Investigating teacher presence in courses using synchronous videoconferencing

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ABSTRACT

This research examines teacher presence in high school distance courses that are delivered by synchronous videoconference. In rural and remote areas, many school districts are using videoconferencing as way to reach dispersed students. This collective case study uses mixed methods to unpack the notion of presence from the perspective of teachers and their students. This study reports four key findings which have implications for building presence in a videoconference course: teachers' confidence and experience aligned with higher presence; teaching videoconference and face-to-face classes simultaneously led to challenges with developing presence; immediacy behaviors correlated with higher presence; and, students' learning preference related to perceived teacher presence. These findings confirm many of the issues raised in the literature about technology integration but also contribute new perspectives on teaching presence in a videoconference.

ARTICLE HISTORY

Received 11 June 2015
Accepted 29 August 2016

KEYWORDS

Distance education; presence; synchronous; technological pedagogical content knowledge (TPACK); videoconferencing

Introduction

Videoconferencing technology offers an enticing opportunity for distance education providers to connect geographically distributed students and teachers through real-time, two-way video. As the cost of hardware decreases and high-speed Internet becomes more accessible, many schools and districts are choosing videoconferencing to meet the educational needs of rural and remote students and those who cannot attend school for other reasons (Bower, Kenney, Dalgarno, Lee, & Kennedy, 2014; Greenberg, 2009). Although videoconferencing is a cost-effective way to connect distance students with qualified teachers (Anderson, 2008; Lawson, Comber, Gage, & Cullum-Hanshaw, 2010; Twigg, 2001), there are very few resources to support teachers who find themselves teaching students across a screen (Bower et al., 2014). Teachers need concrete strategies and clear guidance on how to teach effectively and connect with their students in a course delivered synchronously by videoconference.

Research into asynchronous, fully online modes of course delivery, particularly for the higher education sector, is growing (Maor, 2008). Few studies, however, look at the unique

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context of synchronous delivery of courses to non-adult learners by videoconferencing (Alberta Education, 2006; Murphy, Rodríguez-Manzanares, & Barbour, 2011). When a course is delivered by videoconference, students see their teacher almost daily for a scheduled block of time, during which, the teacher uses direct instruction in a live format to explain content and tasks, and engage learners through interactive activities. As in online learning, there is a geographical distance between the teacher and student, which leads to both a real and a perceived barrier to communication and connection (Moore, 1993). The result of this barrier is a decreased sense of being there, which is otherwise known as presence (Anderson, 2008), a construct that has been investigated and conceptualized through the community of inquiry framework (Garrison, Anderson, & Archer, 2000). Building relationships and rapport between the teacher and the students is critical to a positive learning environment (Munroe, 1998), and the real and perceived distance in a videoconferencing classroom makes it more difficult to create this atmosphere.

A unique set of skills and strategies are therefore required by the teacher to bridge this distance, connect with students, and develop presence (Barbour, 2013). The teacher has an important influence on the cognitive, affective, and behavioural outcomes of schooling for students (Hattie, 2003; Haughey, 1997; Kramas & Kopp, 2010; Rowe, 2003). Based on the assumption that the teacher is critical to student success, and the fact that videoconferencing exists in situations where students are physically separated from their teacher, the goal of this research has been to examine the notion of presence to determine how teachers can better develop it in this unique context. The research questions that drove this study are:

(1) How do the teachers' perception of their own technological pedagogical content knowledge (TPACK) and confidence as well as their experience impact presence?
(2) What do high school students expect of their videoconference teachers in terms of presence?
(3) What actions do videoconference teachers take to increase presence in their courses?
(4) What is the impact on presence when videoconference teachers are required to teach remote and face-to-face students simultaneously?

Presence

Presence is generally considered to be a sense of awareness, receptivity, and connectedness to the mental, emotional, and physical workings of the individual and the group in the context of their learning environments (Rodgers & Raider-Roth, 2006). Presence has also been defined as 'the perceptual illusion of non-mediation' (Lombard & Ditton, 1997, p. 16), which means that presence gives participants who are geographically dispersed the feeling of being there and being together. Gunawardena and Zittle (1997) refer to this as the degree to which a person on the other side of a screen (or computer) is perceived as being 'real' (p. 9).

As a construct, presence is well documented in the literature, although mostly in studies of asynchronous, fully online adult education. Arising from their research into communities of inquiry in distributed learning contexts, Garrison et al. (2000) proposed a framework for understanding presence, which identifies three elements: teaching presence, social presence, and cognitive presence. Cognitive presence refers to the construction of meaning or the acquisition of knowledge by participants; in other words, it is the primary goal of education.

It is based on Dewey's (1933) notion of reflective thinking or meaning-making through discourse, and challenges the practice commonly seen in videoconferencing of content delivery through direct instruction. Garrison et al. argued that a strong social presence needs to exist for cognitive presence to flourish. This is because social presence, or the perception of feeling connected to others, leads to higher levels of comfort and satisfaction for teachers and students. Teaching presence is defined as 'the design, facilitation and direction of cognitive and social processes for the purpose of realising personally meaningful and educationally worthwhile learning outcomes' (Anderson, Rourke, Garrison, & Archer, 2001, p. 5). Therefore, teaching presence serves to initiate and maintain an environment where social presence, and therefore cognitive presence, can flourish. Teachers are responsible for creating the conditions in which students feel connected, supported, and safe to construct meaning, and this requires deliberate effort (Aragon, 2003). In the context of videoconferencing, teachers need to develop presence across a screen and across a distance. Since students' sense of distance can threaten their ability to learn (Moore, 1993), reducing this psychological distance is critical for teachers in a videoconference course.

Previous studies in other distance education contexts can shed some light on the ways that teachers develop presence during videoconferencing. Some scholars operationalize presence in terms of immediacy behaviors, defined as the degree of perceived physical and/or psychological closeness between people (Mehrabian, 1981). Teacher immediacy includes both verbal behaviors (e.g., use of names, tone of voice, use of inclusive pronouns) and non-verbal behaviors (e.g., posture, facial and hand gestures, use of classroom space). Originally used to understand communication in face-to-face relationships, immediacy behaviors have also been applied to distance education contexts. Immediacy has been linked to improved presence (Baker, 2010), and studies have shown how both constructs improve student satisfaction and perceived success (Hackman & Walker, 1990; Witt, Wheeless, & Allen, 2007).

In a technology-mediated learning environment such as a videoconference, teachers need to have proficiency with technology, in addition to pedagogical skills and knowledge of curriculum. Koehler and Mishra (2009) argue, however, that technological knowledge on its own is not sufficient to ensure effective instruction. They proposed the TPACK framework that broadened Shulman's (1987) original pedagogy-content model to show how these three domains of knowledge need to come together for effective integration of technology. In other words, they believe that a teacher's knowledge of subject matter and pedagogy does not assume the transfer of knowledge for incorporating appropriate technologies for teaching effectively. The TPACK model has received some criticism for its theoretical immaturity (Graham, 2011) and its lack of clarity around the subcategories (Cox & Graham, 2009), and so we acknowledge, with Niess (2011), that TPACK is dynamic and gradually evolving. This has led to the development of a number of instruments for measuring TPACK, including self-report questionnaires and performance-based assessments (Jamieson-Proctor et al., 2013; Koehler, Shin, & Mishra, 2012). The instrument chosen for this study was Archambault and Crippen's (2009) survey due to its similarity of context and ease of administration. Videoconferencing technology was not originally designed for education purposes, rather as a business communication tool (Lawson et al., 2010), and for teachers to integrate this technology effectively in distance education courses, they need to merge their knowledge of the technological tools with their existing pedagogical beliefs (Ermter, 2005), including those that lead to increased presence.

For the purposes of this study, the researchers conceptualized presence as a construct that encapsulates the community of inquiry framework proposed by Garrison et al. (2000), feelings of 'realness' described by Gunawardena and Zittle (1997), and the perception of 'closeness' reported by Mehrabian (1981) and Moore (1993). In other words, when teachers design distance learning environments in which the students feel close to their teacher and peers as real people, then presence would be high. As indicated above, research shows that increased presence correlates positively with perceived student success and satisfaction. It is unclear, however, how teachers might develop it in a high school course delivered by videoconference. This research addresses that gap.

Method

Research design

This study explored the experiences of teachers and students in secondary school courses that are delivered by videoconference, focusing on the construct of teaching presence. A constructivist epistemology, holistically and in-context, informed the research. The following collective case study approach used mixed methods to allow for an in-depth study of teacher presence from the teachers' and students' perspectives using multiple data sources (questionnaires, interviews, and observations). The focus was on the interactions and transactions that took place within the videoconferencing class context and the perceptions and experiences of the teacher and student participants. Quantitative methods provided descriptive data to support the qualitative exploration of student and teacher perceptions and experience. Morse and Niehaus (2009) describe this approach as simultaneous QUAL + quant, comprising a qualitative core component and a supplementary quantitative component. Mixing methods in this way offered a stronger chance of answering the research questions than would a mono-method design (Johnson & Onwuegbuzie, 2004; Tashakkori & Teddlie, 2003).

During the study, teachers were surveyed about their confidence and experience with videoconferencing, and perceived skill level with technology. Using observation and interviews, rich detail about the context in which they teach was gathered. We also conducted questionnaires and interviews with students in the observed classes to understand teacher presence from their perspectives. We then used cross-case analysis to look for variations in pedagogy and perceived teacher presence from students' perspectives. Data analysis was primarily inductive as themes and patterns developed across the cases.

Participants

The participants for this study were teachers and students from two rural school districts in Canada. In both districts, schools are geographically dispersed across vast distances with an administration operating out of a central office. Many of the schools in these districts have access to Polycom® videoconferencing technology with SMART™ interactive whiteboards and Bridgit™ software to deliver courses to one another. The students in this study were required to take a videoconference course because they were attending a remote, rural school that had limited face-to-face course offerings and human resources.

With the support of the school district technology consultant and superintendent for each school district, we invited teachers using videoconferencing to the study, and five teachers agreed to participate (labelled teacher A–E). All five teachers had been teaching

for over 10 years but had varying degrees of experience with videoconferencing and were assigned labels accordingly: novice (fewer than two courses); moderate experience (between two and five courses); experienced (more than five courses). Three of the teachers taught a face-to-face class simultaneously with the videoconference course, whereas the other two teachers only had videoconference students. The students of these teachers were also invited to participate in the research. In total, all 40 students completed the teaching presence scale survey, and 26 students took part in focus group interviews.

Instruments

The Archambault and Crippen (2009) TPACK instrument was used to measure teachers' perceptions of their TPACK to see if it impacted teacher presence. This was chosen because it had K–12 data that could be used comparatively. It includes 24 items, and responses are given in the form of a 5-point Likert-type scale (1 = *poor*; 5 = *excellent*). Construct validity was established through expert consultation, item revision and two phases of a pilot study. Results from Achambault and Crippen's study (n = 596) showed an average self-reported TPACK score of 3.75 among K-12 distance educators; this has been used as an average benchmark in this study for comparison against a larger sample. In addition to completing the TPACK questionnaire, the teachers engaged with some additional questions to gather data on their experience with videoconference teaching. They also responded to a series of general questions (developed by the researchers) to gauge their level of confidence with the videoconferencing context. The reason for this survey was to provide further data about each teacher to see if experience and confidence impacted the ability to develop presence.

Each teacher agreed to have at least one of their typical videoconference classes observed by the researcher. The focus of the observations was on teacher behaviors in regards to instruction and interaction with the students, with particular attention given to the indicators of teaching presence as outlined by Anderson et al. (2001). Teachers were informed of the purpose of the observations and were asked to teach over the videoconference and interact with students in a typical way. The teachers also participated in a 1-h interview with open-ended questions about their experience teaching by videoconference. The interview questions focused on the development of presence—what strategies they used to maximize those feelings of connectedness, and how successful they felt they were at it.

Participating students were invited to complete the teaching presence scale survey (Shea, Pickett, & Pelz, 2003) to provide some descriptive data about each teacher's presence from the perspective of their videoconferencing students and to compare these results with the teachers' self-evaluation (via TPACK). The stance on teacher presence implicit in this scale follows the community of inquiry framework (Garrison et al., 2000). A 5-point Likert-type scale was used to measure each item on the scale with a score of five indicating high teaching presence and a score of one indicating low teaching presence. In addition to the electronic TPS questionnaire, some students participated in a focus group interview. The purpose of these focus groups was to have the students share their experience of videoconferencing, in their own words, and in a non-threatening way. The students were asked questions that focused on the expectations they had of their videoconference teacher and the indicators of presence that are reported in the literature. In total, there were seven focus groups, each with no more than five students. In one of the cases (teacher E), the students were too remote and dispersed to participate in a focus group but two of them responded to some open-ended questions by email.

Analysis

Miles and Huberman's (1994) framework served as the guide for data analysis. The quantitative data obtained from the three surveys (TPACK, confidence, and TPS) provided rich, descriptive detail of the videoconferencing context. These data were used to give an objective measure of the teachers' perceived knowledge and skills with teaching by videoconference (TPACK) and their level of confidence and then to compare these to the students' assessment of their teaching presence. To discover patterns in the qualitative data, the researchers employed inductive analysis. Interview transcripts and observation field notes were given initial codes, which were then sorted into themes. The themes were then matched with concepts and constructs reported in the literature to see what ideas about teacher presence, teaching skills, and communication across a distance were being confirmed in the context of high school videoconference and what original ideas were emerging. The final step in the data analysis process involved the researchers returning to the research questions and using the results of the quantitative and qualitative phases to draw tentative conclusions about presence in courses delivered by videoconference. Credibility was established through the triangulation of the quantitative data, the qualitative data and the literature.

Findings and discussion

Four major themes emerged from the analysis:

- teachers' levels of confidence and experience aligned with higher student-reported presence, more so than self-reported TPACK,
- teaching by videoconference during a face-to-face class led to challenges with developing presence,
- teacher immediacy behaviors and feelings of interpersonal connectedness correlated with higher presence, and
- students' learning preference related to teacher presence.

The following section unpacks and provides support for each of these findings.

TPACK, confidence, experience, and presence

The results from the quantitative phase of the study were used to determine if there was a connection between the teachers' self-reported TPACK, their confidence, experience, and the students' assessment of their presence. Figure 1 presents these quantitative results. Teachers A, B and C taught face-to-face and remote students simultaneously while teachers D and E taught only remote students.

There are a few observations to be noted about these data. Firstly, the teachers with the most experience (teachers D and E) did not self-report correspondingly high TPACK scores compared with the less experienced teachers. We suggest that teachers with more videoconference experience likely have a more accurate idea of what they do not know and therefore rated themselves more conservatively on questions about their TPACK. Teachers A and B rated themselves comparatively high (4.5 and 4.6 out of 5, respectively) despite having little experience in this unique context. In the interviews that followed, it was determined that these two teachers were quite tech-savvy and despite having less experience

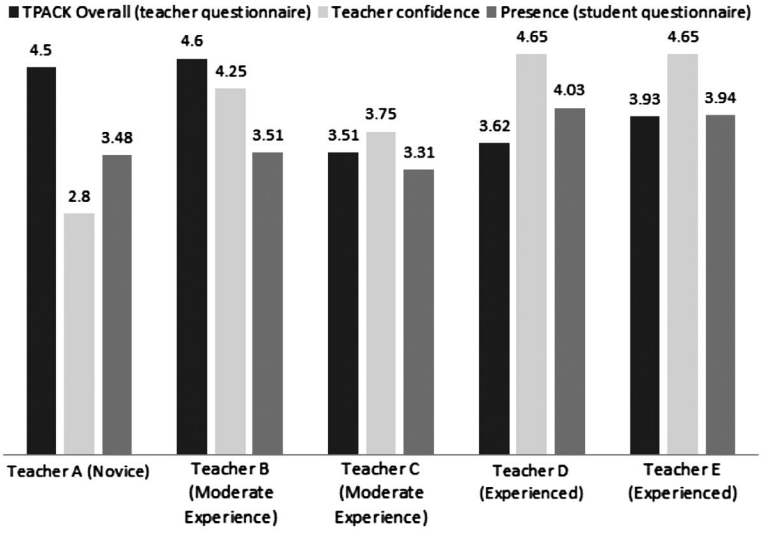

Figure 1. Teachers' self-perception of overall TPACK and confidence scores compared with students' perception of presence.

with videoconference hardware and software specifically, they felt that they would learn quickly.

Secondly, based on what the research says about TPACK (Koehler & Mishra, 2009), we expected that the teachers who self-rated higher technological pedagogical knowledge would also be better at building presence in the technology-mediated context of a videoconference than those who reported lower knowledge, but the data did not reflect this. Although teachers A and B in our study produced the highest TPACK scores, this did not translate to the highest presence scores according to their students (3.5 and 3.5). In contrast, teachers D and E had the highest presence reported by their students (4.0 and 3.9, respectively) but their TPACK scores were lower than those of teachers A and B and much closer to the average score of 3.75 reported by Archambault and Crippen (2009).

The only teacher with TPACK and presence scores that seemed to align was teacher C. This teacher had the lowest TPACK score (3.5), caused mostly by a very low technological knowledge sub-score of 2.0, and also the lowest presence score (3.3). It seems that the TPACK instrument failed to pick up something important here as the teachers' sense of being tech-savvy or belief that they had the knowledge to teach with technology was not necessarily reflected in building presence across a screen, from the perspective of their videoconference students.

Although a minimum level of comfort with technology is required, we suggest technological proficiency is not enough to ensure effective instruction in a technology-mediated environment, such as a videoconference. Instead, the data show that higher levels of confidence and experience aligned more closely with higher levels of presence. In particular, teachers D and E had the most experience, the highest self-reported confidence, and the highest presence scores. This experience gave those teachers a better understanding of the context and the challenges, and how pedagogy needed to be adapted to ensure learning. They had spent more time testing out different strategies for connecting with their students,

building rapport, overcoming logistical tasks, and subsequently, building presence. Teachers D and E knew that they had more to learn, particularly in regards to the technology, but their experience afforded them the confidence to know what worked and to continue seeking new ways to improve. Teacher A, on the other hand, believed that he was tech-savvy and able to teach with technology, but he lacked experience with videoconferencing, specifically. He had a very low confidence score, and received a modest presence score from his students suggesting that his expertise with technology did not immediately translate into the ability to build presence.

The data show that experience and confidence appeared to improve the ability to build presence, but we also need to consider the impact of having to teach face-to-face and remote students simultaneously. We are mindful of the fact that the teachers with the highest presence scores were also the ones who only taught remote students. Further research might reveal which variable has the strongest impact on the ability to develop teacher presence. While the quantitative data show that experience teaching with videoconferencing and a minimum level of technological proficiency appeared to align with teachers' presence, the qualitative phase of this study was able to investigate presence-building practices, as described below.

Teaching face-to-face and videoconference simultaneously

Three of the teachers (A, B and C) delivered their course face-to-face while simultaneously delivering the same course to remote students through the videoconference suite. These teachers were required to communicate in two different ways at one time. The remote students of these teachers reported feeling like they were an audience to the regular face-to-face class, which was confirmed in one of the teacher interviews: 'Because I have my classroom here, I really teach to them and the videoconference students just sort of visit' (teacher B). This challenge was also evident when I observed teacher C. Both her face-to-face (*near*) and remote (*far*) students were presenting projects. When the near students were presenting, they distributed handouts to their near peers, but did not arrange to have them sent over to their far peers. This (lack of) action seemed to exaggerate the distance between the two locations, causing further feelings of being an audience member rather than a classmate. Interestingly, the set-up of the classroom in the simultaneous cases impacted feelings of presence as well. Teacher C explained how she had moved the video camera from the back of the classroom to the front. This brought the images of the far students and the teacher closer together. We assumed that this would improve a sense of presence, but the opposite was true. When asked about the position of the camera in the room, the students unanimously preferred to have it at the back of the classroom so they could see the heads of all their peers, with one of them commenting:

> Even though we don't interact with them, it makes me feel like I am part of a class because I can see them. When the camera and screen are at the front, I feel like we are always being watched. (Student of teacher C)

This situation was contrasted with that of teachers D and E, who only had remote students in their courses. They were not distracted by the immediate demands of students who were right in front of them and were able to singularly focus on the remote students. Subsequently, I observed teachers D and E regularly engaging their students with questions, checks for understanding, and informal conversation. We suggest that this is another reason why they

received high presence scores from their students. Being able to give all their attention to the students on the other side of a screen helped bridge the psychological distance.

The three teachers who were teaching remote students through the videoconference simultaneously with their regular face-to-face class had a harder time creating presence in comparison to the teachers who only had remote students in their classes. This suggests that videoconference teachers need to be creative and innovative to involve the students in the process of learning via videoconferencing. It requires teaching strategies that involve the face-to-face students interacting frequently with the far students to increase immediacy, or secured time for questions and answer, pal writing, and so on. There were too many immediate distractions in the face-to-face class, and subsequently, the remote students felt like audience members rather than equal classmates. This aligns with the findings reported by Knipe and Lee (2002) in their comparison of the experiences of local and remote students in a videoconference.

Immediacy and interpersonal connectedness

Mehrabian (1981) conceptualized immediacy as the degree of perceived physical and/or psychological closeness between people. He provides examples of immediacy behaviors: use of names, use of inclusive pronouns, posture, gestures, and use of classroom space. Through teacher interviews and observation, we identified a number of these teacher behaviors (see Table 1). We then noted any correlation to what their students said about presence.

Teachers D and E, who received the highest presence scores from their students, stood and spoke directly into the camera, used humour, and employed strategies for calling students by their individual names. For example, teacher E kept a list of names by her desk and checked them off as she called on each one so as to ensure each name was spoken at least once each class. Some of these immediacy behaviors were confirmed during the student interviews such as, 'I like how she jokes around with us and makes it so that everyone has a say.' (student of teacher E); and 'She uses our names to get our attention' (student of teacher D). In contrast, teacher A, who received the lowest presence score, rarely used student names: 'I think he knows our names but he doesn't use them' (student of teacher A). Using individual

Table 1. Immediacy behaviors observed during videoconference.

	Teacher A	Teacher B	Teacher C	Teacher D	Teacher E
	Face-to-face and remote students			Remote students only	
Gestures			✓	✓	
Vocal variety				✓	✓
Looks at class				✓	✓
Smiles		✓			✓
Relaxed body posture	✓	✓			✓
Removes barriers between self and students		✓			✓
Calls students by name				✓	✓
Uses inclusive pronouns				✓	✓
Informal talk			✓		✓
Gives feedback	✓			✓	✓
Self-disclosure			✓		
Uses humour					✓

student names was a common theme in the data. Almost all the students desire and expect to be known and acknowledged by this simple gesture. While this is considered generally good practice in teaching, it is even more important in a videoconference. These findings support previous research (Baker, 2010; Bozkaya & Erdem Aydin, 2007) that shows that immediacy behaviors such as these mentioned above improve perceptions of presence.

Instructor self-disclosure is also listed as an immediacy behaviour (Mehrabian, 1981), and teacher C made a deliberate effort to do this. She purposefully shared personal stories with her students about her family and interests, and the students appreciated this, commenting: 'We got to know her a lot better because she added a bit of a personal aspect to the classes and this made us feel connected' (student of teacher C). While this action was noted by the students during the focus group interviews, it was not enough to translate into a high presence score on the TPS questionnaire. Other factors, such as her low technological proficiency and the simultaneous teaching format, overshadowed this simple immediacy behaviour when students assessed this teacher's presence.

Social presence can be improved in online courses with an initial face-to-face meeting of the group (Garrison, 2011). We asked participants in this study about meeting face-to-face at some point during the semester, and they all spoke positively of the idea. Teachers D and E visited their remote sites at least once a semester so that their students could see a real person. In addition to this, teacher E kept track of when her students came into the city so she could go and meet them or watch them play sport. The students of teacher D said, 'It was strange to have her teach us before we had ever met her', and they agreed that following the school visit, they felt more comfortable. Teachers A, B and C all indicated that they would like to visit their students but time and logistics did not allow it. In previous years, teacher B went to the remote site and taught his far students face-to-face while giving his near students the experience of videoconference. He said that after that experience, he felt he was more connected to his students and knew their names better. Teacher B had not had the chance to meet his students this year but he employed an asynchronous tool to elevate connectedness and social presence in the classes. He used Google + Communities to disseminate information and connect students to one another. A survey of the activity log shows that students were posting photos and introducing themselves in the first few weeks of class. Teacher B did not think the students were making much use of this tool, but a few of the far students noted that the 'get-to-know-you' task made them feel more connected to their peers and teacher. One student stated that, 'even though he doesn't ask us anything personal, he knows about us because of what we wrote on Google + Community.' Anderson (2008) found that blending synchronous and asynchronous technologies in this way improved presence. While the students of teacher B noted feeling more connected, it was not reflected by a high presence score. We suggest that the strategies of teacher B to connect with his students through asynchronous social media tools did not replace the positive benefits of meeting face-to-face.

When asked to report on the barriers to presence, many participants referred to the public nature of the videoconference. The far students who were sharing the instruction with their face-to-face peers reported feeling intimidated: They were happy to watch, listen, and work independently, but asking questions and speaking aloud was difficult for them because their voices and images would be projected into the whole classroom. Many students commented on this effect, for example:

> I don't know what my voice sounds like and I don't want to sound stupid. (Student of teacher A)

> It feels kind of awkward to ask a question because it will be projected to the whole class. (Student of teacher C)

The teachers also felt frustrated by the lack of space for informal, personal connections with their students. They were aware that some subjects are more sensitive and not appropriate for the video screen. Teacher E explained, 'I can watch for subtle body language and listen for negative voice tone to know if a student is frustrated or stressed, but it is difficult to then communicate privately with them to see if they are OK.' When asked about building relationships and establishing presence, teacher D said it was hard, also citing the limitations of the public nature of the conference:

> You can't whisper a private conversation with somebody. One of my students had an operation last week and I can't ask them about it on the screen because it is not a public kind of thing.

Lobel, Neubauer, and Swedburg (2002) have proposed the concept of a privacy zone in learning as the subjective experience of personal safety, the extent and reliability of which will improve an individual learning experience. The data show that this privacy zone could apply to the videoconference context as well.

Learning preference and interactivity

Lecturing (or teacher-led instruction) was the most common teaching approach observed in this study. The teachers conceded that this was not the ideal approach but chose to instruct in this manner because it was the easiest. According to Murphy et al. (2011), synchronous teaching does lend itself to more teacher-centred than student-centred styles, which Lowenthal (2009) suggests is a barrier to presence. Interestingly, the students who took the majority of their other courses by traditional, correspondence modes and were used to learning independently said that they liked having a real teacher to explain the difficult concepts to them. While the literature shows that learning that is designed to be interactive leads to higher presence (Baker, 2010), these students liked the high proportion of lecturing. The students who took the majority of their other courses in a face-to-face classroom, however, indicated that they were expecting more from their videoconference teacher in terms of interactivity: 'I feel like if she was in the room then she wouldn't talk as much and we would do more activities' (student of teacher D). They blamed the videoconference format, not their teacher, for the large amounts of lecturing, a response that has been reported elsewhere (Doggett, 2008; Gillies, 2008). Attributing the lecturing format to the videoconference and not the teacher is likely why teacher D still received a high presence score. It appears that student preference for interactive or lecture-based instruction depended on the course format of their previous distance education experiences. Paired with other presence-building actions, some students found that the teacher-centred nature of the videoconference was effective compared to learning the material on their own.

Questioning is a form of interaction that indicates social presence (Garrison, 2011). However, from the teachers' perspectives, students rarely initiated questions. The students of teacher B said that they knew they could ask questions and they often observed the near students approaching their teacher's desk to seek individual help, but they did not ask for help themselves because, 'He is often busy talking to the students there and we don't want to interrupt.' One of the students proposed a solution: 'Have a designated day or time for us to ask questions. Then we would know it was our time to get help' (student of teacher B). This suggests, again, that they felt like intruders in the face-to-face class each time they

spoke up on the videoconference. Teacher A mentioned a few tactics that he had tried to provide space for the far students to ask questions. For example, he initiated a live online chat during class, but reported that the students were not making use of it. After setting up the tool, he left the students to choose whether or not to engage with it rather than directly prompting them to ask questions on specific topics and at specific times. These same students of teacher A made clear a desire to break down the communication barrier and suggested that it was their teacher's responsibility to do so by purposefully engaging them in opportunities to speak. In contrast, teacher E, who had a high presence score, persisted in engaging her students to seek help. She offered additional tutoring time outside of regular class and invited her students to contact her outside of school hours (by text or email) if they needed help. The students appreciated this approach. One of her students commented, 'My teacher is amazing. She takes the time to go through stuff with us and if we need extra help then she is more than willing to stay and do that.'

Students expected their teachers to check regularly for understanding and provide informal feedback. In face-to-face classes or traditional correspondence courses they perceived avenues in place for them to keep updated on progress, but felt this was lacking in the videoconference course. When asked to comment about instructional strategies that would make them feel connected, a student of teacher B mentioned, 'I'd like it if he came every morning and said, "Is there anything I can help you with? Did you understand the homework?" Checking up to see if we understand would improve the situation.' This regular feedback would, in the students' opinions, provide a level of interactivity that leads to higher ratings of teacher presence.

Concluding remarks

This study examined the experiences of teachers and students in distance education courses using videoconferencing in order to understand how presence is viewed in this unique context. The research questions focused on how teachers' perceptions related to their TPACK impacted presence, what expectations students have of their videoconference teachers in terms of presence, what the videoconference teachers were doing to successfully increase presence in their courses, and the challenges associated with teaching face-to-face and remote students simultaneously.

Presence in this study was based on the results of a teaching presence survey that the student participants completed, observations made in the classroom, and interviews with both teachers and students. The findings, as discussed above, confirm many of the issues raised in the literature about technological integration but also contribute new perspectives on TPACK, presence and distance education delivered by videoconference. Participating teachers' self-perceptions of their TPACK did not necessarily result in higher presence in the videoconference setting. Instead, the findings show that experience and confidence better aligned with higher presence.

While it was shown that a minimum technological proficiency is required to create presence in a videoconference setting, this was not sufficient. Teachers need to learn how to adapt pedagogy to the technology, but without resources and training readily available it takes considerable time to trial and refine new strategies. This may have been the main reason why those teachers with more videoconference experience did better. However, even those teachers with comparably effective videoconference classes had room to improve

alongside their lesser effective colleagues. All the teachers in the study talked about the challenges of using their prevailing teaching methods with the new technology. We suggest that a complete paradigm shift is required whereby teachers think about the affordances of a videoconference and then design their courses to exploit these innovative aspects. While connecting distance education students to real teachers who can explain concepts through lecture is one of those affordances, the technology also lends itself to more interaction in the form of teacher feedback and peer collaboration. The technology itself will not make distance education courses good, nor close the psychological distance felt by participants; instead, we agree with Murphy and Coffin's (2003) assertion that teachers have a responsibility to adapt their pedagogy to suit the technological context so that presence is developed to support far students' learning.

Disclosure statement

No potential conflict of interest was reported by the authors.

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