

eTWINNING AND THE DEVELOPMENT OF LANGUAGE TEACHERS' DIGITAL LITERACY: A COMPARATIVE STUDY BETWEEN TWO EUROPEAN UNIVERSITIES

eTWINNING Y EL DESARROLLO DEL LENGUAJE PARA LA ALFABETIZACIÓN DIGITAL DOCENTE: UN ESTUDIO COMPARATIVO ENTRE DOS UNIVERSIDADES EUROPEAS

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Abstract:

Collaborative online international learning (COIL) has grown as an innovative technology-enhanced education approach with great potential for language education. Among the different COIL initiatives, eTwinning offers opportunities for language teachers and learners. Considering the limited research about pre-service language teachers' digital literacy who have participated in the *eTwinning for future teachers* initiative, this paper's objective is to explore how eTwinning can enhance teachers' digital skills involving pre-service language teachers ($N=76$) from two European universities, University of Cordoba, UCO (Spain) and University of Lower Silesia, ULS (Poland). The study follows a quantitative approach, using an exploratory cross-sectional method and an interpretative approach. The results show a general positive perception of participants from both contexts, while there are statistically significant differences regarding gender and university. Finally, the paper reflects on how to use eTwinning to improve teachers' digital literacy.

Keywords: eTwinning; virtual mobility; telecollaboration; teacher training; teachers' digital literacy; digital competence.

Resumen:

El aprendizaje internacional colaborativo en línea (COIL por sus siglas en inglés) se ha convertido en un enfoque educativo innovador con un gran potencial para la enseñanza de lenguas, siendo eTwinning una plataforma europea que ofrece numerosas oportunidades. Considerada la limitada investigación sobre competencia digital de futuros docentes de lenguas que han participado en la iniciativa *eTwinning for future teachers*, este trabajo explora cómo eTwinning puede mejorar la competencia digital docente, con la participación de futuros docentes de lenguas ($N=76$) de dos universidades europeas, Universidad de Córdoba, UCO (España) y Universidad de Baja Silesia, ULS (Polonia). Esta investigación cualitativa emplea un método transversal exploratorio y un enfoque interpretativo. Los resultados muestran una percepción general positiva de los participantes de ambos contextos, aunque existen diferencias estadísticamente significativas en cuanto al género y la universidad de procedencia. El artículo se cierra con una reflexión sobre cómo utilizar eTwinning para mejorar la competencia digital docente.

Palabras clave: eTwinning; movilidad virtual; telecolaboración; formación de profesorado; competencia digital docente; competencia digital.

1. Introduction

In the globalized, interconnected world of today, the importance of learning languages has grown at an unprecedented pace. With advances in the fields of technology, travel, and communication, as well as the exceptional health, legal, war and emergency situations lived in the present, people from different cultures and backgrounds are increasingly interacting and coming closer together, which has, in turn, created a need for effective communication and collaboration across borders (British Academy et al., 2021). This explains why international bodies have been directing efforts ever since the beginning of the 21st century to enhance communicative skills in foreign languages among young citizens to help them become fully prepared citizens (Council of Europe, 2007; Council of the European Union, 2019).

Certainly, learning a language other than one's mother tongue can provide speakers with practical skills, knowledge, and opportunities, as it not only facilitates such necessary communication but also improves awareness, understanding, and empathy toward other cultures. In fact, research has extensively shown the benefits of learning languages, among which the following can be highlighted: improvement of cognitive abilities, benefits in terms of aging and health, more possibilities for finding employment, higher academic achievement, enhanced creativity and, undoubtedly, better communicative and intercultural competences (Fox et al., 2019; Klimova, 2018; Zárata-Aliaga et al., 2020). These multiple assets of learning languages have been translated into growing concerns to offer students quality language education, as well as with new and varied methods and approaches being implemented in the classrooms (Laura-De La Cruz et al., 2022; Porto et al., 2017). This situation pinpoints the need of appropriately train teachers to ensure that learners become proficient in the languages they are learning (Castillo-Izquierdo et al., 2020; Pham, 2022).

In this context, however, not only is language learning a fundamental educational objective in the present but also becoming digitally literate. Indeed, technological developments have revolutionized the way we live, work, and study, from smartphones being used for communication to artificial intelligence being employed for a variety of activities and domains. Such an expansion of technologies in the last decades has turned digital literacy into an essential

requirement for all individuals. According to the Council of the European Union (2018), digital literacy or competence

involves the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It includes information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), safety (including digital well-being and competences related to cybersecurity), intellectual property related questions, problem solving and critical thinking (p. 9).

As technologies have become an integral part of our daily lives, being able to use them properly is of paramount importance. Language classrooms have also witnessed a proliferation of educational technologies with the aim of enhancing the learning and teaching process (Huertas-Abril, 2020b; Sen, 2021), which has consequently made digital literacy a key competence for language teachers, too (Palacios-Hidalgo et al., 2020). In fact, several relevant and innovative language learning and teaching approaches based on the use of technology have been developed in recent years. Such is the case of Technology-Enhanced Language Learning (TELL), Computer-Assisted Language Learning (CALL), and Mobile-Assisted Language Learning (MALL), which entail the use of technology, computers, and mobile phones to facilitate language learning have been proven to foster active, flexible and efficient language learning as well as motivate learners and provide them with opportunities for authentic communication and language use (Palacios-Hidalgo, 2020). More recently, artificial intelligence has also gained relevance in education in general (Holmes et al., 2023), and in language teaching and learning in particular, where it has been demonstrated to pose both benefits and challenges (Koraishi, 2023; Wang et al., 2023). Finally, other forms of educational technology have also transformed language classrooms, such as augmented and virtual reality, which may also entail interesting gains for learners' language proficiency and motivation (Cai et al., 2022; Dhimolea et al., 2022).

As technology has permeated language education, there has been a growing interest in the study of the digital abilities of language teachers as well as the development of frameworks and assessment instruments that can be used to evaluate their knowledge, skills, attitudes, and training needs in this respect. Some of the most significant frameworks at the European level are the *Digital Competence Framework for Citizens*, better known as DigComp (currently in its version 2.2; Vuorikari et al., 2022), which establishes the areas that compose digital literacy as well as examples of competences to facilitate its understanding and assessment, and the *European Framework for the Digital Competence of Educators* (DigCompEdu; Redecker, 2017), a concretion of the DigComp aimed to guide teachers in the assessment of their digital skills and their abilities to help students develop their own digital competence. Based on these frameworks, the DigCompEdu Check-In (Cabero-Almenara et al., 2020) has been designed as an instrument for the self-diagnosis of the level of digital competence and the training needs of teachers, although its use so far is limited to in-service teachers. In the Spanish context, the Spanish National Institute of Educational Technologies and Teacher Training (INTEF) developed the *Common Digital Competence Framework for Teachers* back in 2017 (INTEF, 2017a). The Spanish framework is based on the DigComp and the peculiarities of the Spanish education landscape, and it also has the possibility of creating its portfolio (INTEF, 2017b), an instrument designed to help teachers know and improve their level of digital literacy. Other specific tools have been specifically designed for language teachers, such as the one proposed by Huertas-Abril (2020a), which has been effectively used in various studies in the Spanish context (e.g., Palacios-Hidalgo & Huertas-Abril, 2021, 2022). As indicated by Palacios-Hidalgo and Huertas-Abril (2022), "this instrument takes into special account DigComp and INTEF guidelines, which constitute important frameworks in the European and Spanish contexts" (p. 7). Indeed, the questionnaire has revealed significant findings when analyzing the digital literacy of pre-service

language and bilingual education teachers in different environments and situations, showing generally good self-perceived digital competence among teachers studying both in an onsite and an online university and more positive attitudes among men than women in this regard (Palacios-Hidalgo & Huertas-Abril, 2021, 2022). In any case, the studies also illustrate a need to strengthen language teacher education in digital literacy.

Concerning technology and teacher digital literacy, it is worth mentioning the concept of collaborative online international learning (COIL), an innovative approach to education that takes advantage of technology to facilitate cross-cultural interactions and collaborative learning experiences between students and teachers from different countries, thus promoting global understanding (Rubin, 2017). COIL utilizes the vital role that technology plays in today's digital age and provides platforms for communication, collaboration, and knowledge sharing, breaking down geographical barriers and allowing teachers and students to connect and engage in meaningful interactions regardless of their physical location. COIL has also been demonstrated to have great potential for language education, as it can connect students globally, foster intercultural awareness, and promote personal and professional development (Vahed & Rodriguez, 2021). However, for COIL to be successful, teachers need to be digitally competent and familiar with different digital tools, platforms, and resources to design engaging and interactive virtual learning environments.

A significant COIL initiative is eTwinning, an Erasmus+ program associated platform developed by the European Commission aiming to promote the participation of European schools in international partnerships through the use of educational technology (European School Education Platform, 2022a). eTwinning emerged in 2005 as an eLearning platform committed to the development of cross-curricular competences (e.g., digital literacy or intercultural competence) of teachers and students through the creation of motivating telecollaborative projects that also involve the use of active methodologies (Huertas-Abril et al., 2023). According to the European School Education Platform (2022a),

In eTwinning, teachers organise and run on-site and online activities with their students along with colleagues from countries participating in the Erasmus+ programme. They engage in collaborative projects with the support of the TwinSpace environment. National Support Organisations are responsible for validating user registrations for becoming eTwinners, thus keeping the platform safe, providing support and guidance, and recognising teachers' work with National and European Quality Labels (para. 1).

eTwinning not only advocates the digitization of education but also pedagogical innovation through creativity, collaboration, interaction, and international communication. In this sense, Domínguez-Miguela (2007) highlights the aims of eTwinning: (i) to create networks among European schools; (ii) to encourage students and teachers to participate in projects with their counterparts in other parts of Europe; (iii) to foster a European dimension in education; (iv) to raise awareness among students of the European model of a multilingual and multicultural society; (v) to improve intercultural dialogue and understanding through COIL communities; and (vi) to help improve the professional and digital skills of teachers.

Taking the potential of eTwinning into account, a growing number of publications have been developed in recent years in an attempt to provide examples of effective implementation and explore important aspects to bear in mind when designing a project. In particular, initial teacher education (ITE) has received considerable attention as it has been shown with the development of the European Commission's initiative *eTwinning for future teachers*, "a strategy to expand its reach and engage future teachers" considering that "introducing eTwinning into the education of student teachers is very valuable to them and their institutions" (European School Education Platform, 2022b, para. 1). Such attention is also reflected on research. For instance, Paz-Albo

and López-Cirugeda (2017) analyze the impact of an eTwinning experience developed at the Rey Juan Carlos University and Universidad de Castilla-La Mancha (Spain) by examining the perceptions of the participating pre-service teachers. The study shows that eTwinning enhances the motivation, academic achievement, language skills and lifelong skills of future educators, thus being a promising tool for teacher education. Similarly, Huertas-Abril et al. (2023) report the benefits of eTwinning for future language teachers by describing a COIL project that involved students and teachers from different educational levels in Spain, Poland, Portugal, Serbia and Turkey. The experience proved to be beneficial for future teachers as it offered opportunities not only for enhancing language proficiency but also learning how to develop international telecollaboration.

Considering the importance of technology and teachers' digital skills in eTwinning, research has also attempted to examine the technological abilities of in-service teachers taking part in it, which has been found to be at a high level (Gökbulut, 2023). Nevertheless, no studies have focused on analyzing the digital literacy of pre-service teachers who have participated in eTwinning experiences through the *eTwinning for future teachers* initiative. Considering this, this article seeks to respond to this situation by shedding light on the study of how eTwinning can contribute to improving the digital skills of future language teachers.

2. Method

Considering the scarce research about pre-service language teachers' digital literacy who have participated in the *eTwinning for future teachers* initiative, this paper's objective is to explore how eTwinning can enhance teachers' digital skills. For this purpose, this study follows a quantitative approach, following an exploratory cross-sectional method, as it examines the current situation of an issue within a population at a specific moment (Adèr & Mellenbergh, 1999). Moreover, an interpretative approach was utilized to comprehend and elucidate the viewpoints of the participants (Schwartz-Shea & Yanow, 2012).

2.1 Objectives and hypotheses of the study

This paper aims at analyzing pre-service language teachers' digital literacy of two different European universities, located in Spain and Poland, after participating in a COIL project based on eTwinning during the spring semester 2020. Moreover, two secondary objectives are also set:

- To explore whether gender is a determining factor in pre-service language teachers' perception of their digital literacy.
- To compare the results of the participating pre-service language teachers belonging to the two universities, in order to explore their similarities and differences.

In this light, three hypotheses are established:

- Hypothesis 1 (H1): Pre-service language teachers are generally positive regarding their digital literacy.
- Hypothesis 2 (H2): There are statistically significant differences concerning the perceptions of pre-service language teachers about their digital literacy in terms of gender.

Hypothesis 3 (H3): There are no statistically significant differences concerning the perceptions of pre-service language teachers about their digital literacy considering their university.

2.2 Instrument

The questionnaire for assessing the digital competence of English as a Foreign Language (EFL) and bilingual education teachers (Huertas-Abril, 2020) was used. The purpose of this questionnaire is to analyse teachers' digital literacy, and use and knowledge of digital technology in EFL and bilingual education, taking into special account DigComp and INTEF's guidelines.

The questionnaire consists of an initial demographic data section, followed by other three specific sections: (1) general information about the use of Information and Communication Technologies (ICT) – Q01 to Q04, (2) Teachers' Digital Competence – Q05 to Q11, and (3) the *Common Digital Competence Framework for Teachers* and Portfolio – Q12 to Q16. The instrument is divided into 16 items expressed in a four-point Likert scale (1 = totally disagree, 2 = disagree, 3 = agree, 4 = totally agree). Ethical institutional requirements from both universities were followed in data collection procedures. Before answering the questionnaire, participants were informed about the objectives of the study and the exclusively research nature of the usage and storage of the data, as well as about the possibility of withdrawal from the study at any time. The participants then gave their written consent. The questionnaire was distributed online via Google Forms to facilitate reaching the sample and administered in English. Data were gathered between May and June 2020, when the eTwinning project "Learning English with Technology" had finished. Nevertheless, in order to comply with the ethical requirements of the institutions involved in the eTwinning project, data analysis was carried out after grades had been assigned.

Item 12 was recoded so that all items were formulated in the same direction. Cronbach's alpha was calculated to test the internal reliability of the instrument. The result was $\alpha=.775$, which proves the reliability of the questionnaire (Taber, 2018).

2.3 Participants

A non-probabilistic sample based on convenience was used for the selection of the participants ($N=76$). More specifically, the results were obtained from the questionnaires responded by pre-service language teachers from University of Lower Silesia (ULS) in Poland ($n=24$), and bilingual and English as a Foreign Language (EFL) education pre-service teachers from the Universidad de Córdoba (UCO) in Córdoba, Spain ($n=52$).

A total of 91.7% of the pre-service language teachers from ULS identified themselves as woman, while 8.3% identified themselves as man. On the other hand, 80.8% of pre-service teachers from UCO identified themselves as woman, while 19.2% identified as man. Regarding the nationality of the participants, 63.2% ($n=48$) were Spanish, 32.9% ($n=25$) were Polish, 1.3% ($n=1$) were Austrian, 1.3% ($n=1$) were Finnish, and 1.3% ($n=1$) were Turkish.

Eligibility criteria were based on proximity and participation in a teaching experience based on the eTwinning project "Learning English with Technology" (also see Huertas-Abril & Palacios-Hidalgo, 2022). In this eTwinning project, within the *eTwinning for future teachers* initiative, participants had to exchange ideas, approaches and resources regarding English language learning (ELL) and English language acquisition, ELL self-study, ELL teaching methods and approaches, and ELL online tools. "Learning English with Technology" was carried out between March and May 2020, during the COVID-19 health crisis. All the participants were then selected based on convenience and purposive sample technique (Mertens, 2014).

2.4 Data analysis

The data obtained with the questionnaire were analyzed using IBM SPSS Statistics V25.0 for MacOS. To test whether the sample followed a normal distribution, Kolmogorov-Smirnov and Shapiro-Wilk tests were applied. The level of significance was $p < 0.05$ in all cases; therefore, the sample was assumed to follow a non-normal distribution (Koh & Ahad, 2020). The non-normal distribution together with the limited number of participants, led the authors to apply non-parametric tests (Mann-Whitney U and Wilcoxon W) to determine statistically significant differences among respondents in terms of gender and university.

3. Results

3.1 Descriptive results

The percentage of participants' responses according to the Likert scale as well as the mean scores and standard deviations of the items of the questionnaire are presented in Table 1 below.

Table 1
Descriptive statistics

Item	N	%				M	SD
		TD	D	A	TA		
Q01	76	0.0	11.8	67.1	21.1	3.09	.570
Q02	76	0.0	15.8	65.8	18.4	3.03	.588
Q03	76	6.6	19.7	51.3	22.4	2.89	.826
Q04	76	1.3	3.9	46.1	48.7	3.42	.638
Q05	76	0.0	3.9	61.8	34.2	3.30	.542
Q06	76	0.0	3.9	65.8	30.3	3.26	.526
Q07	76	0.0	3.9	64.5	31.5	3.28	.532
Q08	76	2.6	14.5	75.0	7.9	2.88	.565
Q09	76	1.3	10.5	52.6	35.5	3.22	.685
Q10	76	1.3	10.5	61.8	26.3	3.13	.640
Q11	76	0.0	19.7	51.3	28.9	3.09	.696
Q12*	76	7.9	27.6	53.9	10.5	2.33	.773
Q13	76	1.3	36.8	53.9	7.9	2.68	.637
Q14	76	0.0	6.6	43.4	50.0	3.43	.618
Q15	76	13.2	46.1	34.2	6.6	2.34	.793
Q16	76	7.9	46.1	40.8	5.3	2.43	.718

NOTE: TD = Totally disagree; D = Disagree; A = Agree; TA = Totally agree. * Recoded item. Response with the highest percentage marked in bold.

As shown in Table 1, the participants show a generally positive perception of their use of ICT and educational technology, as well as related to their digital literacy. Participants are also aware of the importance of assessing their level of digital competence in order to improve their skills, although they are not aware of the instruments to measure their skills.

It can be highlighted that the most common answer in the first section (use of ICT, Q01 to Q04) is “agree” followed by “totally agree”, except for Q04 (“I believe that ICT has helped me to improve my English”), for which the most common answer is “totally agree”. Similarly, the mode of second section of the questionnaire (Teachers’ Digital Competence, Q05 to Q11) is also “agree”, followed by “totally agree” except in the case of Q08 (“I use software to adapt and reuse digital material so that it can be applied to teach English as a foreign language or to bilingual education”) whose second most frequent answer is “disagree”. The third section of the questionnaire (*Common Digital Competence Framework for Teachers and Portfolio*, Q12 to Q16) presents certain diversity of responses, as the mode for recoded Q12 (“I know that I have to improve my digital competence, but I do not know how or where to start”), and Q13 (“I know how to assess my level of digital competence as a teacher”) is “agree”, and for Q14 (“It is important to know my level of digital competence as a teacher to improve my way of teaching of English as a foreign language or in bilingual education”) is “totally agree”, while for Q15 (“I know and I have read about the *Common Framework of Teachers’ Digital Competence*”) and Q16 (“I have assessed my level of digital competence by assessing the teachers’ digital competence portfolio”) is “disagree”.

3.2 Differences regarding gender

Table 2 below presents the results of the Wilcoxon-Mann-Whitney test to examine the relationship between gender and perceived digital competence. To determine whether there are statistically significant differences among the respondents according to their gender, and considering the non-normal distribution of the sample, Mann-Whitney U and Wilcoxon W tests were applied to the 16 items. No respondents identified themselves as non-binary, so only binary genders (i.e., man and woman) were considered for the analysis.

Table 2
Mann-Whitney U and Wilcoxon W Tests results for the comparison by gender

Item	Gender	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxon W	Z	p*
Q01	Woman	64	36.02	2305.00	225.000	2305.000	-2.733	.006
	Man	12	51.75	621.00				
Q02	Woman	64	39.64	2537.00	311.000	389.000	-1.238	.216
	Man	12	32.42	389.00				
Q03	Woman	64	38.33	2453.00	373.000	2453.000	-.170	.865
	Man	12	39.42	473.00				
Q04	Woman	64	38.52	2465.00	383.000	461.000	-.016	.987
	Man	12	38.42	461.00				
Q05	Woman	64	38.38	2456.00	376.000	2456.000	-.134	.893
	Man	12	39.17	470.00				
Q06	Woman	64	37.52	2401.50	321.500	2401.500	-1.074	.283
	Man	12	43.71	524.50				
Q07	Woman	64	37.62	2407.50	327.500	2407.500	-.962	.336
	Man	12	43.21	518.50				

Q08	Woman	64	37.88	2424.50	344.500	2424.500	-.742	.458
	Man	12	41.79	501.50				
Q09	Woman	64	38.99	2495.50	352.500	430.500	-.499	.618
	Man	12	35.88	430.50				
Q10	Woman	64	38.48	2463.00	383.000	2463.000	-.017	.987
	Man	12	38.58	463.00				
Q11	Woman	64	38.57	2468.50	379.500	457.500	-.070	.944
	Man	12	38.13	457.50				
Q12	Woman	64	40.55	2602.50	245.500	323.500	-2.178	.029
	Man	12	26.98	323.50				
Q13	Woman	64	36.86	2359.00	279.000	2359.000	-1.680	.093
	Man	12	47.25	567.00				
Q14	Woman	64	37.16	2378.00	298.000	2378.000	-1.376	.169
	Man	12	45.67	548.00				
Q15	Woman	64	38.20	2444.50	364.500	2444.500	-.300	.765
	Man	12	40.13	481.50				
Q16	Woman	64	37.70	2413.00	333.000	2413.000	-.796	.426
	Man	12	42.75	513.00				

* $p < .05$ is recognized as statistically significant (marked in bold).

As shown in Table 2, statistically significant differences ($p < .05$) were only found in two of the items (Q01, "I think that I have the necessary knowledge for using ICT for teaching", and recoded Q12, "I know that I have to improve my digital competence, but I do not know how or where to start"), being men who scored higher in the former, and women in the latter. Although without statistically significant differences, men tend to score higher than women in most of the items, except for Q02 ("I frequently use social networks as teacher training tools"), Q04 ("I believe that ICT has helped me to improve my English"), Q09 ("I can plan and develop activities for my students based on selected Internet resources or contents for teaching English as a foreign language or in bilingual education") and Q11 ("I know that there are online teaching events on digital education innovation that can improve my way of teaching of English as a foreign language or in bilingual education").

3.3 Differences regarding university

The Wilcoxon-Mann-Whitney test was used to compare the responses of the participants depending on the university where they were studying regarding their perceived digital competence (Table 3).

Table 3
Mann-Whitney U and Wilcoxon W Tests results for the comparison by university

Item	Gender	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxon W	Z	<i>p</i> *																																																																																																																																																																																														
Q01	UCO	52	43.00	2236.00	390.000	690.000	-3.155	.002																																																																																																																																																																																														
	ULS	24	28.75	690.00					Q02	UCO	52	36.44	1895.00	517.000	1895.000	-1.424	.154	ULS	24	42.96	1031.00	Q03	UCO	52	38.96	2026.00	600.000	900.000	-.292	.771	ULS	24	37.50	900.00	Q04	UCO	52	40.62	2112.00	514.000	814.000	-1.386	.166	ULS	24	33.92	814.00	Q05	UCO	52	39.15	2036.00	590.000	890.000	-.447	.655	ULS	24	37.08	890.00	Q06	UCO	52	39.41	2049.50	576.500	876.500	-.640	.522	ULS	24	36.52	876.50	Q07	UCO	52	42.74	2222.50	403.500	703.500	-2.944	.003	ULS	24	29.31	703.50	Q08	UCO	52	40.33	2097.00	529.000	829.000	-1.400	.161	ULS	24	34.54	829.00	Q09	UCO	52	43.86	2280.50	345.500	645.500	-3.462	.001	ULS	24	26.90	645.50	Q10	UCO	52	42.37	2203.00	423.000	723.000	-2.604	.009	ULS	24	30.13	723.00	Q11	UCO	52	35.36	1838.50	460.500	1838.500	-2.002	.045	ULS	24	45.31	1087.50	Q12	UCO	52	37.82	1966.50	588.500	1966.500	-.438	.661	ULS	24	39.98	959.50	Q13	UCO	52	36.27	1886.00	508.000	1886.000	-1.456	.145	ULS	24	43.33	1040.00	Q14	UCO	52	44.16	2296.50	329.500	629.500	-3.696	.000	ULS	24	26.23	629.50	Q15	UCO	52	36.28	1886.50	508.500	1886.500	-1.392	.164	ULS	24	43.31	1039.50	Q16	UCO	52	37.00	1924.00	546.000	1924.000	-.954
Q02	UCO	52	36.44	1895.00	517.000	1895.000	-1.424	.154																																																																																																																																																																																														
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* $p < .05$ is recognized as statistically significant (marked in bold).

As observed in Table 3, statistically significant differences were found in items Q01 (“I think that I have the necessary knowledge for using ICT for teaching”), Q07 (“I can create, store, and edit different types of files and presentations to facilitate the teaching-learning process of English as a foreign language or bilingual education”), Q09 (“I can plan and develop activities for my students based on selected Internet resources or contents for teaching English as a foreign language or in bilingual education”), Q10 (“I know tasks that can be done with the use of technologies to improve how I teach English as a foreign language or in bilingual education”), Q11 (“I know that there are online teaching events on digital education innovation that can improve my way of teaching of English as a foreign language or in bilingual education”), and Q14 (“It is important to know my level of digital competence as a teacher to improve my way of teaching of English as a foreign language or in bilingual education”), where UCO participants score higher than their ULS counterparts except for Q11.

Regarding the different sections of the questionnaire, UCO participants tend to score higher than ULS students in items related to use of ICT and teachers’ digital competence, while ULS pre-service language teachers score higher in most items related to their development and assessment of digital literacy.

4. Discussion and conclusions

This paper has attempted to analyze the self-perceived digital literacy of pre-service language teachers after participating in an eTwinning-based COIL project. To achieve this purpose, future language educators from two European universities (located in Poland and Spain respectively) were selected to participate in an eTwinning project that aimed to provide them with opportunities to collaborate with fellow pre-service teachers from another country, get familiar with the eTwinning platform, and improve their level of English as a Foreign Language. As the experience was developed online, it was seen appropriate to then assess whether the participating teachers thought their digital skills have been affected. In this sense, the size of the sample ($N=52$) was considered to be valid for an exploratory quantitative study bearing in mind that it followed a non-normal distribution (Daniel, 2012), moreover, Cronbach’s alpha value showed a high internal reliability (Taber, 2018).

Certainly, the respondents showed a generally positive perception of their use of ICT and educational technology, as well as of their digital competence. Therefore, it could be assumed that the eTwinning-based COIL project in which they had participated actually boosted their positive attitudes towards their digital skills. Nevertheless, it is necessary at this point to revisit the hypotheses initially established in the study. The first hypothesis, H1 (*Pre-service language teachers are generally positive regarding their digital literacy*), was formulated considering the results of previous research that showed positive perceptions among future teachers in terms of their digital abilities (i.e., Palacios-Hidalgo & Huertas-Abril, 2021, 2022) and the potential of eTwinning for the development of pre-service teachers’ lifelong skills, such as collaboration, teamwork and critical thinking skills (Paz-Albo & Hervás, 2017; Paz-Albo & López Cirugeda, 2017). This hypothesis has been corroborated as the participants generally considered to have a good level of digital competence (see Table 1). Nevertheless, it should be noted that the respondents also revealed not being familiar with specific instruments to measure their digital skills (in particular, with INTEF’s framework and portfolio, which are the ones specifically referred to in the questionnaire used in this study; INTEF, 2017a, 2017b). This echoes the finding of previous investigations based on the same research instrument (Palacios-Hidalgo & Huertas-Abril, 2021, 2022) and demonstrates that specific training on tools to evaluate teacher’s digital literacy is very much needed in the higher education contexts of ULS and UCO.

The second hypothesis, H2 (*There are significant differences concerning the perceptions of pre-service language teachers about their digital literacy in terms of gender*), was formulated in the light of previous studies that manifested the existence of gender-based differences with regard to some elements of digital literacy among educators (i.e., Esteve-Mon et al., 2020; Palacios-Hidalgo & Huertas-Abril, 2022). H2 is partially corroborated as statistically significant differences were only found in two (out of 16) of the items considered (related to Q01 – having the necessary knowledge to use ICT for teaching purposes in favor of men – and Q12 – being aware of the need to improve digital competence and knowing how to do it in favor of women –; see Table 2). Nevertheless, men tended to be more positive when thinking about their digital skills, which is in line with the results of other research (i.e., Esteve-Mon et al., 2020).

Finally, H3 (*There are no significant differences concerning the perceptions of pre-service language teachers about their digital literacy considering their university*) was formulated based on the assumption of the researchers that the effects of eTwinning would have been similar in participants from the two contexts as the COIL experience was the same for both. In this sense, this hypothesis is rejected due to the statistically significant discrepancies encountered in 6 (out of 16) items of the questionnaire (related to Q01– having the necessary knowledge to use ICT for teaching purposes in favor of UCO –, Q07 – having skills to create resources to facilitate language teaching in favor of UCO, Q09 – being able to plan and develop activities based on online resources in favor of UCO, Q10 – knowing about technology-enhanced tasks for improving language teaching in favor of UCO, Q11 – knowing about online teaching events to improve language teaching in favor of ULS, and Q14 – being aware of the importance of knowing the level of teachers' digital literacy to improve language teaching in favor of UCO; see Table 3). These findings certainly show that pre-service language teachers from UCO have more positive self-perceptions regarding their use of ICT and teachers' digital competence but conversely and as previously mentioned, ULS participants seem to be more aware of their potential to assess their digital literacy (see Table 3). This may hint at the fact that teachers in the Polish university may have received better training in relation to tools and instruments for digital skills evaluation.

The results and conclusions in this research should be interpreted considering three limitations. Firstly, the study has been exploratory as it has only considered subjects in two very specific contexts (i.e., pre-service language teachers studying their BAs in UCO, Spain, or ULS, Poland). Therefore, the results might not be extrapolated to other settings. Moreover, the convenience sampling techniques used have resulted in an uneven distribution of participants regarding gender and university, which may decrease the validity of the results. For this reason, further research should consider expanding the sample and including students from other contexts and with different backgrounds. Secondly, data have been only analyzed quantitatively, and qualitative information could provide researchers with a complementary perspective and extend the results. Thirdly, results have been only based on self-reported data, so they may be biased as a result of participants' subjective opinions and beliefs. Future studies should also consider using additional sources of data, such as objective digital literacy tests as well as interviews or focus groups, so as to collect more substantial data for data triangulation.

This paper has also tried to show how eTwinning may constitute a great option for teachers to improve their digital literacy. Pre-service teachers participating in eTwinning-based COIL experiences not only can enhance their motivation, academic achievement, language skills, and lifelong skills as shown by research (Paz-Albo & López-Cirugeda, 2017), but also improve their exposure to education technology, their experience with telecollaboration and their development of digital abilities that might be essential for their future professional practice. This latter aspect may certainly be achieved if pre-service teachers are allowed to take part in eTwinning projects but also to organize them, look for the eTwinning partners that are most

appropriate for their needs, and immerse themselves in online formative experiences that provide them with knowledge and practice of how to engage their future language students. For this to be accomplished, however, universities and teacher training institutions need to support the curricular integration of eTwinning as the powerful initiative it constitutes.

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Ethical statement and competing interests

This work is entirely original, and others' work has been cited appropriately. Institutional requirements were followed in data collection procedures, and data analysis were carried out after grades had been assigned. There was no conflict of interest in this study.