Differences in teachers' training in digital competence and its application in the classroom: A comparative study by educational levels between Spain and France

Diferencias en la formación del profesorado en competencia digital y su aplicación en el aula. Estudio comparado por niveles educativos entre España y Francia

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Abstract:

In today's information society, digital competence is an essential tool in teaching and learning processes. The aim of this comparative study was to identify differences in initial and in-service ICT (Information and Communication Technology) training and in the use of these tools in the classroom between teachers in Spain and in France. Data from the OECD's Teaching and Learning International Survey - TALIS 2018, which collects information on different aspects of teacher training, were used for the analysis. After merging the databases, a final sample of 19,088 primary (ISCED 1) and lower secondary (ISCED 2) teachers was used. The results of this study showed parity in the level of initial training among primary school teachers and a lower level of initial training among Spanish secondary school teachers compared to their French counterparts. In-service

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training and application of digital resources and tools in classroom were significantly higher in the case of Spanish teachers. No significant variations were found according to years of teaching experience. It is concluded that there is a need to strengthen ICT training at the initial stage and modify in-service training in Spain so that it can lead to increased application of these tools in teaching and learning processes.

Keywords: ICT, digital competence, teacher training, teaching practice, information society, digital culture.

Resumen:

La competencia digital es, en el contexto de la sociedad informacional actual, una herramienta esencial que los docentes han de incorporar a los procesos de enseñanza y aprendizaje. El presente estudio se ha planteado con un carácter comparativo entre España y Francia, teniendo como finalidad la identificación de diferencias en la formación inicial y permanente en TIC (tecnologías de la información y la comunicación) y la aplicabilidad de estas herramientas en el aula entre los docentes de ambos países. Se han utilizado los datos de la Encuesta Internacional de Enseñanza y Aprendizaje – TALIS 2018 de la OCDE, la cual recoge información sobre distintos aspectos de la formación docente. Se ha trabajado con una muestra final de 19 088 docentes de educación primaria (ISCED 1) y educación secundaria inferior (ISCED 2). Los resultados han mostrado una igualdad en el nivel de formación inicial en esta materia en los docentes de primaria y un menor nivel de los profesores españoles de secundaria respecto a los franceses. La formación permanente y la aplicación de herramientas digitales en el aula ha sido significativamente superior en el caso de los profesionales españoles. No se encontraron variaciones relevantes en función de la experiencia docente. Se concluye que es necesario potenciar la formación en TIC en la etapa inicial y ajustar la formación permanente en España para que esta pueda materializarse en una mayor aplicación de estas herramientas en los procesos educativos.

Descriptores: TIC, competencia digital, formación del profesorado, práctica docente, sociedad de la información, cultura digital.

1. Introduction

Technological advances are causing major changes in contemporary society and have made digital competence a priority for society as a whole, one that requires people to acquire skills linked to the use of digital information and technological development (Castells, 2006; Castells & Himanen, 2016; Rodríguez-Esteban et al., 2021).

This competence is a basic tool in twenty-first century society (Osuna-Acedo et al., 2018), and it has also become a clear indicator of employability (Martín et al., 2013; Rodríguez-Esteban et al., 2019) as, among other aspects, it provides individuals with skills for collaborative work or managing computer programs (Council of the European Union, 2014; European Commission, 2020a).

As a result, educational systems have made significant efforts to provide students with a response aimed at achieving this competence (Sánchez-Antolín et al., 2016). Current students will enter a job market where it is still not known what 90% of the jobs will be and where knowledge of computer skills will be required (European Commission, 2017; European Commission/EACEA/Eurydice, 2019).

This situation has been increased by the Covid-19 health crisis, which has caused changes that have a major effect impact at a global level, both in how people engage with work, confirming the vital need to be competent in any process that involves some degree of technology, and in teaching–learning processes (Asenjo Gómez & Asenjo Gómez, 2021; Babatunde & Soykan, 2020; Cifuentes-Faura, 2020; García-Zabaleta et al., 2021; OECD, 2020).

Two decades ago, authors such as Scriven (1994) and Perrenoud (2004) established different systems of teaching competences, covering aspects such as command of the subject, instruction and evaluation, continuous training, and teamwork in depth. It has become necessary to add digital competence to these systems (López Belmonte et al., 2019) since, as mentioned in the most recent European Commission (2020a) report on the European Higher Education Area, it is essential to take advantage of digital technologies to make progress in the teaching–learning process. For the European Commission/EACEA/Eurydice (2019), the challenge that instruction for digital training has posed for education has resulted in a need

to provide strategies for Europe's educational centres that enable them to offer training that keeps pace with the speed of advances in information technology, thus avoiding a technological imbalance. Furthermore, acquisition of this competence must be considered in the initial university training stage for teaching professionals (Gabarda et al., 2021; Ottestad et al., 2014; Romero-Tena et al., 2020). On the other hand, the support of educational policies for in-service teacher training linked to the development and promotion of teaching as a career is regarded as fundamental (Arnáiz-Sánchez et al., 2021). This particular continuous learning over time is one of the most obvious indicators of the quality of teaching practice (Ministerio de Educación y Formación Profesional, 2019). The position of the Council of the European Union also follows these lines when considering "the training, recruitment and updating of teachers and trainers for the development of lifelong learning" (Council of the European Union, 2002, p. 2).

This study centres its analysis on a comparison of the situations of Spain and France, given the similarities between the two educational systems in regards to the integration of digital competence in the school curriculum in primary and secondary education (European Commission/ EACEA/Eurydice, 2019).

In Spain, there are two distinct frameworks with regards to teaching competences. On the one hand, there are the ministerial orders that set out the requirements for verifying the official university

qualifications that prepare people to work as an early years teacher or primary education teacher. These insist that students on these courses must have a knowledge of and apply ICT in the classroom, and be capable of discerning which tools contribute to improved learning (Orden ECI/3854/2007; Orden ECI/3857/2007). It is, however, worth noting that Order ECI/3858/2007, of 27 December, Establishing the Requirements for Verifying Official University Qualifications that Entitle Holders to Exercise the Professions of Teacher in Compulsory Secondary Education and Baccalaureate, Professional Training and Language Teaching includes neither acquisition of digital competence nor the use of ICT in the syllabuses of the Master's in Teacher Training, with the exception of the specific master's that gives access to the educational guidance specialism (European Commission, 2021). On the other hand, Spain's National Institute for Educational Technologies and Teacher Training (INTEF) has published the Common Framework for Digital Teaching Competence. This establishes five dimensions of digital competence: information and information literacy, communication and collaboration, creation of digital content, security, and problem solving (INTEF, 2017).

In the case of France, digital competences are included in a generic teaching competences framework (Arrêté du 1 juillet 2013). Similarly, the Master's in Teaching, Education, and Training (*Master de l'enseignement, de l'éducation et de la formation*), which is a requirement for entering the teaching profession at pre-primary (equivalent to the second cycle of early years education in Spain),

primary, and secondary stages includes in its content the use of ICT tools and digital resources applied to teaching and learning processes (Arrêté du 15 juin 2012). With regards to the continuous development of digital teaching competences, the European Commission/EACEA/Eurydice (2019) identifies three aspects to consider: in-service professional development activities with the aim of fostering teachers' digital capacities; self-evaluation tools for identifying teachers' learning needs; and professional networks dedicated to facilitating exchanges on the subject of digital education. Regarding in-service professional development activities, Spain offers online ICT training and learning experiences through INTEF and through the different training centres at the autonomous region level, while France's digital training for teachers is provided through the M@gistère platform. It is also worth noting that both Spain and France have networks of teachers – ConectaTIC and Viaéduc respectively – that enable them to interact and share their resources openly and securely (European Commission/EACEA/Eurydice, 2019). Finally, regarding evaluation systems in this framework, the Spanish Ministry for Education and Professional Training, through INTEF, has developed the Digital Teaching Competence Portfolio, which provides a tool for self-evaluation of the five dimensions of digital competence. Teachers in France can demonstrate their digital competence through an evaluation system put in place by the Ministry for National Education, Youth, and Sport by obtaining the C2i level two certificate (*Certificat Informatique et Internet*).

2. Objective

In view of what is set out above, we proposed this study, with the following objectives: firstly, to describe the differences between Spain and France in initial training in ICT applied to teaching according to educational levels; secondly, to analyse differences in in-service training; and thirdly, to identify differences between teachers from the two countries in the degree of use of these tools in the classroom. The three objectives were described independently for teachers from primary education and those from lower secondary. For the three objectives, we also analysed the potential influence on these variables of years of experience as a teacher.

3. Material and Methods

3.1. Data and participants

For this study, we used data from the Teaching and Learning International Survey (TALIS 2018). This is a large-scale international survey run by the Organisation for Economic Co-operation and Development (OECD). It describes the work of teachers and principals from educational establishments, collecting information on four fundamental areas of the teaching profession – basic knowledge and skills, the status and prestige of the profession, the collaborative dimension, and responsibility and autonomy – with the aim of contributing to the development of educational policies.

The study takes place every five years. Spain has participated in every edition of it. In the 2018 edition, which provided the data used in this study, 34 countries participated. In all of them, the questionnaire is completed by teachers and principals from compulsory secondary education centres. Some countries, including Spain and France, also took part in the survey for primary education. This multi-level perspective (data from ISCED-1 and ISCED-2) justifies the use of this database instead of others such as the Programme for International Student Assessment (PISA), the International Civic and Citizenship Education Study (ICCS), the Progress in International Reading Literacy Study (PIRLS), or the Trends in International Mathematics and Science Study (TIMSS), which only provide data on teachers at some educational levels.

Data collection was done over three months towards the end of the 2017–2018 academic year (Ministerio de Educación Formación Profesional, 2019). Once both databases had been merged (ISCED 1 with 51,782 subjects and ISCED 2 with 153,682 subjects) and the teachers from Spain and France had been selected, our final sample comprised a total of 19,088 subjects. Women made up 69% of the Spanish sample, which had a total of 14,653 teachers, while women represent 72% of the French sample, which comprises 4,435 professionals.

With regards to educational level, the Spanish sample in primary education included 7,246 subjects, with a mean of 16.9 years' teaching experience ($SD = 10.3$). In the case of France, there was a total of 1,429 professionals at this level, 87% of them women, with a mean of 15.4 years' experience ($SD = 9.5$).

In lower secondary education, the total number of teachers who answered the questionnaire in Spain was 7,407, with women representing 62% of the total. The mean years' of teaching experience in this case was 17.2 (SD = 10.1). In France, the total number of secondary teachers was 3,006, 65% of whom were women. The mean years' teaching experience was 16.5 (SD = 9.9).

3.2. Instrument and variables

The original English version of the questionnaire completed by teachers (Teacher Questionnaire) features 58 questions. The following segmentation variables were used for the comparative analyses: country, level (ISCED-1, primary and ISCED-2, lower secondary), and years' experience, which has been recoded into 4 bands.

We selected the following study variables. To describe initial training in ICT applied to teaching, we used variable TT3G06H1, which is covered by question 6 on the questionnaire (always using the Teacher Questionnaire in English as a reference): Was training in ICT applied to teaching included in the initial training stage? Continuous training in ICT applied to teaching is described on the basis of question 23 from the questionnaire: Were ICT skills for teaching included in your professional development activities in the last 12 months? This question corresponds to variable TT3G23E and, as in the previous case, has two unique values: Yes/No.

Finally, the extent to which teachers allow students to use ICT in class is de-scribed. Information on this is collected from variable TT3G24P, which appears in question 42 from the questionnaire: How often do you let students use ICT for projects or work in class? The variable includes four categories: never or almost never, occasionally, frequently, and always. For the comparative analysis by bands of years' experience, this variable was recoded into two large categories: a first one including the initial categories of occasionally and never or almost never, and a second one with the categories frequently and always.

3.3. Data analysis

Given the qualitative nature of the study variables, we used contingency tables to measure the association between the country and each of the stated variables. Each comparison was done independently for the two levels of teaching: ISCED-1, primary education and ISCED-2, lower secondary education.

We used χ^2 as a test statistic to describe the statistical significance, considering a significance level of $\alpha < 0.05$. To measure the effect size, the value of the phi coefficient was used in the 2×2 tables, and Cramér's V in the 2×4 table. To improve precision when reading the results, we added the values of the adjusted standardised residuals. This enabled us to check the statistical significance (values greater than ± 1.96) between the expected frequency and observed frequency in each cell in the contingency table (López-Roldán & Fachelli, 2018). All of the analysis was done using the SPSS v26 statistical analysis package.

4. Analysis and results

4.1. Initial training in ICT applied to teaching

Table 1 shows the results of the contingency analysis that enabled us to establish what training in ICT applied to teaching teachers receive in their initial training, comparing Spain and France. With reference to primary teachers, only 1 in 2 teachers in Spain received initial training in ICT for teaching. This figure is similar to the one observed in the case of France. In the case of secondary education, we found a statistically significant association between the country and the initial training received ($\chi^2 = 121.17$, $p < 0.000$) with a small effect size (phi coefficient=0.112). Only 39.6% of the secondary teachers in Spain received this type of training in their initial stage, compared with 51.9% of the French teachers, with a statistically significant standardised residual value of 11.3, which shows that there is a high difference.

TABLE 1. Initial training in ICT for teaching by country and educational level.

|	Primary		Secondary	
	Yes	No	Yes	No
Spain	50.1 % (-0.5)	49.9 % (0.5)	39.6 % (-11.3)	60.4 % (11.3)
France	50.8 % (0.5)	49.2 % (-0.5)	51.9 % (11.3)	48.1 % (-11.3)
	χ^2=0.266, p=0.635		χ^2=121.117, p<0.000; coef. Phi=0.112	

Note: For each cell, the percentage and, in parentheses, the adjusted standardised residuals, are given.
Source: Own elaboration.

Graph 1 shows independently the distribution of teachers who received ICT training in their initial training according to the bands of years of teaching experience. A decrease in the percentage of teachers who have received this training can clearly be seen as years' experience increases. Although this result is completely predictable, the comparative analysis by levels and countries makes it possible to identify several relevant facts. We observe a similar pattern of decrease in Spain and France in the case of primary education. Only slight differences were noted, albeit statistically significant ($p < 0.05$), in the 10 to 19 years' experience band with 61% of teachers responding affirmatively in Spain compared with 53% in France and the more than 30 years' experience band where the response pattern is inverted, with a more positive responses by the French teachers (19% compared with 12%). In the case of secondary education, more pronounced differences are observed in the two bands that correspond to a fewer years' experience. Of French teachers with under 10 years' experience, 77% have received this training compared to 65% of Spanish teachers. In the case of the 10–19 years band, the differences increase to 21 percentage points (62% compared with 41%).

GRAPH 1. Initial training in ICT by years' experience.
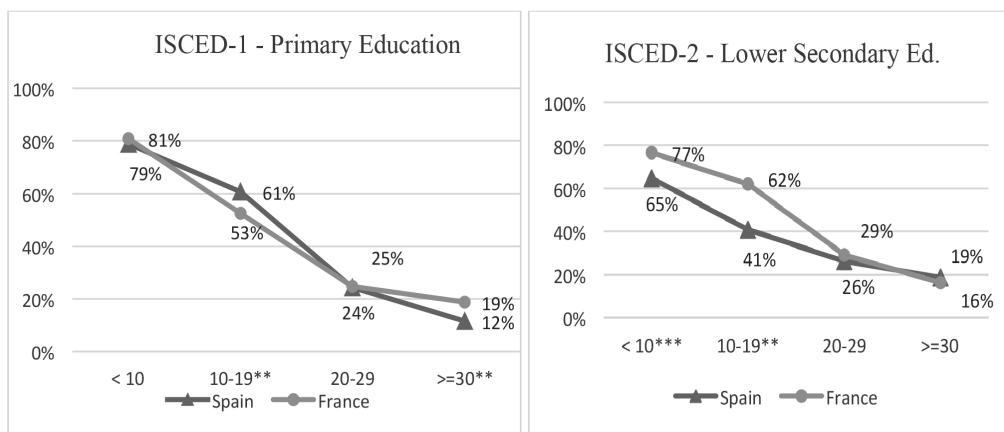
Note: Along with the labels for the intervals, the statistical significance of the differences is presented, where applicable, according to the following levels: **p < 0.05; and ***p < 0.000. Source: Own elaboration.

4.2. In-service training in ICT applied to teaching

Table 2 shows the values that enable us to identify possible differences in ICT in-service training applied to teaching between the two countries analysed for each of the levels of teaching. This variable included the number of subjects who had (or had not) done professional development activities during the last 12 months on this topic. Important differences can be seen between the two countries, especially in primary education. More than 2 out of every 3 teachers from Spain (66.6%) reported having received this training in the last year. This figure is 32.7% in the case of the teachers in France. The differences are statistically significant ($\chi 2 = 537.959$, $p < 0.000$), although the effect size is not high: phi coefficient = 0.256. In the case of secondary education, the differences are also significant ($\chi 2 = 227.497$, $p < 0.000$) with a smaller effect size (phi coefficient = 0.157). Specifical-ly, 68.8% of the Spanish secondary teachers did these activities, compared with 51.7% of the French ones. Analysis of the adjusted standardised residuals indicates that at this level the differences between countries, even though they are important and significant, are smaller than those found in primary education (15.1 compared with 23.2).

Graph 2 shows the percentages of teachers who did professional development activities in ICT in the two countries analysed by bands of years' experience. Considering both graphs simultaneously leads us to note that there is a similar answer pattern at both levels, with higher percentages of in-service ICT training in Spain than in France. The differences, which are significant in all cases, are more accentuated in the case of primary education. At this level, we found differences of more than 30 percentage points in all of the bands. These differences stand out in the group of teachers with between 10 and

TABLE 2. In-service ICT for teaching training by country and educational level.

|	Primary		Secondary	
	Yes	No	Yes	No
Spain	66.6 % (23.2)	33.4 % (-23.2)	68.8 % (15.1)	31.2 % (-15.1)
France	32.7 % (-23.3)	67.3 % (23.2)	51.7 % (-15.1)	48.3 % (15.1)
	χ^2=537.959, p<0.000; coef. Phi=0.256		χ^a=227.497, p<0.000; coef. Phi=0.157	

Note: For each cell, the percentage and, in parentheses, the adjusted standardised residuals, are given.
Source: Own elaboration.

19 years' experience, where the Spanish percentage is 65% compared with 28% for the French. The percentage is also more than double in the highest band, 30 years or more (70% compared with 34%). In the case of secondary education, the percentages in Spain vary between 68% and 70%, with small differences by years of experience, and are similar to those found in primary education. Nonetheless, a differ- ence can be observed in the comparison with France, as there is a clear increase in the level of training of French secondary teachers compared with the primary ones, resulting in a fall in the differences with Spain. These differences, however, continue to be statistically significant. There are also no major variations depending on years' experience. The figures vary between 52% and 49%.

GRAPH 2. In-service ICT training by years' experience.
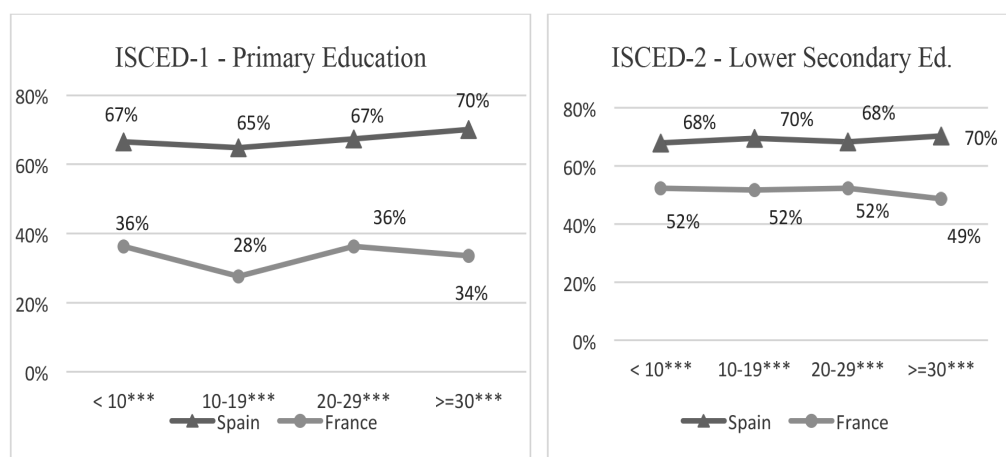
Note: Along with the labels for the intervals, the statistical significance of the differences is presented, where applicable, according to the following levels: **p < 0.05; and ***p < 0.000.
Source: Own elaboration.

4.3. Application of ICT in the classroom

The last block of this study is aimed at identifying any differences in the degree of application of ICT in the classroom. This variable is measured on an ordinal scale according to how frequently teachers allow their students to use ICT in their classes or work. As in the previous sections, independent analyses were carried out for primary and secondary teachers. At the first level, primary education, the largest concentration of subjects in Spain was found in the intermediate categories: occasional and frequently (41.6% and 32.4%, respectively). Significant differences appeared between the two countries ($\chi^2 = 756.457$, $p < 0.000$), with a moderate effect size (Cramér's V = 0.323). Looking at the standardised residuals makes it possible to state the direction of these differences and their meaning for each pair of categories. In the lower category, the differences are significant and high: only 14.8% of the primary teachers in Spain report doing this type of activity never or almost never. As Table 3 shows, in the case of French teachers, the percentage increases to 46.7% (value of the adjusted standardised residuals = 25.5). The direction of the differences is inverted in the case of the opposing categories, especially in the category frequently, where we find an elevated value of the residuals (15.1). The percentage of Spanish teachers in this category is almost three times that of French teachers (32.4% compared with 11.2%). In compulsory secondary education, the responses followed a similar pattern with teaching professionals in Spain making more use of these tools ($\chi^2 = 174.785$, $p < 0.000$) and with a low effect size (Cramér's V = 0.138), although the differences with the group of teachers from France were smaller, as the values of the standardised residuals show. We note the high and significant difference (value of the residuals = 8.6) in the higher category always. Some 16.6% of the Spanish secondary teachers were in this category, compared with 9.6% of the French teachers.

TABLE 3. Application of ICT in the classroom by country and educational level.

	Primary				Secondary			
	Never-almost.n.	Ocas.	Freq.	Always	Never-almost.n.	Ocas.	Freq.	Always
Spain	14.8 % (-25.5)	41.6 % (1.5)	32.4 % (15.1)	11.1 % (9.2)	12.3 % (-5.1)	37.0 % (-9.5)	34.1 % (7.2)	16.6 % (8.6)
France	46.7 % (25.5)	39.3 % (-1.5)	11.2 % (-15.1)	2.7 % (-9.2)	16.3 % (5.1)	47.8 % (9.5)	26.3 % (-7.2)	9.6 % (-8.6)
	χ^2=756.457, p<0.000; Cramér's V=0.323				χ^2=174.785, p<0.000; Cramér's V=0.138			

Note: For each cell, the values of the percentage and, in parentheses, the adjusted standardised residuals are given.
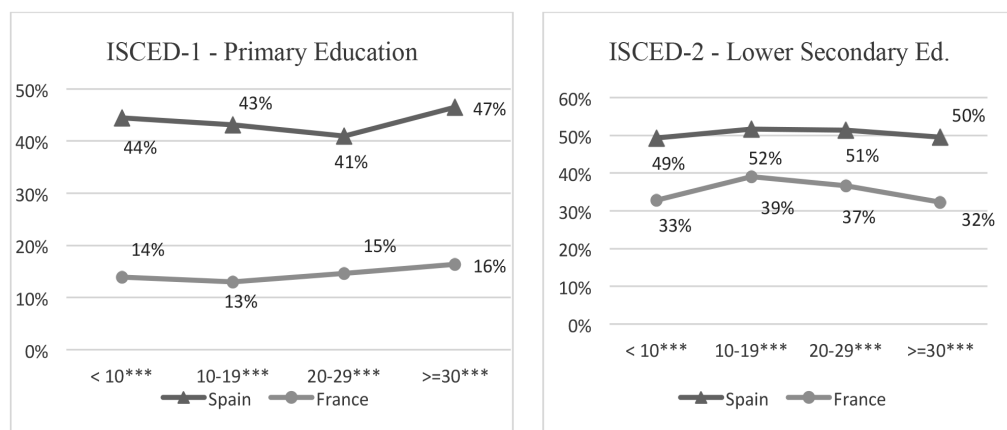Source: Own elaboration.

Finally, Graph 3 shows the response pattern for this variable according to years' experience as a teacher. The values from combining the frequently and always categories are presented to give a better understanding of the graphs. In general, the overall differences between the two countries are maintained in each of the bands that define years of experience. In all of the bands described, and for both levels, the differences found were statistically significant ($p < 0.000$), with teachers from Spain displaying greater use of these resources. In the case of primary education, the differences were between 26 percentage points for teachers with between 20 and 29 years' experience, and 31 points in the group with 30 or more years' experience. Furthermore, it is notable that, in both countries, teachers with more years' experience use ICT more in the classroom: 47% in the case of Spain and 16% in the case of France.

The situation is similar in the case of secondary education: greater use of ICT by teachers in Spain is apparent in all age bands. The differences vary between 13 percentage points, in the group with 10 to 19 years' experience, and 18 points in the case of teachers with 30 years' experience or more.

GRAPH 3. Use of ICT in class by years of experience.

Note: Along with the labels for the intervals, the statistical significance of the differences is presented, where applicable, according to the following levels: **$p < 0.05$; and ***$p < 0.000$.

Source: Own elaboration.

5. Discussion and conclusions

This study centred on describing differences in ICT training between teachers in France and Spain in primary education (ISCED-1 level) and lower secondary education (ISCED-2 level). It also analysed the use in the classroom of these technological tools by these professionals. We used the data from the Teaching and Learning International Survey – TALIS 2018. This is a large-scale survey, coordinated by the OECD, which describes the work of teachers and principals from educational centres around the world. We worked with a total

of 19,088 primary and lower secondary teachers from Spain and France.

With regards to the first objective, describing the differences between Spain and France in initial training in ICT applied to teaching by educational levels, we have found that in general there is limited ICT training for teaching professionals, especially in teachers from lower secondary education. The Covid-19 health crisis has highlighted this shortcoming as it has obliged teachers to call on their digital knowledge, either through blended and online classes, or an endless list of tasks that had not required this digital competence to the same extent (Asenjo Gómez & Asenjo Gómez, 2021; García-Zabaleta et al., 2021). Furthermore, and as a predictable outcome, it was found that professionals with more years' teaching experience have less training. Regarding the difference between countries, we observed that while there are no significant differences between primary education teachers, differences were found in those from the lower secondary stage. Teachers from France received more training. This could be explained by the larger amount of pedagogical training that aspiring secondary education teachers in France have traditionally received compared to their Spanish counterparts (Manso & Valle, 2013; Rebolledo, 2015). Furthermore, at present the French Master's in Teaching, Education, and Training has a duration of two years (120 ECTS), while the Spanish Master's in Teacher Training lasts one year (60 ECTS), in any of the specialities (European Commission, 2020b, 2021). These results show that while the efforts

Spain has made to adapt to the EHEA in regards to the inclusion of ICT in syllabuses have borne fruit in bachelor's degree qualifications (Herrada & Herrada, 2011), the qualifications that give access to teaching in secondary education are still likely to include a greater proportion of content dedicated to teachers' acquisition of digital competence.

The second objective considered differences with regards to in-service training in ICT. Approximately two out of every three teachers in Spain had carried out professional development activities in ICT applied to teaching during the year prior to the application of the survey, which demonstrates the high level of enthusiasm for in-service training among teachers in Spain (Rodríguez-Esteban et al., 2021). While the absolute figures are not very high, we found important and significant differences with the French professionals, especially in the case of primary education. In this sense, it is worth noting the backing that has been given in Spain to both INTEF (2017), as the official body responsible for teacher training and integration of ICT in non-university education, and to the specific teacher training centres in each autonomous region. To this, we should add that some autonomous regions have specific centres of resources and training of teachers in ICT. Similarly, years of experience do not seem to affect the decision to do training activities in this area, as very few differences were found, especially in Spain, according to the bands that defined this variable. These results, which point at the fact that professional practice is not an indicator that shapes

this training decision, are not in line with what was found by González-Vallinas et al. (2007). They analysed in-service training in a sample of 2722 secondary teachers and found that younger and less experienced teachers received more in-service training than those who were older and had more professional experience, as the latter group felt they had more baggage resulting from their everyday practice. Training in digital competence, along with other areas such as bilingualism, turns out to be one of the central foundations on which educational policies are based given its inclusion in syllabuses and its fostering in the context of lifelong learning (Escudero et al., 2018). Shortcomings in initial training of both primary school teachers and secondary school teachers (Tadeu, 2020), along with the constant evolution of technologies, mean that training in this field must always be present in teaching practice. We must understand that one of the principal motives that lead teachers to train continuously over the years derives from shortcomings in training in these areas of content and tools in their initial training (Gabarda, 2015), and we must also consider the economic incentive (financial rewards for hitting training targets over a six-year period) that teachers receive for doing a minimum number of hours of this type of training (Alfaro et al., 2014; González-Mayorga et al., 2017). This could explain the limited influence of years of experience on the realisation of these professional development activities.

Finally, in relation to the third objective, use of ICT in class, our results indicate that while its application is still not very high, with larger percentages observed in the occasional use category, teachers in Spain make significantly greater use of it than that reported by the teachers in France, in both primary and lower secondary education. Accordingly, we can consider different variables that affect this application of ICT in the classroom. On the one hand, teachers need to know how students use ICT and what they use it for, as this will help them identify the aspects that might have a greater influence on the learning process (García-Martín & Cantón-Mayo, 2019; Gutiérrez-Martín, et al., 2022). On the other hand, they must also take into account personal factors, especially teachers' beliefs and attitudes regarding these tools. The teachers who describe more positive attitudes towards new technologies are the ones who make the most and best quality use of them (Gargallo et al., 2006). However, there is a process of feedback here as it is precisely those teachers with more knowledge in this area that describe more positive attitudes towards it (Ramírez et al., 2012). In this sense, Hidalgo-Cajo and Gisbert-Cervera (2022) have studied a series of variables, including attitude and self-efficacy, that explain teachers' different motivations regarding the use of ICT. These variables give various profiles for teaching staff that can be grouped into two categories: on the one hand, those with less motivation for ICT training, that is to say, those who are reluctant to change their traditional methodology or find the change confusing; and, on the other hand, teachers with a more motivated attitude, as in the case of those who are convinced and innovative, who feel attracted towards in-ser-

vice learning and training in ICT. These profiles are also closely related to the role played by the technological development of the educational centre itself. It is clear that the provision of adequate equipment will enable teachers to incorporate these tools into their teaching schedules and classroom practices (Sánchez & Galindo, 2018; Sánchez-Antolín et al., 2016). This aspect is also related to another of the results found in our study, the slight tendency to use these tools to a greater extent in the group with more years of experience, a result also found by Area-Moreira et al. (2016). González-Vallinas et al. (2007) state, in this sense, that teaching staff with more years' experience tend to be found in educational centres with more material resources, which could explain the slight relationship observed between the two variables.

In conclusion, this study, which was proposed as a comparison, has shown that Spain must continue to enhance teachers' digital competence in the initial training stage, where the situation is more unfavourable, especially in lower secondary education. Although in-service training stands out as a strong point, it should be noted that to ensure the efficacy of this type of training and promote better development of digital competence by students (Wu et al., 2022), educational policies must make an effort to link this training to the educational situation (Escudero et al., 2018) so that it does not merely become a collection of courses for the purpose of accreditation. Various studies have noted teachers' dissatisfaction with the training they receive in this area as they believe

that it is not well matched to the challenges of the twenty-first century (Alfageme-González & Miguel, 2017; Escudero et al., 2018; Guarro et al., 2017). Accordingly, various programmes and projects of recognised standing within the EHEA, such as Erasmus+, have done important work in studying digital competence centred on successful educational methodologies to favour the teaching and learning process in educational centres, with the aim of enhancing this training and reducing teachers' dissatisfaction with it (Alonso de Castro & García-Peñalvo, 2022).

Despite the representativeness of the large sample in this study, we believe that one major limitation of this study is the difference in sample sizes between the two countries, with the number of participants in Spain being notably larger. Another important limitation is effect size, as on the whole, small effect sizes were found. However, when used with large samples, low effect sizes can be found in statistically significant associations (Fidler et al., 2005). As future lines of research, we firstly propose the use of validated instruments that make it possible to describe with more precision the situation regarding knowledge and use of digital tools (Tourón et al., 2018). We also propose an analysis of teachers' participation in the new in-service training options, among which MOOCs (Massive Online Open Courses) are particularly notable as they offer advantages such as generalisation at a global level or the possibilities for interactivity (Atiaja & García, 2020) and are not as closely linked to processes of formal recognition or accreditation.

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