The role of telecollaboration in English language teacher education: a systematic review

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Abstract

This study systematically reviews telecollaboration studies conducted between 2013 and 2023 in English language teacher education. This review scrutinized telecollaboration studies conducted in English language teacher education regarding their research focal points, study contexts, and the technological tools employed. The study also aimed to unveil emerging and recurring issues in telecollaboration studies. The findings of the systematic review highlighted the dual emphasis of telecollaboration studies on pedagogical and telecollaborative aspects. As for the pedagogical considerations, this review illustrated that telecollaboration was employed to enhance intercultural competence, techno-pedagogical skills, and instructional design in English language teacher education. Studies focusing on telecollaborative aspects explored telecollaborative competence, task design and implementation, and the challenges associated with telecollaboration in English language teacher education. This systematic review also revealed that partnerships for telecollaborative studies were established in America, Asia, and Europe. This review also explored that telecollaboration studies utilized various synchronous tools for immediate and dynamic interaction and a variety of asynchronous tools to initiate connections, establish rapport, and foster team exchange. In light of the findings, this review explored the role of telecollaboration as a virtual space for developing pedagogical skills, including intercultural competence, techno-pedagogical competence, and instructional design. The transformative role of telecollaboration also emerged from the findings in bridging the gap between pedagogical theory and practical application by increasing awareness and facilitating the application of knowledge to actual or future teaching practice. In addition, the supplementary role of telecollaboration was explored in cultivating telecollaborative competence through adopting various functions such as co-designer, assessor, facilitator, and mediator and engaging in task design and implementation.

Keywords: Telecollaboration, English language teacher education, Interculturality, Techno-pedagogical skills

Introduction

Today's students have grown up in a world saturated with technology (Duffy, 2008). The world has undergone rapid and profound changes in technology, politics, society, and culture. These changes have created a need for education to adapt technology

and connectivity as indispensable tools for disseminating information and knowledge (Pennock-Speck, 2013; Sadler & Dooly, 2016). Digital technologies empower learners to access information, collaborate with peers, and engage with a global audience (Garcia-Esteban, 2015). Within this context, foreign language teacher education programs reevaluate their approaches to preparing future educators. They confront the challenge of equipping teachers with the requisite skills and knowledge to excel in today's interconnected world (Avalos, 2011; Kumaravadivelu, 2012; Sadler & Dooly, 2016; Wiseman, 2012). In that regard, telecollaboration presents opportunities for universities to advance their internationalization strategies by globalizing their curriculum and involving preservice teachers in dialogues with peers from distant corners of the globe. However, the full potential of telecollaboration has yet to be realized, as it has not been fully integrated into higher education (Helm, 2015).

Recently, scholars have concentrated on how telecollaboration can be leveraged in foreign language teacher education by exploring its unique advantages and potential applications (Bueno-Alastuey & Kleban, 2016; Clark et al., 2016; Dooly & Sadler, 2013, 2020). Lewis (2017) notes a growing interest in telecollaboration for teacher development, particularly in online teaching skills (p. 1). This interest is also evident in a dedicated issue of LLT, where articles specifically focus on employing telecollaboration in teacher education (Godwin-Jones, 2019). A driving factor behind the rise of telecollaboration lies in its integration within foreign teacher education programs, especially those rooted in the tenets of social constructivist views of teacher education (Lantolf, 2000; Vygotsky, 1978). This pedagogical paradigm rejects conventional teacher training models and advocates for active participation in educational activities, engagement within learning communities, and reflection and theoretical thinking based on personal learning (O'Dowd, 2015; Sadler & Dooly, 2016). This approach is underpinned by the belief that the collective achievements of a community surpass individual contributions and contribute to broader cultural advancements (Scardamalia & Bereiter, 2003).

In teacher training, telecollaboration impels educators to depart from their accustomed teaching methodologies and foster innovative skills to effectively engage in linguistic, intercultural, and digital learning interactions—areas that may not conventionally be part of their day-to-day pedagogical practices (European Commission, 2020). This viewpoint is further substantiated by O'Dowd and Dooly (2021), who argue that telecollaboration offers teachers valuable experiences for continued professional development and methodological innovation. Specifically, telecollaboration creates opportunities for teachers to establish new professional partnerships and engage in collaborative academic initiatives. It also helps them enhance their online collaboration skills and introduces innovative approaches to their current teaching practices. Consequently, telecollaboration serves as a mediator, providing pre-service and in-service teachers with a platform for dialogue that facilitates the development of essential pedagogical skills by engaging them in online communities of practice (Kleban & Bueno-Alastuey, 2015).

The focus on telecollaboration has now evolved, shifting from its peripheral status to becoming a central nexus within the learning process (Sadler & Dooly, 2016). In this evolution, teachers develop notably challenging skills to nurture within specific educational contexts (Vinagre, 2017). Involving teachers in telecollaborative projects offers the chance for 'exploratory' teaching practices (Guichon & Hauck, 2011) and 'experiential

modeling' (Guichon, 2009). This immersive experience fosters the growth of multimodal communicative competence, multiliteracy, autonomy, and the necessary competences for teaching with multimodal technologies (Fuchs et al., 2012) by encouraging reflective thinking, peer interactions, and documentation of the pedagogical process (Godwin-Jones, 2019). As pre-service and in-service teachers gain first-hand experience, they actively cultivate their language teaching skills through involvement in pedagogical reasoning, such as understanding and adapting texts and tasks, formulating instructions, and engaging in reflective practices (Kleban & Bueno-Alastuey, 2015). As a result, telecollaboration encourages pre- and in-service teachers to dive into communicative online scenarios. This endeavour not only facilitates their learning but also enables them to reflect on the methods of transferring this newly acquired knowledge to future teaching contexts for their students (O'Dowd & Dooly, 2021; Sadler & Dooly, 2016). Such experientially grounded telecollaboration is harmonious with Thorne's (2016) vision of mainstreaming telecollaboration as an integral and expected practice within world language education.

Review of literature

Telecollaboration is generally defined as using online communication tools to connect learners across disparate geographical locations to enhance their knowledge and skills through collaborative tasks and projects (Vinagre, 2016). With over two decades of experience in telecollaboration (Warschauer, 1996), a substantial body of research has emerged to investigate its benefits and limitations in English language education. In that regard, the literature has unveiled the impact of telecollaboration on fostering language skills (Belz, 2003), online literacies (Guth & Helm, 2010), and intercultural communicative competence (ICC) (Hauck, 2010; Müller-Hartmann, 2005). Recently, scholars attempted to explore the potential of telecollaboration in teacher learning and professional development.

Telecollaboration and language learning

Telecollaboration was previously perceived as a method of engaging distant classes of language learners in interaction through Internet-based communication tools to support intercultural exchange and foreign language learning (Guth & Helm, 2016). Interactions with native speakers in telecollaboration are considered particularly valuable in foreign language learning as such interactions provide an authentic way to practice second/foreign language skills (O'Dowd, 2018; Zhang, 2014). Recognizing the benefits of telecollaboration in creating an authentic learning environment, a substantial body of literature has conducted telecollaboration studies to explore its potential to enhance foreign language skills. These studies revealed the positive impact of telecollaboration on improving oral skills in the target language (Angelova & Zhao, 2016; Canto et al., 2013; Chen & Yang, 2016) and fostering a better understanding of lexicon and grammatical structures of the target language (Angelova & Zhao, 2016; Lee, 2011; Pérez Cañado, 2010). In addition, these studies highlighted the potential of telecollaboration in providing feedback to pre-service teachers while practising language skills (Guth & Helm, 2016). They argue that telecollaboration has been beneficial in improving the language proficiency of pre-service teachers, mainly through peer feedback (Lee, 2011), and improving language

accuracy of pre-service teachers by encouraging the use of different strategies and correction techniques to focus on the linguistic form (Vinagre & Muñoz, 2011).

These studies collectively asserted that telecollaboration is an effective add-on activity to an existing foreign language program with the aim of developing foreign language skills (Guth & Helm, 2016). Participating in telecollaboration learning provides pre-service teachers opportunities to overcome their anxiety related to communicating in a foreign language and enables them to use the target language meaningfully in discussions relevant to their interests (Dooly & Vinagre, 2022; O'Dowd, 2021). Therefore, telecollaboration has been perceived as a departure from the traditional approach to foreign language learning, which often emphasizes grammatical accuracy (O'Dowd, 2021).

Telecollaboration and intercultural learning

In our contemporary world, intercultural interactions have become a pervasive and noticeable aspect of daily life with the erosion of boundaries and increased global interconnectedness (Çiftçi & Savaş, 2017). Today, language teacher education aims to endow teachers with the requisite skills for effective engagement in global communication networks and intercultural communicative language practices (Alptekin, 2022; Thorne, 2003). As a result, it becomes imperative to provide prospective teachers with the necessary hands-on with the 'intercultural turn' in foreign language teacher education (Thorne, 2010), in which pre-service teachers are capable of creating and consuming interactive content in alignment with the demand for 21st-century skills. In that regard, telecollaboration has emerged as a prevalent pedagogical approach aimed at enhancing the ICC of both pre-service and in-service teachers. This approach not only facilitates the internalization of the curriculum but also introduces learners to diverse intercultural experiences (Üzüm et al., 2020). The driving factor behind incorporating telecollaboration in language teacher education to enhance ICC lies in offering opportunities to pre- and in-service teachers for mobility and cross-cultural experiences without the need for travel (Çiftçi & Savaş, 2017; Eren, 2021).

There has been a growing interest in telecollaboration in English language teacher education driven by the advances in computer-mediated communication (CMC) tools. The existing body of literature has explored the potential benefits of telecollaboration in enhancing intercultural competence in foreign language teacher education. These studies explored the potential of telecollaboration in boosting pre-service teachers' intercultural competence through engaging in cultural activities and participating in cross-cultural exchanges with partner universities (Lee & Markey, 2014; Üzüm et al., 2020), enhancing critical cultural awareness through negotiation of meaning (Eren, 2021; Üzüm et al., 2020), promoting the internalization of teacher education and foster the development of global citizenship (Fuchs, 2019), creating mindfulness towards the relativity of cultural beliefs (O'Dowd, 2016), fostering intercultural learning together with social interaction (Schenker, 2012). These studies adopted Byram's (1997) framework of ICC to design telecollaboration projects to foster intercultural learning (Lee & Markey, 2014; O'Dowd & Eberbach, 2004; Ware & Kessler, 2016).

These studies indicated the instrumentality of telecollaboration in promoting pre-service teachers' ICC through exposing different cultures, engaging in authentic and real-time communication with peers from diverse cultural contexts, and working

collaboratively. These studies also affirmed telecollaboration as a valid and rewarding model for heightening intercultural awareness and creating a learning environment conducive to intercultural learning. Despite the positive indications, the studies indicated a need for further research to explore telecollaboration's role in promoting ICC among pre-service and in-service teachers.

Telecollaboration and techno-pedagogical skills

The importance of developing pre-service and in-service teachers' technological knowledge has been widely recognized to meet the demands of the twenty-first century (O'Dowd, 2013; Tondeur et al., 2016). The literature highlighted that teachers' knowledge of subject matter does not automatically translate into the ability to integrate appropriate technology (Niess, 2011; Rienties et al., 2013). This aspect adds an additional layer to English language teacher education programs alongside the focus on intercultural learning. Today, equipping pre-service teachers with the necessary competencies to teach with technology has emerged as a pivotal criterion for pre-service teaching programs (Kirschner et al., 2008). In the relevant literature, telecollaboration has been identified as an effective method for enhancing digital literacy and competences of pre-service teachers, which has only recently come to the attention of studies (Ernest et al., 2013; Guichon & Hauck, 2011; O'Dowd, 2018).

Telecollaborative studies on digital literacy and competence assert that the first-hand experiences of pre-service teachers through engaging in digital tools allow them to reflect on their practices and figure out how to use them in their future practices (Antoniadou, 2011; Godwin-Jones, 2019). They also highlight the importance of telecollaboration by claiming that the inclusion of experiential training into teacher education programs could result in adopting ICT tools into pre-service teachers' own repertoire of teaching techniques (Antoniadou, 2011; Dooly & Sadler, 2013). In that regard, motivated by identified deficiencies in teacher training programs, such as limited emphasis on design beyond lesson planning, a lack of attention to instructional planning and implementation, and minimal hands-on experience with collaborative technologies (Bueno-Alastuey & García Esteban, 2016; McKenney et al., 2015), various studies have initiated telecollaboration projects. These studies showed the potential of telecollaboration in improving digital literacy (Bilki et al., 2023; Hauck, 2019), fostering Technological Pedagogical Content Knowledge (TPACK) (Bueno Alastuey et al., 2018; Dooly & Sadler, 2013; Hauck et al., 2020), enhancing pre-service teachers' pedagogical skills using technology (Bueno-Alastuey & Kleban, 2016), and creating pedagogical knowledge through electronic materials (Kleban & Bueno-Alastuey, 2016).

These studies collectively highlight the effectiveness of telecollaboration as a pedagogical approach in fostering technological and pedagogical competence, a new area of telecollaboration that has not been relatively unexplored. These works contribute to conceptualising telecollaboration as a dialogic space that fosters learning communities for teachers' professional development (Lee, 2009; Sadler & Dooly, 2016). Consequently, telecollaboration studies have evolved to become a central educational activity that facilitates the enhancement of pre-and in-service teachers' traditional pedagogical skills, such as task planning and design and material evaluation (O'Dowd, 2021) and introduce more innovative approaches to teaching (O'Dowd & Dooly, 2021).

Current study

Telecollaboration in English language teacher education has undergone substantial growth and change in the past number of years (O'Dowd & Rourke, 2019). Since the emergence of initial reports and research studies over 20 years ago (e.g. Warschauer, 1996), telecollaboration practices have significantly evolved. It has transitioned from being a supplementary activity in enhancing English language skills to evolving into a pedagogical approach that fosters teacher learning (Bueno-Alastuey & Garcia-Estaban, 2016; O'Dowd & Dooly, 2021). This transition has led to conducting a variety of telecollaboration studies in diverse settings and with varied focus to facilitate the global integration of telecollaboration into English language teacher education. Through the synthesis and analysis of the telecollaborative studies conducted in various contexts and partnerships, a systematic review can refine our understanding of the effectiveness of telecollaboration as a pedagogical approach in this context. Despite its increasing importance, a limited number of research reviews on telecollaboration have been conducted to provide a more in-depth exploration of telecollaboration practices.

Barbosa and Ferreira-Lopes (2023) conducted a bibliometric investigation to discern research tendencies in telecollaboration and virtual exchange. They reviewed 254 articles extracted from the Web of Sciences and Scopus databases. Their findings underscored that telecollaboration practices have predominantly cultivated intercultural competence and fostered learner autonomy. The bibliometric study concluded that there is a need for further research to enhance intercultural exchanges. In a similar vein, Çiftçi and Savaş (2017) systematically examined telecollaboration studies to delve into the role of telecollaboration in language and intercultural learning. Their review aimed to elucidate discernable trends and emerging issues associated with intercultural and language learning. Seventeen studies published between 2010 and 2015 were scrutinized to investigate participants' overall perspectives on telecollaborative learning, intercultural and language learning facilitated by telecollaboration, the challenges inherent to telecollaboration, and the need for further effective telecollaboration. They concluded that, despite emerging socio-institutional and communication challenges, telecollaboration exhibits as an effective avenue for language and intercultural learning. Avgousti (2018) also aimed to unveil the potential impact of online exchange on the development of foreign language learners' intercultural communicative competence in her review study by examining the role of online exchanges facilitated through various modalities of Web 2.0 tools and applications in relation to foreign language learners' ICC. The review included 57 telecollaborative studies that employed Web 2.0 tools and assessed learners' ICC from 2004 to 2028. The systematic review proposed that the modality within Web 2.0 tools and applications has diverse implications for ICC development.

Wu (2021) conducts a systematic review of telecollaboration studies in language teacher education. The primary objective of this review is to identify emerging themes pertaining to teacher telecollaborative learning. The study encompassed 39 empirical research studies that were published in peer-reviewed journals, conference proceedings, and book chapters during the period spanning from 2009 to 2019. This comprehensive analysis illustrated six emergent themes, which collectively reflect the potential benefits of telecollaborative learning for enriching teacher-learning experiences. This review bears a striking resemblance to the present study at hand. Particularly, Wu's

([2021](#)) review focuses on telecollaboration in foreign language teacher education with an emphasis on reviewing the emerging themes within telecollaboration studies. In contrast, the current review study adopts a subtly distinct approach from Wu's ([2021](#)) work. The primary difference lies in the emphasis of the present study on presenting a comprehensive perspective on telecollaboration studies to understand the current role of telecollaboration in English language teacher education through a broader exploration of such studies rather than delving into specific, prevalent themes like Wu's analysis. Furthermore, the present study echoes the notion that diverse synthesis or review studies in rapidly evolving research areas, such as telecollaboration, offer valuable opportunities to bring fresh perspectives and challenge existing paradigms (Çiftçi & Savaş, [2017](#)). As Çiftçi and Savaş ([2017](#), p. 3) put it, these efforts can "make the familiar strange" or vice versa, contributing to a deeper understanding of the subject matter.

This review study thus aimed to review telecollaboration studies in English language teacher education published between 2013 and 2023 with the goal of unveiling the focal points of studies, the context in which telecollaboration studies were conducted, types of technologies used, and emerging issues in the telecollaboration studies to define its role in the English language teacher education. Within this aim, the current study addresses the following question:

1. What are the focal points of telecollaboration studies in English language teacher education?
2. In which contexts are telecollaboration studies in English language teacher education conducted?
3. What types of technologies are employed to facilitate telecollaboration studies in English language teacher education?
4. What are the emerging issues in the telecollaboration studies in English language teacher education?

Research method

This study systematically reviews telecollaboration studies carried out in English language teacher education. Gough et al. ([2012](#)) define systematic reviews as comprehensive evaluations of research literature using methods that are systematic, explicit, and accountable (p. 2). In simpler terms, systematic reviews involve a comprehensive evaluation and analysis of various studies undertaken in a methodical, lucid, and justified manner. Norris and Ortega ([2000](#)) articulated that synthesis pertains to any form of systematic review involving primary research, whether quantitative, qualitative, or employing mixed methods (p. 805). This form of synthesis is far from a straightforward endeavor; rather, it constitutes a complex exercise in interpretation. It involves "peeling away the surface layers of studies to find their hearts and souls in a way that does the least damage to them" (Sandelowski et al., [1997](#), p. 370). Consequently, the resulting analysis surpasses what a single study can provide (Hammersley, [2001](#)).

Articles were sourced from prominent journals in English as a second or foreign language teaching to construct the dataset for this systematic review. This selection was made based on two specific criteria. Firstly, the chosen journals were required to be indexed in either the Social Sciences Citation Index (SSCI) or the Emerging Sciences

Citation Index (ESCI). Secondly, the journals were chosen based on their scope, which needed to encompass technology in English as a second or foreign language teaching and learning. This was particularly relevant as telecollaboration falls under the broader field of Computer-Assisted Language Learning (CALL). Consequently, the review encompassed four prominent journals: Computer-Assisted Language Learning (CALL), Language Learning and Technology (LLT), ReCALL, and The Computer-Assisted Language Instruction Consortium (CALICO). These journals were deemed fitting for the review due to their comprehensive coverage of technology integration within the context of English language education.

The study established specific inclusion and exclusion criteria to select studies from prominent journals. First, the search focused on telecollaboration studies conducted between 2013 and 2023. Within this range, telecollaboration studies conducted exclusively in English language teacher education were pinpointed. The initial search employed relevant terms such as "telecollaboration," "virtual exchange," and "online international exchange." The search results were complemented by downloading the identified journals. In cases where any pertinent articles might have been overlooked, a manual search was conducted within the selected journals. Following the comprehensive search, only full original papers were considered for inclusion, while book reviews and other non-relevant journal sections were excluded from the analysis. Subsequently, each relevant article underwent a thorough examination by focusing on three primary components: the abstract, methods, and findings, with additional sections explored when necessary. Only articles that involved pre-service teachers studying English language teacher education and English as a second language (ESL)/English as a foreign language (EFL) and in-service teachers as participants were considered eligible in the present study. The study incorporated twenty-two articles published across four prominent journals. The distribution of articles across journals and publication years was presented as follows (Table 1):

This study conducted content analysis, a methodical approach that helps researchers distill and organize large amounts of textual or visual data into meaningful categories (Cavanagh, 1997). It provides a structured framework for identifying patterns, trends,

Table 1 Distribution of articles across journals and publication years

Publication Years/ Journals	CALL	LLT	ReCALL	CALICO	
2013			1		
2014	1		1		
2015		1			
2016	1				
2017	2		1		
2018		1			
2019	1	3			
2020		1	2		
2021	3			1	
2022			1		
2023			1		
Total	8	6	7	1	22

and critical elements within the data, which makes it a valuable tool for gaining insights and drawing conclusions from diverse and complex sources of information (Dey, 1993). In this systematic review, content analysis enabled researchers to identify the main topics or themes that were the central focus of the telecollaborative studies in English language teacher education, the various contexts in which studies were conducted, pinpoint the technological tools and platforms that were used in the telecollaborative studies. By systematically examining the studies, content analysis also assisted researchers in uncovering emerging or recurring issues within telecollaboration in English language teacher education. In conducting content analysis, this review initially employed a top-down approach to identify key study objectives, including the study's focal points, study contexts, types of technology used, and emerging issues within telecollaborative studies in English language teacher education. Subsequently, the analysis shifted to a bottom-up approach to present the primary findings of telecollaborative studies in terms of emphasizing the significant role of telecollaboration within English language teacher education.

Findings

This study aimed to systematically review telecollaboration studies conducted in English language teacher education. It addressed the specific research areas, study contexts, types of technologies used, and emerging issues in telecollaboration within English language teacher education.

Focal points of telecollaborative studies

This study identified the critical focal points of the studies related to telecollaboration in the context of English language teacher education. The findings are displayed in Table 2.

Table 2 Focal points of telecollaborative studies in English language teacher education

Pedagogical Focus	Pedagogical competence	Interculturality	Intercultural communicative competence
			Critical cultural awareness
			Intercultural competence
			Internalization and global citizenship
		Teaching with technology	Techno-pedagogical skills
			Critical digital literacy
			Flipped instruction
		Instructional design	Grammar instruction
			Teaching presence
	Teacher cognition	Teacher Identity	Online teacher identity
		Language ideologies	Beliefs and attitudes toward native-speakerism
Telecollaborative focus	Design and Implementation	Telecollaborative competence	Pre-service teachers as telecollaborators
			Teachers as mediators
		Task design/Implementation	Group functionalities
			Negotiation
			Affordances and challenges of telecollaboration

Table 2 indicates that telecollaborative studies in English language teacher education primarily had two main areas of focus: a pedagogical focus and a telecollaborative focus. Predominantly, telecollaborative studies placed significant emphasis on the pedagogical focus, which encompassed the enhancement of pedagogical competence among pre-service and in-service teachers, their professional development, and investigations into teacher cognition.

Several studies concentrated on interculturality, technology-integrated teaching, and instructional design within pedagogical competence. Regarding interculturality, telecollaborative studies were primarily conducted to enhance the ICC of pre-service teachers (Alghasab & Alvarez-Ayure, 2021; Üzüm et al., 2020), their intercultural competence (Lee & Markey, 2014; Sardegna & Dugartsyrenova, 2021), and critical cultural awareness (Eren, 2021). These studies often implemented cultural activities and cross-cultural exchanges with partner universities to enrich students' understanding of different cultures and foster their intercultural communication skills. Similarly, Ryshina-Pankova (2018) focused on operationalizing abstract elements of ICC by utilizing specific discourse structuring and linguistic resources. In addition, Fuchs (2019) conducted a telecollaboration study to serve as an exemplar of technology utilization and task design driven by internationalizing teacher education and fostering the development of global citizenship.

Telecollaboration studies also showed a keen interest in technology-enhanced language teaching. These studies focused on enhancing pre-service or in-service teachers' techno-pedagogical skills and critical digital literacy and offering a pedagogical design for flipped instruction, incorporating flipped materials, in-class discussions, and telecollaboration. Bueno-Alastuey and Kleban (2016) concentrated on improving pre-service teachers' techno-pedagogical skills in the EFL field. They sought to align pedagogical and technological objectives within the framework of a telecollaborative project. Similarly, Dooly and Sadler (2023) adopted an integrated approach to teaching about and through technological resources. Their focus was on introducing pre-service teachers to innovative methods for communicative-based language learning through computer-mediated communication. Similarly, Dooly and Sadler (2020) emphasized pedagogical design within the context of English language teacher education. Their approach combined flipped materials, in-class instruction, and telecollaboration to provide a comprehensive educational experience.

Studies on telecollaboration also displayed a focus on instructional design, with particular attention given to grammar instruction and teaching presence. In a study by Wach et al. (2022), the focus was on teaching English grammar within a telecollaborative project involving 41 pre-service language teachers. The study traced pre-service teachers' grammar instruction techniques in the context of online exchanges, the grammar forms addressed in the exchanges, and participants' evaluations of the usefulness of telecollaboration for teaching and learning grammar. Kürek and Müller-Hartmann (2019) investigated the role of teaching presence in fostering a Community of Inquiry in a teacher training virtual exchange delivered in a blended format. Their research centered on the impact of teaching presence on students' self- and co-regulatory learning.

Teacher cognition was also an area of interest within telecollaboration studies, focusing on teacher identity and language ideologies. Regarding teacher identity, del Rosal,

Contry, and Wu (2017) explored the intricate online identities of language teachers. They identified issues that arose when teachers from diverse cultural and linguistic backgrounds interacted through telecollaboration. Similarly, Liaw and Wu (2021) concentrated on examining the identities shaped by three L2 teachers with distinct backgrounds and experiences in an intercultural telecollaborative project that incorporated mixed-reality technology. Their research aimed to uncover the various identities held by participants and how they aspired to become effective educators. González (2019) directed attention toward investigating telecollaboration regarding language ideologies among pre-service English teachers from diverse cultural backgrounds. This exploration revolved around the potential for reshaping the self-perceptions of eight participants as (non-) native speakers. Specifically, the study delved into their native-speakerism ideologies, aiming to prompt a re-evaluation of their potentially problematic self-views as future educators.

In addition to the pedagogical focus, several studies also directed attention to the telecollaborative aspect, which revolved around the design and implementation of telecollaborative projects. Within the scope of improving telecollaborative practices for teachers and pre-service teachers, two key areas emerged: teachers as mediators and teachers as telecollaborators. Fuch et al. (2017) explored the role of a novice teacher as a mediator in a telecollaboration with student–teacher peers tasked with designing activities for EFL learners. The novice teacher aimed to play a crucial role in mediating the student teachers' task design process by offering insights into technological and institutional constraints and the specific needs of his EFL learners. Shifting the focus to teachers as telecollaborators, O'Dowd (2015) investigated strategies for effectively preparing in-service teachers to establish and manage telecollaborative exchanges at the university level. This study aimed to present a model of competencies for telecollaborative teachers, achieved using the Delphi technique. Similarly, Grau and Turula (2019) concentrated on how pre-service foreign language teachers could develop the skills needed to be successful telecollaborators. They explored teaching EFL pre-service teachers' perceptions of how they acquired the competencies, attitudes, and beliefs outlined by O'Dowd (2015) through experiential learning in a virtual exchange.

Studies pertaining to telecollaborative task design and implementation placed their emphasis on three key aspects: negotiation, group functionality, and the affordances and challenges associated with integrating telecollaboration into English language teacher education. In the realm of negotiation, Fuchs (2016) delved into collaborative task formats in telecollaboration by investigating how both ESL and EFL pre-service teachers negotiated the design, implementation, and evaluation of technology-based English language learning tasks. The study specifically examined the various types of negotiation (personal, interactive, procedural) that telecollaborative teams engaged in, both at the micro and macro levels of the project. Similarly, Priego and Liaw (2017) concentrated on different levels of group functionality within a telecollaborative project. Their research aimed to identify where contradictions arose among intercultural groups during multilingual digital storytelling co-constructions and the subsequent resolution, or lack thereof, of these contradictions. Finally, Yang (2020) focused on exploring the affordances and challenges of telecollaboration by implementing a telecollaborative study involving pre-service teachers from diverse cultural

backgrounds. This study concentrated on harnessing the affordances of telecollaboration to enhance ICC, teaching skills, and digital literacy skills. It also examined the challenges associated with telecollaboration, particularly those stemming from time differences and varying levels of engagement among participants.

Study contexts of telecollaborative studies

This study analyzed the contexts of telecollaborative studies in English language teacher education to highlight international collaborations. The findings, depicted in Fig. 1, unveiled various partner countries engaged in telecollaboration projects.

Figure 1 illustrates an overview of multifaceted contexts in which telecollaborative studies across America, Asia, and Europe had been undertaken. Within these studies, telecollaboration emerged as notably prominent in European and American settings, followed by Asian settings. Specifically, the United States demonstrated marked activity in telecollaborative research in English language teacher education within the American context. Europe, Poland, Spain, and Germany emerged as active contributors to telecollaborative studies. In the Asian educational setting, China and Taiwan played pivotal roles in conducting telecollaborative research.

These studies entailed collaborative efforts spanning multiple regions, including Europe and America, America and Asia, and Europe and Asia. Collaborations between Europe and America involved partnerships such as those between the United States and Turkey (Fuchs, 2016; Üzüm et al., 2020), the United States and Germany (Ryshina-Pankova, 2018), Argentina, the United States, Germany, and Italy (O'Dowd, 2015), and Spain and the United States (Dooly & Sadler, 2020; Lee & Markey, 2014). Within the context of America and Asia, collaborations comprised Kuwait and Colombia (Alghasab & Alvarez-Ayure, 2021), Canada and Taiwan (Priego & Liaw, 2017), the United States and Korea (Yang, 2020), China and the United States (Fuchs et al., 2017), and the United States and Taiwan (Liaw & Wu, 2021). In the context
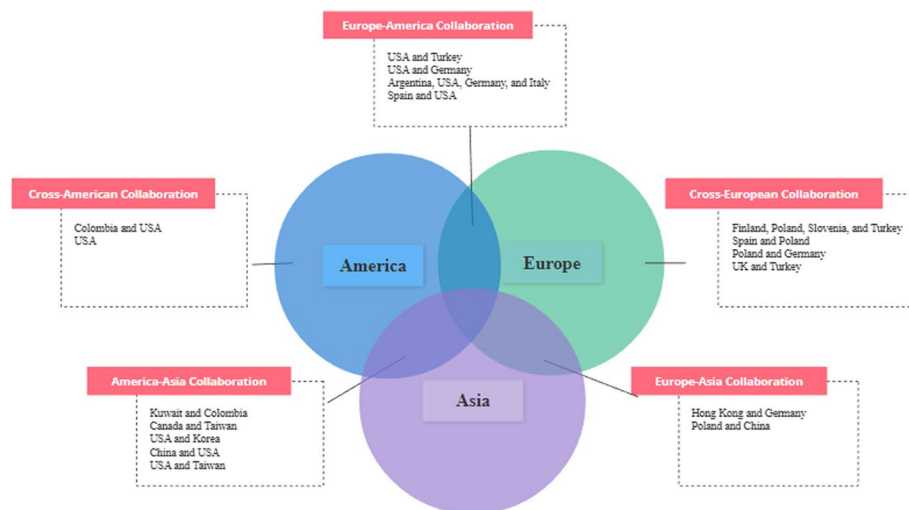

Fig. 1 Telecollaborative study contexts in English language teacher education

of Europe-Asia telecollaboration studies, partnerships encompassed Hong Kong and Germany (Fuchs, 2019), Poland and China (Wach et al., 2022).

Partnerships for telecollaborative studies were also established within countries of both European and American origin. In European countries, collaborations were observed between Finland, Poland, Slovenia, and Turkey (Eren, 2021; Sardegna & Dugartsyrenova, 2021). Further partnerships included collaborations between Spain and Poland (Bueno-Alastuey & Kleban, 2016), Poland and Germany (Grau & Turula, 2019; Kürek & Müller-Hartmann, 2019), and the United Kingdom and Turkey (Bilki et al., 2023) in the context of telecollaborative studies within English language education. On the American front, collaborative efforts were noted between Colombia and the United States (González, 2019) and among various educational institutions within the United States (del Rosal et al., 2017).

Technological tools in telecollaborative studies

This study aimed to identify the technological tools employed in telecollaboration projects. The findings revealed that telecollaborative studies used a range of Computer-Mediated Communication (CMC) tools to facilitate online exchanges and interactions. Table 3 provides a detailed list of the CMC tools utilized in these telecollaborative studies.

Table 3 displays that telecollaborative studies utilized synchronous and asynchronous platforms to facilitate online exchanges and interactions. Concerning synchronous interactions, telecollaborative studies primarily utilized learning management systems, videoconferencing tools (e.g., Zoom and Skype), and virtual worlds (e.g., Second Life). These synchronous tools were pivotal in enabling telecollaborative projects to facilitate immediate and dynamic interactions among participants and promote active engagement in collaborative activities regardless of geographical distance.

Telecollaborative studies also leveraged asynchronous platforms, often in conjunction with synchronous tools, to foster online interaction. Several studies employed interactive walls (e.g., Padlet) and social media (e.g., Twitter) to initiate connections, establish

Table 3 Technological tools in telecollaborative studies

Modality	Platforms	Tools	Aim
Synchronous	Learning management system	Sakai course management system	To facilitate immediate and dynamic interaction
	Videoconference	Zoom, Skype	To promote active engagement
	Virtua lworld	Second life	
Asynchronous	Interactive wall	Padlet	To initiate connections and establish rapport
	Virtual classroom	Edmodo	To commend on others' posts
	Chatrooms	Facebook chat, WhatsApp	To encourage initial brainstorming of ideas
	Web-based voice board	Voxopop, Voicethread	
	Wiki	Zoho Wiki	To publish solutions and recommendations on a joint team website
	Blog	Blogger	
	Email	Google email	To foster team exchanges
	Discussion forum	Wix, Moodle	To share flipped materials
	Social media	Facebook, Twitter	
	Online word processor	Google Docs	

rapport, and build group dynamics during the initial phases of telecollaboration. These tools allowed participants to post their information and exchange brief text messages to foster early engagement. Web-based voice board platforms (e.g., Voxopop and Voice-thread) were primarily used for asynchronous telecollaboration, which enabled participants to record, upload, and respond to oral messages and tasks at their own pace.

Studies also employed virtual classrooms, wikis, blogs, emails, discussion forums, chats, and social media as collaborative spaces for participant interactions. Virtual classrooms (e.g., Edmodo), wikis (e.g., Zoho Wiki), and blogs (e.g., Blogger) were generally to extend interaction and exchange beyond synchronous sessions. They served as virtual spaces where participants could engage in ongoing discussions by contributing to content and commenting on each other's posts, allowing for a deeper exploration of topics at their own pace. Discussion forums (e.g., Moodle and Wix) were utilized primarily to brainstorm ideas and as platforms to publish solutions and recommendations on the joint team website. Similarly, social media (e.g., Facebook), chats (e.g., WhatsApp and Facebook chat), and emails were also employed to enhance team communication and encourage connections among participants. Telecollaboration projects also made use of online word processing tools, such as Google Docs, for sharing flipped materials. Overall, telecollaboration studies utilizing synchronous and asynchronous platforms created a comprehensive environment that fostered a wide range of interactions, ultimately enhancing the overall telecollaborative experience.

Emerging issues in telecollaborative studies

This study aimed to uncover emerging issues arising from telecollaborative studies conducted in English language teacher education. The research revealed both pedagogical and telecollaborative insights, with pedagogical insights illustrated in Table 4.

Table 4 Pedagogical insights of telecollaborative studies

Interculturality	Intercultural communicative competence	Attitudes
		Knowledge
		Skills of interpreting and relating
		Critical cultural awareness
	Discourse-semantic moves	Interactivity
		Expanding cultural information
		Negotiation of disalignment
Techno-pedagogical skills	Digital literacy	Awareness of digital affordances
		Semiotic and interactional means to build connections
		Ensuring the inclusiveness of all community members
	Transferal of knowledge	From knowledge telling to knowledge transferring
	Theoretical application and practical implementation	Theorizing what they practice and practicing what they theorize
	Technology integration into teaching practice	Self-achievement and confidence
Instructional design	Modelling in action	Communicative orientation
		Implicit technique
		Embedding structures within the discourse

Table 4 illustrates that telecollaboration has proven effective in enhancing teachers' pedagogical competence. In terms of interculturality, telecollaborative studies demonstrated that EFL pre-service teachers and teachers developed their ICC through interactions with peers from diverse cultural backgrounds. These studies primarily aligned with Byram's framework and revealed that both teachers and pre-service teachers engaged in various interactional behaviors, including both socio-affective and cognitive, and showed improvements in several key aspects regarding attitude, knowledge, skills in interpreting and relating, and critical cultural awareness. Participants in these studies showed a heightened awareness of cultural diversity, not only within their own culture but also in their interactions with peers from other cultures through social interaction. They demonstrated an ability to identify and challenge stereotypes and commonly held assumptions. They exhibited curiosity and a willingness to deepen their understanding of other cultures and expressed how stereotypes and prejudices can impede effective communication and hinder the process of socialization. Furthermore, participants demonstrated critical cultural awareness by examining broader societal issues within their own cultural context. They critically assessed practices such as sexism within society and analyzed the consequences of these practices in their daily lives.

Telecollaborative studies also identified three primary functions of discourse-semantics moves concerning Byram's aspects of ICC: contributing to interactivity, expanding cultural information, and changing perspective and negotiating disalignment. Interactivity, viewed as a balance between initiating and responding to moves in conversations between exchange partners, was influenced by the skills of discovery and interaction and the attitudes of openness and curiosity. It encompassed the basic conversational initiation-response structure and additional moves like elaboration, enhancement, extension, and clarification. These additional moves contributed to a deeper exploration of cultures by aiding the development of ICC by enhancing cultural discovery. A crucial element of ICC, as emphasized by Byram (1997), extended beyond simply displaying high interactivity and in-depth elaboration of intercultural information. It involved interactions that suggested a fundamental shift in one's cultural perspective. However, achieving a change in perspective and effectively negotiating differences in intercultural learning were shown to be challenging and may not be easily demonstrated.

Studies also highlighted telecollaboration's contribution to teacher training, particularly in enhancing techno-pedagogical skills. These studies demonstrated that telecollaboration played a pivotal role in enhancing the critical digital literacy of pre-service teachers. This included heightening participants' awareness of the digital capabilities that enable self-expression and the semiotic and interactional tools that foster connections and ensure inclusivity within virtual communities. Furthermore, these investigations highlighted that participants developed an enhanced understanding of the use of various modes of communication, such as text and images, for constructing meaning and their respective strengths in self-representation. They also gained a heightened awareness of digital tools that facilitated real-time communication, joint participation among peers, and the successful completion of collaborative tasks. These studies underscored participants' unwavering commitment to promoting inclusivity among all community members by upholding interactional equality and solidarity with their virtual partners.

Regarding theoretical application and practical implementation, engaging in online dialogic learning has allowed them to effectively bridge the gap between theory and practice, enabling them to apply what they theorized in practical teaching contexts and vice versa. In telecollaborative studies, participants actively designed and implemented technology-enhanced language teaching tasks, such as creating podcasts. Moreover, these participants engaged in critical reflections on the implementation of these tasks, gaining valuable insights into the realities of teaching with technology. These studies highlighted that this iterative process encouraged them to consider both theoretical knowledge and practical experience as they navigated the practical challenges and opportunities presented by these tasks.

Additionally, telecollaborative studies showed that participants enhanced their ability to facilitate knowledge transfer, which unveiled a shift from mere knowledge telling to knowledge transferring and enabled educators to develop a deeper understanding of leveraging technology as a pedagogical tool. These studies showed that participants were encouraged to explore and utilize a wide range of digital tools and resources as a means to disseminate information but also to empower students to engage with and apply that knowledge actively. They became adept at designing digital learning experiences that encourage critical thinking, problem-solving, and the practical application of concepts. As a result, teachers emerged from these experiences with more refined and versatile techno-pedagogical competencies, better prepared to integrate technology effectively into their teaching methodologies, driven by self-achievement and confidence to work with technology in their own teaching.

Studies underscored telecollaboration's contribution to instructional design, mainly through modeling in action. Telecollaborative studies focusing on instructional design revealed that both pre-service and in-service teachers often favored modeling as a teaching method. Teachers tended to choose modeling as an implicit technique, subtly embedding instructional structures within discourse without explicitly drawing the interlocutors' attention. This preference was reported to be likely influenced by the communicative nature of the exchanges within telecollaboration. Studies also highlighted the use of technology in facilitating collaboration and communication while effectively modeling the target structures.

This review also uncovered telecollaborative insights, which are presented in Table 5.

Studies also yielded valuable telecollaborative insights which cover various aspects such as telecollaborative competence, telecollaborators' roles, telecollaborative task design, and challenges encountered in telecollaboration. Regarding telecollaborative competence, studies identified four distinct types: organizational competence, pedagogical competence, digital competence, and attitudes and beliefs. The studies recognized telecollaboration as a social interaction where effective organization played a pivotal role, which contributed to the organizational competence of pre-service and in-service teachers. Participants were observed setting telecollaboration goals, designing telecollaboration exchanges to meet their students' needs and maintaining successful collaborative relationships with their partners during the exchange. In terms of pedagogical competence, participants were reported to successfully integrate telecollaboration into the curriculum, create tasks aligned with the learning objectives from their face-to-face lessons, design tasks that fostered collaboration among students, develop assessment

Table 5 Telecollaborative insights of studies

Telecollaborative competence	Organizational competence	A good working relationship
		Designing the structure of the exchange
		Value of compromise
	Pedagogical competence	Task identification
		Applying the knowledge of culture and language
		Learner support
		Learner supervision
	Digital competence	Knowledge of Web 2.0 tools
		Tool selection
	Attitudes and beliefs	Openness
		Willingness
		Interest in learning
Telecollaborators' role	Co-designer	Planning the process
	Facilitator and mediator	Fostering supportive environment
		Addressing challenges
	Assessor	Evaluating the process
		Providing feedback
Task Design	Pedagogical mentoring	Discussion questions
		Encouraging peer feedback
		Allocating sufficient time
	Negotiation	Personal negotiation
		Interactive negotiation
		Procedural negotiation
	Technological tool selection	Synchronous tools
		Asynchronous tools
Challenges	Different time zones	Time difference
	Different degrees of engagement	Lack of engagement
	Technical difficulties	Connectivity problems
		Software and platform glitches

procedures for evaluating activities and tasks during telecollaboration exchanges, and provide linguistic, technological, cultural, and procedural support to participants. Concerning digital competence, pre-service and in-service teachers became familiar with various ICT tools and increased their ability to choose the most suitable ICT tools for achieving the telecollaborations' objectives and those of the students. Participants also demonstrated positive attitudes toward telecollaboration exchange regarding displaying openness to new cultures, interest in telecollaboration learning, and willingness to participate in more telecollaboration projects.

Telecollaborative studies also uncovered diverse roles undertaken by telecollaborators throughout the telecollaboration process. These roles included co-designer, facilitator and mediator, and assessor. As co-designers, telecollaborators actively engaged in crafting collaborative activities, tasks, and content that aligned with the course goals, classroom settings, participants' proficiency levels, learner profiles, and participants' academic interests. They also functioned as facilitators and mediators by establishing parameters for telecollaboration tasks, presenting task topics and ideas to participants for feedback, suggesting improvements to task feasibility, fostering a supportive environment for effective collaboration, and addressing potential cultural, linguistic, and other

challenges. Moreover, telecollaborators took on the role of assessors by providing feedback on final task outcomes, evaluating participants' telecollaboration learning process in relation to target learning outcomes, and evaluating the overall process of telecollaboration in terms of its contribution to participants' learning.

Telecollaborative studies revealed the various elements critical for effective task design in telecollaboration. To achieve an effective task design, pedagogical mentoring emerged as a crucial factor in achieving successful outcomes, which involved formulating appropriate discussion questions, encouraging peer feedback among participants, and allocating sufficient time to complete telecollaboration tasks. In that regard, the formulation of pedagogical questions was found to have a considerable influence on the extent and nature of participants' engagement in intercultural learning. Two question formats, "Brainstorm + Focal Question" and "Brainstorm + Reflection Question on Experiences," were identified as particularly effective in prompting participants to brainstorm ideas and then delve deeper into the discussion by either taking a stance or reflecting on their experiences. Studies also underscored the importance of encouraging peer feedback as part of effective pedagogical mentoring. Peer feedback was observed to not only assist learners in expanding their lexical knowledge but also prevent language fossilization and contribute to the development of native-sounding discourse. Additionally, allocating sufficient time for each task was deemed crucial within pedagogical mentoring, which ensured that learners had the necessary resources to complete their tasks effectively and made personal commitments to online contributions.

Regarding task design, studies also identified various forms of negotiation among learners, which were personal, interactive, and procedural negotiations. These studies observed a significant number of instances of procedural negotiation, which highlighted a strong focus on task-oriented approaches. Participants primarily focused on completing telecollaboration tasks, ensured access to the collaborative task platform, offered concrete suggestions for project execution, solicited each other's input on task content and procedures, and promptly provided clarifications as needed in telecollaboration exchanges. However, studies also emphasized the importance of encouraging personal and interactive negotiations within teams. They suggested encouraging participants to engage more with task materials by synthesizing and analyzing them and considering how to apply the materials to teamwork for personal negotiation. In addition, participants were encouraged to share their experiences and check and clarify their understandings and experiences at the team level for interactive negotiations.

Studies also emphasized the critical importance of selecting appropriate technological tools in the design of telecollaborative tasks. One key finding from these studies was the preference for synchronous tools as learners' primary communication mode. Synchronous tools were favored for offering real-time interactions and facilitating immediate and dynamic exchanges between participants. Conversely, studies indicated that opting for asynchronous tools tended to limit learners' communication depth and frequency. However, it is noteworthy that most studies preferred blending both synchronous and asynchronous modes. This approach aimed to enhance social interaction and effectively address areas of conflict and misunderstanding within telecollaborative settings.

Finally, studies identified several challenges in telecollaboration within English language teacher education. One significant challenge was different degrees of participant

engagement, where differences in engagement among partners substantially impacted the overall effectiveness and outcomes of collaborative learning experiences. Technological difficulties emerged as another primary challenge which significantly affected the telecollaboration process. These difficulties encompassed connectivity problems and software or platform glitches. When such technological challenges arouse, they could disrupt the smooth flow of communication and collaboration between participants. Furthermore, differences in time zones were also recognized as a challenge, as the time gap between partner countries appeared to influence the frequency of communication significantly. This discrepancy in time zones posed logistical challenges and sometimes hindered real-time interactions between participants.

Discussion

This study aimed to conduct a systematic review of telecollaboration studies in the context of English language teacher education to explore its potential for enhancing teacher learning. The findings revealed that telecollaboration studies primarily focused on pedagogical and telecollaborative aspects in English language teacher education. These studies spanned various contexts, including American, European, and Asian settings. A variety of synchronous and asynchronous platforms were also employed, often in combination, to enrich the telecollaborative experiences. The findings demonstrated that telecollaborative studies offered valuable insights for English language teacher education. These insights contributed to teacher learning, particularly in developing ICC, techno-pedagogical skills, and instructional design. This was achieved through telecollaborative tasks that facilitated effective pedagogical mentoring, negotiation, and the selection of appropriate technological tools. Additionally, the study identified telecollaborative competences, explored the roles of telecollaborators, and delineated potential challenges associated with conducting telecollaboration projects.

This study asserted that telecollaboration served as a virtual space for the development of pedagogical competences among both pre-service and in-service teachers. This assertion aligned with the insights provided by Wu (2021), who emphasizes the substantial value of a globally connected and technologically enhanced telecollaboration context in fostering the acquisition of new teaching competences. In this systematic review, telecollaborative learning was seen as a social process that occurred within communities where pre-service and in-service teachers actively engaged in meaningful activities (Dooly, 2017; Lave & Wenger, 1991). In other words, telecollaboration, operating as a digitally connected space, proved to be an ideal environment for the community of practice, facilitating the exchange of knowledge, experiences, and expertise among participants from diverse cultural backgrounds (Lave & Wenger, 1991). In that regard, this systematic review provided evidence that, through collaborative tasks and interaction, pre-service and in-service teachers collaboratively shaped and refined their understanding of pedagogical strategies, intercultural communication, and the effective use of technology in language education (Dooly & Sadler, 2013, 2020).

This systematic review also revealed that telecollaboration in English language teacher education transcended its traditional role as a supplementary tool. Instead, telecollaboration was found to evolve into a multifaceted and integral component of teachers' 'learning ecologies' (Barron, 2006). In line with the concept of telecollaboration as a learning

ecosystem, O'Dowd (2003, p. 133) elucidated that telecollaboration empowers educators to articulate their thoughts and subsequently refine and redefine them through feedback and exposure to alternative perspectives. This systematic review, in that regard, provided evidence that telecollaboration encouraged reflective thinking, fostered peer interactions, and emphasized the documentation of the pedagogical process (Bueno-Alastuey & Kleban, 2016; Dooly & Sadler, 2020; Fuchs, 2019; Grau & Turula, 2019). Consequently, this study illustrated that telecollaboration departed from conventional teacher-learning approaches and offered a distinctive framework for teacher development. Within this framework, both pre-service and in-service teachers enhanced their skills, particularly in terms of intercultural competence (ICC), techno-pedagogical skills, and instructional design expertise (Çiftçi & Savaş, 2017; Dooly & Sadler, 2013, 2020; Fuchs, 2019; Fuchs et al., 2012).

This systematic study identified promoting ICC as one of the primary objectives of telecollaborative learning in English language teacher education. This finding aligns with systematic reviews of telecollaboration studies by Avgousti (2018) and Çiftçi and Savaş (2017), which asserted that telecollaboration stimulated participants to reflect on different worldviews and fostered intercultural growth. By their very nature, telecollaboration projects are socially and culturally situated endeavors. Studies demonstrated that telecollaboration offered a rich and immersive environment for both in-service and pre-service teachers to enhance their intercultural competence by engaging in cross-cultural interactions, fostering cultural sensitivity, and developing practical communication skills in diverse cultural contexts (Alghasab & Alvarez-Ayure, 2021; Eren, 2021; Fuchs, 2016; Lee & Markey, 2014; Ryhsina-Pankova, 2018; Sardegna & Dugartsyrenova, 2021; Üzüm et al., 2020). In a similar vein, this systematic review validated the role of telecollaboration in nurturing intercultural competence, which makes it a cornerstone of modern language education.

In addition, this systematic review recognized ICC as an integral component of pedagogical competence. As highlighted in the work of Byram et al. (2013), foreign language teacher education had undergone what could be termed a 'cultural turn', which involved an expanded understanding of the concept of foreign language teacher competence, including new pedagogies and theoretical trends in foreign language teacher education. This evolution had been motivated by the imperatives of internationalization and globalization, which, in conjunction with telecollaboration, enabled language teachers to become interculturally competent to effectively navigate the multicultural landscapes of our interconnected world (Byram et al., 2013). Therefore, this study claimed that the development of ICC through telecollaborative learning was vital to align English language teacher education with the evolving demands of a cultural turn.

Apart from ICC, the systematic review unveiled the role of telecollaboration in the development of techno-pedagogical skills of both in-service and pre-service teachers. As stated by Koehler and Mishra (2009), telecollaboration serves as a platform for providing trainees with a dialogic space that facilitates the development of their 'traditional' pedagogical skills related to task planning, design, and material evaluation, as well as the enhancement of their techno-pedagogical skills. The systematic review found evidence that telecollaboration emerged as a means to equip pre-service and in-service teachers with opportunities to engage with digital technologies in language education through

first-hand experiences, which enabled them to reflect on their affordances and the challenges associated with their implementation (Bilki et al., 2023; Bueno-Alastuey & Kleban, 2016).

This systematic review study not only affirmed the role of telecollaboration but also delved into its critical significance in enhancing language teaching skills with technology. Through the reviewed studies, concrete evidence emerged of pre-service teachers engaging in pedagogical scaffolding, a concept intricately linked with Vygotsky's Zone of Proximal Development (ZPD) (Vygotsky, 1978). Through this alignment, the reviewed studies underscored the profound advantages of pre-service and in-service teachers collaborating with peers with higher expertise by facilitating a more profound grasp of pedagogical strategies and the effective incorporation of technology into language education. In that regard, Dooly and Sadler (2013, 2020) revealed that pre-service teachers actively participated in a range of pedagogical reasoning activities, such as text comprehension, task transformation, instruction formulation, and reflective practices. In a similar vein, Bueno-Alastuey & Kleban (2016) and Kleban and Bueno-Alastuey (2016) illustrated that the dialogues among participants, each representing diverse educational backgrounds and experiences, led to an expansion of pedagogical perspectives and a form of pedagogical support for teacher learning, which could be referred to as pedagogical scaffolding.

The systematic review also illuminated the transformative role of telecollaboration as a virtual space, effectively bridging the gap between pedagogical theory and practical application. This critical observation can be grounded in socio-constructivism, which emphasizes the recall and practical application of existing and newly constructed knowledge in diverse contexts (Dooly & Sadler, 2013). The reviewed telecollaborative studies showed that pre-service and in-service teachers actively engaged in telecollaborative learning as both teacher-learners and designers of meaningful tasks for their own students. As noted by Antoniadou (2011), their participation led to the collective absorption of linguistic and conceptual knowledge, often referred to as 'external semiotic resources'. In a similar vein, Bueno-Alastuey and Kleban (2016), Dooly and Sadler (2013, 2020), and Kurek and Müller-Hartmann (2019) demonstrated how these teachers encountered both opportunities and challenges inherent in innovative learning and eventually transitioned into the role of creators of educational tasks for their own students. Likewise, the studies conducted by Kurek and Müller-Hartmann (2019) and Wach et al. (2022) pointed out that teachers engaged in follow-up activities, including (meta) cognitive practices such as reflection and peer evaluation/feedback. These endeavors aimed to enhance the transferability of their teaching competences further. Collectively, these telecollaborative studies underscored the impressive capacity of pre-service and in-service teachers to not only acquire new knowledge but also seamlessly integrate it into their existing understanding by effectively bridging the theory–practice gap intrinsic to telecollaboration projects (Dooly & Sadler, 2020; Grau & Turula, 2019).

Beyond pedagogical competence, the comprehensive examination of these studies illuminated another critical dimension—telecollaborative competence—which in-service and pre-service teachers acquire through their roles in telecollaboration projects (Fuchs et al., 2017; Grau & Turula, 2019). These initiatives underscored the flexibility and adaptability of educators willing to extend their traditional instructional roles to encompass

additional functions. These roles included but were not limited to that of a task design mediator (Fuchs et al., 2017), discussion facilitator (Helm, 2013), pedagogical mentor (O'Dowd et al., 2020), and coach (Melchor-Couto & Jauregi, 2016). It is vital to emphasize that these supplementary roles demanded active involvement in the learning journeys of their peers. This involvement was manifested through various means, such as active participation in online interactions and contributing to the phase of task design. Significantly, these additional roles extended beyond mere facilitation; they provided reflective opportunities that nurtured deepened learning experiences (Garcia-Esteban et al., 2019; Wu et al., 2020). In essence, the systematic review demonstrated that telecollaborative competence transcended the boundaries of conventional teaching through fostering a rich and collaborative environment that facilitated multifaceted teacher learning and development.

Telecollaborative studies unveiled the challenges faced in telecollaboration projects, with varying degrees of engagement emerging as a notable concern. It was observed that some participants in telecollaboration initiatives exhibited lower motivation levels, which, in turn, led to disengagement from the collaborative tasks (Yang, 2020). In telecollaboration, reciprocity is of paramount significance, as the learning experience's success is contingent upon both partners' mutual support and contributions (Hauck & Youngs, 2008). Thus, to foster productive telecollaboration, it is imperative to strive for parity in motivation and participation levels by ensuring that each participant is equally invested in the collaborative endeavor (O'Dowd et al., 2020). Furthermore, negotiations played a pivotal role in addressing the disparities in engagement levels among participants. These negotiations encompassed a range of discussions and agreements which aimed to align participants' expectations, motivations, and responsibilities (Fuchs, 2016; Priego, 2017). Such negotiations not only facilitated a shared sense of purpose but also created an inclusive and supportive environment for teacher learning.

Conclusions

The systematic review of telecollaboration studies in English language teacher education firmly established telecollaboration as an educational activity that brimmed with invaluable learning opportunities for pre-service and in-service teachers. These studies underscored the vital role of teachers' engagement in collaborative communities by emphasizing its significance in their professional growth and development. The attributes illuminated by telecollaboration studies were instrumental in enhancing teaching practices and fostering teacher reflection and subsequent innovation. These studies offered comprehensive insights into how the telecollaboration experience prompted teachers to reflect upon their professional development and teaching methodologies through collaboration with peers from diverse backgrounds. Engaging in collaborative teaching often initiates what can be described as a 'peer-supported collaborative, reflective teaching cycle' (Murray, 2015, p. 24). The imperative need for discussions, negotiations, and joint course planning encourages educators to delve into alternative teaching methods and critically evaluate whether their prior approaches have positively impacted or hindered student learning (O'Dowd & Dooly, 2021). Consequently, this study advocates the adoption of the notions of 'inquiry as stance' and 'inquiry communities' in teacher education. These concepts facilitate educators working collaboratively to acquire

professional knowledge by bridging the gap between theory and practice (O'Dowd & Dooly, 2021).

Telecollaboration has garnered increased attention as a potent educational strategy facilitating continuing educational and intercultural exchanges. However, for many teachers and institutions, engaging in telecollaboration and virtual exchange can be a novel and sometimes daunting venture. Understanding this field's evolution can significantly benefit teachers, schools, and policymakers when designing telecollaborative tasks and projects. This comprehensive review aims to propel the professional development of language teachers by offering valuable insights derived from 22 telecollaborative studies conducted between 2013 and 2023. These findings serve as a valuable resource for telecollaboration scholars and provide practical guidance for telecollaboration practitioners and institutional leaders. These insights are relevant for those committed to internationalizing language teacher education and equipping language instructors with innovative teaching practices.

Telecollaboration has been observed as a powerful tool for enhancing teacher training. Both pre-service and in-service teachers can benefit from engaging in telecollaborative projects that facilitate the development of techno-pedagogical competencies. The review highlights the importance of telecollaboration in promoting innovative teaching practices (Wasch et al., 2020). Teachers who participate in telecollaborative projects often design unconventional and multifaceted tasks, which leads to creative approaches to language teaching. As such, the review also demonstrated the transfer of training, in which pre-service and in-service teachers can transfer what they have learned in telecollaboration into their actual classroom practices (Dooly & Sadler, 2013, 2020; Grau & Turula, 2019). However, more longitudinal studies are needed to track the long-term impact of telecollaboration on language teachers' ability to transfer learning.

Several essential suggestions emerge further to enhance the effectiveness of telecollaboration in language teacher education. Firstly, telecollaboration has demonstrated its potential as a virtual platform for bridging the gap between theory and practice (Dooly & Sadler, 2020). This suggests the need for exploring hybrid models that seamlessly integrate in-class discussions with telecollaboration experiences. Such hybrid approaches can be particularly effective in fostering teacher learning in terms of successfully transferring and assimilating new knowledge into already existing knowledge and understanding. Discussion as part of reflective practice is essential, and it does not necessarily guarantee that student teachers can bridge the gap between theory and practice (Akbari, 2007; Edwards & Protheroe, 2003). The classroom organization and a supportive environment are essential for ensuring that the talk leads to the uptake of ideas and scaffolding to ensure conceptual understanding and handover.

For ethical considerations, this study rigorously defined the search criteria. This study focused on articles from reputable journals indexed in either SSCI or ESCI, which specifically targeted research on technology in English as a second or foreign language teaching and learning. The inclusion criteria also emphasized the participation of pre-service or in-service EFL/ESL teachers to ensure the ethical relevance of the studies incorporated into the systematic review. Throughout this review, proper attribution was a priority, with each source receiving meticulous and accurate citations as an ethical imperative. Additionally, it is worth highlighting that this study rigorously adhered to

ethical standards regarding data. There was no manipulation or misuse of data to ensure the integrity and transparency of the systematic review process.

Declarations

Consent for publication
The authors utilized ChatGPT to proofread the manuscript to improve readability and language of single sentences as the authors are not native English speakers. The authors take full responsibility for the content of the publication.

Competing interests
The authors declare that there are no competing interests.

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