Disruptive Technologies and Peer-learning for Dialogue and Reflection

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DOI: https://doi.org/10.54337/ecrpl25-10932

Abstract

This paper presents a study of reflection in online, intercultural dialogues between teacher students from The United States of America and Denmark. The study is based on a Collaborative Online International Learning (COIL) exchange between the teacher education programs at University at Albany, SUNY, USA, and University College of Northern Denmark, Aalborg. The COIL project aimed to provide students with cross-cultural perspectives on teaching while fostering reflection about how cultural factors shape educational systems and practice. COIL allows for increased opportunity for the intercultural exchange of ideas without the difficulties of traditional physical exchange. However, it can also potentially decrease experiences of "human" interaction and reflection. Thus, this study explores how online exchange can be structured to create optimal opportunities for peer-learning and reflection. The study's data is produced through a mixed survey, excerpts from student reflections, comments on the online platform Microsoft Teams, and student interviews. The interviews and the specific student's reflection assignments formulate three cases that illustrate different approaches to participation in online dialogue and subsequent routes to reflection. The methods of case study and informed grounded theory investigate how the differences between asynchronous and synchronous multimodal exchange impact the students' experiences of the selected affordances of an online platform as disruptive or non-disruptive, and how this influences their intercultural dialogue and level of reflection. The conclusions from the analysis suggest recommendations for additional scaffolding of online exchanges in future practice as well as themes for further research.

Key words
Dialogue, Reflection, Online Exchange, Intercultural Learning, Peer-learning, Affordances, Synchronous/Asynchronous, Disruptive Technologies, COIL, Intercultural Dialogue

Introduction

The context of this study was a Collaborative Online International Learning (COIL) project in which students from University at Albany, SUNY, USA, and University College of Northern Denmark (UCN), Aalborg collaborated to explore the respective educational systems and the local views of the purpose of education in the two student communities. The intention was to foster reflection in action and to catalyze and scaffold local, personal and insightful dialogues within peer-teams. The concept of COIL developed from the emergence of general online communication opportunities in learning management systems (Naicker et al., 2022), and a wide adoption of online communication in the everyday life of students. These technologies provided opportunities to bridge physical distances by connecting multimodally across geographical boundaries. These technologies have been utilized in distance and e-learning for more than two decades (Lee & McLoughlin, 2007) and the pedagogies for teaching through online platforms have been developed to include dialogic and reflective practices (Kjærgaard & Wahl, 2015; Sorensen & Kjærgaard, 2016; Zakaria et al., 2023). This COIL project utilized the past decades' refinement of distance and e-learning, which provided a well-known set of affordances for communicating that were already nested in the learning platforms. However, this particular way of engaging in educational dialogue to foster reflection was new to the majority of the participants. Investigating this disruption to the default approach to educational dialogue was therefore deemed relevant and necessary to determine how such an approach can influence learning. Thus, this study investigated the extent to which the interposition of TEAMs as a framing, delineating and limiting technology influenced opportunities for intercultural dialogue and reflection through the following research question:

How do the affordances of disruptive technologies influence reflection and intercultural dialogue in peer-learning-groups in an online intercultural exchange?

Context

The theme of the COIL project was 'Dialogues in Education'. The students were organized into 17 peer-teams (one group of SUNY students and one group of UCN students in each peer-team) that collaborated through their assigned channel in Microsoft Teams (TEAMS). The channels were open to all participants (students and lecturers).
The students completed various tasks throughout 4 stages of the project over a period of 6 weeks. For the first stage, students produced a short introductory video which provided background on their educational context. The videos were shared and viewed in the peer-team channel. In stage two, the students engaged in dialogue regarding the similarities and differences and underlying values of their respective educational systems. This dialogue took place through an asynchronous exchange via the TEAMS discussion board or a synchronous videoconference on TEAMS. The peer-team then wrote a brief collaborative summary of their findings. Finally, in stage four, the students individually reflected on their experience and learning through a written or video reflection. Throughout the project, the students also reflected on the process with their "home" classes and lecturers.

Theory and Definitions

This section introduces and defines the central terms and concepts used in the analyses.

Affordance

The notion of affordance describes both the objective potential of a technology (specifications and features) (Gibson, 1977) and the subjective potential of a user's exploitation of the technology (Gaver, 1991). It raises questions regarding what functionality the technology offers, which functions can actually be used in a specific context, and who or what can scaffold the user's benefit from using the technology in a specific context (Conole & Dyke, 2004; Evans et al., 2017).

Technology and Disruption

In this study, technology is understood as "the application of conceptual knowledge to achieve practical goals, especially in a reproducible way" (Skolnikoff, 1994) Additionally, languages are recognized as partially natural and partially technological, whereby dialogical and reflective skills can be developed and improved through focused techniques. Thus, the COIL project may have disrupted the general understanding of language in a monocultural context through utilizing technology to develop methods of communication across languages and cultural contexts.

"Disruptive technology" is a business term used to describe a set of circumstances, "where technologies improve a product or service in ways that the market does not expect" (Christensen et al., 2015). The technological affordances of COIL disrupt the concepts of "'international exchange" in an educational setting by improving the possibilities for virtual, rather than physical, exchange.

Dialogue

Dialogue is understood as "thinking together through language" (Kjærgaard & Georgsen, 2021; Mercer et al., 2019). It is a refined type of purposeful conversation in which learning, respect and understanding are key, and is therefore categorized as educational dialogue (Tartas, V., Baucal, A., & Anne-Nelly, P. (2010) Studies of educational dialogues (Kjærgaard, 2016; Kjærgaard & Georgsen, 2021; Kjærgaard & Andersen, 2023; Sorensen & Kjærgaard, 2016), show that this type of dialogue spirals upwards toward deliberation through a state of flow that entails less focus on turn-taking protocol and more focus on learning.

Intercultural Dialogue

Intercultural dialogue is understood as a transformative form of communication in which the participants engage in dialogue in order to learn and share perspectives, wherein the term intercultural refers to two or more peoples, nationalities, age groups, sub-cultures, ethnicities etc. who meet in an activity of shared interest (Elias & Mansouri, 2020). The perspective awareness developed through this type of intercultural dialogue leads to the development of multiperspectivity: a state in which individuals are able to decenter, see viewpoints, context, and situations from different angles, and thereby increase cultural learning. (Huber, 2012, chap. 1)

Reflection

Reflection is understood as analytical and critical thinking: "the process of critically assessing the content, process, or premise(s) of our efforts to interpret and give meaning to an experience" (Mezirow, 1991 p. 104). Additionally, reflection is viewed as the ordering of thinking in a consecutive sequence that forms a chain, wherein each thought builds upon previous thoughts in order to develop the following thought (Dewey, 1933, p. 3). The COIL project was designed to foster this type of critical reflection: thinking that required participants to listen and analyze utterances from others, critically assess the content of the utterance in relation to the learning gained from the dialogue, and to use that assessment to give rise to new and or/deeper questions (Dewey, 1933).

Data and Method

This study investigated the outcome of the COIL project through the description of three cases that emerged from the data, followed by an analysis of the cases and other data sources in relation to the research question using an informed grounded theory approach. The data supporting this study can be accounted for as follows:

Table 1: Overview of the primary data of the study

	Data type	Population	Institution
Quantitative	Observation: dialogues/videos in TEAMS	N=17	Peer-teams
	Reflection papers/videos	N=61	UCN: N=27 SUNY: N=34
	Interviews with students	N=6	UCN: N=4 SUNY: N=2
	Open-ended answers in the survey	N=61	UCN: N=27 SUNY: N=34
Qualitative	Close-ended answers in the survey	N=61	UCN: N=27 SUNY: N=34

The initial data source was the observations of the peer-team channels and the student reflection papers, which provided insight into all the stu-

dents' experiences in real-time, while also identifying levels of student engagement with the online technologies, participation in intercultural dialogue, and evidence of their level of reflection based on their questions and comments.

Six student interviews were conducted on a voluntary basis and selected using intentional sampling based on the existing data to create a representative sample of the different levels of engagement with the themes of the research question. Three interviews were subsequently selected to provide the basis for the three case studies. The interview data for each case was supplemented by the respective student's contributions in TEAMS as well as the final reflection paper/video. The case descriptions were formulated to express a particular experience with the COIL dependent on whether the case was exemplary or extreme (Flyvbjerg, 2006; Yazan, 2015; Yin, 2018; Zakaria et al., 2023). One of the cases was an extreme case because the student had read and watched all videos, posts, and comments in all 17 peer-team channels. The other two cases were exemplary cases since they exemplified two different experiences with the COIL based on whether the peer-team communicated asynchronously or synchronously. Hence, the cases were formulated with the research question in mind and aimed to present a selection of students' in-depth experience with the COIL, with focus on the themes of disruptive technologies, reflection, and intercultural dialogue.

The survey provided insight into the demographics of the population, which consisted of mainly 20–24-year-olds (66%), with a slightly higher representation of female students (56%). However, the survey's main contribution was to provide background for answering the research question and to supplement the observations, interviews and other data with a wider insight into the participants' experience with the COIL project.

The data from the cases was synthesized with the outstanding data from the survey and other interviews, as well as the remaining students' reflection papers/videos and contributions in TEAMS to provide a wider representation of the extended student population's experiences with the COIL. This synthesis used an informed grounded theory approach to continually integrate each new data set with the existing data, theoretical stances and emerging analytical viewpoints to allow for the emergence of an answer to the research question (Thornberg, 2012). The analysis reflected the three different levels of engagement that had been found through the intentional sampling process for the interviews and provid-

ed an opportunity to combine the qualitative and quantitative data to answer the research question and present topics for further research.

Case-studies

Case Description 1: Sofie's Asynchronous Exchange

Sofie is a 21-year-old student enrolled in the Teacher Education bachelor program at UCN. She is in her 3rd year of a 4-year program and is specializing in math, English, and home economics. Sofie described her overall experience with the COIL as positive but felt that the asynchronous format of the exchange resulted in the dialogue being somewhat broad and superficial. She characterized the asynchronous discussion boards as being less of a group dialogue between all members, and more of a "question and answer" structure, wherein one member would post a question, one or two others would answer, and then they would move on to a new question and repeat the process. Sofie felt that this format led to a wide discussion of many topics, but on a superficial level rather than delving into all potential aspects of each topic.

Sofie hypothesized that a synchronous video call may have allowed for more in-depth conversation on fewer topics, wherein all team members could have shared their perspectives and asked follow-up questions. She states, "I think then […] everybody would say *their* perspective on the topic, instead of two people talking and then another one making a thread and posting. And if we're all talking, we wouldn't just change the subject because that would be rude."

Since her peer-team was unable to participate in a video call, Sofie credited the introductory videos as essential in "humanizing" the COIL exchange. She stated, "we [were] just looking forward to see each other, so I think that it was great also that we got to see each other and who we are and like get a closer relation in some way by seeing each other's face." The weight that Sofie placed on the introductory videos was due to the importance of being able to read body language and have a "face to face" interaction through visual media, which facilitated a connection that could not be created through written text alone.

Overall, Sofie found that even the "superficial" interactions in TEAMs ultimately provided a foundation for deeper reflection when sharing the experience with her Danish peers post-COIL. She stated, "It was also nice that we had some activities after the COIL project about what we

have talked about and experienced, because [...] it was also really interesting to hear about what was the most important thing that somebody else explored. [...] And a lot of us had this deeper reflection afterwards, I think." For Sofie, more structured face-to-face dialogue provided the space and time for deeper reflection.

One of Sofie's most impactful realizations was an understanding of the need to move beyond an initial thought of "that's weird," and understand the cultural and systematic elements that underpin an observation. Sofie hypothesized that the reason for these deeper reflections was that engaging in dialogue with other members of her class at UCN meant that "I would get to think more about it because I would have to explain it to somebody else," as well as adding additional input and different perspectives that she may not have considered had her "normal" thought patterns not been disrupted by participation in the COIL.

Case Description 2: Paige's Synchronous Exchange

Paige is a 24-year-old student enrolled in a SUNY graduate teacher education program. She holds an undergraduate degree in political science and is studying to be a secondary school social studies teacher.

She characterized her COIL experience as "eye-opening," emphasizing that it prompted her to rethink her understanding of American education policy and to question some aspects of that system, which she described as "competitive" and a reflection of Capitalism. Through this project, she felt connected to her Danish peers, who shared her passionate commitment to education and who helped her see her own education system with "fresh" eyes. She gained new insights into what she describes as the "regionality" of American schools in contrast to the "uniformality" of Danish schools, and she reconsidered the curriculum in American schools, which she now believes is disconnected from the concerns of parents, in contrast to the more significant role of parents in Danish schools. Ultimately, she said, "I was fascinated, in a bad way, by how much I learned about the American system—to feel how segregated our system is, by both race and also socio-economic status." But the project also reinforced her belief in teaching. She learned, she said, that "all teachers, really, have very similar goals, . . . and that's something special."

For Paige, the impact of this experience arose from the use of video technologies, including the introductory videos and the video conferencing software that her peer-team used for a two-hour synchronous

meeting. Although the introductory videos were asynchronous, they lent an intimacy to the interactions that was reinforced by the synchronous video conferencing: "We were all in each other's living rooms, […] and that was really special." The video meeting with her Danish peers "made me feel like I knew them personally" in a way that the asynchronous discussion board did not. Interestingly, for her required reflective essay, Paige chose to submit a video rather than a written text, which perhaps indicated that she had embraced the affordances of video technology.

The key to the reflection and rethinking that Paige demonstrated seems to be the opportunity to work closely with pre-professional peers from a different national context who shared a fundamental belief in education as a public good. The basic structure of the COIL prompted students from both countries to learn about key aspects of their own education system in comparison with the other system. The intimacy and immediacy of the video technologies enabled the students to engage in in-depth shared inquiry to explore differences in the Danish and American education systems and illuminated the similarities in the sense of purpose that these teachers-in-training embraced. The technologies were disruptive in a way that provoked reflection, but at the same time they allowed for a reassuring familiarity among the students.

Case Description 3: Eric the Extremist's Open-access Exchange

Eric is a 21-year-old student enrolled in the Teacher Education bachelor program at UCN. He is in his 4th semester and studying the subjects English, STEM and PE. He was generally positive towards doing international collaborations such as COIL-projects, and he stated that he has learned a lot from taking part in COIL-projects. This was his third international collaboration at UCN, and he said it was by far the most constructive COIL he has experienced.

He is defined as an 'extreme case' (Flyvbjerg, 2006; Yin, 2018) in the empirical data since he had watched and read most, if not all, comments and videos in the various TEAMS channels. He explained that discussion boards and threaded communication in general were very familiar to him and that he participated in other fora online in relation to his interests. He particularly appreciated the combination of introductory videos and accompanying written discussion in the COIL design. As he explained, the multimodality of the communication in his own peer-group channel gave him a more 'full' understanding of the person "at the

other end." Furthermore, this motivated him to search for other interesting conversations in the other channels. He said that he didn't anticipate specific input or points of view, rather, he let serendipity guide the way. This opened a "networked understanding" of the whole COIL project (Dohn; Kjærgaard, Rasmussen, & Hachmann, 2022). Instead of just focusing on completing the tasks in his own peer-group, he formed an understanding of relations and exchanges in the entire population of the project, which gave him a more detailed view on the cultural differences among the participants. While reading laterally across the channels, he narrowed down his reading strategy from open and serendipitous, to focusing on specific people, and finally into more detailed dialogues. He started searching for the theme of "the purpose of education" as it emerged in the discussions and found 4–5 students in the other channels, who he started following. He deemed these 4–5 key participants interesting because they shared deeper thoughts and raised more precise question than the generic "what is it like to attend university in the US, I bet it is expensive?" In addition to reading their conversations, he also looked them up on social media in order to gain a more in-depth understanding of them as people – not just students.

He utilized his extensive, prior experiences with online communication (gaming etc.) to exploit the possibilities for learning and engaging in a new network. The open learning approach led him to think of the COIL project as a community and not just as a "school assignment." He represented an extreme case of the objective affordance of the COIL (Gibson, 1977), which exemplified what the technology and the techniques utilized may facilitate when exploited to their full extent.

He was very active in his own peer-team, producing videos and opening posts and commenting on other students' posts. However, in the other channels he just 'lurked'. He said that the possibility of lurking in the other channels scaffolded his participation and further motivated him to participate in his own peer-team. To him, the open structure of the platform that allowed every student to read, post and comment in all peer-team channels was a key affordance of the technology. However, this was dependent on the active participation of the people in these channels.

Throughout this process of open learning, Eric gained insights into very different approaches to education. He encountered his own preconceived, covert and tacit belief that the purpose of education is to educate the individual for the general good of the community and to foster de-

mocracy and relevant competencies to create democratic, knowledgeable citizens. This belief was arguably very Scandinavian. However, it was countered by the US students' view that education should foster an independent and competitive individual and, furthermore, that a competitive, individualized system motivates and inspires citizens. This insight led him to reflect on preconceptions about education and the socialist/liberalist dichotomy.

Eric's case illustrated the transformative potential of online interactions in educational contexts. His engagement with multimodal communication and networked understanding, coupled with reflection on educational beliefs and active participation, showcased how technology can enhance learning experiences. By leveraging his prior experience and viewing the COIL project as a community, Eric maximized the affordances of the platform, providing valuable insights into effective online learning strategies.

Analysis of Case Studies and Additional Data

The analysis was conducted using an informed grounded theory approach (Thornberg, 2012), whereby the initial observation of student participation in the TEAMS channels led to intentionally sampled interviews and the construction of three cases. The construction of the three cases was based on the themes of the research question and therefore focused on how each student experienced the disruptive technologies, reflection, and intercultural dialogue. Three different, yet exemplary experiences emerged in the construction of the cases, and a subsequent synthesis of the outstanding data reinforced these observations.

Analysis of Disruptive Technologies

Three themes related to disruptive technologies emerged from the data and revealed differing experiences regarding how the students perceived the affordances of the technologies as disruptive in relation to language, the communicative situation, and asynchronous/synchronous communication.

The data indicated that the students generally did not regard the technologies utilized in this COIL as 'disruptive' in regard to language and literacy. They were familiar with the affordances of TEAMS and many of them expressed that they were used to even more advanced affordances

in other technologies. In Eric's case, he talked about how students use Snap-maps, which show his networks' immediate position in the world, and he explained how Reddit's upvote/downvote function and TL;DR acronyms affect the reading and writing processes online. Since these simple functions of Reddit are more disruptive to well-known literacies than those found in TEAMS, it follows that the students didn't regard the technologies used in the COIL as disruptive to their understanding of literacy and language.

However, the students did report experiencing a disruption related to the communicative situation. The students reacted negatively to the displacement in time between posting a comment and receiving a response in TEAMS. They were used to immediate and multimodal responses when they normally communicate, but they seemed to lack this quick relay between post/response in the COIL's discussion boards. The data shows that when communicating online in their private lives, the students generally regarded a delayed response as a sign of disregard or even unfriendliness. This was also reflected in Sofie's interpretation of the "rudeness" of continuing to ask questions on a discussion post when the group had moved on. However, even though the students were aware of the educational nature of the communication and the 6-hour time zone difference, they still seemed to attempt to replicate the immediacy of the communication that they normally engage in with peers. In the survey, one student stated, "We used a video call on TEAMS. This allowed us to ask any questions we wanted without waiting hours for a response because of time differences." This was contrasted by another student's response that "We really only used text, but I wished we had gotten to do a synchronous video call. I think that would have given us much more to discuss than the very infrequent responses over text."

As seen in Sofie's case, what really created a disruption for the students was that the asynchronous posts in the peer-team channels often hindered a sense of dialogue. As previously stated, dialogue is regarded as 'thinking together through language' (Kjærgaard & Georgsen, 2021; Mercer et al., 2019). An advanced level of dialogue was necessary for deliberating on a shared level of intercultural awareness in the COIL project. In prior studies of educational dialogues (Kjærgaard, 2016; Kjærgaard & Georgsen, 2021; Kjærgaard & Andersen, 2023; Sorensen & Kjærgaard, 2016), it is shown that this type of dialogue requires a reflex, relay immediacy in the responses. In the data, the students express

that they experienced a flow (Kjærgaard & Andersen, 2023) when they were able to build on each other's utterances in real time. That sense of flow was lost when the communication relied on time-shifted written responses posted at an unknow time in the future and resulted in, what Sofie referred to as, "rapid-fire" superficial questions. As one American student stated,

> *"while the project was beneficial, the format of it was hard and I didn't love the video and message-sending activities. No one seemed super inspired to be asynchronously sending out messages and then responding to each other later because that just created a situation like when you get lots of emails and drown in having to respond to them all. [...] Making videos and sending messages out overwhelmed me and took a lot of the fun out of learning. I would have much preferred a real small group discussion, which I think could have both taught me a lot more and made the learning more fun and memorable."*

The solution suggested by this student did indeed make a difference in Paige's case. Her team solved the time-shift issue by arranging synchronous videoconferences, which lead to an in-depth, flow dialogue. Here, the technology was not disruptive, but an essential facilitator of the dialogue. Similarly, in Eric's case, the technology was also non-disruptive because it allowed him to utilize the open-access nature of the TEAMS set-up for the COIL to absorb all the utterances that he found interesting. While in Sophie's case the technology of the asynchronous discussion forum was generally regarded as disruptive, she found great potential in the asynchronous introductory videos, where much of her actual learning outcome seemed to originate. In her case, the non-disruptive affordance of the technology was to facilitate the easy sharing of high-res videos with good audio.

In order for the technologies used in an international exchange to be experienced as non-disruptive, the lecturers' knowledge of the affordances provided by the selected technologies and the students' literacies to engage with those technologies must align. The success of the exchanges and the learning outcome in the COIL seemed to be nested in meeting the students' needs and expectations while also accommodating the practicalities of communicating in ways that made them feel

proficient and empowered to communicate across borders and cultures, which in turn led to deeper reflection.

Analysis of Reflection

Analysis of the data sets yielded clear evidence that the COIL project fostered genuine reflection among the participants. For example, nearly all students reported that the project resulted in new learning about educational issues and, in some cases, prompted serious rethinking of previously held views or beliefs about education. Even the few students who did not report significant change in their views about education indicated that their interactions with peers as part of the project exposed them to new ways of thinking and raised useful questions about important educational issues. Three main factors emerged from this analysis as significant in fostering and influencing reflection on the part of the participating students: time, dialogue, and multiple modes of interaction.

Students reported the need for sufficient time to engage in dialogue with one another, to make sense of their interactions, and to address the questions raised by those interactions. In the survey, several students noted that the short time frame for the project did not necessarily provide sufficient time for conversations with their peers. Although this concern was broadly reported among the participants, students who were able to participate in a synchronous videoconference reported the most significant impact on their thinking about education. For example, although Paige expressed concern about the lack of time to engage in this project fully, given the students' busy schedules and obligations, she also emphasized that the video call enabled her to get to know her Danish peers, and that familiarity opened up opportunities for deeper exchanges. She described the experience as "holistic" as compared to an exclusively asynchronous text-based interaction. In addition, although the students reported a wish for more time, several students noted the value of simply having time allotted to engage in reflection. As one student noted in a survey response: "I think it is good to get a space where one is able to do [reflection]. Because you so rarely get to do it, even though you know it is good for you." Therefore, although the COIL project did promote reflection, that reflection could have been deepened with a longer time frame and more synchronous interactions.

A second main factor to fostering reflection was dialogue with peers who shared similar professional goals (to become educators) and a com-

mitment to education. Paige experienced this when she learned that despite their different contexts, "all teachers, really, have very similar goals, ... and that's something special." The value of communicating with peers can also be seen in the survey results, where 81% of students agreed that the questions raised by their peers made them curious. This curiosity led the students to engage in a spiraling dialogue (Kjærgaard & Andersen, 2023), which led to increased reflection. Sofie, for example, reported that she reflected more deeply about her experience once she had time to discuss the project with her Danish peers "and a lot of us had this deeper reflection *afterwards*, I think."

The third factor affecting reflection was the combination of multiple modes of interaction, which included both synchronous and asynchronous online technologies, text-based and video modes, and traditional academic writing, all of which worked synergistically to foster reflection among the participating students. Each mode of communication contributed in specific ways to create a rich opportunity for reflection. Many of the students in the survey reported that the introduction videos were essential in providing a "human" connection that established a good foundation for the rest of the project. One student commented in the survey that the introductory videos included descriptions of things like hobbies that "might seem trivial on a surface level, but I appreciated them because I feel that speaking to those objects, people, and places we choose indicates to us so much about purpose [of education]." Eric maximized the navigation of the multimodal communication tools provided by TEAMS, which resulted in an enriched educational experience for him. For Sofie, the videos, combined with the asynchronous discussion boards, provided disruption to "normal" thought patterns and encouraged her to seek deeper reflection. Paige underscored the importance of the lengthy discussion with her Danish peers during her team's synchronous videoconference, which allowed for in-depth conversation about key educational issues. And although she felt the asynchronous communication was superficial, Sofie nonetheless emphasized the need for the more focused and deliberate kind of thinking that traditional writing can prompt, such as in the written summary statements that students were required to complete in stage 2: "Our [online] discussions were quite superficial, [...] But after […] I was reading our statement again, I was thinking more deeply about what we talked about."

What seems significant among all of the respondents is that dialogue and various modes of interaction functioned in combination to foster reflection; no one mode was sufficient on its own to prompt the disruptive thinking and in-depth reflection that students described. This was reflected in the survey, where one student succinctly reported, "Videos are great for introductions. Text great for focused academic interaction."

This study showed that intercultural exchange does foster reflection, but elements of time, dialogue, and multimodality influence the *level* of that reflection. All of these elements must be scaffolded properly to provide the optimum opportunity for genuine, deep reflection.

Analysis of Intercultural Dialogue

Analysis of the data demonstrated that the intercultural nature of the COIL project was essential to creating opportunity for reflection. Intercultural dialogue allowed the students to gain new cultural knowledge, reflect on their new perspectives, and thereby ultimately achieve deeper reflection.

While Sofie, Page, and Eric took different paths to reflection, they all reported gaining new insights regarding American and Danish cultural and educational contexts. They all expressed an aspect of initial "surprise" when engaging in the opening dialogue with students from the other context, which then led to reflection and deeper insight about underlying values in their own context.

These moments of increased intercultural knowledge were made possible by the opportunity to engage in dialogue with students from a different cultural context. This can be seen in the survey results, where 71% of respondents agreed that *the questions raised by my peers were different from the questions that are normally discussed in class*. In addition, 92% of respondents indicated that they had learned something that they otherwise wouldn't have learned. A Danish student noted, "I learned a ton about the American school system – It was a big eye-opening experience. My knowledge of the American school system was very naively rooted in pop culture, and what you see on American shows or movies. Crazy how big the difference is between the two [sources of knowledge]." Here the student highlighted the importance of intercultural dialogue as an essential way to break down stereotypes and gather more information than would not have been possible without dialogue and interaction. In these conversations the students were truly "thinking together."

Participation in intercultural dialogue also led to increased reflection and new perspectives. 69% of respondents agreed that the COIL project had changed the way they think about education, while 79% agreed that they had learned as much about their own educational system as the other system. While some of this learning was new knowledge, much of the gain from the project was the disruption of previously held views or beliefs. Paige, Sofie, and Eric all reported how exchanges with peers from a different cultural background disrupted their prior thinking about the purposes of education and about specific aspects of educational systems. This disruption allowed them to reconsider the underlying values of their societies and practice perspective awareness. These findings were echoed in the survey where an American student noted, "I more so gained new perspective rather than new information in regard to the American education system." New knowledge was less important than the ability to question and change one's perspective based on intercultural dialogue. Several students appeared to be developing multiperspectivity, whereby they were able to decenter their experiences of what is "normal" and "right."(Huber, 2012). An American student noted, "What seems 'normal' to me in the United States may not be 'normal' in Denmark, and this project has allowed me to reflect on that." Another states, "This project has influenced how I understand reflection in education because it has made me think of things that I always just believed were the only truth and "normal", but now I have seen different perspectives which has been a great experience."

Ultimately, the students placed value on the intercultural learning gained through the COIL project. This was seen across the data sources throughout this analysis, but also directly in the survey where 74% of the respondents indicated that their participation in the COIL project inspired them to do intercultural exchanges when they become a teacher.

Conclusion and Suggestions for Further Research

This study intended to explore how the affordances of disruptive technology influence reflection and dialogue in peer-learning-teams in an online intercultural exchange. Through analysis of the case studies and data, it became apparent that the affordances of the technology itself in the COIL were not disruptive, but rather that the disruption lay in how those affordances were structured and scaffolded. The synergy of

multiple modalities led to the best outcome, as seen in Paige and Eric's cases, since all the affordances of the technology supplemented each other and provided rich environments for dialogue and subsequent reflection. However, it is notable that even when the students experienced disruption, the majority felt that the COIL project provided opportunities for dialogue, intercultural learning, and reflection. 98% of the students reported that the general experience of taking part in the COIL was positive. Since the COIL exchange would not have been possible without the affordances of TEAMS, it was clear that the technology was essential in creating opportunities for dialogue and reflection. However, the technology cannot stand alone, but must be well-structured by the lecturers, and must encourage active participation for the students. This study has highlighted the profound impact that well-structured online collaborative environments can have on student learning and engagement, if scaffolded appropriately. In future projects, if students' ability to navigate and utilize the multimodal communication tools provided by the technology were optimized, it could not only enrich the educational experience for the students, but also demonstrate the potential for fostering deeper, more meaningful connections and understandings.

In conclusion, this study demonstrated how COIL projects can serve as a testament to the power of technology in breaking down traditional educational boundaries and creating a more interconnected and reflective learning community. In addition, it has underscored the importance of designing online learning environments that encourage both active participation and the freedom to explore, which ultimately lead to a more holistic and transformative educational experience.

Further research could determine the optimal exploitation of the various modalities of the technology to create a COIL that promotes the best possible opportunities for dialogue and reflection. Notably, there seems to be a discrepancy between how students use technology in the academic arena versus how they use technology in their personal lives. The affordances of TEAMS bridged both arenas and perhaps resulted in confusion for the students about how to respond to delay in responses on the asynchronous message boards, as well as how to navigate the unspoken rules regulating turn-taking and flow in the dialogue. While one solution is simply to exclusively engage in synchronous communication, there are perhaps unexplored values related to asynchronous communication or multimodality that could be investigated.

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