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Educator capacity for online global collaborative learning: developing a framework

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ABSTRACT

Despite recent moves to online learning, online global collaborative learning does not seem to have been taken up as a daily practice by most educators in the K–12 context. Yet it is evident that early adopters are seeing the benefits of such practice, not only for students but for their own professional learning. The research described here uses single case-study methodology to investigate a small group of educators, located in a range of countries and with varied teaching experiences, who have identified the potential of global interactions. Data analysis, using manual and software-supported coding, identified three key influences on the educators' personal pedagogies: their disposition to online learning, their approach to professional learning, and conceptual change. The findings were used to construct an online global collaborative learning framework, which has the potential to inform considerations about building educator capacity in digital pedagogical knowledge.

Introduction

Since the 1990s, governments and school systems have spent millions of dollars providing hardware, software, and networking capability in conjunction with educator professional development, to make classrooms ready to connect and collaborate (Selwyn 2013; Ting, Liu, and Scott 2018). An array of digital technologies for communication and collaboration, along with new pedagogies to support online learning, has enabled global connections for curriculum-based projects and informed global competence objectives (Andrews and Conk 2012; Biswas-Diener and Jhangiani 2017; Greenhow and Askari 2017; Jimoyiannis et al. 2013). These have raised awareness of the possibilities afforded by digital technology-scaffolded learning (Lock and Johnson 2017), and the need for new pedagogical approaches to support future-ready students and to equip them with transferable skills, such as global competence and awareness, critical thinking, collaboration skills, and intercultural understanding (Fullan, Langworthy, and Barber 2014; Organisation for Economic Cooperation and Development 2022; Zhao 2018).

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Nevertheless, actively implementing online global collaboration is either non-existent or has low priority with K–12 educators personally or sometimes it seems to be blocked entirely within schools.

The phenomenon of online global collaboration is where global partnerships (beyond schools and classrooms) involve working and learning together on specific goals and co-creating new knowledge (Lei and Medwell 2021; Lindsay 2016). This is distinct from technology integration or online collaborative learning communities which involve sharing, but not typically the co-creation of knowledge. Key affordances for online global collaboration are the use of online technologies, along with opportunities to contribute, create, and co-create with partners at a distance (Lei and Medwell 2021; Lindsay 2016).

Despite the benefits and more recent moves to extensive online teaching and learning, online global collaboration does not seem to have become daily practice for most teachers. For educators to accomplish meaningful work in the global classroom, they require pedagogies and guidelines to enable their students to 'learn from each other anytime and anywhere in the world while building knowledge collaboratively over time' (Lindsay and Redmond 2022, 3; Lock 2015). The purpose of the current study, therefore, was to explore the views of teachers who are already engaging with and fostering online global collaboration, in order to make sense of their experiences, beliefs, and pedagogies.

This article briefly presents background information related to the concepts of collaboration, online collaboration, and relevant pedagogical approaches. It then outlines the method for the study before reporting on the findings. Finally, the paper describes an online global collaborative learning framework suggested by the study's findings before discussing the limitations of the current project and possibilities for future research.

Background

Collaborative learning involves two or more people learning or attempting to learn something together (Dillenbourg 1999) and includes multidisciplinary processes and enhanced learning outcomes. It is distinct from cooperative learning, where required tasks are distributed amongst learners (Laurillard 2009); instead, connected learners rely on each other to share and construct knowledge (Nussbaum-Beach and Hall 2011). Collaboration – building something through participation and negotiation with partners – is pedagogically valuable and achieved through coordination, continued attempts, construction, and shared conception (Laurillard 2012). In K–12 contexts, collaboration involves student-to-student interaction in the learning process, as opposed to cooperation, whereby students communicate and work in small, often mandated groups, usually monitored by a teacher (McInnerney and Roberts 2004). According to Dede (2010), collaboration needs a sophisticated skill set to enable task accomplishment through mediated interactions with peers, who are possibly halfway across the world and whom they may never meet face-to-face.

The transformational potential of online learning implies learning taking place online through digital platforms and the creation of global virtual communities in both blended and online modes, for the purpose of thinking and learning collaboratively (Garrison 2016). Despite standards inclusive of collaboration afforded by digital technologies (e.g. International Society for Technology in Education [ISTE] (2022) and transmission teaching becoming less important than experiential learning in the twentieth century (Dewey

1938), the integration of technologies into online learning has generally relied on traditional pedagogies as opposed to social constructivism (Anderson 2016). Indeed, educators continue to use digital technologies for finding information on the internet, practising routine skills, and writing and presenting assignments and tell-practice-test activities (Laurillard 2009), rather than for collaboration and knowledge creation, working with others beyond the classroom, and developing simulations or animations (Fullan, Langworthy, and Barber 2014).

According to Lee and Ward (2013), to become the norm, online collaboration requires a paradigm shift to reflect the needs of a digital, networked world which, by its very nature, affords learners both synchronous and asynchronous opportunities to connect, collaborate, and learn together. Such learning requires educators to develop key design and implementation skills, so they can plan for and promote experiences for students to collaborate, solve problems, engage in critical thinking, and develop deep understandings (Redmond and Lock 2008).

Harasim's (2012) theory and practice of online collaborative learning (OCL) is based on instructor-led online group learning in higher education, utilises a constructivist approach, and includes collaborative learning, knowledge building, and the use of the internet. Although learners are typically geographically dispersed, OCL allows learners to learn with and from each other (McCollum 2020). It defines the educator as a facilitator and an online community member, with students collaboratively solving problems through online discussion and interaction that is typically text based and asynchronous.

This aligns with the online collaborative learning framework developed by Redmond and Lock (2006), where the online learning environment encourages learners and educators to engage as co-creators through interaction and collaboration. Harasim (2017) proffered a more recent version of OCL as 'collaborativism or collaborativist theory' (105). By exploring the role of discourse as theorised by Vygotsky (1978), collaborativism builds on constructivist learning theory and the use of the internet for collaborative knowledge creation, with the role of the instructor as a key component.

Pedagogies for online global collaboration

To facilitate online global collaboration, educators need pedagogical skills and attitudes for the application of connected learning (Siemens 2005), ability to build online communities for collaboration (Garrison 2016), and readiness to contribute and collaborate (Nussbaum-Beach and Hall 2011). Choi et al. (2016) suggested that it is important for younger generations to be exposed to global communities to develop minds that are 'R2C2': 'respectful, reflective, collaborative and creative' (2060). According to Riel (1996), a 'build a space they will come' approach is not a guarantee, because online learning communities of practice require four elements: 'balance between unity of purpose and diversity of experiences,' observance that group size relates to the purpose, balance between structure and the creativity of participants, and possibilities for sharing through reflection and evaluation (Design Issues for Creating Global Villages section). More recently, Owens and Hite (2020) found that the affordances of project-based learning pedagogies in a global context 'are synergistic, amplifying opportunities for communication competences' (16).

In the past 10 to 15 years, Web 2.0 technologies and social media have emerged to support a collaborative pedagogical focus (McLoughlin and Lee 2010), including fostering teacher networked and collaborative relationships (García-Martínez et al. 2022). Research has focused on the making of global connections (Arteaga 2012; Greenhow and Robelia 2009), learning through the use of social media (Casey and Evans 2011), and the practice of implementing global education and global projects in K–12 learning environments (Choi et al. 2016; Espino 2018; O'Connor and Hite 2017; Stornaiuolo 2016). These studies have revealed possibilities and highlighted those who are already embracing online technologies to connect within and beyond classrooms. Oran (2011) found that, although educators lacked formal preparation for global learning, they integrated global education into their classrooms because of their personal commitment to it, in spite of a lack of formal curriculum.

The learning circle structure, involving 'small electronic communities' set up 'to accomplish specific goals' (Riel 1993, 223), could be considered one of the predecessors of online global collaborative projects. Although learning circles typically do not reach an ideal level of connection and collaboration amongst members, they do bring diverse classrooms together for global and collaborative objectives (Riel 1993). Indeed, classroom-based global projects have varied from one-on-one classes as individual teacher initiatives to organised classroom groups coming together for a more sustained curriculum purpose (Choi et al. 2016; Espino 2018; O'Connor and Hite 2017; Stornaiuolo 2016). According to Wells (2007), collaborative global projects were more integrated when students communicated regularly and/or had a major role in developing the final product, while Leppisaari and Lee (2012) identified some of the challenges to online global collaboration. These included the range of conditions in schools, systems, and countries (e.g. timeline interruptions affecting the completion of agreed outcomes), the experiences, attitudes, and habits of individual educators (organisational and technical barriers), and differences impacting communication styles (cultural and language differences). O'Neill (2007) noted access barriers to technology: necessary time and educator training, particularly in the use of technology.

Despite such challenges, research has highlighted positive moves to enhance online global challenges. O'Neill's (2007) research on the outcomes of intercultural virtual exchanges, for example, showed that positive changes in students' cultural awareness and intercultural skills were achieved through interaction between participants. Examining educator participation in global collaboration, Stornaiuolo (2016) shared how important it was for educators to be supported by appropriate technologies and have skills for mediating cosmopolitan collaborative conversations, whereby students see themselves as 'citizens of the world' (503) while online. In a recent doctoral study, Espino (2018) focused on the challenges of and best practices for online global collaborative learning from the perspective of educators. Her recommendations included developing a global collaboration toolkit to outline the responsibilities and characteristics of educators for facilitating global collaborations.

Research into the pedagogical aspects of online collaborative learning has been limited. Lock (2015) described implications for technological and pedagogical change in the context of learners able to work in global classrooms, and educators enabled through pedagogical shifts to design rich learning experiences. Hattie's research (see Fullan, Langworthy, and Barber 2014) revealed a new pedagogical role for educators as

activators, impacting educator–student relationships, reciprocal teaching, and feedback. Moving from hierarchical to networked learning that is end-user driven (Siemens 2006) allows educators to become 'knowledge conduits, not containers' (99). Therefore, it is important to consider how online learning spaces, tools, and pedagogical approaches might support educational change and inform educators' online work with students.

As this brief literature review has shown, much of the research relating to K–12 has focused on the learning technology itself (how technology facilitates, supports, and enhances the act of learning), how learners learn, technology integration, Web 2.0 tools and learning modes, and the limitations of using technology or online learning modes. In particular, the research has focused on the learning outcomes of online collaboration for students, structural organisation including barriers and enablers for global learning, and the uses of particular technologies to connect within and beyond classrooms. Although the research has highlighted positive learning outcomes through the innovative use of technologies and global collaborative learning for students, clarity is required around why educators are not adopting these practices more widely and more frequently, and which pedagogies are being employed.

To this end, the current study focuses on educators' perceptions of the elements contributing to their readiness and ability to implement online global collaboration in K–12 classrooms. It explores their perceptions of the impact on their pedagogies, focusing on their beliefs and attitudes about pedagogy and technology, their professional learning approaches, and conceptual change.

Method

The research was guided by the question: In what ways do educators' pedagogies enable online global collaboration? It employed a qualitative, single case-study research design, based on Yin's (2014) claim that a case should be a real-life phenomenon with an observable manifestation – in this case, educators' experiences of their pedagogical approaches to online global collaboration. As per Miles, Huberman, and Saldaña's (2014) definition of a case as 'a phenomenon ... occurring in a bounded context' (28), the case was bounded by educators' experiences within the K–12 education context. The inclusion of individual global educators provided multiple embedded units of analysis (Miles, Huberman, and Saldaña 2014) with in-depth information about the quality and extent of teaching-learning experiences (Cox 2008).

This study reported was Phase 2 of a larger study. In Phase 1, online survey data were collected from 65 K–12 educators, recruited via email, online professional networks, and social media. From this group, eight were invited to participate in semi-structured interviews, selected because they identified themselves as willing, ready, and capable of conducting an online global collaboration and with at least six weeks' experience of a global online project. As shown in Table 1, the research participants were diverse: teaching in six countries, in a range of school types, with various specialisations. All were female; none were beginning teachers, and six of the participants had at least 16 years of experience.

A 60-minute online interview was conducted with each participant, recorded, and transcribed. They were asked about their personal experiences, understandings, implementation, management, and outcomes of online global collaboration, their beliefs

Table 1. Research participants' profiles.

Pseudonym	Location	Teaching Experience (Years)	Current Teaching	
			School Type	Year Level/s and/or Specialisation/s
Stella	Australia	30+	government	K–12 (ages 5–18), ICT
Janice	Thailand	16–20	international	primary/elementary (ages 5-12), Year 3 (8–9 years old)
Donna	USA	16–20	government	Secondary (ages 12–18), Social Studies and English
Jill	Australia	30+	government	primary/elementary (ages 5–12), ICT
Susan	Ecuador	26–30	international	Year 5 (10–11 years old)
Meredith	Canada	6–10	government	Year 1 (6–7 years old)
Angela	New Zealand	30+	independent	K–8 (ages 4–13), ICT
Claire	USA	6–10	independent	library

around the use of educational technology for this purpose, and their pedagogical approaches.

Data analysis involved a narrative interpretation and systematic coding (Saldaña 2013), with continual revisiting and reconsideration of the data (Carlson 2010) to inductively delineate concepts and identify broad categories, themes, and keywords (Saldaña 2013). Nvivo 11 provided software-supported analysis and coding, enabling data searching and cross-referencing. Descriptive (short phrase/word) (Saldaña 2013) and process (using *-ing* words that connote action) (Miles, Huberman, and Saldaña 2014) coding led to the creation of a 'codebook' (DeCuir-Gunby, Marshall, and McCulloch 2011, 137) and coding schedule structure (Hay 2017). The resultant code map, with three key themes, is shown in Figure 1.

I recognise that potential bias existed in the educators' perceptions of my position as a known global thought-leader in the field, and the fact that some interviewees were known to me. To minimise possible effects, the interview questions were shared beforehand and member-checking was conducted after transcription (Onwuegbuzie and Leech 2007). In addition, the all-female participant group was a potential research limitation.

Findings and discussion

In this study, the research participants shared information about the influences on their personal pedagogical practices: their dispositions to online learning and the adoption of new pedagogies, their approaches to professional learning, and conceptual change.

Educator disposition to online learning

All research participants indicated that a positive disposition to online learning through personalisation and customisation and flexible, proactive, and versatile use of social media and Web 2.0 technologies influenced their pedagogical approaches and enabled them to embrace online global learning. Stella talked about 'learning right now,' highlighting how online activities helped learning by actively connecting with other educators. Most leveraged social media and maintained a personal or classroom blog. Seemingly empowered and fearless, they implemented new innovative learning designs, inclusive of online, blended, synchronous, and asynchronous
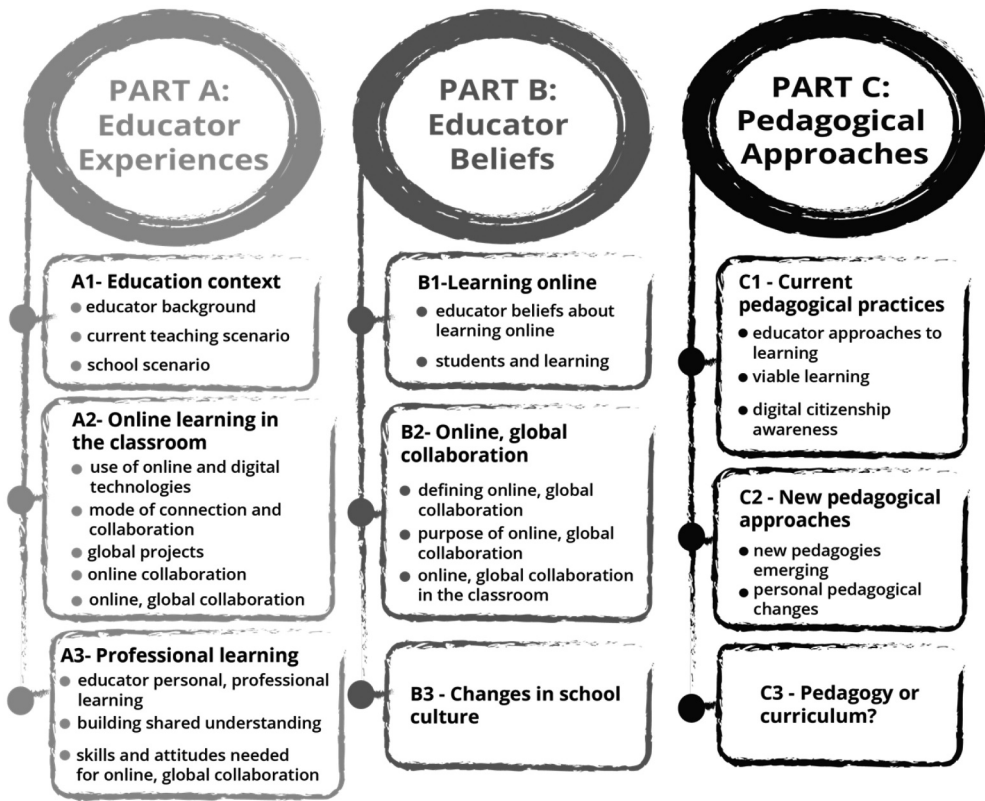
Figure 1. The codemap developed during data analysis.

modes, that linked with required curriculum objectives. They took risks willingly, fostered new cultures for learning, and practised openness through transparent collaboration within and beyond school wherever possible. They also encouraged and scaffolded students to personalise their use of online technologies, in order to collaborate beyond the classroom walls.

Morris, Stommel, and Morris (2018) used the term 'digital pedagogue' to acknowledge educators looking for new ways to inspire active classroom learning and willing to work within more fluid and adaptable learning spaces (15). In this regard, the research indicators regarded successful online global collaboration as hinging on educators' attitudes and willingness to be flexible and not always masters in the classroom. Stella, for example, explained that it was important to understand they were no longer the experts; they learnt along with their students, took risks together, experimented, laughed at things going wrong, and used mobile technologies and apps (e.g. WeChat), while making and sustaining important connections.

Donna shared her view that learning happens from failure as well as success, and teacher control of learning should be relaxed. This realisation came through having a network of teachers with a passion for global collaboration and willingness to modify approaches to teaching and thinking about education. She explained that she became more flexible, confident, open to risk-taking, and centred on what students needed to be

successful. She gave her students time to explore and discover and was comfortable and flexible with mistakes and 'on-the-job' learning. She realised that students could teach the teacher and that both stakeholders could sit side-by-side. She articulated online global collaboration as a 'philosophy' of teaching and learning:

> If we are teaching students to be global citizens or helping them become these global citizens, how do you do that without having global experience and understanding what that means? So it becomes a philosophy, a way of doing business, and then it becomes part of everyday teaching and learning.

Several of the educators talked about the disposition necessary to take on global online collaboration. Angela highlighted that a teacher's mindset may be a barrier to new ideas and practices, but an 'I-can-do-anything' mindset was a significant enabler. Similarly, Stella articulated that global educators needed 'mindsets, confidence in using technology, confidence in being able to communicate with people who maybe don't speak English as their first language.' Donna suggested that a mindset-complementing infrastructure was necessary to shift practice:

> I think we have the technology in place; I think some of it's going to be mindset, the fact that you know it can be done; I see sometimes when you bring up an idea they'll say, 'Oh that's just one more thing,' and I totally understand that teachers can be overwhelmed with expectations.

According to Janice, adopting a mindset for online global collaboration meant that educators have the attributes of patience, open-mindedness, flexibility, and confidence in their ability to learn new technologies in a confident and motivated way. She also acknowledged:

> You know, that it's not hard because I think a lot of people just go, 'Oh I can never do that,' or 'I'll wait until I'm told I have to do that,' and those are the kind of mindsets that hinder online collaboration.

The views of these research participants aligned with the concept of mindset as a set of personal believes, values and qualities such as intelligence, talents, and personality (Duffy 2009; Dweck 2017; Lindsay and Redmond 2022).

Educator approach to professional learning

In talking about professional learning and preparation for online collaboration, the research participants made personal choices. No two pathways were identical. Their professional learning was mostly organic and experiential, with broad educator networks, personal learning networks, and professional learning communities helping them find global like-minded partners to extend knowledge and practice. This was how they acquired the skills for enhanced development and understanding of network and connection literacy, and for troubleshooting online technologies. This included knowing how to learn from partners, and how to develop skills for sharing and teaching back, a type of mentoring related to being active in a community of practice.

The research participants interacted through local and global networks, sharing experiences, stories and tools, and solving problems. They described a range of strategies, including engaging in purposeful communities of practice, with those who shared their

passion and were willing to interact to learn to do something better (Wenger-Trayner and Wenger-Trayner 2020), and peer-to-peer mentoring. These provided professional learning that gave meaning to and shaped the practice of the community, while connecting local with global practices (Dirckinck-Holmfeld and Coto 2019).

The research participants' experiences were diverse. As a pre-service teacher, Meredith had developed a virtual mentorship with a more experienced educator. This continued and grew into her default, but not only, classroom partner. This prepared her 'as much as you can be prepared' for online global collaboration. Stella worked hard at being a mentor to others, acting as the bridge to external opportunities for local colleagues and more widely across global professional communities: 'I relied on learning with the people I collaborated with, and I think it's by hands-on and experiencing . . . that you really learn very much about collaboration on a global scale.' In contrast, Susan claimed she 'plunged' into global collaboration without formal preparation. She described the virtues and affordances of Twitter and other online communities that she interacted with regularly, moving into relationship-building and a broader concept of mentorship within online communities. Janice mentioned the fast personal learning rate when connecting with and learning from others beyond school.

The organic, self-organised peer learning described by the research participants demonstrated that they understood what they wanted to know – not necessarily what the school dictated – and this was on a global scale, beyond school and the traditional organisational boundaries of usual professional learning. Their personalisation of personal learning networks and professional learning communities, with the subsequent cross-pollination that occurred, suggested they had an aptitude or disposition to openly explore and gain skills through interaction. Stella, for example, connected with educators and organisations in many ways and was thus positioned as a leader with prominent online global organisations, following and using Twitter hashtags and hosting regular professional learning webinars. She stated: 'Just getting involved in global projects and being a mentor for different groups like Google groups and being involved with ISTE Global PLN [personal learning networks] . . . it's very much organic learning. I think that has helped me.'

The research participants identified the outcomes from their professional networking, including building global and cultural awareness, fostering empathy for future global partnerships, and developing competencies for learning with and from others, along with honing skills transferable to their classrooms. They were already highly trained and skilled; however, they embraced new professional online learning modes that encouraged (or required) reflection and sharing with the group, which operated as a supportive community. Angela, for example, conducted online TeachMeet sessions, saying these were about building relationships to make connections stronger. Claire stressed that one of the most critical outcomes of online global collaboration was the professional development that the teachers experienced. She explained:

> There are always people who do things differently who have great ideas to share with you, and most of the people who want to do this kind of thing are big sharers, and they want to learn from you, and they want to teach you what they know.

The educators' personalisation of professional learning to suit their individual needs and goals was organic, self-motivated, self-organised, and flexible. This finding reflects the

work of Krutka, Carpenter, and Carpenter (2016), who showed how the digitisation of communities offered new forms of professional growth, and Charteris, Smardon, and Page's (2018) discussion about learning environments being reconsidered in terms of fluidity, flexibility, and spatiality. As Lantz-Andersson, Lundin, and Selwyn (2018) found, sustained interaction between educators, self-directed research, and reading provided critical forms of professional development.

To move other educators into online global collaboration, Meredith suggested that the best approach was targeted professional learning in conjunction with coaching and support, such as mentoring, to shift educational beliefs away from emphasis on content mastery. Similarly, Janice stated: 'We need teachers teaching other teachers. We need better approaches to learning skills and more pedagogical conversations and opportunities to learn from others. I think one reason people don't do it is because they don't know about it.'

Their comments reflected the findings of Trust and Horrocks (2017), who explained that educators benefitted from ongoing engagement in learning with others through a diverse range of means. The research participants recommended that opportunities for professional development should be informal and formal, as well as in-person and online (such as Twitter chats) and should be accessed in multiple ways.

These findings indicated that it is important for educators to know how to work online in asynchronous and synchronous modes, in order to share understandings of global project goals and outcomes. According to Stella, conversations amongst educators lead to shared reflections and understandings of the collaboration focus and goals. Redmond and Lock (2006) also found that online collaboration partners need to negotiate their educational experiences and expectations.

Educator conceptual change

The research participants talked about how their professional learning experiences led to the linking or integrating of new information with prior knowledge. This knowledge restructuring, also referred to as conceptual change (Schneider, Vamvakoussi, and Van Dooren 2012), occurred when their understandings of teaching-learning practices were modified over time (Kolb 2014). They constructed new knowledge through authentic teaching experiences, in collaboration with others in a social context (Hashweh 2003).

According to the research participants, ability and willingness influenced their adoption of new global learning modes. Although many participants were experienced educators, as indicated by their years of teaching experience (see Table 1), they indicated an ability to adopt new attitudes and develop through experience as a practising professional. They noted attitude and flexibility as important impacts on practice. For example, Claire described being able to 'build the plane as you are flying it,' and Angela discussed the skill involved in being a 'risk-taker' in the classroom when adopting new technologies and learning collaboratively with others beyond her school. Jill leveraged her enthusiasm for new technologies and new modes of working such as online global collaboration when working with both colleagues and students to increase engagement and 'real learning' that takes place as students communicate online.

The research participants were willing to use online technologies to connect with others and explore and gain skills through online learning. They employed reflective

practices, such as writing personal and/or professional blogs, thus openly sharing their ideas for comments and feedback. Angela commented that educators often want their ideas to be perfect before they share, but in reality it is about the process: 'So there is never a perfect product or a perfect reflection because there is always something else to do.'

The research participants also explained that open classroom approaches, such as tweeting in-class activities, encouraged interaction with and acknowledgement from online peers. Their learning and that of their students took place mainly in an open environment while connected to supportive professional learning communities. They discussed the learning environment as offering a range of online strategies that supported student autonomy, as well as educator facilitation and monitoring, thus enabling the modelling of online global digital citizenship through effective collaborative practices. The educators were learning from their students and vice versa. This reflects Yang and Kuo's (2020) finding that teacher–student role reversal can prompt pedagogical conceptual change.

In Susan's opinion, it was crucial for teachers to be active in online participatory learning through writing, contributing, blogging, tweeting, and interacting via other social media. She explained: 'How can I help my kids see the value of it if I don't see the value of it – if I'm not participating?' She argued that culture change had to be part of this. The valuing of activities like reflection on learning and teaching, along with putting thoughts online for others and accepting responses from within and beyond the school community, was identified as facilitating an important conceptual shift. As Susan explained, online global collaboration requires:

> A different kind of communication, an awareness that the other is not right next to you, an awareness that you are talking to someone that you don't really know everything about, but that you are trying to connect with for learning purposes either to teach them or learn from them.

The research participants discussed empathy for and understandings about how to connect and communicate responsibly and reliably in both offline and online contexts as vital to the success of global collaboration and imperative to the conceptual change that takes place.

They explained that, within schools, this occurs through co-teaching and/or mentoring relationships; amongst schools, it occurs when educators reach out to others through personal learning networks and professional learning communities. They suggested that agile virtual communication habits with global partners lead to collaborative learning and shared purposes amongst educators, thereby resulting in faster learning and empowering experiences. They also confirmed the advantages of having a global audience to share student outputs and learning with peers beyond their own classrooms. Similarly, Cook et al. (2016) identified the benefits of engaged collaboration, including writing and speaking for authentic audiences, to develop cross-cultural empathy and global perspectives. As Meredith said, 'I think that audience really increases motivation and the drive to really do a good job and to polish our work if it's seen online by other classrooms.'

Stella expected students to be learning from others online and at a distance, rather than simply reading textbooks and looking up online information. In her view, the experience of connecting and collaborating with others is a forerunner and catalyst for

further research, as interest is piqued about the location and lifestyle of the partner collaborators. In her classroom, online global collaboration often took place in what is called a backchannel, a chat forum where questions and comments can be posted in real time as well as asynchronously. Stella shared how her students loved the social element to online collaboration: they asked a variety of questions. She indicated that student confidence was boosted when they shared answers, and a more profound knowledge of the home country and culture was fostered, with an enhanced understanding of the advantages of living there. When asked what online global collaboration in the classroom was, Stella said:

> I think it's interaction between people in other countries around the globe; I think there has to be that interaction to make the learning more meaningful and engaging. It allows the students to follow their own curiosity and inquisitiveness … I think that students and I learn a lot more beyond the textbook for a start. So we start to learn a lot more from people and with people.

Stella explained that she had changed her approach to teaching and learning by accessing people and resources beyond the traditional textbook approach used in her school: 'So many people out there can actually bring textbook learning to life for you. I think just be flexible, get yourself networked as networked learning is huge.'

This research did not set out to assess the educators' claims of pedagogical change and impacts on educator practice, but it focused on their perceptions about their approaches to personal teaching and professional learning. Nevertheless, the research participants highlighted the way they started to introduce new, educator-initiated connected and collaborative modes in their classrooms, and they assessed this as substantial. At the same time, however, several of them stated that the changes in their practices and the associated impacts were not always acknowledged or adopted more widely in their schools.

Building an online global collaborative learning framework

As has been discussed, online global collaborative learning seemed to be enabled by the educators' actions and associated experiences, and their dispositions towards adapting and changing their personal pedagogies. In this evolving space of online learning, global learning, emerging technologies, and changing educator practices, the data suggested that three essential factors influenced the educators' use of online global collaboration: their disposition to online learning, approach to professional learning, and potential for conceptual change. The research participants indicated that the purpose of online global collaboration was more than just using online technologies, more than learning how to collaborate online, and more than simple intercultural interaction. In implementing online global collaborative learning, they developed new networking and communication abilities and knowledge-building capabilities. They acknowledged that pedagogical approaches that were connected, participatory, and open with participants assisted a move towards autonomous and agile teaching.

As explained by the research participants, their professional learning was mostly embedded in daily activities through authentic networking, practical application, mentor and mentee relationships, and risk-taking. Often isolated within their school and feeling as

though they had an outlier profile (Arteaga 2012), they reached out beyond their class-rooms. They generally operated in an autonomous way, using collaborative decision-making and making professional choices based on their experiences. Such actions seemed to connote a reflective, intrapersonal attitude, where they were able to self-direct in an interdependent context, thereby facilitating collaboration without losing personal choice and freedom (Vangrieken et al. 2017). The educators seemed to take on the characteristics of collaborative individualism, namely the empowerment of the indi-vidual and interdependence amongst individuals (Limerick and Cunningham 1993). At the same time, they worked independently towards global collaborative goals and leveraged digital technology to break isolation, connect local and global learning envir-onments, and transform learning for themselves and their students.

The research participants regarded open participation in virtual global networks as an essential new pedagogical approach which enabled learning online and transformed professional learning, allowing them to receive and share ideas in multiple ways. By transferring this approach to their teaching, this helped to encourage openness when learning with others, the sharing of digital platforms to capture ideas, and, as a consequence, collaborative outcomes. They recognised that online global collaboration, by its very nature, implies asynchronous learning, which is another shift in thinking about classroom pedagogy. The research participants also shared how they were making pedagogical conceptual change from collaboration to co-creation in the contexts in which they operated. This seemed to cut across established understandings about individualised learning and personal accountability, and it also impinged on assessment modes and mono-disciplinary approaches to curriculum. Such ideas enabled them to think about new learning opportunities in K–12 classrooms.

In thinking about the enablers that were identified by the research participants, I reflected on how the factors identified by the study provided some indication about what facilitates online global collaborative learning. It seemed that such findings might provide a framework for educators and education systems that want to build and promote educator capacity in terms of digital pedagogical knowledge, application, and practice. I recognise, however, that the framework I develop has to be tentative, because it is based on a very small sample of educators. Nevertheless, the data that were collected were detailed and insightful.

In developing the framework, I began with the notion of a construct of online global collaborative learning being a product of collaborative, global, and online learning modes, which exist independently and blend in various combinations. As shown in Figure 2, collaborative learning (CL) applies to classroom or school-based, localised non-networked activities. Global learning (GL) refers to individuals, classes, and schools learn-ing about the world from artefacts such as books, videos, and letters. This learning is non-networked and learners do not meet up in any way. When collaborative and global learning combine to form global collaborative learning (GCL), connections and collabora-tions take place between geographically dispersed schools and systems. However, they are devoid of essential networking technologies.

The advent of the internet catalysed online learning modes (OL) and, when combined with collaborative learning, produces online collaborative learning (OCL). This practice is localised and within the one classroom, or perhaps within the one school or school system, similar to Harasim's (2017) collaborativism. This
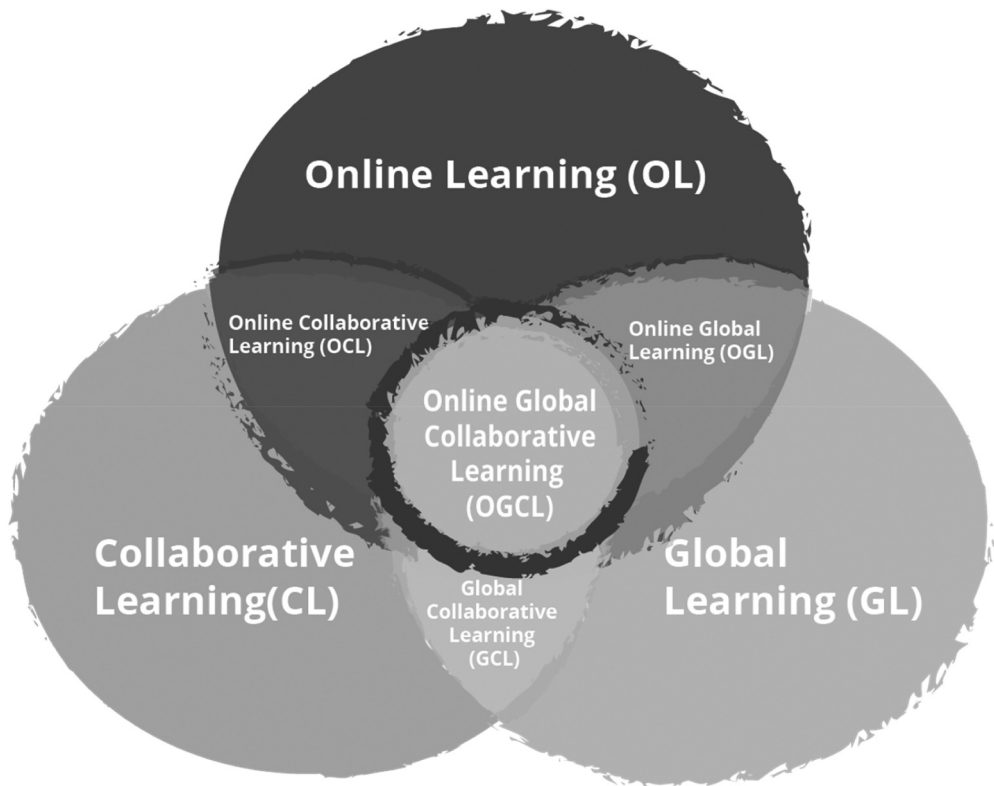
Figure 2. The online global collaborative learning construct.

particularly applies to institutions where online collaboration is predominantly possible only through internal digital technology platforms and structures, and it can also refer to the use of supportive tools external to the learning management system, such as blogs, wikis, and other Web 2.0 applications including Padlet and Voicethread. Nevertheless, the collaboration is part of a relatively closed community.

However, when online learning is joined with global learning, it provides the opportunity for online global learning (OGL). It includes internet-based activities such as exploring the world through online resources, reaching out to external experts and organisations for relevant and updated information, following real-world developments vicariously such as a polar bear expedition, to cooperatively solve problems. The intent is to learn about the world through real-world interactions made possible by online networking and conferencing.

The central part of Figure 2 demonstrates that when online collaborative learning, online global learning, and global collaborative learning are merged, this results in online global collaborative learning (OGCL). In this mode, learning is online, collaborative with others beyond the immediate classroom (real or virtual), and characterised by ubiquitous, autonomous, and open approaches. Connecting with the world for meaningful learning is not location based and provides the freedom to collaborate and co-create with the contention that whom you learn with and what you construct together are most

important. Online global collaborative learning ostensibly takes learning beyond primary resources, such as textbooks and educator knowledge, to use the affordances of digital networks for occasional or ongoing online knowledge-building through global collaborative learning experiences.

The second step of building a framework involved using Figure 2 at its centre, with the findings of the current study as the middle layer, thus providing a structured approach to learning that connects learners with others for collaboration and co-creation, and where the context of learning is 'with' rather than 'about.' As shown in Figure 3, the middle circle represents the influences on educators' personal pedagogies, as discussed earlier: dispositions and beliefs about online learning and the adoption of new pedagogies, the competencies that were developed and approaches to professional learning and conceptual change.

The outer circle of Figure 3 represents the attributes of a global collaborator mindset: Connection, Openness, Autonomy, and Innovation (Lindsay and Redmond 2022), as these can be drivers of both behaviours and outcomes (Klein 2017; Sadler and Dooly 2018). The global collaborator mindset is contextually applicable and adaptable to the K–12 learning
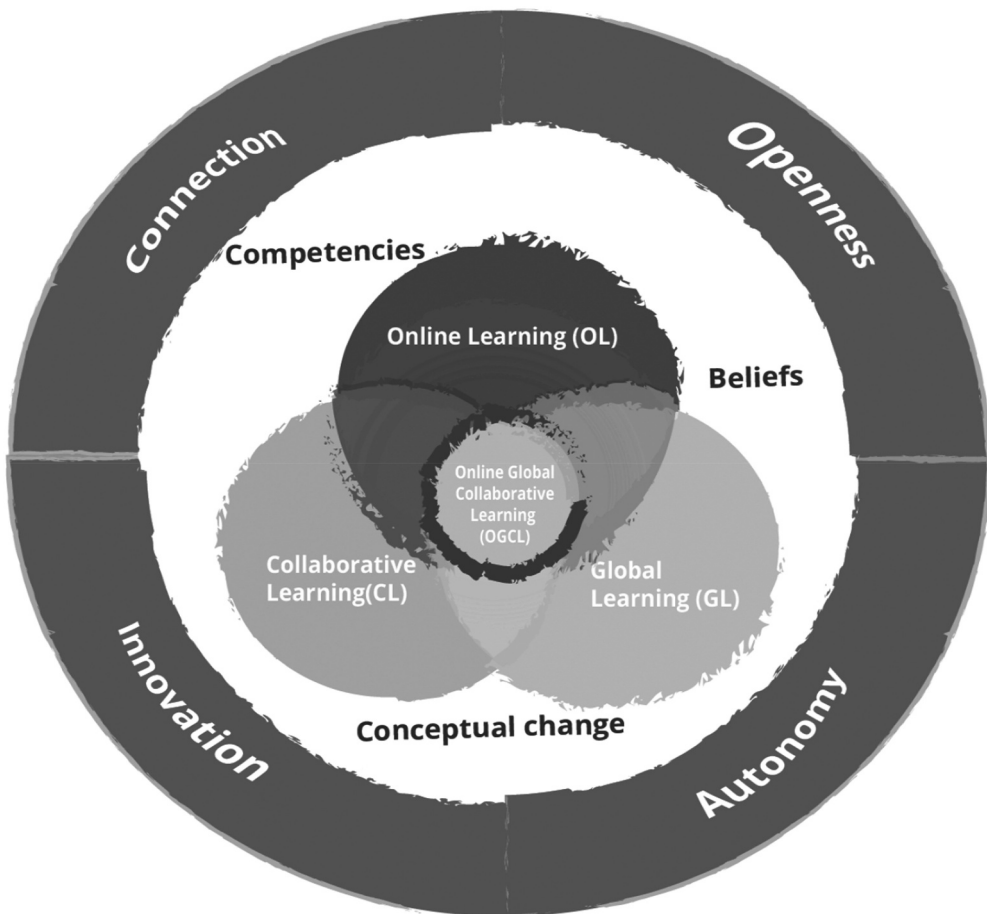

Figure 3. The online global collaborative learning framework.

environment as well as higher education and beyond (e.g. organisations and businesses), and acknowledges an openness to and awareness of diversity across education systems, countries, and cultures, and the ability to foster autonomous relationships (Lindsay and Redmond 2022).

When applying the framework as a vision to benefit schools, the outer circle (attributes of the global collaborator mindset) seems to provide a useful starting point. Professional learning design within a school context could focus on how to identify and develop each attribute and encourage educator practical adoption. The development of a pedagogical toolkit could include concepts and actions based on the middle circle to aim at far-reaching paradigm shifts in education, with the inner circle (OGCL) being the overarching goal. It is unlikely that this could be done in a typical two-day workshop; it would seem to require a holistic approach, visionary leadership, and time to build global networks of peers for planning, designing, and implementing new learning modes, including online global collaborative projects.

Limitations, future research, and implications

Although predicated around educators who are already implementing global online projects, this study was not about global projects as such, nor about individual educators. It was about the phenomenon of online global collaboration in all of its guises, including as a curriculum objective (such as global projects), as a pedagogical approach, as an online learning objective to support digital fluency, and as a means of developing global competency. It avoided the pitfall of an embedded single case-study design (Yin 2014), where the tendency is to focus on the sub-unit level (e.g. the educators in this study) rather than returning to the larger unit, or the phenomenon (online global collaboration).

Due to the small number of research participants, generalisation from the data is not possible and is not the intention of this study. It is also recognised that the study relied only on the perceptions of the eight educators, not on details about their work in schools or the projects they conducted, or the perceptions of other staff or students. Nevertheless, the findings offered a way of thinking about aspects that teachers, schools, and education systems could consider in terms of upskilling staff and moving them towards the potentials of online global collaboration. The strength of the framework that was developed relies partly on the fact that the eight interviews were with geographically dispersed educators from a range of K–12 teaching contexts and levels, and also on the criteria for interviewees to have had experience in online global collaboration through participation in longer-term global projects.

In terms of future research, the current study could be widened to include additional research participants and to include other types of data and data from a wider spectrum of stakeholders. It will also be important to investigate whether the framework holds up in light of this further research and to investigate application of the framework. Indeed, one implication underpinning this research is clarification that, although the online global collaborative learning framework can apply to individuals who described themselves as online global collaborative educator outliers within schools (Arteaga 2012), for pedagogical transformation to occur, a whole-school approach is necessary. This implies embedding personalised professional learning objectives within institutions, with associated adaptation to the needs of educators and learners; that is, this is not about applying off-

the-shelf approaches, but about taking affirmative action in support of curriculum-based collaborations.

Another implication is that development using the online global collaborative learning framework is best done in conjunction with a focus on educators as creators of knowledge in global classrooms. Activities such as doing and creating, sharing, and collaborating are intrinsic motivators informed by, not isolated from, the online global collaborative learning concept. The goal here is to develop and apply skills, attitudes, and behaviours to accommodate connected learning, open learning, autonomy, and digital freedom, as well as innovation for global and collaborative learning.

Conclusion

This article makes a contribution to educator practice through its insights into the perceptions of teachers in a range of international contexts and through an online global collaborative learning framework, incorporating dispositions and collaborative approaches and proposed as a tool for understanding classroom learning modes that are online, collaborative, and global. The study demonstrated that the phenomenon of online global collaboration impacted educators positively and profoundly, and there was evidence of online social learning and innovative pedagogical approaches becoming ingrained into teachers' everyday practices. It could be argued that some of these pedagogies were already in place and that online global collaboration further developed or strengthened them. However, there is evidence to suggest that significant new ways of teaching and learning were emerging. What this study and the online global collaborative framework provide is a longer-term approach, not a quick fix. The framework was not proposed as a novel way to utilise digital technologies or educational computer systems, but rather as an adaptable approach that would fit within the culture, context, and visions of different schools and education systems.

Statements and declarations

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