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ANALYSIS OF SELF-PERCEIVED DIGITAL COMPETENCES IN FUTURE EDUCATORS: A STUDY AT THE UNIVERSITY OF GRANADA

Santiago Alonso-García, Juan-José Victoria-Maldonado *, Jose-Antonio Martínez-Domingo, Blanca Berral-Ortiz

Universidad de Granada (Spain)

salonsog@ugr.es
**Corresponding author: jjvmjuanjo@gmail.com*
josemd@ugr.es, blancaberral@ugr.es

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Abstract

Digital competence stands as a pivotal element in educational training across all levels, notably within higher education and particularly within the realm of initial teacher training. As prospective educators, these individuals bear the crucial responsibility of championing digital competences and integrating them into their teaching curricula. However, for this integration to materialize effectively, it becomes imperative for them to establish a robust framework for digital competence training. The linchpin of this preparation lies in DigCompEdu. This study adopts a correlational approach with a retrospective ex-post-facto design aimed at scrutinizing the digital competences among future teachers within the Faculty of Education Sciences at the University of Granada. Notably, the research uncovers intriguing insights: self-perceived digital competence exhibits variations based on the gender of the students, with men tending to display a more positive self-assessment in contrast to findings suggesting otherwise. Diverse perspectives exist among authors, some advocating for correlation while others refute it. Conversely, factors such as the academic course or degree do not seem to exert significant influence. A critical revelation surfaces from the majority of students at the Faculty of Education: their self-assessed digital competence level hovers around B1, an assessment considered inadequate for effectively imparting knowledge to future generations. This deficiency persists partly due to the absence of dedicated spaces and training opportunities in this domain, as perceived by students. However, nuances emerge based on the degree pursued, highlighting disparities in perceptions regarding this aspect. Ultimately, this research underscores the urgency to enhance digital competence training within initial teacher education, advocating for a more comprehensive approach to bridge the gap between perceived competence and the actual proficiency required to navigate the digital landscape in education effectively.

Keywords **–** Teaching skills, Teacher competencies, Teacher training technological education, Digital literacy, Higher education.

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1. Introduction

Digital competences have become fundamental in all areas of human beings and, in particular, in the field of education (Pettersson, 2018). These competences refer to the ability to use Information and Communication Technologies (ICT) effectively, including hardware, software, applications and digital media, to achieve educational goals. In the context of education, digital competences imply the ability to use technological tools to enhance teaching and learning. Successful incorporation of these competences into teaching practice can have a significant impact on the quality of education (Levano-Francia, Sanchez-Diaz, Guillén-Aparicio, Tello-Cabello, Herrera-Paico & Collantes-Inga, 2019).

The training of future educators has evolved to address the growing importance of digital competences. Today's teachers must not only be experts in their subject area, but also competent in the use of educational technology. This involves integrating digital competences into teacher education programmes, which may include specific courses on educational technology, developing skills in digital content creation, managing virtual classrooms and adapting traditional teaching methods to digital approaches (Falloon, 2020).

Self-assessment of digital skills is an important process for understanding students' level of preparedness in terms of technology skills. However, it is crucial to recognise that the perception of one's own digital skills may differ from actual skills (Dimaculagan, San Luis & Gabitanan, 2021). Students may overestimate or underestimate their digital skills. Therefore, self-assessment should be considered alongside objective assessment of digital competences to get an accurate picture.

Such self-assessment of digital competences can be done through questionnaires, interviews, rating scales or other tools that allow learners to assess their own skills in specific areas such as web browsing, multimedia content creation, use of educational software, data management and technological problem solving.

There is a growing body of research such as the one presented above that has focused on measuring digital competences of educators and learners (Cabezas, Casillas, Sanches-Ferreira & Teixeira, 2017; Flores & Roig, 2017). These studies have used a variety of methodologies to assess digital competences, including questionnaires, practical skills tests and observations of participation in digital learning environments. In addition, they have identified the need for technological resources and infrastructures to be available in order to optimally train students in digital competences (Luján-Guevara & Apolaya-Sotelo, 2021; Mendez-Gijon & Morales-Barrera, 2020; Morales-Zambrano, Pazmiño-Campuzano & San Andrés-Laz, 2021).

Some previous research has identified gender differences in digital skills among students (Cabezas & Casillas, 2018; Vázquez-Cano, Marín-Díaz, Maldonado-Berea & García-Garzón, 2017). The benefits of strong digital skills training in improving teaching effectiveness and promoting more active and participatory learning have also been highlighted (Chiecher, 2020; Zhao, Sánchez-Gómez, Pinto-Llorente & Zhao, 2021).

The importance of these digital competences becomes particularly relevant when the digital divide is mentioned. It is necessary to know the digital competences in depth, among which problem solving is one of them (Palacios-Rodríguez, Guillén-Gámez, Cabero-Almenara & Gutiérrez-Castillo, 2023). It is especially necessary to mention the digital divide that is generated among students if teachers are not trained to teach and train in this competence (Cisneros-Barahona, Marqués-Molías, Samaniego-Erazo & Mejía-Granizo, 2023).

Specifically, this research focuses on the Faculty of Education Sciences at the University of Granada. This generates a situation in which the assessment of digital competences has certain differences with respect to the research by Cabezas et al. (2017) or Flores and Roig (2017), as for the assessment of future teachers it is more appropriate to assess them through instruments focused on teachers (Fernández-Sánchez & Silva-Quiroz, 2022).

In contextualising the digital evaluation of teachers, it is important to point out the existing methods of teacher evaluation. On the one hand, the TPACK model. This model focuses on establishing knowledge in three specific areas, pedagogical, technological and content knowledge, and the relationship between the three areas generates the model (Morales, 2020).

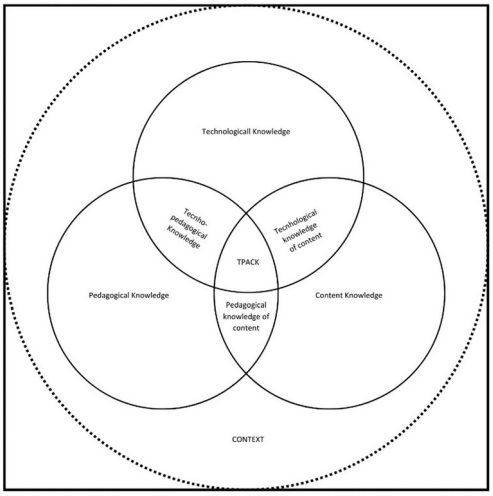

Figure 1. Explanation of the TPACK model

From South America, another means of assessing the digital competences of future teachers has been proposed: the NETS-T model, which divides the competences that teachers should have into the following areas (Jiménez-Hernández, Muñoz & Sánchez, 2021):

1. Technological.
2. Technical
3. Pedagogical
4. Responsibility
5. Management

Finally, the instrument proposed from Europe called DigCompEdu. This instrument is of great importance at international level. On the one hand, this instrument is proposed from the common research centre, which makes the instrument internationally relevant on its own, being relevant at European level.

However, the relevance of the instrument is not only due to its European relevance. In Spain, the INTEF adapts it to generate the common framework of digital competence in teaching, the last one being published in 2022. This means that this self-assessment questionnaire is also used in South America, where we find research such as that of Martín, Llorente and Barroso (2022) or Riquelme-Plaza, Cabero-Almenara and Marín-Díaz (2022).

This questionnaire has professional aspects among which are the areas Professional Engagement and Digital Resources; pedagogical aspects with the areas Digital Resources, Teaching and Learning, Evaluation and Feedback and Student empowerment; and finally, aspects related to the development of student competences with the areas Student empowerment and Facilitating students' digital competence (Mora-Cantallops, Inamorato-Dos Santos, Villalonga-Gómez, Lacalle-Remigio, Camarillo-Casado, Sota-Eguizábal et al., 2022).

To highlight this document because of the number of studies that have been carried out in contexts similar to those presented in this research and the validation by multiple investigations that have been carried out, establishing correlations, descriptions and validating the questionnaire (Palacios-Rodríguez et al., 2023;

Cabero-Almenara, Barroso-Osuna, Gutiérrez-Castillo & Palacios-Rodríguez, 2020; Alonso-García, Victoria-Maldonado, García-Sempere & Lara-Lara, 2023; Mora-Cantallops et al., 2022).

2. Methodology

2.1. Hypothesis

The primary aim of this research is to identify the self-perceived digital competences of trainee teachers at the University of Granada and explore the factors influencing these competences.

To achieve this objective, the following hypotheses are proposed:

H1. Gender of students does not affect students' self-perceived level of digital competence.

H2. Students' grade level does not affect students' self-perceived level of digital competence.

H3. The grade of the learner does not affect the learner's self-perceived level of digital competence.

H4. According to students at the Faculty of Education, the University provides sufficient tools for the development of digital competences.

2.2. Research Design

The present research is a correlational study with an ex post facto retrospective design. For this purpose, a questionnaire was used, specifically the DigCompEdu questionnaire validated by Mora-Cantallops et al. (2022). The sample was collected through non-probability sampling known as convenience sampling. This type of sampling is used especially because of the date on which the data are collected. The type of sampling selected is chosen because of the timing of data collection, as the sample collection takes place during the end of April and the whole month of May 2023. These two months are the last months of the University school calendar, as June is dedicated to the preparation and taking of exams. Based on Otzen and Manterola (2017), we selected this type of sampling as the main advantage is that the sample can be collected with great speed and little economic cost, and the main limitation is the false representation of reality, especially in small populations, although in this case the sample is 419 students, which gives a fairly representative perspective of reality.

2.3. Sample Description

As mentioned above, a non-probabilistic convenience sampling is used (Otzen & Manterola, 2017) due to the need to collect the sample before the end of the academic year. However, and with the intention of collecting data that show the reality of the centre, a sample of all the degrees present in the Faculty of Education Sciences of the University of Granada was collected, with a total sample of 419 students distributed according to degree as follows: Early Childhood Education 47.3%; Social Education 24.8%; Primary Education 14.8% and Pedagogy 13.1%. Although this is not the real representation of the students within the faculty, samples have been collected from all the degrees, with more than 50 students in all the degrees.

2.4. Data Collection Instrument

Regarding the instrument, it is important to mention that DigCompEdu is the instrument proposed by the European Union's Joint Research Centre (JRC), which makes it particularly relevant in the current context. The DigCompEdu is the reference framework established to determine the digital competences that teachers should have, regardless of the educational stage they focus on. In Spain, Instituto Nacional de Tecnologías Educativas y Formación del Profesorado (National Institute of Educational Technologies and Teacher Training) has adapted it and established it as a reference framework under the name Marco de Referencia de la Competencia Digital Docente (Framework of Reference for Digital Competence in Teaching), which was last updated in 2022. Thus, the competences and areas established at a theoretical level are the following areas:

1. Professional Engagement
2. Digital Resources
3. Teaching and Learning
4. Assessment
5. Empowering Learners
6. Facilitating Learners' Digital Competence

The instrument has reliability and validity as the validation of the questionnaire can be found in Mora-Cantallops et al. (2022), so it can be used as a reference for data collection.

2.5. Data Analysis

For the analysis of the results, the IBM SPSS statistical program version 28 was used to carry out an exploratory and confirmatory factor analysis of the factors, as well as the correlation between the different points.

2.6. Reliability and Validity

The validation of the questionnaire can be found in Mora-Cantallops et al. (2022) and Cabero-Almenara et at. (2020), where a Cronbach's alpha of 0.87 is found in the case of Mora-Cantallops et al. (2022) and 0.931 in the case of Cabero-Almenara et at. (2020). For the selected sample in this study the result was 0.933.

Continuing with the tests that have been carried out for the analysis of reliability and validity, the KMO test is proposed, the aim of which is to find out whether the variables can be factored, thus achieving a more efficient instrument (Edgardo & Medrano, 2010) and Bartlett's test of sphericity. For this test, the minimum acceptable level is 0.80, being 0.953 for the sample presented, and in the case of sphericity it is 0.00, being below the acceptable limit of 0.05.

Finally, the degree of saturation of the sample is carried out from the factor analysis and factor rotation, which is carried out from the Oblimin method, as the paper by López-Aguado and Gutiérrez-Provecho (2019), which argues that this is more suitable for the Social Sciences. In this test, the result is 70%, above the acceptable 60%.

3. Results

Once the reliability and validity of the instrument have been analysed, the results obtained according to the different hypotheses that have been put forward should be mentioned.

For the analysis and contrast of the different hypotheses raised, the Kolmogorov-Smirnov test was carried out first of all due to the size of the sample and to make a first approach to the sample by looking at its distribution. As can be seen in Table 1 in the Kolmogorov-Smirnov test, all the questions and all the areas follow a non-normal distribution with a result <0.001.

		AREA 1	AREA 2	AREA 3	AREA 4	AREA 5	AREA 6
N		1676	1257	1676	1257	1257	2095
Normal Parameters[a,b]	Mean	3,26	3,71	3,62	3,14	3,83	3,83
	Std. Deviation	1,593	1,656	1,551	1,453	1,617	1,723
Most Extreme Differences	Absolute	,167	,178	,174	,198	,146	,185
	Positive	,167	,178	,174	,198	,146	,185
	Negative	-,092	-,112	-,095	-,111	-,124	-,120
Test Statistic		,167	,178	,174	,198	,146	,185
Asymp. Sig. (2-tailed)[c]		<,001	<,001	<,001	<,001	<,001	<,001

Table 1. Results of the Kolmogorov-Smirnov test

Because of this, correlations have been performed using the non-parametric Rho Spearman test and for testing the correlation between variables the Mann-Whitney U test which shows the degree of significance (Flores-Ruiz, Miranda-Novales & Villasís-Keever, 2017).

Firstly, an analysis is made of how the gender of the students influences their self-perceived digital competence. In this aspect, Spearman's Rho test shows how the students' perception in the area 3 teaching and learning is altered according to gender, being better self-perceived in the case of males. Specifically, this difference is made in the ability to know in which context to use ICT. This correlation is confirmed by the Mann-Whitney U test, which establishes a mean relationship in this area as Sig<0.3 as shown in Tables 2, 3 and 4.

			AREA 1	**AREA 2**	**AREA 3**	**AREA 4**	**AREA 5**	**AREA 6**
Rho de Spearman	Sex	Correlation coefficient	,093	,002	,111	,36	,069	,077
		Sig. (bilateral)	,057	,968	,023	,463	157	,116
		N	419	419	419	419	419	419

Table 2. Spearman Rho in relation to Sex and areas

			C1	**C2**	**C1**	**C4**
Rho de Spearman	Sex	Correlation coefficient	,111*	,090	,068	,009
		Sig. (bilateral)	,023	,066	,164	,851
		N	419	419	419	419

Note: The letter C is used to refer to the fact that it is a question relating to area 3 and the number after the C refers to the question number of the area to which it refers.

Table 3. Spearman's Rho Spearman correlation of gender with questions

	AREA 1	**AREA 2**	**AREA 3**	**AREA 4**	**AREA 5**	**AREA 6**
U de Mann-Whitney	7304,500	8711,500	7019,500	8180,500	7654,000	7532,500
Sig. asin. (bilateral)	,057	,968	,023	,462	,157	,116

Table 4. Mann-Whitney U-test where correlation is shown when Sig<.05

As the sample has a non-normal distribution, different tests will be carried out to show the reality of the different statistics. Firstly, the Kruskal-Wallis test is performed, in which a value below 0.05 indicates a significant difference according to the dependent variable (Table 5). In addition, the degrees of Primary Education, Early Childhood Education and Pedagogy have a subject of technological resources, so a segmentation will be made by degrees to see if the appearance of this subject in the curriculum is appreciated.

The statistics show that there are no statistically significant differences between the courses independently and by course. Only in the third year of Social Education is there a difference, on the understanding that this difference is due to the size of the sample, as there is no subject in the syllabus that explains this difference (Table 6).

Finally, it is important to mention how the DigCompEdu mentions how the institutions present accessibility towards ICT development. For this part, the DigCompEdu includes 5 questions on a 5 options Likert scale.

Again, the distribution of responses is non-normally distributed, so again, non-parametric statistics are used to analyse the existing correlations (Table 7).

As can be seen in Table 7, the mean of the responses is approximately 3, which corresponds to the statement "Neither agree nor disagree". With regard to this mean and these points, it stands out because there is no difference in reference to the sex of the students, as in reference to the Mann-Whitney U, Sig>0.05 is not observed in any case (Table 8).

Null hypothesis	Test	Sig.	Decition
The distribution of AREA 1 is the same across course categories.	Kruskal-Wallis test for independent samples	,617	Retain the null hypothesis.
The distribution of AREA 2 is the same across course categories.	Kruskal-Wallis test for independent samples	,520	Retain the null hypothesis.
The distribution of AREA 3 is the same across course categories.	Kruskal-Wallis test for independent samples	,274	Retain the null hypothesis.
The distribution of AREA 4 is the same across course categories.	Kruskal-Wallis test for independent samples	,655	Retain the null hypothesis.
The distribution of AREA 5 is the same across course categories.	Kruskal-Wallis test for independent samples	,676	Retain the null hypothesis.
The distribution of AREA 6 is the same across course categories.	Kruskal-Wallis test for independent samples	,940	Retain the null hypothesis.

Table 5. Kruskal-Wallis test

Null hypothesis	Test	Sig.[a,b]	Decition
The distribution of AREA 1 is the same across course categories.	Kruskal-Wallis test for independent samples	,393/,886/, 395/,269	Retain the null hypothesis.
The distribution of AREA 2 is the same across course categories.	Kruskal-Wallis test for independent samples	,600/,558/, 354/,187	Retain the null hypothesis.
The distribution of AREA 3 is the same across course categories.	Kruskal-Wallis test for independent samples	,373/,981/, 037/,917	Retain the null hypothesis. (Except in Educación Social)
The distribution of AREA 4 is the same across course categories.	Kruskal-Wallis test for independent samples	,733/,758/, 592/,102	Retain the null hypothesis.
The distribution of AREA 5 is the same across course categories.	Kruskal-Wallis test for independent samples	,130/,411/, 560/,653	Retain the null hypothesis.
The distribution of AREA 6 is the same across course categories.	Kruskal-Wallis test for independent samples	,285/,101/, 102/,852	Retain the null hypothesis.

Note: The order of appearance of the data is Primary Education, Early Childhood Education, Social Education and Pedagogy.

Table 6. Kruskal-Wallis test in relation to grade and segmented by grade level

		University invests in upgrading and improving technical infrastructure	The University provides the necessary technical support	Students have access to digital devices	The University's Internet connection is reliable and fast	The University supports the development of my digital competence, e.g. through continuing professional development activities
N		419	419	419	419	419
Standard parameters	Mean	2,77	2,91	3,35	2,87	3,03
	Deviation	1,060	1,087	1,028	1,184	1,067
Extreme maximum differences	Absolute	,191	,179	,252	,161	,205
	Positive	,167	,152	,168	,151	,174
	Negative	-,191	-,179	-,252	-,161	-,205
Test statistic		,191	,179	,252	,161	,205
Sig. asin. (bilateral)[c]		<,001	<,001	<,001	<,001	<,001

Table 7. Kolmogorov-Smirnov test results

With reference to the grade being studied, it is important to mention that there are differences according to the grade being studied.

The Kruskal-Wallis test is presented below (Table 9), showing how there are significant differences in the last three questions, and the Mann-Whitney U test is shown for each of the degrees, showing the

differences found in each of the degrees. This shows how there are similarities between the Degrees in Pedagogy and Social Education and Early Childhood Education, while these Degrees have differences with the Degree in Primary Education (Table 10).

	University invests in upgrading and improving technical infrastructure	**The University provides the necessary technical support**	**Students have access to digital devices**	**The University's Internet connection is reliable and fast.**	**The University supports the development of my digital competence, e.g. through continuing professional development activities**
Mann-Whitney U	8201,000	8252,500	8304,000	7672,500	8212,500
Wilcoxon W	77579,000	77630,500	77682,000	8800,500	9340,500
Z	-,719	-,648	-,590	-1,407	-,706
Sig.	,472	,517	,555	,159	,480

Table 8. Mann-Whitney U-test where correlation is shown when Sig<.05

Null hypothesis	**Test**	**Sig.**[a,b]
University invests in upgrading and improving technical infrastructure.	,088	Retain the null hypothesis.
The University provides the necessary technical support	,068	Retain the null hypothesis.
Students have access to digital devices	,018	Reject the null hypothesis
The University's Internet connection is reliable and fast	,003	Reject the null hypothesis
The University supports the development of my digital competence, e.g. through continuing professional development activities	,005	Reject the null hypothesis.

Table 9. Kruskal-Wallis test for grade

	Sig.
Pedagogía-Eduación Social	,971
Pedagogía-Educación Infantil	,384
Pedagogía-Educación Primaria	,010
Eduación Social-Educación Infantil	,296
Eduación Social-Educación Primaria	,003
Educación Infantil-Educación Primaria	,017

Table 10. Mann-Whitney U test where correlation is shown when Sig<.05

For the question "The university's Internet connection is reliable and fast" (Table 11) the degree that differs from the rest is the degree in education, and in relation to the question "The university supports the development of my digital competence, e.g. through continuous professional development activities" (Table 12) again, the degree that differs from the rest is the degree in primary education.

	Sig.
Pedagogía-Eduación Social	,005
Pedagogía-Educación Infantil	,002
Pedagogía-Educación Primaria	<,001
Eduación Social-Educación Infantil	,973
Eduación Social-Educación Primaria	,231
Educación Infantil-Educación Primaria	,196

Table 11. Mann-Whitney U test where correlation is shown when Sig<.05

	Sig.
Pedagogía-Eduación Social	,560
Pedagogía-Educación Infantil	,132
Pedagogía-Educación Primaria	,001
Eduación Social-Educación Infantil	,275
Eduación Social-Educación Primaria	,002
Educación Infantil-Educación Primaria	,013

Table 12. Mann-Whitney U test where correlation is shown when Sig<.05

4. Discussion

The results show that, in relation to the perception of digital competence and gender, men tend to have a higher self-perception in the ability to know when to use information and communication technologies (ICT), specifically in area 3. This finding coincides with the results of the study by Cabezas and Casillas (2018) in which men have a higher score or self-perception of their level of digital competence when using ICT compared to women. Along these lines, there are other studies focusing on digital competence that also establish differences depending on gender, specifically in communication, knowledge and management, pedagogical and technical dimensions (Cabezas et al., 2017; Flores & Roig, 2017; Vázquez-Cano et al., 2017).

In terms of grade and year, there are no statistically significant differences. However, among the courses in general, a difference was found in the third year of Social Education in relation to the degree of digital competence. It is important to note that this difference cannot be attributed to a specific subject in the curriculum. Therefore, this finding may require further research to understand the reasons behind this discrepancy, with the influence of the sample being likely. In contrast, there are studies that focus on grades other than education, where there are differences mainly between first-year and fourth-year undergraduate students, as well as between the grades themselves (Chiecher, 2020; Zhao et al., 2021). Further research is therefore needed to investigate this fact.

Also, the results suggest that students have varying perceptions of the ICT infrastructure and support at their university. Although the majority of responses tended towards a neutral perception ("Neither agree nor disagree"), significant differences in perceptions were found between the different grades. This could indicate that the university could improve its ICT infrastructure and support to ensure a more uniform experience among students of different grades.

Linked to the above, there are studies that emphasise the need for optimal technological resources in order to carry out good teaching and acquisition of digital competence at university and other educational stages (Luján-Guevara & Apolaya-Sotelo, 2021; Mendez-Gijon & Morales-Barrera, 2020; Morales-Zambrano et al., 2021).

5. Conclusion

Digital competence is essential to be able to use ICT when they are used in the teaching-learning process. Thus, the planned objective of identifying the self-perceived digital competences of future educators was answered. In addition, hypotheses were put forward in relation to self-perceived digital competence. To achieve the objective and determine whether the stated hypotheses are true, various statistical tests and data analysis were carried out to investigate the relationships between different variables, including gender, grade level and students' perceptions of digital competence.

The results of the study provide relevant information on differences in perceived digital competence and ICT accessibility between students of different gender and grade levels, with males having higher perceived competence in the area of teaching and learning, so gender differences in digital competence in this area could be addressed. Therefore, H1 is rejected as there is a small difference. Regarding the course

and grade linked to digital competence, hypotheses H2 and H3 are accepted as the course or grade does not affect the level of digital competence. In relation to H4, it is rejected because according to the students of the Faculty of Education Sciences, the University can improve the tools and infrastructures for the development of digital competences.

With these results, a thorough review of the Faculty of Education Sciences at the University of Granada should be carried out. There are specific subjects within the syllabuses proposed for the different degree courses to develop students' digital competences. However, these are not producing the expected results, as no differences can be seen between the courses that have taken this subject and those that have not.

In this aspect, it is also necessary for the university itself to generate new points of action for the promotion of digital competences. Although according to the data collected, the students' assessment is that the university's action in promoting students' digital competences is neither excessively positive nor negative, there are differences in this aspect in the different degree courses, so that depending on the studies, the teachers or different factors that exist, the information on resources varies.

Regarding the limitations of the research itself, mention should be made of the time of the resolution of the call for funding, which due to the time of the resolution, the research requires a specific type of sampling that is characterised by the speed of sample collection, for this reason, the intention is to seek other resolutions with a higher economic amount that will allow research to be carried out over a longer period of time.

Another limitation of the study is the sample collected, which is limited and would need to be expanded to take into account the statistics shown at the international level.

Another future line of research is the possibility of making a comparison with other universities in order to establish which universities, faculties and specific teaching staff are carrying out practices that most effectively support the development of this competence.

As a final future line of research proposed on the basis of this research, mention should be made of the possibility of establishing an instrument which, from a practical perspective, assesses digital competences, so that they can be assessed internally on the basis of these questionnaires and evaluated externally on the basis of validated and practical instruments.

Furthermore, the findings highlight the importance of considering students' digital competence needs when designing curricula and support resources. Universities can use this information to adapt their curricula and improve ICT infrastructure based on identified differences in student perceptions.

In summary, the level of digital competence of trainee teachers at the University of Granada is at an intermediate level. This may vary according to different aspects, however, the aspects that determine the differences regarding this level are internal factors such as gender, etc. With regard to the information and training that the university provides about digital competences and the accessibility to them, the factors that justify the differences are external, with the main differentiating factor being the degree to which the university provides information and training in digital competences.

Declaration of Conflicting Interests

The authors declare that there is no conflict of interest in this research.

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