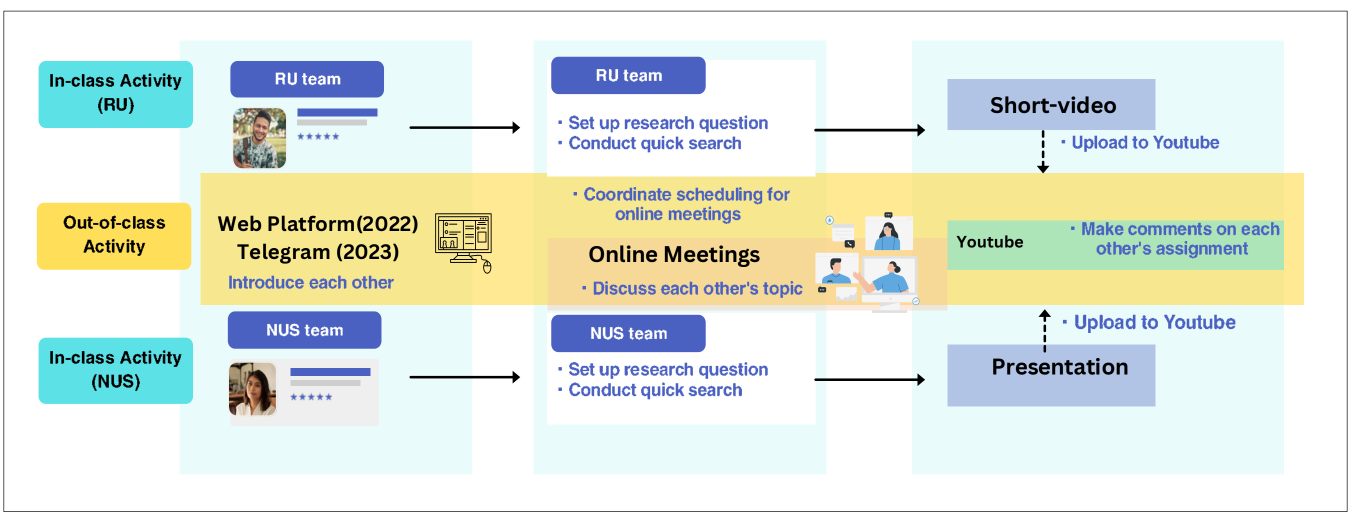

FIGURE 2. Multimodal study setting illustrating graphically the time course over which each setting took place.

MULTIMODAL SETTINGS

Based on identifying challenges in our existing courses, we decided to design four specific settings (see Figure 2).

This section introduces each setting, explaining its purpose and the reasoning behind its design.

Web Platform (2022)

We sought the web platform as the first point of contact for participants who had never met face to face. We expected this online interaction would serve as a scaffolding learning environment for participants not fluent in the target language.

We needed extensive discussions as to what kind of platform would be suitable. Due to our limited budget, the platform operation needed to be low-cost. Additionally, we required high immediacy and usability so that we could quickly address any technical issues that arose or update necessary information. I found a free web production service (Wix), and established the web page for this project. I became an administrator, updated information, and set up the system.

FIGURE 3. Top page of the groups' room on the web platform. Each group was allocated a room and group members could share information by entering the room.

We developed a custom web platform to facilitate students' collaboration and exchange of ideas related to their research projects and assignments. The web platform, initially called "Rooms for Groups," was designed to provide dedicated chat spaces for students who had not previously worked together, fostering interaction and collaborative learning. Additionally, we expected that it would allow students to observe other groups' interactions, providing scaffolding for those unsure how to engage in communication in their learning language.

This approach was rooted in our shared theoretical understanding that observing others' behavior can enhance the learning process. Specifically, Rizzolatti and Craighero (2004) argued that a fundamental human capacity is the ability to observe and learn from the actions of others—commonly referred to as imitation learning. Reflecting this theory, our design aimed to encourage spontaneous imitation learning by emphasizing a bottom-up approach. Our design case shed light on this method, encouraging students to engage

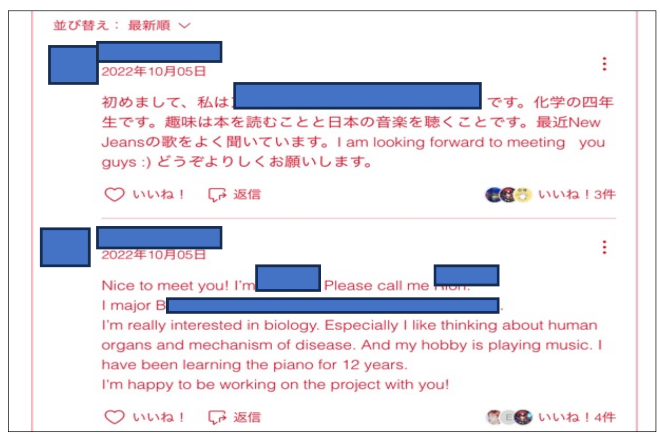

FIGURE 4. Self-introduction section on the web platform in which students were asked to introduce themselves here in their learning language before the online meeting.

in voluntary imitation, rather than imposing a top-down, faculty-driven, forced imitation process.

"Rooms for Groups" (see Figure 3) was designed with four distinct sections to facilitate structured interaction: (1) an introduction space to encourage initial engagement (see

Figure 4), (2) a discussion area specifically for NUS students, (3) a dedicated space for RU students to discuss their projects, and (4) an open chat area for informal conversations. This deliberate organization aimed to streamline communication and simplify information management for both students and instructors, ensuring clarity and ease of use within the platform.

The second component, the "Information" section, was implemented to centralize project-related materials, ensuring that students could access guidelines, assignment deadlines, and relevant resources conveniently.

Finally, the "Exhibition Space" was incorporated to serve as a repository where students could upload and share their video assignments.

In designing this web platform, we prioritized creating an integrated space where students could both communicate and access instructions for group work. To reduce complexity and maintain engagement, we ensured that a single platform facilitated both peer interaction and instructor guidance, avoiding the need for multiple tools that could hinder workflow and motivation.

Telegram (2023)

Following the student feedback obtained in 2022 (see "Web Platform (2022)" in the section "PROJECT IMPLEMENTATION"), we realized that convenience is essential for out-of-class learning. In November and December 2022, after the first program ended, we discussed which platform would best facilitate more active interaction between students, deciding to use an existing social networking service (SNS) application for AY 2023.

After discussing platform options, we decided to use Telegram, as suggested by Morikawa, since it was commonly used by NUS students, while Japanese students primarily used LINE. As LINE has a short data storage period, whereas Telegram is free and allows permanent data storage, we selected Telegram for its functionality.

Zoom Meetings

We designated the organization of Zoom meetings for each group as one of the primary events through which to facilitate participant interaction. This approach aims to cultivate an environment where participants can engage in open discussions with one another, rather than having their interactions monitored by instructors during the limited class time. Simply, our objective was to replicate the informal interactions that typically occur outside of the classroom during SA experiences.

However, merely instructing participants to conduct Zoom meetings may not stimulate active engagement sufficiently. Therefore, we formulated specific tasks that necessitated discussions of each participant's research topics during these meetings. At RU, the class was compulsory and some students enrolled in the course solely to fulfill credit requirements. Consequently, we concluded that implementing specific guidelines or constraints would be essential for fostering student motivation and engagement.

While an environment devoid of instructor observation would foster a greater degree of free interaction, we also sought to enable the observation of the dialog occurring and the individual's contributions. This was the rationale behind our decision to have participants record the Zoom meetings and save them in a designated folder on Google Drive as part of their group's assignment.

Assignments (Short Video and Presentation with Authentic Photos)

We set up the assignments for this project in a way that maintained the integrity of our existing syllabi content while making minimal changes to the tasks in each course. Each university adopted a different assignment format, as the project implementation was integrated into the design of existing classes. Modifying the assignments completely would have required substantial revisions to the syllabi, which could have been challenging during the project's implementation. To align with the existing class structures, students formulated research questions for each team and conducted research based on them. This project-based learning design ensured consistency with the original assignments while accommodating the objectives of the collaborative project. We allowed students to choose any topic for their assignments, but we guided them to include a broad direction for this project, particularly incorporating a perspective of cultural comparison between Singapore and Japan. The reason for this approach was to give significance to the interaction between the RU and NUS participants.

To strengthen the connection between language learning and real-world experiences, as well as to explore how learners' experiences of physicality and materiality contribute to language acquisition, we designed an assignment format for RU and NUS that contained videos and their own photographs, respectively. Designing this format, which differed from mere PowerPoint presentations, was our main attempt to introduce a theoretical framework that engaged with materiality and physicality within the context of this online project. In other words, we did not want the students to limit their communication to desk-based discussions. Therefore, we emphasized the importance of including visual information, such as videos and still images that the students had created, as part of their final output.

PROJECT IMPLEMENTATION

The project was implemented over two years (2022–2023), in classes containing a total of 200–270 people. RU's English language courses were conducted with a cohort of around 100–130 undergraduate students aged from 18 to 23 in the two years. NUS offered Japanese language classes to around 100–140 undergraduate and adult students, ranging in age from 20 to 27. The NUS participants were classified as beginners in terms of Japanese language proficiency, whereas the RU students displayed a range of proficiency in English, from beginner to advanced. The project was implemented as part of an existing class schedule, and comprised a total of 50 groups of four to five members (two to three members from each university), thereby ensuring an RU team and an NUS team within each group. The project's timeline started in September 2022, with the collaborative group work taking place over one month for each session from October to November 2022 and from October to November 2023.

The RU students who participated in this study took classes for PEP—a mandatory course taught by Yamanaka. I did not conduct this project in my PEP classes, but rather acted as a project facilitator, providing necessary information to the students. NUS conducted this project in the Japanese classes taught by Morikawa and in classes taught by other Japanese instructors. Morikawa served as the facilitator for the other NUS classes and this subject was an elective, rather than a mandatory class.

The lesson structure encompassed a blend of synchronous communication, such as sharing information via the web platform created for the project in 2022 and Telegram in 2023; synchronous communication through video meetings conducted on Zoom; and asynchronous media utilization, specifically in the form of video production.

Web Platform (2022)

After introducing the web platform to the students, I monitored its usage regularly and recorded progress. Specifically, I tracked the progress of each group's conversations—such as whether self-introductions had been completed and if students had begun scheduling meetings via Zoom—and shared updates among the authors. When I noticed that a particular group had not accessed the platform, I contacted the other authors and asked them to encourage their students to participate.

However, during the initial implementation phase in 2022, I discovered an issue with the platform. Around 30% of the participants, possibly due to difficulties in using the platform, exchanged contact information for existing social networking services (SNS) within the platform and shifted their conversations to those external SNS tools.

Since the project had already commenced and only had approximately two months remaining, I decided that altering the operational method at that stage could cause confusion. Therefore, we agreed to leave the reconsideration of platform usage for the following academic year.

Through the feedback provided by Yamanaka's students, we discovered two main reasons for the shift to the existing SNS. First, the web platform had a large data load, resulting in slow loading times and difficulties accessing the platform. Second, the platform was not integrated into students' mobile phones, so they did not receive notifications when posts were made. Consequently, if someone posted a comment in Rooms for Groups, others would only notice it if they actively accessed the platform. As a result, many groups abandoned the web platform and reverted to more familiar SNS tools for communication.

FIGURE 5. The image of bicycles that the RU team were asked to provide by the NUS team, using Telegram.

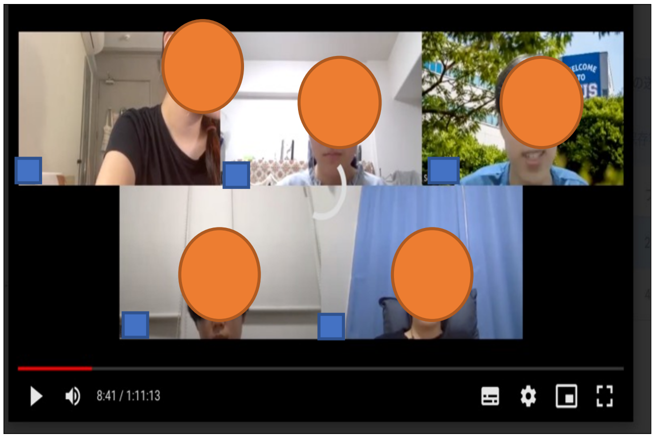

FIGURE 6. Group of participants having a Zoom meeting without sharing visual information.

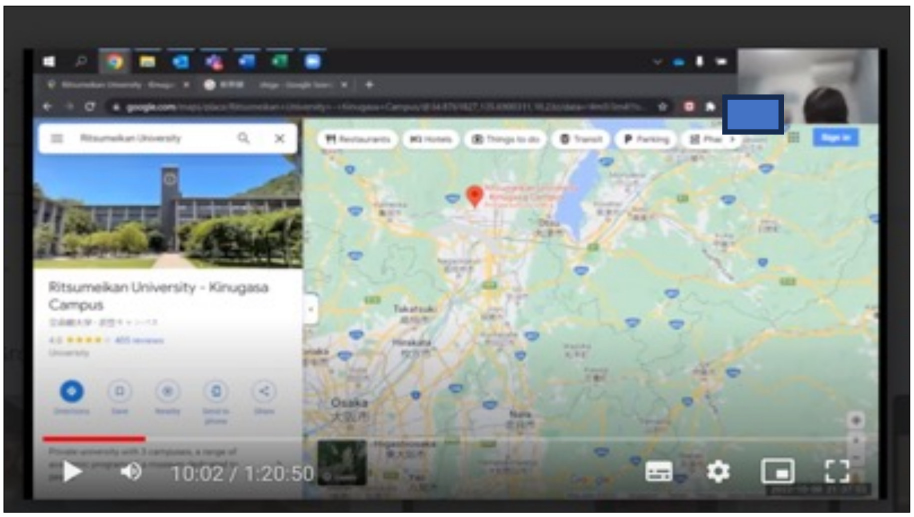

FIGURE 7. Participant talking about his native Shiga Prefecture while sharing his screen during a Zoom meeting

FIGURE 8. Participant sharing visual information by using her mobile phone.

Telegram (2023)

In AY 2023, we therefore decided to adopt the existing social networking tool. As students exchanged videos and still images with one another, we searched for an SNS application with the following primary conditions: the app must be able to handle large volumes, the app must have a notification function, and the data must be stored permanently on the server. Telegram was selected as it fulfills all the requirements. To streamline communication, we structured Telegram into four dedicated channels: (1) a space for group members to interact freely, (2) an announcement channel for project instructors (the authors), (3) a channel for students to submit questions to instructors, and (4) a space for uploading video and presentation assignments.

This structured setup ensured easy navigation and efficient information management. We found that, in particular, the app's instant notification feature enabled students to check updates quickly whenever a post was made within the group.

Continuing from the previous year's practice of using the web platform, I also participated in all Telegram groups as a silent user, which allowed me to monitor the interaction between students easily and assess how much progress each group was making. I observed students actively engaging in group chats and exchanging videos as well as still images. When interaction in certain groups stalled, I could send messages to prompt further communication, maintaining active exchanges effectively. Since the project was conducted in small groups, there was a risk that if even one student did not participate, the group work would not progress. However, thanks to the use of Telegram, it was easy for both students and a coordinator (me) to identify any issues within the group and determine who should be contacted to resolve them.

The tool was positively evaluated by users for its interaction capability. To be specific, a post-survey completed by the Japanese students (73 students) in 2023 revealed that approximately 70% of respondents considered the system easy to use.

In our design discussions for AY 2023, we focused on ensuring immediate notifications and stable storage for visual materials such as videos. Not only was the design objective achieved, but an unanticipated outcome also emerged: participants exchanged more visual materials than we had expected. For instance, Japanese students shared images of bicycles (see Figure 5) as part of introducing their student life. While bicycles are a familiar part of daily life for Japanese university students and are commonly used for commuting, students in Singapore—where cycling culture is less prevalent—perceived the image as a representation of life in Japan. This case demonstrates that interactive tools enabling the exchange of videos and images enhance online language exchange significantly—an outcome not anticipated during the initial design phase.

ZOOM MEETINGS

As part of the design decision, each group was required to conduct at least one Zoom meeting in 2022 and two meetings in 2023. This design aimed to replicate the natural interactions typically experienced in SA settings by creating opportunities for students to engage in open discussions beyond the confines of formal class time. The objective was to foster mutual engagement and encourage authentic interaction in an online environment.

To ensure stability in data collection and promote a sense of responsibility among students, we designated that the group hosts were responsible for recording the Zoom meetings and saving them to a designated Google Drive folder. Given that the students were already familiar with using Zoom during the pandemic, we did not provide specific instructions regarding Zoom operations, thereby facilitating smoother participation.

Analyzing the recorded video data revealed two main interaction patterns. The first pattern involved groups relying primarily on verbal information. These groups tended to prepare scripts in advance or had leaders who facilitated discussions effectively (see Figure 6).

The second pattern involved groups who supplemented their discussions by sharing visual materials via screen sharing or through displaying objects via the PC camera. These groups used visual resources to confirm mutual understanding when verbal communication alone was insufficient.

This observation highlighted the importance of integrating visual and material elements into online communication. For instance, one participant used the screen-sharing function to introduce their hometown of Shiga Prefecture by displaying a map (see Figure 7).

Another participant introduced the Singaporean dish "Laksa" by showing an image of the dish through their PC camera (Figure 8).

These spontaneous strategies were not initially anticipated during the design phase but provided valuable insights into how visual and material elements can enhance mutual understanding in online interactions. Follow-up interviews also revealed that some groups actively used Zoom's chat function and other tools to share new vocabulary and reference materials, thereby enriching their discussions.

These findings suggest the importance of designing flexible and multimodal environments that enable diverse forms of information exchange.

The fundamental structure of each course remained intact, but the tasks were designed to encourage students to engage physically and interact with tangible materials. This design decision aimed to go beyond screen-based interaction and foster a pseudo-material learning experience. In addition, students were required to submit their videos and slides to designated folders to facilitate data analysis by the authors.

For RU students, the assignment required submitting a five-minute video. Students were encouraged to document their real-life activities, such as cooking, commuting to school, and giving tours of their rooms.

Following the 2023 program, a follow-up interview conducted with an RU student revealed that this design decision positively impacted her cultural understanding. The student described purchasing and eating Singaporean chicken rice in Japan and recording the experience as part of her video assignment. She emphasized that "actually experiencing" different cultures was essential for deeper understanding and highlighted the value of interacting with material things to achieve this.

For NUS students, the assignment required creating presentations using original images provided by RU students, rather than easily accessible images from the internet. This decision aimed to foster deeper engagement and provide a more authentic cultural experience by sharing uniquely obtained images. In practice, original images and videos exchanged

FIGURE 9. Video provided by an RU student, showing her room.

via Telegram were used extensively in the final assignments. According to the questionnaire survey conducted after the design case in 2023, approximately 85% of students perceived these images as "more special" than those from the internet, and 92% reported feeling a stronger sense of familiarity with the original images.

Reflections from the NUS students indicated that exchanging original images strengthened relationships among learners and enhanced motivation. For example, in videos where RU students introduced their daily lives, NUS students noticed subtle cultural elements that had not been highlighted intentionally, leading to an increased awareness of cultural differences. Some NUS students in Morikawa's class started to make comparisons with their rooms when seeing the RU student's room (see Figure 9).

Since video captures a range of visual information, the participants were able to notice cultural nuances that the presenters had not expected.

Given the observation, it can be said that this design approach successfully facilitated a process in which learners negotiated a shared "real world" through symbols (e.g., words) and images. The original design decisions were crucial in promoting mutual understanding and cultural insights, demonstrating the value of integrating materiality and physicality into online learning environments.

POINTS TO IMPROVE ON

This section presents reflections by the authors based on our experience of designing and implementing this design case. It primarily highlights the key improvements made from the first to the second year of the two-year implementation and discusses potential areas for future enhancement.

Web Platform Limitations and Transition to Existing Tools

In this design case, selecting a convenient communication tool was a critical design decision to facilitate smooth interaction among students. The web platform, developed using Wix in 2022, was effective in centralizing information but proved inadequate for immediate information sharing, which therefore hindered student interaction. This issue was confirmed through post-project surveys. In response to these challenges, Telegram was adopted in 2023. The communication tool design focused on four key features to enhance learner engagement:

1. Group Chat Function: Pre-set group chats reduced barriers for low-motivation and low-proficiency students, promoting smoother initial interactions.
2. Administrator Observation: Enabled monitoring of group progress and timely follow-up with non-participating students.
3. History Preservation: Allowed long-term storage of videos and images for research data collection.
4. Notification Function: Immediate notifications facilitated quick responses and strengthened student collaboration

Through this process, it became clear that choosing a convenient tool is key to enhancing learner motivation and promoting mutual understanding in out-of-class learning. This design decision significantly impacted learning outcomes and the overall quality of student interactions.

The accessibility of a tool that learners can use to communicate has not received much attention in academic discussions on designing online learning settings, but it was confirmed that convenience is important in designing out-of-class learning to motivate learners and promote mutual understanding.

Understanding Video Production and Reflection

In the initial design phase, it became evident that some groups did not fully understand the concept of producing "self-taken videos," and instead used videos sourced from the internet. This misinterpretation influenced our design decisions in the second year (AY 2023). To clarify expectations and promote authentic engagement, we incorporated a model video from AY 2022 as a reference. This design adjustment emphasized the importance of creating content that reflects personal experiences—an essential component for fostering authentic learning and deeper material engagement.

Another critical design insight emerged regarding the lack of linguistic reflection after video production. For example, one RU student produced a video documenting her experience of eating chicken rice, which had been a discussion topic in her Zoom group. However, she did not articulate her impressions or reflect on her experience in the video. In our post-project meeting following the implementation in AY 2022, we reflected that the lack of verbal reflection limited the depth of students' learning. This realization led us to identify the need for integrating structured reflection into the design. We concluded that, in addition to creating videos, students should be encouraged to articulate their experiences—either as part of class activities or through reflective assignments. However, due to differing semester schedules between the universities, it was challenging to allocate sufficient time for feedback within the existing curriculum framework.

Going forward, incorporating reflection activities will be a key design consideration to enhance learning outcomes.

CONCLUSION

This experience of designing and implementing the project highlighted significant takeaways.

The first takeaway is the effectiveness of an exploratory design approach and the pivotal role of a dedicated coordinator. Our design explored the potential of incorporating elements of physical contact and materiality into the online framework, moving beyond simple screen-based interactions to create experiences that closely simulate cross-border SA programs. To bring out-of-class activities closer to the broad, physical experiences associated with SA programs, we adopted a relatively flexible design format that encouraged participants to engage actively in the project.

Given that this was an exploratory design—not a target-bound approach focused on testing and measuring specific learning outcomes—the authors' division of roles became critical. Particularly, having a designated project coordinator and designer who could facilitate this communication and oversee participant engagement proved to be essential for ensuring the design's continuous refinement. We executed the project from design to implementation within a relatively short period (six months from the initial meeting) in the first year by making minor modifications to the existing curriculum and incorporating online exchanges as extracurricular activities. Over the two years, unexpected challenges and errors arose occasionally, necessitating immediate responses and on-the-spot revisions. In these cases, I took on the role of coordinator, monitoring participants' out-of-class activities closely and communicating regularly with course instructors (the other authors) to share insights and identify areas for improvement in the design. This role was particularly important in using submitted assignments and stored digital data shared by participants as discussion points for the next stages of design. Each submission and stored data were carefully reviewed and served as a step toward refining future iterations of the project. This iterative approach required constant monitoring and adaptation, with authors playing an active role in adjusting the design based on participants' experiences. Given this experience, the role of a designated project coordinator and designer is pivotal in design projects that operate within limited timeframes.

The second takeaway is that we deliberately designed this project to allow for the storage of data provided by students, using platforms such as Zoom and Telegram. Initially, the project was designed to visualize and document out-of-class activities—such as Zoom meetings, web platform discussions, and Telegram exchanges—by having students save relevant data. This approach was not only crucial for data analysis, but also became key in detecting areas for design improvement. By making student interactions visible, it was easier to identify obstacles and enhance the overall learning experience.

This sensory-rich information, especially visual information, may also help participants become aware of unexpected differences in one another's culture, possibly helping them to negotiate the real world that they are trying to share as they enjoy their SA experience. This supports the argument that sensory cues reduce learners' burden in the process of understanding phenomena and concepts (Moreno & Mayer, 2007; Pares & Eisenberg, 2022; Sannomiya, 2021).

Overall, these insights from this design case emphasize the importance of flexible, exploratory design approaches, active coordination, and intentional data visualization in designing effective and immersive online international exchange programs.

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