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Centering Cultural Knowledge in TPACK— Evidence From a Collaborative Online International Learning Collaboration

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Abstract

In this qualitative study, we analyzed the processes of a collaborative online international learning (COIL) collaboration between two higher education institutions in Japan and the United States from the perspective of the technological, pedagogical, and content knowledge (TPACK) framework. The research question this study aimed to address was: What is the utility of the TPACK framework, as a lens of analysis, for this online cultural exchange? To address this question, we conducted semi-structured interviews with student participants and examined their written works. From the student participants' learning experiences, we identified evidence of cultural exchange as well as evidence of missed opportunities for cultural exchange arising from the limited knowledge of technology, pedagogy, content, and culture. COIL and TPACK both share a common goal of increasing students' access to multiple knowledge systems using educational technology. As a result, COIL conceptually aligns well with the TPACK framework. This collaboration showed an ongoing need for the centering of cultural knowledge and cultural exchange in both COIL and TPACK. We, accordingly, outline potential for a TPACCK, a modified TPACK framework to center cultural knowledge in both with the hope of taking steps towards a more culturally sustaining framework of international collaboration.

Keywords: collaborative online international learning (COIL), technological pedagogical content knowledge (TPACK), culturally sustaining pedagogy, online education, college teaching

Introduction

In the past three decades, the number of tertiary students studying abroad increased dramatically until more than 5.6 million students chose to study abroad in 2018 (OECD, 2020). However, global instability and restrained mobility created by the COVID-19 pandemic reversed this growing trend. This changing global education environment demands more robust cultural exchange opportunities using online and virtual pedagogies and more advanced and tailored communications technology for use in education.

Collaborative online international learning (COIL) methodology is an applicable instructional choice that enables students to exchange cultural experiences through virtual collaboration (SUNY COIL Center, 2018). This virtual exchange has long been adopted in various postsecondary settings for its benefits in enhancing global perspectives and intercultural competence providing more equitable access to intercultural experiences than studying abroad. This methodology, amidst the pandemic, saw pedagogical value as one of the organized forms of virtual exchange in an online course at our large American Midwestern university. We collaborated with a Japanese liberal arts institution in a semester-long collaboration, using COIL, in which we had students from both contexts conduct a joint project throughout the semester. In this class, we saw both the potential and challenges at the crossroads of online learning, and international education in pursuit of cultural exchange.

As more educators shared their COIL practice in different educational settings, these academic conversations seemed to focus more on learning outcomes and students' satisfaction rather than the cultural learning process in online classes itself (Vahed & Rodriguez, 2021). Given the necessity of understanding this distinctive online, intercultural learning process at a deeper level, we revisited Koehler and Colleagues (2013) work on the necessity of technological, pedagogical, and content knowledge (TPACK). This model in online learning has become a powerful tool for educators throughout and since COVID-19 (Hodges et al., 2010). TPACK has been long used as a way of ensuring that learning with technology preserves similar outcomes and balances attention to how we teach with what is taught (Swallow & Olofson, 2017). By applying the revisited TPACK model to our COIL experience, we offer new insights into the COIL process toward a more culturally equitable COIL practice.

In this qualitative study, we answer the question: What is the utility of a TPACK framework suitable for online cultural exchange, given evidence from a multi-level (undergraduate, graduate) COIL collaboration? Students' experiences in a transnational COIL collaboration, which we examined in this study, invite further conversation in the fields of adult education and international education about how online international collaboration can better center cultural exchange in instructional design. Backed by evidence from this online collaboration, we argue that while COIL conceptually aligns with TPACK, there is an ongoing need to imagine both COIL and TPACK forward and modify both to center cultural knowledge and cultural exchange. We do so by first reviewing recent literature on COIL and TPACK, then demonstrating both evidence of, and further opportunities for, cultural exchange in the COIL collaboration. We conclude with a roadmap for COIL that centers on cultural knowledge and exchange to contemplate the potential for a TPACCK framework that adds a dimension of cultural knowledge with implications for international online education.

Literature Review

COIL is a pedagogy by which postsecondary students from different contexts can learn together virtually through a set of common learning outcomes and assignments (Appiah-Kubi & Annan, 2020; SUNY COIL Center, 2018). As many postsecondary educators have adopted this pedagogy, COIL has been emphasized as an effective learning method to enhance language skills, critical thinking, and intercultural competence (Hackett et al., 2023). COIL can be used in multiple ways, with instructional collaborations emphasizing technology adaptation and intercultural collaboration.

TPACK is a framework for teacher knowledge for integration of technology into pedagogical content knowledge (PCK; Keeler, 2008; Koehler & Mishra, 2009). This framework consists of three components of teachers' knowledge—content, pedagogy, and technology—and emphasizes the interactions among these components. Pedagogical knowledge is teachers' knowledge of how to teach and learn, while pedagogical content knowledge means the knowledge of pedagogy applicable to specific content. Technology knowledge is similar to fluency in technology: knowledge necessary to apply technology efficiently to classrooms and daily lives. Technological content knowledge is to understand how technology and content influence one another. Technological pedagogical knowledge is how teaching and learning change when specific technologies are adopted (Koehler & Mishra, 2009). Although this model explains knowledge of content and pedagogy when technology is integrated into the teaching and learning process, it shows a limited understanding of contextual knowledge influencing learners and their learning process greatly in various classroom settings.

COIL, we argue, presents a site of analysis to discern the potential limits of TPACK and focus on cultural exchange. Dalal and colleagues (2021), in their study of international teachers and a cultural exchange program, found that TPACK's limited attention to relationships and contextual concerns (cultural identity versus teacher self-knowledge) yielded demonstrable growth in teachers' confidence using educational technology integration. Similarly, MacKinnon (2017), aligned with other literature on cultural exchange and TPACK (Benton-Borghi, 2013, 2016; Porrás-Hernández & Salinas-Amescua, 2013), argued that TPACK should continue to center contextual factors. COIL, in its explicitly international focus, helps to conceptually align with TPACK with its emphasis on technology to facilitate global learning and collaboration across contexts (Appiah-Kubi & Annan, 2020). COIL's epistemological groundings in transformative learning (Dirkx, 1998) foster outcomes for learners that demonstrate growth in their understandings of self and others. COIL, consequently, functions as a pedagogical and technological approach, from which the content and self-knowledge interplay within the learning experience by making the teachers' and students' self-knowledge central to facilitating a transformation from the collaboration (Tanhueco-Nepomuceno, 2019).

While COIL can be framed to be more student-facing, we align with Laal and Ghodsi's (2012) framing of collaborative learning as a joint effort with and by students and teachers. TPACK, similarly, can be seen to unite teachers and students in "how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology" (Koehler & Mishra, 2009, p. 66). COIL's explicit international focus is fundamentally grounded in how these differences and potential transformations in students' epistemologies are facilitated by technology (Appiah-Kubi & Annan, 2020). Instructors' pedagogical and content knowledge is therefore necessary for a successful COIL collaboration. While the technological media may differ, the need to facilitate movement between linguistic, cultural,

national, and educational contexts to align pedagogical parameters and learning outcomes is central to the student's learning within the collaboration as well.

Method

In our study, students in the joint COIL collaboration between an American Midwestern research university (MU) and a Japanese liberal arts college (LC) participated in the collaboration for 5 weeks. The COIL collaboration between MU and LC began with the meetings of instructors from both institutions, seven months before the start of the course. The courses COILed in this joint project were Teaching in Postsecondary Education, a remote master's level course at MU, and Innovation, Communication, and Change, a hybrid course at LC. When the COILed courses were designated, the instructors made small changes to their syllabi to include materials borrowed from the other courses.

After several scaffolds and initial measurements of students' senses of self and identities, the summative assessment of the COIL collaboration was a research paper assignment, which also served as a data source for this project. The assignment created was jointly crafted by instructors, asking students to conduct a pilot empirical study on a model of educational change in a postsecondary setting, or teaching approach. Students were assigned to five research teams and asked to create a brief "scholarly identity snapshot" by the end of week 3 of the 16-week course (MU) and by week 2 of the 10-week course (LC). They revised and expanded upon these narratives at the end of their respective courses which served as a further qualitative dataset for this collaboration. The intentionality behind this assignment was to gather qualitative data from students about their cultural and contextual situatedness as well as their self-knowledge of their socialization (Dirkx, 1998; Harro, 2000; Tatum, 2000).

Teams included at least one doctoral student to informally support the master's and undergraduate teammates with methodological work, and support students for whom this was their first time engaging in research. Teams communicated initially through a learning management software (LMS) and collaboration space designed for COIL collaborations and were asked to submit assignments and arrange meetings using this software. While some later communicated by other means, students were then assigned to create short asynchronous presentations to present their initial findings and generate feedback.

In this study, we collected and analyzed qualitative data collected in the form of semi-structured interviews with participants and their written works. We conducted semi-structured interviews in English with the participants after the 5-week COIL collaboration. Since the data collection needed to be completed by the end of the short program, we chose semi-structured interviews rather than in-depth forms. Four participants at MU (two master's and two doctoral students) and three participants at LC (one master's and two undergraduate students) shared their experiences. We recorded the virtual interviews and transcribed the recordings using pseudonyms for each participant (see Table 1 for more details). The first round of transcription was done algorithmically using Temi (<https://www.temi.com/>) and then checked by researchers for accuracy.

After completing the transcription, we engaged in exploratory open coding, which allowed us to approach the thematic fragments in the data systematically (Williams & Moser, 2019). With what we found from this initial exploration, we discussed the identified patterns in the data that may have been related to the conceptual framework we were developing (Suter, 2011). The analysis of the data was inductive in that we examined the data repetitively and applied the patterns identified to generate a new framework based on what we pre-developed. Through this iterative process of exploring the patterns and relationships among the constructs, we interpreted the meanings of participants' lived experiences of COIL from the perspective of the TPACK framework.

Table 1

Study Participants

Name (Interview #)	Institution	Program enrolled	Gender identity	Nationality
Elizabeth (#1)	MU	Master's	Woman	USA
Allie (#2)	MU	Master's	Woman	USA
Cassie (#3)	MU	Doctorate	Woman	USA
Jayson (#4)	MU	Doctorate	Man	China
Riku (#5)	LC	Undergraduate	Man	Japan
Minsu (#6)	LC	Master's	Man	S. Korea
Minato (#7)	LC	Undergraduate	Man	Japan

Note. All names are pseudonyms. MU = American Midwestern research university; LC = Japanese liberal arts college.

Findings

We discuss three strands of findings to explore the utility of the TPACK framework in this COIL collaboration: (a) students' perceptions of a lack of cultural exchange in the collaboration which suggests the *pedagogical* decentering of cultural exchange; (b) missed opportunities that participants identified which suggests the structural marginalization of cultural exchange; and (c) opportunities students did find for cultural exchange which indicates informal and unstructured opportunities for students to experience the sharing of cultural knowledge. These strands converge to show how informal opportunities for students to learn with and from each other happened in the cracks of the COIL collaboration design suggesting future pathways for COIL and TPACK. Each of our interviews will be referred to in this paper by the number assigned to them in Table 1 and appear in-text attributed by this number (e.g. #1).

Students' Perceptions of a Lack of Cultural Exchange

Students possess a variety of different goals and expectations when they decide to enroll in a specific course. Participants in the MU and LC COIL collaboration seemed to have certain levels of expectations for learning experiences enabling cultural exchange besides their course-oriented learning goals. COIL aims to encourage international and multicultural learning. From the interviews with participants, we realized that many students had prior knowledge of COIL and expected learning experiences to help them better understand different cultures. One participant, who was interested in experiencing COIL methods through this study, stated he expected “far more intercultural learning” from COIL including more cultural exchange and interactions among participants (#4).

As we noticed from what he and others said about his COIL experiences, COIL collaboration seemed to not fully meet students' expectations for cultural exchange. One participant from Japan expressed that he would have liked to have had more conversations on cultural and societal issues during his COIL collaboration with American students. He explained the gaps between what he expected and experienced in COIL by saying, “I expected some, something I speak to some about some, something about this current situation. Yeah. Emergency online, learning something like I suspected to know more about that” (#6). Another participant stated,

I was expecting more stuff like a cultural study, like understanding the Japanese culture and . . . higher education broader than their higher education system, governing structure more. I was expecting to learn more about the cultural aspect of Japan in their higher education. (#4)

This shows the participants' expectations for COIL in broadening their cultural understanding and limitations in accomplishing their expected goals.

Students recognized the limitations of COIL in achieving their goals for cultural exchange compared to their study abroad experiences. One participant who used to participate in study abroad programs explained the difference by saying,

...a study abroad is fully immersive, right? You get on a plane, and you go; and you're focused . . . Whereas COIL is not that immersive. I feel like at least this experience was a group project that almost just happened to have a person that is not from the US on it. (#1)

From her explanation of COIL, participants' experiences of cultural learning seemed more bounded than study abroad programs where they would encounter different cultures in an immersive environment. Participants thus perceived that COIL could not meet their expectations for cultural exchange. Most of these limitations in cultural exchange seemed to arise from the pedagogical design of the MU-LC COIL.

Missed Opportunities for Cultural Exchange

The COIL collaboration's foregrounding of transformative outcomes without centering cultural knowledge suggested we had to look elsewhere for evidence of structural, as opposed to perceptual, missed opportunities for cultural exchange. Participants reported that attention to the outcomes focus and a large-scale summative assessment rather than the pedagogical scaffolds suggest it was both students' perception and experiences with the pedagogical design that necessitated presenting both strands of findings. While

affective outcomes can be hard to measure qualitatively, we show in the section how participants were able to identify missed opportunities for cultural exchange because of the pedagogical design of the COIL collaboration which emphasized student technological and content knowledge as pedagogical knowledge to suggest the need to more explicitly center cultural knowledge in such international online collaborative experiences.

Five of the seven participants expressed some level of regret about their COIL experiences which is distinct from the disappointment we discussed above. Their specific critiques of the pedagogical and technological experiences help to locate the specific limitations of the collaboration. They show the outcome focus perhaps as a result of the confluence of the technological, pedagogical, and content knowledge, rather than the emphasis on the exchange. Several participants indicated how the COILed component of the courses felt “separate” (#1) and “task-oriented” (#3); both suggested how the structure of the collaboration and its integration into the courses was inimical to cultural exchange.

The participants’ team-building interactions and platform onboarding showed this tension between the technological needs of COIL and its cultural exchange capacity demonstrating the need for instructors’ pedagogical-cultural knowledge. Elizabeth, a social science doctoral student mentioned, for example, how “we were all super flexible with each other. I, we all were separated enough from the project that we didn’t get emotionally attached” (#1). This report shows the distance between the project and the students because of a lack of cultural exchange opportunities. For another, Cassie mentioned that “I professionally do this work, but I would have built in time to intentionally do intercultural exchange” (#3) which explains this detachment to imply that, in addition to the assignment, there was an untapped desire to do an explicit cultural exchange. These two examples, taken together, suggest how the group dynamics were supportive and there was a desire for cultural exchange, but that the pedagogical knowledge of facilitating a technologically complex collaboration infrastructure with epistemologically distant courses could not be allayed by the instructors’ pedagogical strengths.

Cassie, who works in student affairs, implies that the tasks intended in a COIL collaboration should protect time instead of creating constraints on the student groups’ time. Elizabeth built upon this point by stating that “I was also coming from a non-research background, [and] I was very, ‘if that sounds good to everyone else, then that sounds good to me too,’ because I’m not really sure where to go” (#2). Allie, a master’s student in student affairs, further exposes the technological knowledge heaviness of COIL that relied on simplified assumptions about the students participating in the collaboration. Doing so suggests a missed opportunity for cultural exchange insofar as the amount of labor needed to get to the high level of technological knowledge to engage in this collaboration synchronously across time zone contexts requires significant scaffolding by both sponsoring institutions. Further, as Elizabeth stated, “the COIL project more fit into a learning experience related to the research process, rather than the teaching” and, on top of her perception, that “this is a teaching class, but then there’s a COIL thing on top” (#1).

This dichotomization perception suggests she perceived even less room than other participants for cultural exchange because of the compartmentalization necessary to manage the competing deadlines in the course which suggests cultural knowledge gaps in the COIL frameworks. Without an explicit curricular carve-out for cultural exchange, participants’ perceptions of the course and the curricular space for cultural exchange opportunities, or lack thereof, could perhaps be explained structurally. Alternatively, this could also reflect

the operation of dominant identity markers, such as being associated with an American institutional context, that could revert to mistaking such dominant identity markers as “normal” and therefore less of a perceptible difference from normal coursework (Tatum, 2000). This matters because students in the Japanese context shared little that expressed missed opportunities for cultural exchange. While not all the participants from the Japanese institution were Japanese, the primary assumption as seen in the American institution’s syllabus was to give the students an overview of Japanese educational practices. The assumption of a simple bilateral American-Japanese collaboration implies that there was little expected attention to the potential for a multidimensional cultural exchange between students from non-American contexts who were in the U.S., or students from non-Japanese contexts in Japan.

For example, one student, Jayson, a doctoral student of education at MU, identifies as Chinese and has been educated in mainland China, Canada, and the US. He stated that, about his group mates, who included a Korean student who had studied in the US and an American studying at the Japanese institution,

In terms of intercultural learning, our group ... wrote something about ourselves, and a group member called to read and discuss. But other than self-reflection, we didn’t do any intercultural learning from each other. ... [One student is] South Korean studying in Japan and he studied in the US before anyway, was the most quiet one. And I see that for two reasons. First, English is still quite challenging for him. And I’m an English second language learner. So I’ve been there, done that. And I really feel the institutional hierarchy from Japan because our Japanese colleague is a master’s student. And I feel, I’m guessing that he felt, he’s less knowledgeable in terms of offering ideas. (#4)

Jayson suggests, first, the institutional potential power dynamic that the COIL collaboration created between the American and Japanese institutions based on national context. Second, a power dynamic was at play between students in terms of academic rank, with the undergraduates and master’s students being perceived as less knowledgeable than the doctoral students. As well, with the normalization of English-medium communication, the collaboration structurally privileged those from non-US and Japanese contexts who had more exposure or experience in English-medium settings. However, Jayson’s comment reflects the tenuousness of a simple bilateral assumption in the COIL collaboration suggesting a structural missed opportunity within the COIL collaboration for cultural exchange. This also suggests the need for more nuanced cultural knowledge to feature more prominently in the design of the collaboration which theoretically aligns with the TPACK framework, as we discussed above. The simplicity of the assumed relationship between the two institutional contexts, in addition to the tacit assumptions that the student observed above, foregrounds the development of joint research skills. This was an example of how our pedagogical knowledge of our students was incomprehensive in course development.

Evidence of Cultural Exchange

Although students in this program explained their limited opportunities for intercultural learning coming from the research-oriented COIL project, intercultural communication among participants happened marginally during the COIL experiences. We noticed evidence of cultural exchange in experiences of those students who had a certain level of knowledge on intercultural learning from previous lived experiences. Among the interview participants, two students, one from MU and the other from LC, articulated their intercultural exchange during their COIL experiences.

Jayson, whom we quoted previously in this paper, seemed to arrive at a profound understanding of cultural differences from the interactions among students from MU and LC based on his prior experiences of various cultures. He explained the somewhat limited engagement of the LC participants in the group conversations, reflecting the different learning styles he observed from his global educational experiences.

I've been studying in North America for almost eight years. So, I feel more comfortable doing that, but our American colleagues [are] very vocal, not necessarily more eloquent than, you know, the Japanese colleagues because English is their first language. (#4)

He also shared a story of how he gained intercultural insights from his interactions with a Korean colleague. He stated the distinctive concern of this colleague.

Being South Korean, living in Japan is not an easy decision because of the historical conflict between South Korea and Japan, I heard about it. I'd heard about the, you know, some Japanese and Koreans don't get along. He said it's not an easy decision. (#4)

He paid attention to his Korean teammate's cultural concern about studying in a country conflicting with his home country for he already had knowledge of the historical conflicts.

The evidence of cultural exchange was most salient in the interview with one participant, named Riku, from LC. This Japanese student, who used to live and spent a year as a high school exchange student in the US, seemed to have more extensive intercultural experiences during the COIL project than other participants. Riku's intercultural exchange largely started from communicating his prior experiences in the US with MU participants who shared similar lived experiences. He explained his successful interactions with American students through these shared experiences.

I didn't know that I had, [but] I lived really near to X [Student Name]. Ah, right. He lived in Madison. I was in Heartland, which is really close, like an hour's drive in Wisconsin. So those small discoveries were a positive point. (#5)

He shared his experience talking about the Japanese prime minister with the same colleague in the group. He seemed to enjoy this type of small talk with American participants and gain more expanded intercultural perspectives from these experiences.

Riku's intercultural experience in the COIL was more extensive compared to other participants. We noticed that not many students in the interviews, either American students at MU or Japanese/Korean students at LC, discussed their intercultural exchange experience to this extent. From what he said about his goals for this course, we thought that his cultural experience was possible because his COIL activities aligned well with what he wanted to accomplish, enhanced by his prior knowledge of different cultures. He explained the reason he took the course.

The course. Like I said, because I wanted to kind of apply for the exchange program. I want it to have English or at least some kind of multicultural communication in my classes. So the COIL project really helped on that one. (#5)

The COIL project allowed him to have opportunities to communicate in English in classes to prepare for his participation in study abroad programs in the coming semesters. For English learners who are in non-English speaking countries, important learning goals might include learning and practicing English with foreign colleagues and having a meaningful intercultural experience. When his goal to practice English was combined with his prior intercultural knowledge and English language proficiency, the levels of intercultural exchange seemed to be more elevated through this short five-week collaboration.

These two participants exemplify how students' intercultural experiences would differ based on their cultural knowledge and learning goals. Compared to other colleagues in the COIL project, these two students reported gaining a more extensive intercultural experience. This highlights the importance of understanding learners' cultural aspects in designing and implementing COIL. Considering the intercultural learning goal of COIL, this cultural knowledge seemed to be as important as other pedagogical, content, and technological knowledge teachers should have addressed in the TPACK framework. Rather, other aspects of higher education suggest several ways in which cultural knowledge within the TPACK framework can fortify the COIL approach to international online collaboration that can mitigate the high technological and content knowledge barriers to entry for a pedagogical-methodological approach that intends to be an alternate to study abroad. In this section, we have shown that there was space within the COIL collaboration for cultural exchange, but not necessarily space structurally created in the instructional design. Furthermore, findings suggest that students perceived our design to be disappointing for its lack of structured opportunities for cultural exchange, despite instructors' attempts to center pedagogical, content, and technological knowledge in the collaboration. Next, we argue for the utility of a TPACCK (TPACK that adds a dimension of cultural knowledge) framework and how COIL can be more culturally sustaining if aligned thereto.

Discussion

Thus far, we have shown evidence of students' cultural exchange despite the structural and curricular limitations of the COIL collaboration and the missed opportunities associated with their perceptions of a lack of cultural exchange in the COIL collaboration as a result of both pedagogical and technological limitations described in the interviews. While the interviews exposed the definitional limits of what students understand cultural exchange to be, we also found that this shows the conceptual limits of TPACK as a guiding but also an analytical framework for assessing COIL. Next, we discuss the implications of these findings and argue that they present an opportunity to showcase how COIL aligns with the TPACK framework of online teaching and learning. However, there remain opportunities for a more culturally sustaining TPACK, which we argue can be achieved by centering cultural (exchange) knowledge in TPACK, which we are calling TPACCK. While COIL does not purport to extend or even apply TPACK as a framework (Appiah-Kubi & Annan, 2020; SUNY COIL Center, 2018), we have shown its theoretical alignment, as well as the students' perception that this was a cultural exchange opportunity. We nuance and clarify how COIL purports to be a global learning experience. By doing so, we make a twofold argument: (a) for a TPACK framework that also centers cultural knowledge, which we call TPACCK, and (b) the potential for a more cultural knowledge and exchange centering COIL.

Towards a TPACCK Framework

In the COIL experience, students showed a hesitancy to equate their experience to cultural exchange or study abroad, evident in how they exposed a narrow concept of what cultural exchange is (as opposed to learning about another [educational] context). While we do not argue in this paper that COIL is a methodological panacea for students to gain universal access to cultural exchange opportunities, participants did show the limits we, as instructor-researchers, exhibited as we tried to disrupt in our framing of cultural exchange, informed by TPACK. In the case of the Japanese institution, students were more often themselves amidst a global learning experience or were undergraduates. While they reported that the COIL experience was an opportunity for international cultural exchange, there was some hesitancy due to how the pedagogical and technical knowledge were foregrounded in the collaboration, rather than the cultural or content knowledge (Koehler et al., 2013). The students' disappointments or identified missed opportunities for cultural exchange suggested that deliberate attention needs to be paid to both instructors' and students' cultural knowledge. Paris and Alim (2014) and Carter Andrews (2021), in teacher education, argue for cultural knowledge to be more multidimensional and not merely reliant upon food and festivals. Based on our findings, centering cultural knowledge also suggests a need to center cultural knowledge in the pedagogical design.

Specifically, the difference we see in the data between the COIL collaboration being simply bad pedagogical design and evidence of a need for a more comprehensive TPACCK framework is in students' reflections about the aims of the course content. For example, we showed above how Elizabeth (#1) perceived the relationship between the COIL component of the course and the existing course content as being laid on top of one another. The SUNY COIL Center (2018) instructs COIL collaborators not to closely integrate course content materials into the COIL collaboration component. However, students' experiences of seeing the COIL component as separate from the course content, which Cassie (#2) noted had a significant technological learning curve, leaves the cultural exchange scaffolds to the discretion of the instructors, and developers' assumptions. For example, the LMS platform used in the COIL collaboration was English medium, and there were other popular apps such as LINE in non-US contexts. However, requiring students to use the COIL-affiliated LMS suggests the US-centric assumptions of the collaboration that prioritized a "neutral" LMS and thus shows how COIL can attend to the technological, content, and pedagogical knowledge without centering the cultural aspects in a COIL collaboration. Alternatively, given that neither institution has universally Japanese or American students, participants' identified concerns about their COIL experience suggest that this is less a fault of the instructional design but an opportunity to make visible how attending to pedagogical, content, and technological aspects alone can be limiting, especially on the assumption that content is cultural. As a result, our findings suggest that imagining a more culture-centered COIL is a framing issue and that pedagogical scaffolds could offer students space to deliberate about how and to what extent cultural knowledge is embedded within our technological-pedagogical teaching as much as the content that instructors cover.

As a result, nuancing TPACK further to include the extra "C" can instead create intentional space in instructional design to lessen the burden on the pedagogical and content knowledge domains to account for cultural learning. As well, doing so would have prevented students from having to learn another LMS as part of the instructional design. While explicit space for cultural knowledge and exchange in the instructional design would not have necessarily prevented some of the instructors' assumptions about the

need to learn about the Japanese educational system, the pedagogical design would not have fully accounted for the largeness of the COILed assignment that did account for all aspects of the TPACK framework.

A TPACCK framework, while providing a potentially useful framework through which to assess cultural knowledge relative to technological and pedagogical content knowledge, offers possibilities for further study of COIL, and improving future collaborations. This COIL collaboration studied in this paper would have benefited significantly, as participants indicated, from a more nuanced cultural exposition less reliant upon a binary and nation-state-centric construction of the collaborating institution. This framework, beyond the scope of this single collaboration, also has implications for other forms of online learning, and other COIL collaborations, in which even more social context is lost between collaborating partners (such as the absence of required synchronous work). As well, in addressing these gaps, despite COIL's clear alignment with the TPACK framework, instructors with limited curricular space or narrow expertise can also struggle, without explicit cultural knowledge preparation, to avoid making assumptions about the collaboration partner institution's national or sociocultural context. Next, we offer a discussion on how the data in this study can be used to create a more culturally centering COIL.

The Potential for a More Culturally-Centering COIL

Our central contentions in this study are twofold: (a) to show COIL's connections to TPACK with the hope of showing how TPACK can better center cultural knowledge and exchange, and (b) to analyze COIL to propose a more culturally centered COIL. In this section, we discuss how the TPACCK framework and the findings we outlined above can suggest potential futures for a more culturally-centering COIL. While COIL, we have shown, is both theoretically and empirically aligned with TPACK, we suggest potential areas of growth for both models.

While COIL's inherent structure necessarily brings together pedagogical, content, and technological knowledge, we also understand how transnational collaboration can be necessarily predicated upon assumptions about the other institution. However, that relationship building is often left to instructors who have to negotiate those relationships based on partial or nascent cultural knowledge. While both of us as authors have ample experience in East Asian higher education contexts, it is by no means a guarantee that instructors will be sufficiently open to learning from and with the partner institution.

Creating a more cultural-knowledge-centering COIL using the TPACCK framework facilitates collaboration that departs from essentialized cultural knowledge. Instead, co-creating knowledge with the partner institutions as a scaffold of the collaboration can benefit and offset opportunities for essentialism in the cultural exchange components of COIL. For example, participants in this study identified wanting more opportunities to get to know one another rather than on the assignment and structured opportunities for both instructors and students to engage with each other in more culturally sustaining technological environments (such as the LMS). It is important to be student-centered and pair with their consciously noticed, self-assessed shifts in their cultural knowledge rather than having that "told to" by a "neutral" instrument.

Centering cultural knowledge can also lead to more nuanced content-knowledge alignment between the two courses in the COIL collaboration. For example, in this collaboration, the Japanese institution borrowed readings from the American course's syllabus, but the American course added readings about Japanese higher education. While COIL's guidance to instructors is not to create joint courses, the multiple entry points embodied in both content and cultural knowledge should be centered. Interviews show that these distinct entry points manifested in both content and the amount of work students had to do to get to a common understanding within the collaboration components.

Instead, centering cultural knowledge as interconnected to content, pedagogy, and technology can yield different outcomes. Centering cultural knowledge in content suggests the curricular conversation described above, while cultural knowledge centered in technology identified in the findings above can bring the LMS into closer alignment with user needs and lower linguistic barriers implied in the COIL design. Also, the joint teaching component can more closely center a variety of intervention strategies that are more efficacious in contexts presumed to be non-homogenous (Shahjahan & Kezar, 2013). This will ultimately coalesce around a COIL framework that centers collaboration grounded in mutual understanding, rather than the supposedly neutral principle of collaboration. While many COIL studies are neither inherently nor intended to be cultural exchange opportunities, facilitating intellectual dialogue across contexts can also disrupt the presumed monopoly of intellectual legitimacy and privilege that Western contexts have. Critically interrogating the structural reinforcements for this implicit ideology allays some of COIL's potentially problematic pedagogical implications, which still conceptually align with the TPACK framework. Additionally, a TPACCK framework can serve to model for instructors how to create these high-impact moments of collaboration that draw more on precedent in established literature on project-based learning, rather than virtual exchange. Seeing all four knowledges (technological, pedagogical, content, and cultural) as equal in supporting student learning, therefore, can support a more centering cultural exchange in COIL that integrates the expertise that instructors bring to their courses.

Conclusion

In this paper, we have shown the perceived and structural missed opportunities in an American-Japanese COIL collaboration. We have shown how the collaboration between our two institutions exemplified the TPACK framework in that COIL's commitments largely align with the need to interconnect technological, pedagogical, and content knowledge in an online learning space. However, despite this alignment, there was ample (structured and unstructured) space needed for further and deeper cultural exchange between students in each class, and a need to recognize the assumed national homogeneity of both contexts, which was not the case. As a result, we have used these findings to argue for a more culturally-centering form of COIL, and an expansion of the TPACK framework to create conceptual space for cultural exchange, especially if COIL is positioned to be an alternative to study abroad.

Reflecting on this experience, we see how many considerations there are to create sustainable relationships and substantive opportunities for students to learn with others in different contexts. Despite the additional complications of online learning across time zones, languages, institutional contexts, and courses, this study affirms the need to center the sharing of cultural knowledge in postsecondary international online learning,

even when courses do not explicitly call for it. In many ways, we were lucky to have students who represented a multiplicity of national, racial, and cultural experiences and who, in their research areas, centered cultural knowledge, but to create a more generalizable set of outcomes, further study is needed to support educators who are well-intended in their desire to promote greater international learning. That said, as we have shown in this paper, there remains ample potential for COIL to be a culturally sustaining and cultural knowledge-advancing pedagogical intervention in a postsecondary educational environment equipped with seeing the long-term benefits of online collaborative learning.

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