

ARTICLE

Digital Competence of Future English Language Teachers: Influence of Age and Gender on Their Self-perception

Ingrid Mosquera-Gende^{ORCID}

Department of English Language Teaching, Faculty of Education, International University of La Rioja, La Rioja, 26006, Spain

ABSTRACT

This research analyses how age and gender may influence the self-perception of prospective secondary school teachers regarding their digital competence in teaching. Testing students' self-perception can be a starting point for implementing programmes to improve this competence. To this end, the author presents the results of a didactic experience carried out within the framework of the subject Didactics of the English Language, as part of the Master's Degree in Teacher Training for Compulsory Secondary Education and Baccalaureate, Vocational Training and Language Teaching at a Spanish online university. Therefore, the subjects of the present study are future English teachers who are studying via a distance-learning modality. In order to measure their self-perception, they answered a questionnaire at the beginning and at the end of the course. This is a subject in which the teacher introduces numerous digital tools, both in synchronous online classes and through asynchronous activities, with students' future teaching practice in mind. A mixed methodology is used: a previously validated quantitative questionnaire and a qualitative analysis of the responses obtained by students in the subject forums. Once the intervention had been carried out and the data analysed, it could be seen that the students' self-perception in relation to their digital competence decreased, as they became more aware of how many tools they were unfamiliar with before starting the course. However, the difference was not equal between men and women, with the former being more positive than the latter. In reference to age, older participants show, as in the case of women, a greater degree of self-reflection and self-demand. It is expected that these results will be the starting point to try to improve these aspects, taking them into consideration in our classrooms and in our teacher training programs.

Keywords: English; ICT; Online education; Self-perception; Teacher digital competence; Teacher training; University

Note: This article is an update, adaptation and translation of an article originally published in Spanish in the Journal *Lenguas Modernas*: Mosquera Gende, I. (2021). Variación en la autopercepción de la competencia digital en futuros docentes de inglés: una experiencia didáctica. *Lenguas Modernas*, 58, 35–53.

*CORRESPONDING AUTHOR:

Ingrid Mosquera-Gende, Department of English Language Teaching, Faculty of Education, International University of La Rioja, La Rioja, 26006, Spain; Email: ingrid.mosquera@unir.net

ARTICLE INFO

Received: 12 May 2024 | Revised: 10 June 2024 | Accepted: 28 June 2024 | Published Online: 15 July 2024

DOI: <https://doi.org/10.30564/fls.v6i3.6613>

CITATION

Mosquera-Gende I., 2024. Digital Competence of Future English Language Teachers: Influence of Age and Gender on Their Self-perception. *Forum for Linguistic Studies*. 6(3): 357–373. DOI: <https://doi.org/10.30564/fls.v6i3.6613>

COPYRIGHT

Copyright © 2024 by the author(s). Published by Bilingual Publishing Group. This is an open access article under the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License (<https://creativecommons.org/licenses/by-nc/4.0/>).

1. Introduction

The use of digital tools does not necessarily imply the development of digital competence, as digital competence has several dimensions beyond the use of technological resources. However, the knowledge and correct use of tools can be a great ally for future teachers, promoting interaction and active learning during their university education (Coutinho Santos et al., 2024; Hosseini et al., 2024; Mosquera-Gende 2021; 2023a; 2024b). We are not referring to the use of digital resources as an end in itself but as a means. In other words, it is emphasized that the didactic and pedagogical purpose of the resources used must always be taken into consideration (Gallego et al., 2010; Instefjord and Munthe, 2017). Through a gradual, progressive, voluntary and relatively playful incorporation of new tools, we can try to introduce these resources in a natural way, without putting added pressure on students who may already feel sufficiently stressed by other academic work or personal issues (Mosquera-Gende, 2022a; 2022b; 2024b). Pressure and stress are often present when learning a foreign language, especially in reference to activities related to oral expression skills. In this sense, tools like Flip, Padlet or Lyricstraining have already proven to be very useful resources for reducing this anxiety (Mosquera-Gende, 2023c).

1.1 Digital competence in teaching

Regarding digital competence in teaching, Spain has recently published the Framework of Reference for Digital Competence in Teaching (INTEF, 2022), based on the European Framework for the Digital Competence of Educators: DigCompEdu (Redecker and Punie, 2017), translated into Spanish in 2020 as the *Marco Europeo para la Competencia Digital de Educadores (DigCompEdu)* and which is an update and adaptation of the framework used since 2017 (INTEF, 2017). This new Framework of Reference incorporates the areas marked out at European level, broken down into six main sections that can be seen in **Table 1**. Essentially, the two frameworks were equalised after this new update.

Table 1. General areas of the framework of reference for digital competence in teaching.

Area number	Aspects involved
AREA 1	Professional commitment
AREA 2	Digital content
AREA 3	Teaching and learning
AREA 4	Evaluation and feedback
AREA 5	Student empowerment
AREA 6	Students' digital competency development

Source: Own elaboration based on Redecker and Punie, 2017 and on INTEF, 2022.

Areas 5 and 6 refer to a term that complements ICT (Information and Communication Technologies) and LKT (Learning and Knowledge Technologies). The discussion is about TEPs, Technologies for Empowerment and Participation, an acronym that has a relatively long history, but is currently regaining a central role in the educational environment (Del Pilar Rodríguez Tenjo and Gallardo Pérez, 2020; González González et al., 2020; Pinto Santos et al., 2017), including at university and in teacher training (Fernández et al., 2018). The aim is for students to be prosumers of technology, rather than just consumers, being protagonists of their own learning, and constructing and creating through technologies (Andreu-Sánchez and Martín-Pascual, 2014; González Fernández and Huerta Gaytán, 2019).

1.2 Digital competence of future teachers

There are many studies that underline the need for the development of the digital competence of university students (Castellanos Sánchez et al., 2017; Durán et al., 2017). Specifically, when referring to the training of future teachers, the development of their digital competence and, therefore, the use of technology in the classroom, seems to become a *sine qua non* (Espuny et al., 2010; Gisbert et al., 2011; Gutiérrez et al., 2010). In line with this, many studies highlight the fact that university students tend to have developed basic skills related to the use of word processors or sending emails, but lack knowledge in reference to the more creative areas of digital competence, such as areas 3 to 6 (DigCompEdu) of the frameworks mentioned above (INTEF, 2022;

Mosquera-Gende 2021; 2022b; 2023b; 2023c; Pino and Soto, 2010; Prendes et al., 2010; Redecker and Punie, 2017). These data show a certain correlation with other studies on the digital competence of practicing teachers which yield similar results (Fernández and Fernández, 2016).

In view of the above, it seems necessary to develop the digital competence of future teachers, as already shown in the study by Moreno-Guerrero et al. (2020), with a sample of more than nine thousand teachers. This development does not only involve the use of tools in the classroom, but also encompasses the different areas of this competence, including a didactic approach to it (Gallego et al., 2010; Instefjord and Munthe, 2017). This will facilitate the work of teachers in the classroom, who will thus have more resources to cope with day-to-day life (Adell and Castañeda, 2012; Marqués, 2000; Mosquera-Gende, 2021). In order to contribute to this development, it is necessary to carry out a prior diagnosis to assess the starting point of university students and thus be able to develop intervention and improvement programmes (González Martínez et al., 2010).

1.3 Teachers' self-perception of their digital competence

If it is assumed that there is a need to develop digital competence in teaching, it is worth asking what teachers themselves think about it and whether they consider such training and updating of knowledge to be necessary. In this case, reference is being made to teachers' perception or self-perception of digital competence (Ali et al., 2024; Coutinho Santos et al., 2024; González-Cabanach et al., 2008; Perochena González et al., 2021). If the self-perception is high, the prospective teacher may not feel that there is room for further learning or, conversely, if the self-perception is very low, the student may not see himself/herself capable of acquiring new knowledge and may give up before starting.

Analysing various studies on the subject, different or even contrary results have been found. In 2014, a study carried out among students of the Bachelor's Degree in Teaching at the Faculty of Education in

Albacete revealed a negative perception in relation to their digital training (Cózar and Roblizo, 2014). Two years later, Pérez Escoda and Rodríguez Conde (2016) obtained the same conclusions, this time referring to primary school teachers in Castilla y León showing poor results in relation to their self-perceived digital competence. In 2019, there are three studies that follow the same lines. Girón Escudero et al. (2019) analysed the self-perceived digital competence of 117 prospective pre-school and primary school teachers, measuring it according to the INTEF (2017) framework, with results ranging between levels A1 and A2, i.e., having a basic competence level. In the same year, similar studies were published, even referring to other environments, for example, a Music School, and the results were similar, with students having a low self-perception of their digital competence (Caldeiro-Pedreira et al., 2019; Palau Martín et al., 2019). However, studies from 2014 can also be found with positive results in relation to the self-perception of prospective primary school teachers (Cabezas et al., 2014). More recently, the same trend has been reinforced in other research on the self-perception of early childhood teachers (Pinto-Santos et al., 2020), with very high results.

In relation to self-perception, there is an interesting study by Ramírez Mera and Barragán López (2018) which concludes that university students' self-perception of digital technology use depends on the purpose of its use: for an activity, informal learning or for leisure and communication uses, the latter being the most common and most positive in relation to their self-perception.

Comparing self-perceived digital competence from a gender perspective, a study by Grimalt-Alvaró et al. (2020), carried out among teachers of the Master's Degree in Educational Technology, concluded that women, in general, considered themselves less competent than men, despite achieving more positive results. In the words of the authors: "they show more humility when valuing their abilities" (p. 214).

Referring to the self-perception and age of education students, younger students (aged 20 to 24)

showed a more positive self-perception in a study carried out by Esteve (2015) with a sample of 159 prospective teachers. In this study and contrary to the previous case, women showed a higher score, but the study did not consider it significant. However, in the previous case, the difference was indeed considered relevant. The age-related data were corroborated in a study the following year, with younger people scoring more positively (Esteve-Mon et al., 2016).

With reference to the English language, in a 2019 study by Muñoz et al., the authors conclude, through interviews, that future teachers of English have a very positive self-perception of their digital competence. However, from their responses, they can also extract that only the first two areas of DigCompEdu are adequately developed, and training is required in the rest. In addition, the authors conclude by stressing the need for these future English teachers to be familiar with more digital tools.

1.4 Objectives and research questions

As we can see, there are numerous studies related to teaching digital competence, but the number is considerably reduced if the focus is on the self-perception of future English teachers, taking into consideration age and gender. Therefore, the general objective of this research is to measure students' self-perception of their own digital competence influenced by those two variables. The subject in which this study is based, Didactics of English Language, part of the Master's Degree in Teacher Training for Compulsory Secondary Education and Baccalaureate, Vocational Training and Language Teaching at a Spanish online university, is one in which the teacher always introduces numerous digital tools, both in synchronous online classes and through asynchronous activities, thinking about the future teaching practice of the students (Mosquera-Gende, 2021; 2022a). Taking that into account, the following specific objectives are proposed:

- Find out the students' starting point regarding their self-perception of their own digital competence.
- Collect data on students' final self-perception

of their digital competence.

- Compare the results regarding the initial and final self-perception of prospective teachers in relation to their digital competence.
- Considering these objectives, various research questions are established:
- Are there significant differences in students' initial self-perception depending on their gender or age range?
- Are there significant differences in students' final self-perception depending on their gender or age range?

2. Materials and methods

This research uses a mixed methodology consisting of a quantitative questionnaire and a qualitative analysis of the comments included in the forums of the subject in question. The data obtained from the questionnaire and the forums were treated anonymously at all times. It should be noted that this article is part of a larger research, complemented by other publications (Mosquera-Gende, 2012; 2022a; 2023b; 2024b). Part of the results obtained from the questionnaire provided to the students have been included in them. For the design of the quantitative questionnaire, other previous questionnaires were taken into consideration (Mosquera-Gende, 2021; Tourón et al., 2019). Once prepared, it was validated by three experts: two experts in language teaching and one expert in educational methodology and research. In the case at hand, the data referring to the gender and age variables are taken into account, as well as the questions referring to the students' perception of their digital competence, both before and after the development of the intervention. Therefore, we are talking about a pre-experimental design without a control group (Mosquera-Gende, 2023b).

As previously indicated, this analysis is developed within the framework of the subject of Didactics of English Language, which is part of the Master's Degree in Teacher Training for Compulsory Secondary Education and Baccalaureate, Vocational Training and Language Teaching at a Spanish online university. In order to measure the students' (who are all

future English teachers) self-perception of their own digital competence, they answered a series of questions at the beginning and at the end of the course (questionnaire). This questionnaire was provided to the students in an online format (Google Forms) with their corresponding informed consent and with the previous positive evaluation of the university's ethics committee. It consists of fifteen questions, of which only six were analysed in this case. Two refer to socio-demographic questions, asking about the age ranges and gender of the students, the other four are directly related to their self-perception of digital competence, which are answered on a Likert scale with five possible options (*Very good; Good; Acceptable; Improvable; Null*). The remaining questions, not analysed in this study, refer to the three levels of knowledge of specific digital tools, adapting the classifications of INTEF (2022), Redecker and Punie (2017) and Tourón et al. (2019): knowledge of the tool, use as learners (consumers) and use as creators (prosumers) (Mosquera-Gende, 2021; 2023b).

In addition to the students' responses to the questionnaire, both at the beginning and at the end of the subject, there were also comments in the forums about the questionnaire itself, contributions that were not requested but that the students made spontaneously (Mosquera-Gende, 2024b). These responses were categorised and coded using MAXQDA software, allowing for the incorporation of emerging elements through an inductive-deductive process (Braun and Clarke, 2019; Maxwell, 2012). The categories found focus on three fundamental areas: Decrease in self-perception, Learning opportunities and Education and ICT.

In relation to the digital tools used in the experience, the following stand out (Mosquera-Gende, 2021; 2022a; 2022b; 2023a; 2024a): Loom (for video recording), Vocaroo (for audio recording), Wakelet (for content curation and synchronous and asynchronous collaborative work), Genially (for content sharing), Padlet (for synchronous and asynchronous collaborative work), Powtoon (for creating animated videos), Flip (for asynchronous audiovisual collaboration), YouTube (for content sharing),

quiz creation tools, avatar creation tools, word cloud creation tools, Pinup (for synchronous collaborative work), MindMeinster (for synchronous collaborative work), Twitter (for content sharing and interaction), Doodle (for group management), Coggle (for content sharing) and Edpuzzle (for sharing enriching videos).

Taking into account the objectives set for this research, these tools will not be analysed, but it is relevant to present them in order to know the resources used during the course and thus to understand the variations in the students' answers in relation to the question on their self-perception of their digital competence at the beginning and at the end of the experience.

A total of 78 participants took part in this research, out of a total of 83 students in the subject. This could be considered a high rate of collaboration (94%), especially taking into consideration that this is a voluntary activity within an online educational environment, meaning it is asynchronous work carried out autonomously by the students, with no time set aside in class sessions to take part in the study (Mosquera-Gende, 2021; 2022a).

The sample is composed of 59 women (75.6% of the total) and 19 men (24.4% of the total), with the age distribution that is presented in **Table 2**.

Table 2. Distribution of the sample by age and gender.

Age range (AR)	Women (W)	Men (M)	Number of participants (N)
Between 18 and 25	30 (77%)	9 (23%)	39 (50% of the total)
Between 26 and 35	19 (70.4%)	8 (29.6%)	27 (34.6% of the total)
Between 36 and 50	9 (90%)	1 (10%)	10 (12.8% of the total)
Over 50	1 (50%)	1 (50%)	2 (2.6% of the total)

Source: Own elaboration.

It can be seen that 50% of the participants belong to the 18 to 25 age range, 77% of them being female. In second place comes the 26 to 35 age range, with 34.6% of the total sample, again with a higher percentage of women (70.4%). The figures decrease drastically in the last two age ranges, with 12.8% and 2.6% of the total sample. Only in the last age range

(over fifty years of age) does the number of women and men coincide, although it is not significant since there are only two people, representing 2.6% of the total sample.

3. Results

Before we start, it is worth noting that no participant indicated the *null* option in any of the questions posed and so it is excluded from all the tables for ease of reading, although it has been taken into consideration.

Starting with the general analysis of the results, regarding digital competence, the initial perception of the participants is compared with the final perception after the intervention. As previously mentioned, the levels they had to choose from in terms of how they consider their competence are as follows: *null*, *improvable*, *acceptable*, *good* or *very good*.

Considering the Likert scale, from 1 to 5, with 1 being *Null* and 5 being *Very good*, the resulting average initial level of the participants is 3.69. **Table 3** shows the standard deviation of each level with respect to this average, which lies between *acceptable* and *good*, although it is closer to the latter (SD 0.1). This implies that these are results with a distribution marked by the central values; with an initial self-perception that is neither very good nor very bad. The students rate their digital competence, for the most part, in a positive but moderate way.

Table 3. Initial self-perception of the students.

Total	Score (S)	Initial N (IN)	Percentage (%)	Standard deviation (SD)
Improvable	2	6	8%	2.5
Acceptable	3	20	26%	0.5
Good	4	44	56%	0.1
Very good	5	8	10%	1.5

Source: Own elaboration.

In **Table 4**, which shows students' final self-perception, we see that the mean is very similar to the initial one, but has fallen slightly to 3.59, with the standard deviations of *acceptable* and *good* at a very similar level.

Table 4. Final self-perception of students.

Total	Score (S)	Final N (FN)	Percentage (%)	Standard deviation (SD)
Improvable	2	9	12%	2.2
Acceptable	3	24	31%	0.3
Good	4	37	47%	0.2
Very good	5	8	10%	1.8

Source: Own elaboration.

The table above also shows that there is an increase in the lower part of the table compared to a decrease in the number of participants who consider their digital competence to be *good*. In general, it can be seen that the standard deviation decreases slightly at lower levels and increases at higher levels. In this sense, the final results do not show very different data from the initial ones, although, if we look at the final standard deviation, the central results are distributed in a more uniform way than at the beginning of the intervention, in line with the decrease detected in their self-perception.

The previous tables also include the differences expressed as percentages. In line with what has previously been indicated in relation to the standard deviation, we see that the percentage of students who consider their competence as *very good* does not vary at the beginning and at the end (=10.3%), but the number of students who consider their competence as *improvable* (+4%) or *acceptable* (+5%) increases. Finally, with regard to students who consider their competence as *good* (-9%), we see a considerable decrease.

As can be seen in the two tables above and as already mentioned, in no case was the *null* option selected, which seems to be consistent with the fact that this is an online university and so some level of digital literacy can be assumed.

Moving on to the analysis in **Table 5**, we can extract the initial and final average of men and women. The initial average for men is 4.6, a value close to *very good*, which is also the one with the lowest standard deviation with respect to that average (0.1). The initial average for women is lower, with 3.7, closer to the *good* value in terms

of their self-perception of their digital competency (SD 0.1). It would be very interesting to review previous gender studies to reflect and analyse the reasons for this initial difference in self-perception between men and women.

With reference to the final averages of the participants, in this same table, we see that the average for men decreases to 3.9 and for women it also drops, but to a lesser degree, to 3.5. In this case, the most predominant score for men is *good* (SD 0.01) and for women, there is a tie between those who consider

their competence as *acceptable* and *good* (both with an SD of 0.2).

If the same analysis is carried out comparing the results of men and women purely based on the percentage, in **Table 6** we can notice that the initial perception of women is, in general, lower than that of men. Among women, the percentage who admit that their digital competence is *improvable* (8.5%) is three points higher than that of men (5.3%), while among men, the percentage who consider their digital competence to be *very good* (21.1%) is 15 points higher than that of women (6.8%).

Table 5. Comparison of results by gender.

S	INM	INW	FNM	FNW	SD initial M	SD initial W	SD final M	SD final W
2	1	5	2	7	3.4	2.4	2.3	2
3	6	14	2	22	2.2	0.5	0.6	0.2
4	8	36	7	30	0.3	0.1	0.01	0.2
5	4	4	4	4	0.1	1.4	1.01	1.8

Source: Own elaboration.

Table 6. Overall percentage comparison of men's and women's self-perception.

	S	Initial	Final	Variation
Women	Improvable (2)	8.5%	11.1%	+2.6%
	Acceptable (3)	23.7%	34.9%	+11.2%
	Good (4)	61.0%	47.6%	-13.4%
	Very good (5)	6.8%	6.35%	-0.4%
Men	Improvable (2)	5.3%	13.3%	+8.1%
	Acceptable (3)	31.6%	13.3%	-18.2%
	Good (4)	42.1%	46.7%	+4.6%
	Very good (5)	21.1%	26.7%	+5.6%

Source: Own elaboration.

In the same table, it can be seen that after the intervention has taken place, there is an increase in both men and women who think that their digital competence is *improvable*. But this is as far as the similarities go. Among the women, the number of female students who consider their competence as *good* (-13.4%) or *very good* (-0.4%) decreases, while among male students, self-perception increases in these higher ranges of the table, by 4.6% and 5.6% respectively. Considering that the number of women far exceeds the number of men, these data are in line with the downward trend discussed when comparing **Table 2** with **Table 3**.

With reference to the difference in perception by age, also taking the overall sample as a basis, **Table 7** shows how the age ranges *between 26 and 35* and *over 50* are particularly positive in their initial assessment, which is generally positive, as mentioned above.

When comparing these results with the final results after the intervention has taken place, we see that the perception decreases very significantly among the older age ranges (*between 36 and 50* and *over 50*). This is also reflected in the initial and final averages by age range presented in **Table 8**. The average increases slightly in the youngest age ranges and decreases by several decimal points in the older age ranges.

Table 7. Overall self-perception percentages by age.

AR	S	Initial %	Final %	Variation %
Between 18 and 25	Improvable (2)	15.4%	9.1%	-6.3%
	Acceptable (3)	28.2%	34.1%	+5.9%
	Good (4)	48.7%	50.0%	+1.3%
	Very good (5)	7.7%	6.8%	-0.9%
Between 26 and 35	Improvable (2)	11.1%	4.5%	-6.6%
	Acceptable (3)	18.5%	22.7%	+4.2%
	Good (4)	59.3%	54.5%	-4.7%
	Very good (5)	11.1%	18.2%	+7.1%
Between 36 and 50	Improvable (2)	10.0%	40.0%	+30.0%
	Acceptable (3)	40.0%	30.0%	-10.0%
	Good (4)	40.0%	30.0%	-10.0%
	Very good (5)	10.0%	0.0%	-10.0%
Over 50	Improvable (2)	0.0%	0.0%	0.0%
	Acceptable (3)	0.0%	50.0%	+50.0%
	Good (4)	50.0%	0.0%	-50.0%
	Very good (5)	50.0%	50.0%	0.0%

Source: Own elaboration.

Table 8. Initial and final average of self-perception by ages.

AR	Initial average	Final average	Variable
Between 18 and 25	3.5	3.6	+0.1
Between 26 and 35	3.7	3.9	+0.2
Between 36 and 50	3.5	2.9	-0.6
Over 50	4.5	4	-0.5

Source: Own elaboration.

Table 9 shows a cross-comparison of age and gender in relation to self-perceived digital competence with an initial analysis using percentages. Looking at the starting point, we can see that women aged 18 to 25 have a more positive self-perception than men, with around 60% considering their digital competence as *good* or *very good* compared to 44% of men. Moving to the next age bracket, 26 to 35, men already outnumber women in their positivity, with almost 90% of men considering their competence to be *good* or *very good* compared to 63% of women. If we move on to men between 36 and 50

years of age, we see that 100% are in the *acceptable* range, but, as shown in Table 2, this is not very significant, as there is only one male in this age range. Among the women, confidence decreases with age and only 55% see themselves as having *good* or *very good* digital skills. When we look at the over 50 range, again looking at Table 2, we see that we only have two subjects, one male and one female, so the data is not significant. Even so, it can be said that men are more optimistic in their perception of their digital competence as they consider it to be *very good* compared to women's perception of it as *good*.

Table 9. Percentages of variation in self-perception by age and gender.

AR	S	Initial		Final		Variable	
		M	W	M	W	M	W
Between 18 and 25	2	11.1%	16.7%	12.5%	8.3%	+1.4%	-8.3%
	3	44.4%	23.3%	12.5%	38.9%	-31.9%	+15.6%
	4	22.2%	56.7%	50.0%	50.0%	+27.8%	-6.7%
	5	22.2%	3.3%	25.0%	2.8%	+2.8%	-0.6%
Between 26 and 35	2	0,0%	15.8%	0.0%	5.6%	0.0%	-10.2%
	3	12.5 %	21.1%	25.0%	22.2%	+12.5%	+1.2%
	4	75.0%	52.6%	50.0%	55.6%	-25.0%	+2.9%
	5	12.5%	10.5%	25.0%	16.7%	+12.5%	+6.1%
Between 36 and 50	2	0.0%	11.1%	50.0%	37.5%	+50.0%	+26.4%
	3	100.0%	33.3%	0.0%	37.5%	-100.0%	+4.2%
	4	0.0%	44.4%	50.0%	25.0%	+50.0%	-19.4%
	5	0.0%	11.1%	0.0%	0.0%	0.0%	-11.1%
Over 50	2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	3	0.0%	0.0%	0.0%	100.0%	0.0%	+100.0%
	4	0.0%	100.0%	0.0%	0.0%	0.0%	-100.0%
	5	100.0%	0.0%	100.0%	0.0%	0.0%	0.0%

Source: Own elaboration.

In the group of participants between 18 and 25 years of age, comparing the initial perception of students with the final one, a tendency can be seen among young women to choose the option of *acceptable*, which is the only value that increases among the women, by 16%. This means that those students who perceived their digital competence as *improvable* consider that there has been an evolution and, on the other hand, some of those who considered it as *good* or *very good*, have now decided to take it down a step. Among men, the process is the reverse, with only the *acceptable* range decreasing, while all the others, both the *improvable* and the *good* or *very good* ranges, have increased, with the *good* range standing out, with an increase of almost 30%.

In the 26 to 35 age range, women seem more positive about their digital competence after the intervention, with a 10% decrease in those who think their competence is *improvable* and a slight increase in all other scores, with those who consider their competence *very good* standing out (+6.1%). The case of men is slightly different, with a 25% drop in the number of men who consider their competence to be *good*, and this percentage is redistributed between

those who choose the adjective *acceptable* and those who choose the adjective *very good*. In other words, half of the 25% have increased their self-perception and the other half have decreased it.

In the last two age brackets, between 36 and 50 and over 50, there are very few subjects. Nevertheless, it can be observed that among men aged between 36 and 50, as was the case in the previous age range, the initial perception of *acceptable* is redistributed and divided in two after the experience, increasing to *good* and decreasing to *improvable*, by 50% each way. The one man over 50 years of age does not change his perception, remaining *very good* at the beginning and at the end. In the case of women between 36 and 50 years of age, the perception is more divided between the different scores, but, once the intervention has been carried out, their self-perception decreases in the more positive ranges, with a significant increase in *improvable* (+26.4%) and *acceptable* (+4.2%). The same is true for women over 50, with their perception dropping from *good* to *acceptable*.

Comparing the averages obtained by cross-examining gender and age, we obtain the results shown

in **Table 10**. Despite what is indicated in **Table 9**, we can see that if the averages are taken into consideration, men are more positive in relation to their digital competence in all age groups except those between 36 and 50 years old. This trend is reinforced in the final average, where men’s self-perception is higher than that of women in all bands.

Furthermore, **Table 10** shows, as also reflected in **Table 9**, how men’s perceptions hardly vary before and after the experience, while those of women do, in all but the youngest age groups. Once again, **Table 10** shows the previously detected trend of greater positivity in the younger age brackets and greater self-criticism among the older age groups, a trend that is largely accentuated in the case of women.

In reference to the subject forum, where the link to the voluntary questionnaire was left, 52 students left comments related to the initial questionnaire without having been asked to do so, i.e. almost 70% of the students (67% exactly) wanted to share their impressions with their peers after having completed the questionnaire. Most of the contributions are related to their surprise at discovering that they were not aware of many of the tools presented to them. They also refer to the reflection it led them to carry out. **Table 11** shows a selection of some of these contributions grouped into the three main categories found (Decrease in self-perception, Learning opportunities and Education and ICT).

Table 10. Average of variation in self-perception by age and gender.

AR	Initial average		Final average		Variation	
	M	W	M	W	M	W
From 18 to 25	3.6	3.5	3.9	3.5	-0.1	0
From 26 to 35	4	3.6	4	3.8	0	+0.2
From 36 to 50	3	3.6	3	2.9	0	-0.7
Over 50	5	4	5	3	0	-1

Source: Own elaboration.

Table 11. Comments in the forum.

Sex	Extract from the contribution	Categories
Woman	<i>“It has made me reflect on the use of technologies during my academic career. Of all the options available, teachers didn’t use any of them in the classroom. Both at university and at secondary school. They think that using technology means reading a Powerpoint in class. It has always been us students who have made use of it in our presentations and work, but not them in their teaching”.</i>	Education and ICT
Woman	<i>“I enjoyed doing the questionnaires because I learned about tools that I had never heard of before and it is a subject that both concerns me and interests me a lot”.</i>	Decrease in self-perception Learning opportunities
Man	<i>“I realised that I knew less about digital competence and tools than I thought I did, I hope I’m not the only one”.</i>	Decrease in self-perception
Woman	<i>“Like my colleague, those questions related to the previously used tools have led me to the conclusion that the teachers I have come across in my academic life were not very innovative in that sense. I really hope that at the end of this course I will have a wide range of tools, which I can then apply in the educational field”.</i>	Decrease in self-perception Education and ICT Learning opportunities
Man	<i>“I am interested to learn about several of the resources that were on the tools list. I recognise some of them, but I’ve never worked with them. Everything related to digital competence and new tools really captures my attention”.</i>	Learning opportunities
Woman	<i>“As my colleagues have said in their answers, I was not familiar with most of the tools, but if we are going to get to know them, I will be happy to learn!”</i>	Decrease in self-perception Learning opportunities

Source: Own elaboration.

As mentioned above, most of the contributions refer to students' personal reflection on their digital competence, considering that their knowledge of tools was not as good as they had assumed (Decrease in self-perception). Many show interest and eagerness to learn (Learning opportunities; Education and ICT) and some students also refer to the usefulness of this learning for their future teaching (Learning opportunities). It is also noteworthy that two female students reflect on the education they have received so far, concluding that it has not contributed to the development of their digital competence (Education and ICT; Decreased in self-perception).

These comments in the forum represent an exercise of free and spontaneous reflection on the part of the students that had not been considered in the development of the project but was very enriching, both for the teacher and for the students (Mosquera-Gende, 2024b). They were able to relate by interacting and showing their reflections and concerns about the importance of digital competence, both in reference to their personal competence and in reference to its presence in the educational system itself.

4. Discussion and conclusions

Considering the objectives set and the results obtained, in relation to the initial general self-perception of the students, the starting point is a score of 3.69 out of 5, which is closer to *good* than *acceptable* (see **Table 3**). If the overall analysis is taken as a reference after the experience has been completed, the difference is minimally lower, with an average of 3.59 (see **Table 4**).

With reference to the evolution of self-perception, it could be said that students who started with a *very good* perception of their digital competence have not changed their perspective. In their study with future English teachers, Muñoz and Sergio (2019) indicated that students' perceptions were generally very high. In the research that has been carried out, it could also be said to be high. Muñoz and Sergio (2019) concluded that it was necessary to develop this digital competence in future teachers of English.

After completing the questionnaires, as can be seen from the comments on the forum, many students, who are also future teachers of English, shared similar opinions.

Addressing the research questions posed, we intended to analyse whether there were significant differences, both at the start and the end of the course, in relation to the gender or age of the participants. With reference to gender, at the start of the process, women have a lower perception than men and, after the intervention, women's perception remains lower than men's, as shown in **Table 10**, which compares the overall results by age and gender. In general, men tend to see the intervention as an improvement of their digital competence, while for women, it seems to be a verification that they really "*still have a lot to learn*", as they point out in the forums, in line with the results of Grimalt-Álvaro et al. (2020).

In reference to self-perception by age range, following the initial inconsistency, we see at the end of the intervention that there is a decrease in self-perception in the older age groups and it seems that, among the women, more reflection and higher self-criticism may be taking place. Only in the younger age group do women outperform men in their positivity when considering their digital competence. This trend towards a more positive self-perception of young students coincides with the previous studies of Esteve (2015) and Esteve-Mon et al. (2016). The trend remains the same as the one discussed at the global level across all age groups. Men seem to view the experience more positively in terms of their digital competence development, while women seem to be more critical of themselves, seeing how far they still have to go. Once more, in the same line with the results of Grimalt-Álvaro et al. (2020).

In conclusion, we could say that the data obtained from this study refer to the two possibilities seen in some of the research mentioned at the beginning of this article. On the one hand, it begins with a high perception of digital competence, coinciding with the results of Cabezas et al. (2014), Mera et al. (2018) or Pintos-Santos et al. (2020). However,

once the intervention had been carried out, students were more aware of what they still had to learn, reducing the positivity of their overall perception, in line with Cózar and Roblizo (2014), Pérez Escoda and Rodríguez Conde (2016), Girón Escudero et al. (2019), Caldeiro-Pereira et al. (2019) or Palau Martín et al. (2019).

In any case, these results cannot be extrapolated as it is a small sample in a specific context. Moreover, the large difference in the number of men and women who took part in the study means that the overall results are indeed in line with the results provided by women, but it is not possible to extract minimally significant figures for men or for the older age groups, where there was an insufficient sample size.

It will be necessary to continue with this research in order to expand the sample and systematically analyse aspects that were thought to be secondary but, in fact, provide very valuable information, such as the spontaneous comments made by students in the forum (Mosquera-Gende, 2024b). These comments show the reflection made by students on the need to learn about more digital tools, on the training they have received so far or on their interest in learning about more resources that, in their opinion, will be very useful in their future as teachers (Mosquera-Gende, 2023b).

In addition to the above, the differences by age range and gender appear to be significant, although, as already mentioned, no conclusions can be drawn from such a small sample. A much more in-depth and meticulous study should be carried out, controlling the different variants that may have an influence and proposing an instrument that covers all the elements to be assessed. Obviously, given that the study has several limitations, the implementation of classroom measures, modifications in the didactic design or changes in the content of teacher training cannot be considered. Still, it is hoped that this may be the beginning of a more extensive investigation into the intersection and relationships between age ranges, gender, use of digital tools and self-perceived digital competence of future English teachers. It can

serve to help us consider that self-perception can play a fundamental role in students' learning of new knowledge, in this case technological knowledge, in both our face-to-face or online classrooms (Adell and Castañeda, 2012; Marqués, 2000; Mosquera-Gende, 2021; Muñoz et al., 2019).

While the topic of digital competence in education is not new, the specific focus on pre-service English teachers' self-perception influenced by age and gender provides an angle that, it is hoped, will add new insights to existing literature. Perhaps we should start to take certain variables into consideration when beginning to teach a subject in order to improve the initial self-perception of our students and thus be able to contribute to an improvement in their final results (González Martínez et al., 2010). Without a doubt, in this sense, digital tools and digital competence, if used correctly, can be fundamental allies to improve the teaching and learning process (Gallego et al., 2010; Instefjord and Munthe, 2017).

One thing that also remains to be studied is the appropriate formula so that a possible negative self-perception can be an incentive to learn and improve and not a demotivation for not believing oneself to be capable of carrying out any of the proposed activities (Mosquera-Gende, 2023c). The way in which digital tools are introduced in the classroom can tip the balance in one direction or the other.

Authors Contributions

This paper was conceptualized, researched, and written entirely by Ingrid Mosquera-Gende. All aspects of the study, including the formulation of the research question, the development of the methodology, the data collection and analysis, and the manuscript preparation, were undertaken by the author alone.

Conflict of Interest

The Author declare that there is no conflict of interest.

Data Availability Statement

Given the anonymous nature of the data, it is not collected in any public database.

Funding

This work has been funded by the Call for Funding for the translation of scientific articles and publication fees in open access journals 2023/2024 of the Universidad Internacional de La Rioja (UNIR).

Ethics Statement

The study has the positive evaluation of the Ethics Committee of the Universidad Internacional de La Rioja.

References

- Adell, J. y Castañeda, L., 2012. Emerging technologies, emerging pedagogies? In: Hernández J., Pennesi M., Sobrino D., Vázquez A. (eds.), *Emerging trends in education with ICT*. Asociación Espiral, Educación y Tecnología: Barcelona. pp. 13–32. (in Spanish). Available from: <https://dialnet.unirioja.es/servlet/articulo?codigo=4230542> (Cited 2 February 2024).
- Ali, Z., Palpanadan, S.T., Asad, M.M., et al., 2024. Embracing technology in EFL pre-university classrooms: A qualitative study on EFL learners' perceptions of intensive and extensive reading approaches. *Forum for Linguistic Studies*. 6(1).
DOI: <https://doi.org/10.59400/fls.v6i1.1894>
- Andreu-Sánchez, C., Martín-Pascual, M.Á., 2014. Audiovisual education and the creation of media prosumers. *Revista de Estrategias, Tendencias e Innovación en Comunicación*. 7. (in Spanish).
DOI: <https://doi.org/doi.org/2174-0992>
- Braun, V., Clarke, V., 2019. To saturate or not to saturate? Questioning data saturation as a useful concept for thematic analysis and sample-size rationales. *Qualitative Research in Sport, Exercise and Health*. 13(2), 1–16.
DOI: <https://doi.org/10.1080/2159676x.2019.1704846>
- Cabezas, M., Casillas, S., Pinto, A.M., 2014. Perception of Primary Education students at the University of Salamanca about their digital competence. *EDUTEC, Revista Electrónica de Tecnología Educativa*. 48, 1–14. (in Spanish).
- Caldeiro-Pedreira, M.C., Sarceda-Gorgoso, C., Barreira-Cerqueiras, E.M., 2019. The digital competence of the university students under examination: self-perception of the students of the Faculty of Teacher Training of Lugo. *Rua. ua.es*. (in Spanish).
DOI: <https://doi.org/978-84-17667-23-8>
- Castellanos Sánchez, A., Sánchez Romero, C., Calderero Hernández, J.F., 2017. New technopedagogical models. Digital competence of university students. *Revista Electrónica de Investigación Educativa*. 19(1). (in Spanish).
DOI: <https://doi.org/10.24320/redie.2017.19.1.1148>
- Coutinho Santos, J., Cerezo-Segovia, B.A., Brito Amorim, G., et al., 2024. University students' perspectives on online English language learning: Implications for Ecuadorian educators. *Forum for Linguistic Studies*. 6(2).
DOI: <https://doi.org/10.59400/fls.v6i2.1183>
- Cózar Gutiérrez, R., Roblizo Colmenero, M.J., 2014. Digital competence in the training of future teachers: perceptions of the students of the Teacher Degrees of the Faculty of Education of Albacete. *RELATEC: Revista Latinoamericana de Tecnología Educativa*. 13(2), 119–133. (in Spanish).
DOI: <https://doi.org/10.17398/1695-288X.13.2.119>
- Del Pilar Rodríguez Tenjo, J., Gallardo Pérez, O.A., 2020. Teaching profile with an inclusive vision: ICT-TAC-TEP and teaching skills. *Encuen-*

- tro Internacional de Educación en Ingeniería (EIEI). (in Spanish).
DOI: <https://doi.org/10.26507/ponencia.731>
- Durán, B.Z., López, J.F.B., Martínez, J.G., et al., 2017. Training in ICT and digital competence in teaching in public higher education institutions.. *Apertura*. 9(1), 80–96. (in Spanish).
DOI: <https://doi.org/10.32870/ap.v9n1.922>
- Espuny, C., González, J., Gisbert, M., 2010. What is the digital competence of students when they arrive at university? *Enseñanza y Teaching. Revista Interuniversitaria de Didáctica*. 28n(2), 113–137. (in Spanish). Available from: <https://revistas.usal.es/tres/index.php/0212-5374/article/view/7893> (cited 10 March 2024).
- Esteve, F., 2015. Teaching digital competence: analysis of self-perception and performance evaluation of university education students through a 3D environment [Ph.D thesis]. (in Spanish). Universitat Rovira i Virgili. TDX. Available from: <https://bit.ly/3kWVmjI> (cited 5 March 2024).
- Esteve-Mon, F.M., Gisbert-Cervera, M., Lázaro-Cantabrana, J.L., 2016. The digital competence of future teachers: How do current education students see themselves? *Perspectiva Educacional*. 55(2). (in Spanish).
DOI: <https://doi.org/10.4151/07189729-vol.55-iss.2-art.412>
- Fernández, F.J., Fernández, M.J., 2016. Generation Z teachers and their digital skills. *Comunicar*. 24(46), 97–105. (in Spanish).
DOI: <https://doi.org/10.3916/C46-2016-10>
- Fernández, G.E., Tarabini, N., Lell, A., 2018. The transition from information technologies to technologies of empowerment and participation in university classrooms. *Tecnología, Diseño e Innovación*. 4(1). (in Spanish). Available from: <https://www.unae.edu.py/ojs/index.php/facat/article/view/99> (cited 10 February 2024).
- Gallego, M.J., Gamiz, V.M., Gutiérrez, E., 2010. Digital skills in the training of future teachers. Didactic proposals. Congreso Euro-Iberoamericano de Alfabetización Mediática y Culturas Digitales. (in Spanish). Available from: <http://hdl.handle.net/10481/65487> (cited 1 January 2024).
- Gisbert, M., Espuny, C., González, J., 2011. INCOT-IC. A tool for diagnostic @self-assessment of digital competence at the university. *Profesorado. Revista de Currículum y Formación de Profesorado*. 15(1), 75–90. (in Spanish). Available from: <https://www.redalyc.org/pdf/567/56717469006.pdf> (cited 4 January 2024).
- Girón Escudero, V., Cózar Gutiérrez, R., González-Calero Somoza, J.A., 2019. Analysis of self-perception of the level of teaching digital competence in initial teacher training. *Revista Electrónica Interuniversitaria de Formación Del Profesorado*. 22(3), 193–218. (in Spanish).
DOI: <https://doi.org/10.6018/reifop.373421>
- González-Cabanach, R., Valle, A., Rodríguez, S., et al., 2008. An intervention programme for the improvement of self-perceptions and self-beliefs. *Handbook of Instructional Resources & Their Applications in the Classroom*. Nova Science Publishers Inc.: New York. pp. 251–266.
- González Fernández, M.O., Huerta Gaytán, P., 2019. Flipped classroom experience to promote higher-level prosumer students. *RIED. Revista Iberoamericana de Educación a Distancia*. not22(2), 245. (in Spanish).
DOI: <https://doi.org/10.5944/ried.22.2.23065>
- González González, M.G., Ojeda Chimborazo, M.C., Pinos Coronel, P.C., 2020. Challenge of the 21st Century in education: making leaps from ICT-TAC to TEP. *Revista Científica*. n5(18), 323–344. (in Spanish). Available from: <https://dialnet.unirioja.es/servlet/articulo?codigo=9604123> (vited 4 February 2024).
- González Martínez, J., Espuny Vidal, C., Gisbert

- Cervera, M., 2010. The zero evaluation of digital nuclear competence in the new degrees of the EHEA. *TIC. Revista d'Innovació Educativa*. 4, 13–20. (in Spanish).
DOI: <https://doi.org/10.7203/attic.4.169>
- Grimalt-Álvaro, C., Usart Rodríguez, M., Esteve González, V., 2020. Teaching digital competence in continuous teacher training from a gender perspective: case study. *Rua.ua.es*. (in Spanish).
DOI: <https://doi.org/978-84-18348-11-2>
- Gutiérrez, A., Palacios, A., Torrego, L., 2010. The training of future teachers and the integration of ICT in education: anatomy of a disagreement. *Revista de Educación*. 352, 267–293. (in Spanish). Available from: <https://dialnet.unirioja.es/servlet/articulo?codigo=5764946> (cited 1 January 2024).
- Hosseini, S.A., Dabiri, A., Kashefian-Naeeni, S., et al., 2024. A comparison of the level of the ESP language learners' performance and engagement in a synchronous online course and the face-to-face course. *Forum for Linguistic Studies*. 6(1).
DOI: <https://doi.org/10.59400/fls.v6i1.1935>
- Instefjord, E.J., Munthe, E., 2017. Educating digitally competent teachers: A study of integration of professional digital competence in teacher education. *Teaching and Teacher Education*. 67, 37–45.
DOI: <https://doi.org/10.1016/j.tate.2017.05.016>
- INTEF, 2017. Common Framework of Digital Teaching Competence. (in Spanish). Available from: [https://aprende.intef.es/sites/default/files/2018-05/2017_1020_Marco-Com %C3 %BA%BA%BA-de-Competencia-Digital-Docente.pdf](https://aprende.intef.es/sites/default/files/2018-05/2017_1020_Marco-Com_%C3%BA%BA%BA-de-Competencia-Digital-Docente.pdf) (cited 6 March 2024).
- INTEF, 2022. Reference Framework for Teaching Digital Competence. (in Spanish). Available from: https://intef.es/wp-content/uploads/2022/03/MRCDD_V06B_GTTA.pdf (cited 22 February 2024).
- Marqués, P., 2000. Impact of ICT on university teaching. *Facultad de Educación Universidad Autónoma de Barcelona*. (in Spanish).
- Maxwell, J.A., 2012. *Qualitative research design: An interactive approach*. Sage: Newcastle upon Tyne.
- Moreno-Guerrero, A.J., López Belmonte, J., Pozo Sánchez, S., et al., 2020. State of teaching digital competence in the different educational stages from an international scope. 41(16). (in Spanish). Available from: <https://www.revistaespacios.com/a20v41n16/a20v41n16p19.pdf> (cited 5 January 2024).
- Moreno Rodríguez, M.D., Gabarda Méndez, V., Rodríguez Martín, A.M.R.M., 2018. Information literacy and digital competence in teaching students. *Profesorado, Revista de Currículum y Formación del Profesorado*. 22(3). (in Spanish).
DOI: <https://doi.org/10.30827/profesorado.v22i3.8001>
- Mosquera-Gende, I., 2021. The development of digital competence of future teachers in an online university. *Bordón. Revista de Pedagogía*. 73(4), 121–143. (in Spanish).
DOI: <https://doi.org/10.13042/Bordon.2021.89823>
- Mosquera-Gende, I., 2022a. Make the teaching and learning process more flexible in an online university. *EduTec. Revista Electrónica de Tecnología Educativa*. 79, 199–213. (in Spanish).
DOI: <https://doi.org/10.21556/edutec.2022.79.2351>
- Mosquera-Gende, I., 2022b. Collaborative digital tools for the training of future teachers in an online university. *REDU. Revista de Docencia Universitaria*. 20(1), 35–50. (in Spanish).
DOI: <https://doi.org/10.4995/redu.2022.16806>
- Mosquera Gende, I., 2023a. Informal learning in net-

- works. Twitter and the #CharlasEducativas. (in Spanish).
DOI: <https://doi.org/10.36006/16414>
- Mosquera-Gende, I., 2023b. Digital tools and active learning in an online university: Improving the academic performance of future teachers. *Journal of Technology and Science Education*. 13(3), 632–645.
DOI: <https://doi.org/10.3926/jotse.2084>
- Mosquera-Gende, I., 2023c. Teacher perspective on learning English with digital tools: emotional and attitudinal implications. *TEJUELO. Didáctica de la Lengua y la Literatura. Educación*. 38, 13–42. (in Spanish).
DOI: <https://doi.org/10.17398/1988-8430.38.13>
- Mosquera-Gende, I., Marcelo-Martínez, P., Postigo-Fuentes, A.Y., et al., 2024a. The hashtag #CharlasEducativas as a teacher affinity space on Twitter. *Comunicar*. 32(78), 222–233.
DOI: <https://doi.org/10.58262/V32I78.18>
- Mosquera-Gende, I., 2024b. Forums as a dynamic element for active participation in an online university. *Hachetetepé. Revista Científica en Educación y Comunicación*. (28), 1–21. (in Spanish).
DOI: <https://doi.org/10.25267/Hachetetepé.2024.i28.12031>
- Muñoz, P.A., Sergo, M.V., 2019. Assessment of the digital competence of future English teachers *Revista Estudios de Lenguas*. 2(1), 55–76. (in Spanish).
- Palau Martín, R.F., Usart, M., Ucar Carnicero, M.J., 2019. The digital competence of conservatory teachers. Self-perception study in Spain. *Revista Electrónica de LEEME*. (44), 24–41. (in Spanish).
DOI: <https://doi.org/10.7203/leeme.44.15709>
- Pérez Escoda, A., Rodríguez Conde, M.J., 2016. Evaluation of the self-perceived digital competencies of Primary Education teachers in Castilla y León (Spain). *Revista de Investigación Educativa*. 34(2), 399. (in Spanish).
DOI: <https://doi.org/10.6018/rie.34.2.215121>
- Perochena González, P., Cárdenas Lizarazo, J.A., Mosquera Gende, I., et al., 2021. Self-efficacy of Colombian mathematics teachers in relation to their job self-perception and other variables. *Universitas Psychologica*. 19, 1–15. (in Spanish).
DOI: <https://doi.org/10.11144/Javeriana.upsy19.apmc>
- Pino, M.R., Soto, J., 2010. Identification of the mastery of digital skills in teaching degree students. *Revista Teoría de la Educación*. 11(3), 336–362. (in Spanish). Available from: <https://www.redalyc.org/pdf/2010/201021093015.pdf> (cited 11 February 2024).
- Pinto Santos, A.R., Cortés Peña, O., Alfaro Camargo, C., 2017. Towards the transformation of teaching practice: spiral model of ICTTACTEP competencies. *Pixel-Bit. Revista de Medios y Educación*. (in Spanish).
DOI: <https://doi.org/10.12795/pixelbit.2017.i51.03>
- Pinto-Santos, A.R., Pérez, A., Darder, A., 2020. Self-perception of Digital Teaching Competence in the initial training of Early Childhood Education teachers. *Revista ESPA-CIOS*. 41(18). (in Spanish). Available from: <https://www.revistaespacios.com/a20v41n18/a20v41n18p29.pdf> (cited 26 March 2024).
- Prendes, M.P., Castañeda, L., Gutiérrez-Portlán, I., 2010. Competencies for the use of ICT for future teachers. *Comunicar*. 35, 175–182. (in Spanish).
DOI: <https://doi.org/10.3916/C35-2010-03-11>
- Ramírez Mera, U.N., Barragán López, J.F., 2018. University students' self-perception on the use of digital technologies for learning. *Apertura*. 10(2), 94–109. (in Spanish).

DOI: <https://doi.org/10.32870/ap.v10n2.1401>

Redecker, C., Punie, Y., 2017. European Framework for the Digital Competence of Educators: Dig-CompEdu. Publications Office of the European Union. Available from: <https://publications.jrc.ec.europa.eu/repository/handle/JRC107466> (cited 6 March 2024).

Tourón, J., Martín, D., Navarro, E., et al., 2018. Construct validation of an instrument to measure teachers' teaching digital competence (CDD). *Revista Española de Pedagogía*. 76(269), 25–54. (in Spanish).

DOI: <https://doi.org/10.22550/REP76-1-2018-02>