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SECONDARY ENGLISH TEACHERS' DIGITAL COMPETENCE: AN EXPLORATORY STUDY IN CHICLANA DE LA FRONTERA

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ABSTRACT

The purpose of the study is to analyse the level of digital competence of 26 EFL teachers from Andalusia working in secondary education in the town of Chiclana de la Frontera. In particular, the study is aimed at identifying which areas and digital competences present more difficulties for teachers as well as those where they perform better. These data have been gathered from an ad-hoc questionnaire designed to measure the level of performance at B1 level from the *Marco de Referencia de la Competencia Digital Docente* (2022), a document whose latest revision is based upon the *European Framework for the Digital Competence of Educators* (DigCompEdu). The results indicate that participants show a good performance when it comes to communicating through digital platforms, and yet, they need to improve their skills in solving technical problems. This study might be of interest for teachers and teachers' trainers.

Keywords: digital competence, teaching, digital technologies

RESUMEN

El objetivo del estudio consiste en analizar el nivel de competencia digital de 26 profesores de inglés andaluces que trabajan en educación secundaria en la localidad andaluza de Chiclana de la Frontera. Más concretamente, se pretende identificar qué áreas y competencias digitales les resultan más problemáticas, así como aquellas en las que se desenvuelven mejor. Estos datos se han obtenido a partir de un cuestionario diseñado ad-hoc para medir el nivel de desempeño en el nivel B1 del *Marco de Referencia de la Competencia Digital Docente* (2022), un documento cuya última revisión está basada en el *European Framework for the Digital Competence of Educators* (DigCompEdu). Los resultados muestran que los participantes tienen un buen desempeño a la hora de comunicarse mediante plataformas digitales, pero sin embargo necesitan mejorar en habilidades para resolver problemas técnicos. Este trabajo puede ser de interés para docentes y formadores de profesores.

Palabras clave: competencia digital, enseñanza, tecnologías digitales

1. Introduction

It is obvious that Information and Communication Technologies have changed our world forever, and they are still shaping our present and future way of communicating, working, studying, or passing our leisure time. It is a fact that our education system is not excluded from this digital revolution, and thus, teachers need to readapt and update their methodologies and teaching techniques in order to better prepare students for a digitalised world.

Hence, it is of the utmost importance for teachers to be digitally competent, as they are in charge of providing learners with the skills and resources that will turn their students into citizens who can fully exert their rights and duties and participate in a more plenary manner in our society. The question is whether teachers are prepared to incorporate digital methodologies in their teaching practice. Following this query, the present paper aims to provide a picture of how teachers of English as a foreign language, from a specific town in southern Spain, Chiclana de la Frontera, perform in different areas and skills comprised within digital competence. In order to carry out this study, a questionnaire has been designed, focused on the level B1 from the latest revision of the *Marco de Referencia de la Competencia Digital Docente* (January, 2022). The questionnaire was administered to teachers of English as a FL from different high schools, 8 in total, working in secondary education.

The research questions pursuit in the study here presented are the following:

- To which degree are teachers able to handle digital resources?
- In which aspect do teachers perform better regarding the use of digital resources: for teaching or for communication?
- Does the age of teachers affect their level of development of digital competence? Do these two variables present a correlation?
- In case there is a correlation between the age of teachers and their level of development of digital competence, is this correlation also visible in the number of years working as teachers?

- Do younger teachers try to motivate students by means of digital resources more than more experienced teachers?

Popular opinion always says that more aged people tend to be less engaged with electronic devices and digital tools. Younger generations are thought to be born with the capacity to cope with these digital tools. Thus, if this were true, the results analysed from the questionnaire would probably show that, the older the teacher, the less digitally competent they may be. This will be properly addressed in the chapter corresponding to Results and Discussion.

2. Theoretical framework

This section will be devoted, on the one hand, to providing a review of different concepts and documents that are mentioned in this paper, and, on the other hand, to revising prior research about the digital competence for teachers in and outside Spain.

A study carried out by Cabero-Almenara et al. (2020), declares and justifies the preference for the *European Framework for the Digital Competence of Educators* (2017), qualified, by an expert judgement, as the most valued and reliable reference for measuring teachers' digital competence. Hence, the present study will be based upon this framework.

The *European Framework for the Digital Competence of Educators* (2017), also called "DigCompEdu", gives reasons that support the importance of digital technologies nowadays, reminding us that children are not born with the abilities to properly use these technologies, thus making it even more necessary for teachers to be equipped with those skills in order to transfer them to their students:

The ubiquity of digital technologies has profoundly changed almost all aspects of our lives: the way we communicate, the way we work, the way we enjoy our leisure time, the way we organise our lives, and the way we source knowledge and information. It has changed how we think and how we behave. Children and young adults are growing up in a world where digital technologies are ubiquitous. They do not and cannot know any different. This does not mean, however, that they are naturally equipped with the right skills to effectively and conscientiously use digital technologies. (European Commission, Joint Research Centre, Redecker, 2017: 12)

Other publications, such as Garzón-Artacho et al. (2020), highlight the importance of digital competence as a valuable skill which should be attained by the end of secondary education, and the Spanish Ministry of Education has also established it as one of the competences that teachers must develop in their students. However, before delving into prior research, we should provide a definition of digital competence first, and digital competence for educators secondly, which is the one which this paper is concerned about.

It is difficult to provide a definitive and common definition of digital competence, since there are many different aspects and competences (or competencies) which may be included within digital competence. For this purpose, we will consider the words by Anders Skov (2016), a sociologist specialised in the use of the Internet:

Digital competence is a combination of knowledge, skills and attitudes with regards to the use of technology to perform tasks, solve problems, communicate, manage information, collaborate, as well as to create and share content effectively, appropriately, securely, critically, creatively, independently and ethically [...] The understanding of the concept of digital competence is so varied that there is no common or globally accepted definition. The same has happened and happened to virtually all concepts in relation to digital tools and processes. This is caused, among other things, by the constant and rapid development of technologies that enable and create new activities and goals.

Digital competence can then be understood as the set of skills that allow us to perform actions which involve the use of digital technologies in an effective and confident way. The European Commission has developed a framework for the digital competence which comprises five different areas, and it is known as “DigComp”. This document has had several revisions, beginning in 2010, with the last one being published in March 2022. The areas that this framework covers are the following:

1. Information and data literacy
2. Communication and collaboration
3. Digital content creation
4. Safety
5. Problem-solving

In a more specific way, it is the **digital competence of educators** the one which concerns the present study, whose framework is also referred to as “DigCompEdu” by the European Commission. In this case, the European Commission identifies three different dimensions under which the teachers’ digital skills are organised. The first dimension deals with the teachers’ professional competences, the second dimension is oriented towards the pedagogic competences of teachers regarding the use of digital technologies, and, thirdly, the

teachers' abilities to boost learners' digital competence. In turn, these dimensions of the DigCompEdu are divided into six different areas, which are the following:

1. Professional Engagement (corresponding with the first dimension)
2. Digital Resources
3. Teaching and Learning
4. Assessment
5. Empowering Learners (areas 2 to 5 belong to the second dimension)
6. Facilitating Learners' Digital Competence (connected with the third dimension).

Each of these areas focus on different skills or competences (or “competencies”, although the two expressions are equally employed in most papers). We will now delimit and define these areas according to the DigCompEdu.

- **Area 1:** Professional Engagement. It deals with the use of digital technologies in order to communicate and collaborate with other teachers, and also, as its name points out, to progress and keep on developing their digital competence.
- **Area 2:** Digital Resources. This area is concerned about the teachers' abilities to search for and find different digital resources and digital material that might be of use for their lessons, and also to create, modify and share that digital material.
- **Area 3:** Teaching and Learning. It focuses on how teachers exploit digital tools for their lessons, that is, how digital technologies are employed in order to improve their teaching practice and the learning processes of their students.
- **Area 4:** Assessment. It deals with the teachers' abilities to assess and evaluate their students' learning process, and also to store, interpret and share that information through the use of different digital technologies.
- **Area 5:** Empowering Learners. This area tries to measure how teachers make use of digital technologies to make students feel more responsible of their own learning process and also to help them progress at their own pace.
- **Area 6:** Facilitating Learners' Digital Competence. This area looks into the teachers' abilities to contribute to their students' own development of digital competence, using them in a creative, responsible and safe way.

In Spain, the DigCompEdu has been adapted to the Spanish educational system by the *Instituto Nacional de Tecnologías Educativas y de Formación del Profesorado (INTEF)*, an organisation which belongs to the Spanish Ministry of Education. This organisation published a framework for the digital competence of educators in Spain in 2017, the same year the European Commission published a revision of the DigCompEdu, thus rendering the Spanish document outdated. It was in January 2022 that INTEF published a new Spanish framework that could be in consonance with the latest revision of the DigCompEdu.

The Spanish *Marco de Referencia de la Competencia Digital Docente* (January, 2022) organises the levels of digital competence, like the DigCompEdu, into six different stages. We will focus on the level B1 described by INTEF in the *Marco de Referencia de la Competencia Digital Docente* (January, 2022). Since it is the level B1 the one that demonstrates a basic, intermediate or conventional use of digital technologies, which could thus be considered as the minimum that should be accepted. The stage “B” is actually characterised by a growing autonomy, and B1, more specifically, is where teachers implement digital technologies in a conventional way, where they begin to be aware of the best ways to choose digital material and how to implement it into their lessons, according to the cited publication.

2.1. Research into the digital competence of educators

In the following lines we will provide a summary of the outcomes from different investigations related to the digital competence of educators.

The objective of every teacher is to make students learn new skills, acquire new knowledge or perform a series of actions effectively, and the correct implementation of digital technologies seem to be effective in this sense. A study conducted by Moltudal S. et al. (2019) focuses on how learners perceive their teachers in terms of their level of digital competence, and it found out that those who are more digitally competent are also those who are more skilful in the correct management of the classroom, especially in technological environments,

something that is ultimately perceived by learners. This implies students also consider that more digitally competent teachers are better in managing the classroom resources, which seems to be a compelling reason for the development of the digital competence of teachers.

It is clear digital competence is pivotal for good teachers, but it became crucial when the pandemic COVID-19 imposed a global lockdown which lasted from several weeks to months, depending on the country. There is also research that looked into the effects of this pandemic in the digital competence of teachers, such as the one conducted by Prieto-Ballester et al. (2021). This document highlights how the educational system had to change its methods overnight, with teachers trying to cope with new teaching methods in a world that had suddenly become unavoidably digitalised. The study by Prieto-Ballester et al. found out that teachers' self-perception of their digital competence level, after the COVID-19 pandemic, was "upper-intermediate". Yet, it also found out that most teachers have problems when it comes to the actual implementation of these digital technologies in the classroom.

In this regard, it is also worth mentioning a study that looks into teachers' digital competence at a regional level in Spain, focusing in Andalusia. This research, conducted by Garzón-Artacho et al. (2021), by the University of Granada, looks into the teachers' perception of how their digital competence is developed in different aspects. It obtained interesting results, showing a low performance by teachers in terms of digital competence, especially when it comes to the creation of digital content and solving technical problems. Yet, it also illustrated relatively good performance in communication and collaboration skills through digital platforms.

In this study factors such as age or teacher training were identified as playing a determining role in the level of digital competence, suggesting that older teachers perform worse. In this work, the current level of the digital competence of educators is qualified as "worrying", adding that "teachers have a minimum set of skills to make a superficial use of ICT", but lack the skills to "promote methodological tasks or strategies that require a greater knowledge of the infrastructure or its didactic potential".

Finally, another study by Garzón-Artacho et al. (2020) considers the importance of digital competence when it comes to innovation in the teaching practice. In line with the study previously mentioned, this one also found out that younger teachers, more specifically those with less than 10 years of experience, are better equipped in terms of digital competence. Yet, they all still need to improve in this regard, highlighting teachers' participation in ongoing training as key in their development of digital competence. It also offered some worrying results, such as the lack of any contact with digital technologies by some teachers, apart from the fact that most of them have not been enrolled in any courses aimed at developing their level of digital competence.

In Garzón-Artacho et al. (2020) it is concluded that age is also determining in teacher training, where it can be observed that younger teachers try to improve their digital skills more than older teachers, since it is them who prefer to enrol in courses related to digital technologies.

Thus, the literature about the topic points towards age as playing a determining role in the level of the digital competence of teachers, with younger teachers showing a better performance in this sense. The years of experience is also important and seems to determine the teachers' predisposition to improve their digital competence and include, make use or implement digital technologies in the classroom, as pointed out especially by the last two cited articles.

The present study will also try to determine whether age and years of experience also have an effect in the teachers' level of digital competence, that is, whether the results here presented are in consonance with those of the studies previously mentioned in the case of the teachers of English as a foreign language working in secondary education in Chiclana de la Frontera.

3. Methodology

3.1. Objectives of the study

This study presents an analysis of the degree at which the level B1 from the *European Framework for the Digital Competence of Educators* (2017) has been and is being attained by teachers of English working in the locality under scrutiny. It also aims at exploring the effects and correlations that some variables may have on the attainment of the cited teaching digital competence.

The main objective of the study is thus to provide a picture of the teachers' level of performance at B1 from the DigCompEdu. There are also particular or more specific objectives, as listed below:

- ▶ To analyse the state or level of achievement of the different areas distinguished within the *European Framework for the Digital Competence of Educators*.
- ▶ To analyse whether there exists a correlation between the age of teachers and their degree of achievement of the level B1 from the aforementioned framework.
- ▶ To analyse, in a similar way, the correlation between the years working as teachers and the degree of achievement of the digital competence for educators.
- ▶ To identify the aspect that poses the greatest problems or most difficulties for teachers when it comes to developing their digital competence.
- ▶ To explore whether educators commit with the teaching authorities in the use of the digital platforms established by these authorities.

3.2. Research design

This section will be devoted to the categorisation of the type of research presented in this paper, following the guidelines described in *Research Methodology and Academic English* (Universidad de Jaén). In this sense, the first aspect we need to identify is the nature of the study. Given that the project describes and analyses the degree of achievement of level

B1 from the digital competence for educators, we are here dealing with applied research. Since the study does not present or introduce new theories or expand existing ones, which means the project is not theoretical in nature.

The data obtained in the different steps of the research had to be treated and interpreted, meaning that the source of information of the present study is primary. If we focus on the approach adopted, the project is to be classified as analytic research, as it aims at identifying factors that may affect achievement and improvement of digital competence in teachers. The study can be identified as deductive, since data have been collected and treated in order to draw up different conclusions.

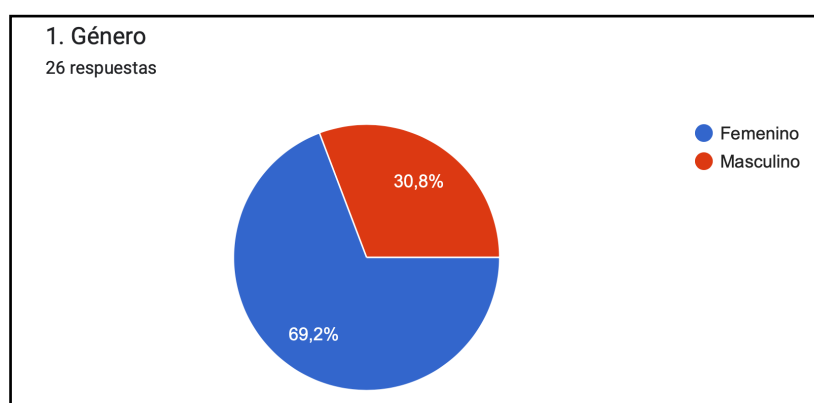
The sample taken for this research makes it a group study, and the type of data here treated and analysed is quantitative in nature. In addition, the method of data collection categorises the study as non-experimental, as it does not alter the different variables being considered.

Regarding the time of the data collection, the project is to be classified as cross-sectional, given that it measures the level of attainment of digital competence in a given point in time. As for the method of analysis, the study here presented is statistical, as it provides an objective analysis and interpretation of data.

3.3. Participants

The subjects whose answers to the questionnaire have been analysed in this project are 26 teachers of English as foreign language in Compulsory and Post-Compulsory Secondary Education. They all work in Chiclana de la Frontera, a town located in Andalusia, in the province of Cadiz, at the southernmost point of the Iberian Peninsula. This town is characterised by three main economic sectors, in order of importance: tourism, building, and wine production.

The town has a population of 86,306 inhabitants, as of January 2021, according to the INE (*Instituto Nacional de Estadística*). The number of schools where Secondary Education is taught is 8. From these 8 schools, 6 are public schools and 2 are charter schools (schools which receive public fundings but work as private institutions). The stages of Secondary Education where teachers who have participated in the study are Compulsory Secondary Education (*ESO*), and Baccalaureate (*Bachillerato*), which means that the population of the study work with 5,572 students. This population consists of 55 teachers of English, who teach this subject as first or second foreign language. In the following lines, a description of the participants in terms of different variables will be provided.

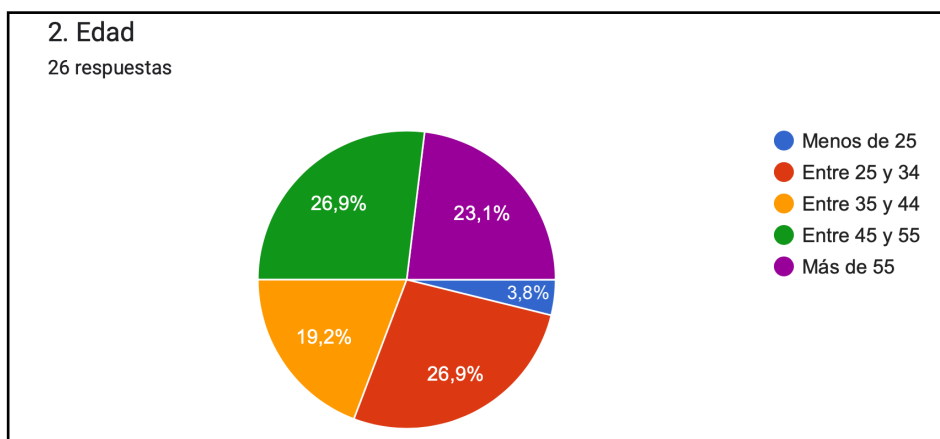


Graph 1. Participants according to gender.

As it can be observed in the graph provided above (Graph 1), most participants are women. **There are 18 women and 8 men**, which means that 69.2% of participants are women, and 30.8% are men. It has been observed, by different institutions, that there are professions which are more feminised than others, that is, there is a greater presence of women in some professions. According to the International Labour Organisation, teaching is the sixth most feminised occupation, where we can find 32% of men, and 68% of women. These proportions seem to be in agreement with the ones obtained after having administered the questionnaire used in the present study.

It is also necessary to identify our sample in terms of **age**. For the sake of better organisation, the participants have been grouped in 5 different ranges of age. These ranges, or groups of age, are distributed as follows:

- ▶ 1 = less than 25 years old
- ▶ 2 = between 25 and 34
- ▶ 3 = between 35 and 44
- ▶ 4 = between 45 and 55
- ▶ 5 = more than 55



Graph 2. Participants according to groups of age

By having a look at Graph 2, it can be observed that the two groups of age that count with more participants are group 2 (between 25 and 34 years old), and group 4 (between 45 and 55 years old). The following table offers a description of participants, again grouped by age, but in absolute numbers:

Age group	Frequency
1 - less than 25	1
2 - between 25 and 34	7
3 - between 35 and 44	5
4 - between 45 and 55	7
5 - more than 55	6
Total	26

Table 1. Participants according to groups of age in absolute numbers

If we analyse both Graph 2 and Table 1, we observe that there is a very low participation for the first group of age (less than 25). This phenomenon might be due to the late incorporation of younger teachers to the profession, as there are many previous steps to

be followed before becoming a teacher (getting a degree, an MA, a possible public examination...).

Another variable to be taken into account in terms of the participants of the study is the type of school where they work as teachers. Given that there are no fully private schools in the town where the project has been carried out, there were two possibilities: teachers may work either in charter schools or in public schools. According to this variable, we find the data shown in the graph below:



Graph 3. Participants according to type of school

As it can be observed in Graph 3, most participants work in public schools, more specifically, 84.6% of participants, as opposed to the 15.4% of teachers who work in charter schools. These percentages, in terms of absolute numbers, give us the following figures:

Type of school	Public schools	Charter schools
Number of teachers	22	4

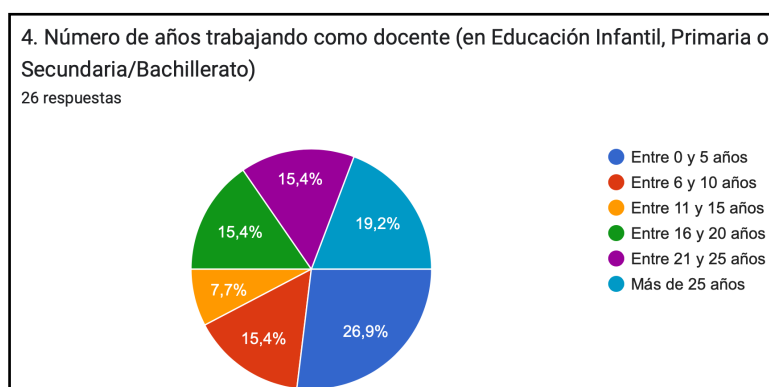
Table 2. Participants according to type of school in absolute numbers

Finally, one more variable that has to be considered in this section is the number of years that teachers have been working in this occupation. Teachers were thus grouped in 6 different ranges of years. The groupings that we find, according to the number of years working as teachers, are the following:

- ▶ Between 0 and 5 years
- ▶ Between 6 and 10 years

- Between 11 and 15 years
- Between 16 and 20 years
- Between 21 and 25 years
- More than 25 years

As it can be observed below, Graph 4 provides a pie chart of the proportions of the sample distributed in the different ranges of years working as teachers:



Graph 4. Participants according to number of years working as teacher

In order to visualise these proportions in absolute numbers, Table 3 offers these data organised as follows:

Number of years working as teacher	Frequency
0 - 5 years	7
6 - 10 years	4
11 - 15 years	2
16 - 20 years	4
21 - 25 years	4
More than 25 years	5
Total	26

Table 3. Participants according to years working as teacher in absolute numbers

As it can be observed both in Graph 4 and Table 3, the group with the greatest number of participants is that of the teachers who have been working for 0 to 5 years (26.9%), followed by those who have worked as teachers for more than 25 years (19.2%). However, the

group where we find less participation is for teachers who have been working for 11 to 15 years, with just 2 participants and 7.7% of participation.

Now that the sample of the study has been characterised in terms of the four variables mentioned above (gender, age, type of centre, number of years working as teacher), we will describe the instrument that has been employed to make possible this study.

3.4. Instruments

In order to give a description of the teachers' profile and find out their level of attainment of B1 digital competence, participants were asked to complete a questionnaire that had been administered via *Google Forms*. Before administering this questionnaire, a series of steps were cautiously followed, which include:

- **Instrument design.** In this first phase of the instrument, different references were consulted, in order to elaborate a reliable and consistent scale. The first document that was considered was *Marco Común de Competencia Digital Docente* (2017), a document created by INTEF (Instituto Nacional de Tecnologías Educativas y de Formación del Profesorado) which served as the basis for preliminary ideas about teachers' digital competence and the aspects that should be considered in a study of this nature. Nevertheless, the aforementioned document was updated and a subsequent revision ensued. Although many aspects from the previous version are still considered, the new *Marco Común de Competencia Digital Docente*, revised and published in 2022, was the one finally employed as a reference for the elaboration of the questionnaire, as it is in agreement with the current *European Framework for the Digital Competence of Educators: DigCompEdu* (2017), focusing on the level B1 from this framework. The design of the instrument also followed the guidelines contained in *Diseño y validación de un instrumento para conocer el grado de competencia digital real y autopercebida del docente español* (Álvarez-Herrero, 2021), which provided some useful ideas as to what sections the questionnaire should contain.

► **Instrument validation.** The questionnaire was sent to five different experts who assessed the design of the instrument and provided counsel and guidance as to how the questions should be formulated, how to make a better use of Likert scales, and which aspects should be considered in the demographic questions from the preliminary set. The commentaries and suggestions derived from this guidance were incorporated. Additionally, in order to test the internal consistency of the instrument, the Cronbach Alpha was calculated, which provided the following figures:

Cronbach Alpha	0.9587692
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Table 4. Cronbach Alpha of the instrument

As it can be observed, the questionnaire has a **high level of reliability**, according to one of the references employed both for the elaboration of the questionnaire and its validation process (Duque-Vaca et al, 2017). As stated in Duque-Murcia et al. (2017), the different levels of reliability according to the Cronbach Alpha are the following, as described in Table 5:

Index	Level of reliability	Cronbach Alpha
1	Excelent	0.9 - 1
2	Very good	0.7 - 0.9
3	Good	0.5 - 0.7
4	Low	0.3 - 0.5
5	Deficient	0 - 0.3

Table 5. Levels of reliability according to Duque-Vaca et al. (2017)

► **Instrument administration.** The instrument was administered to 26 participants who were given several photocopies in the schools from the town where the study has been carried out. These copies contained a QR code which had to be scanned by teachers, using their mobile phones, and were thus redirected to the website where they could answer the questionnaire. Although the questionnaires were answered online, participants were personally informed of the nature of the study

previously and had to be asked several times to participate. This QR code was preceded by an invitation to participate.

3.5. Data collection

There have been, as described in the Instruments heading, different steps in the process of developing both the questionnaire and a collection a references that would provide essential information for the literature review. First, different publications and websites were consulted in order to identify the essential elements that a questionnaire of this nature should contain. Subsequently, the questionnaire, after having been examined and revised by experts, was administered to the participants. Then, literature from previous studies in this area of research was consulted, especially those by Garzón-Artacho et al. (2021), although different references have been considered throughout the whole process.

3.6. Data analysis

Once the questionnaires had been answered by the teachers, all the information was processed using Excel, conducting different quantitative analyses of the sample. The most frequently used operation was the calculation of the mean, which provides us with a General Coefficient of the level of attainment at level B1 from the *European Framework of the Digital Competence of Educators*. Other operations involve the use of correlation coefficients.

4. Results and discussion

As preliminary considerations, it is worth considering that the items from the questionnaire follow a Likert scale ranging from 1 to 4, in order to avoid the so-called “central tendency error”. Thus we may consider an item has been “passed” when the mean is above 2.5, which is the medium point between 1 and 4.

4.1. General coefficient of Digital Competence

The first step we took was to calculate the coefficient that shows us, in a scale from 1 to 4, how teachers perform in terms of digital competence at the level B1 from the aforementioned framework of the digital competence of educators. This will be referred to as “General Coefficient” or “G.C.” henceforth. As it can be observed in the following table, it is relatively high: 3.2509. Thus, we may consider that teachers pass, in general terms, the level B1 from the digital competence of educators framework.

	N	Minimum	Maximum	Mean	Standard Deviation
General Coefficient	26	1.5714	3.9048	3.2509	0.9073

Table 6. General Coefficient

However, it must also be taken into account that there are some teachers who perform quite low at level B1 of digital competence, given that the minimum value found for the General Coefficient is 1.5714. On the other hand, the maximum figure obtained for this coefficient is 3.9048. Therefore, the range of this coefficient goes from 1.5714, which represents the less digitally competent teacher, and up to 3.9048, being this one the coefficient corresponding to the most digitally competent teacher. Additionally, the standard deviation, being a measure of dispersion, as observed in Table 6, is 0.9073. If we consider that we are here dealing with a scale in which the possible values range from 1 to 4, then we find a relatively high standard deviation, which means that the results present some degree of heterogeneity. Yet, the average is much closer to the maximum value than to the minimum, which means that we find more teachers performing near the most digitally competent teacher than to the least digitally competent one, as observed in the table provided above.

Let us now consider how the General Coefficient is divided into the different areas or competences observed within the digital competence of educators, both by the *European Framework for the Digital Competence of Educators* (2017) and by the *Marco de Referencia de la Competencia Digital Docente* (2022), which distinguish 6 different areas, as it has been mentioned in the literature review. Each area will be analysed along with their corresponding items of the scale and the results obtained in each item individually.

4.2. Area 1: Professional Engagement

The first area covered or analysed in the questionnaire corresponds to the first one considered by the two publications cited just above. Different competences are found within this area, some of which deal with how teachers communicate with their colleagues, whether they collaborate with other teachers in the use of digital resources, or if they make efforts for keeping developing their level of digital competence in any regard, among others. Let us now remind how the *European Framework for the Digital Competence of Educators* (2017) describes this area.

According to the cited publication, teachers' digital competence is expressed by their abilities to make use of digital technologies in order to improve the learning experiences of students, but also in order to communicate with other teachers, students, parents or other professionals. Additionally, this area also looks into the teachers' capacities to implement digital technologies for their professional development.

These aspects are measured by the scale in the items 5 to 9, just after the questions that deal with the biographical data of the teachers. We will first analyse the data obtained in the area as a whole, and then the data of the items corresponding to this area will be described in detail. The table provided below describes how teachers perform in the area here analysed:

	N	Minimum	Maximum	Mean	Standard Deviation
Area 1 Coefficient	26	1.4	4	3.3	0.9617

Table 7. Area 1 Coefficient

If we have a look at Table 7, we can observe that teachers perform slightly better in this area, given that the mean here is above the General Coefficient. However, the distance between the minimum and maximum values for this area is even greater. Additionally, the standard deviation shows a higher figure, which means that answers are less homogeneous, that is, they are more disparate. Yet, as it happened with the General Coefficient shown in Table 6, the mean is much closer to the maximum than to the minimum, which means most answers in the items corresponding to the area of Professional Engagement.

In order to know which is the most frequent or repeated answer, we need to calculate the mode. In this sense, calculating the median is also a useful quantitative analysis technique, since it provides us with the figure which divides the sample in two equal halves: one half above this value, and the other one below it. Both the median and the mode is 4, which indicates that the most repeated answer for these items is “4 = Fully agree”.

We will now proceed to the analysis of the first item found within Area 1, which is fifth question found within the instrument, as it is preceded by the four questions about biographical data. This item goes as follows: *Sé comunicarme de forma autónoma con otros profesores usando la plataforma digital más adecuada en cada caso* (“I know how to communicate with other teachers autonomously, using the most adequate digital platform in each case”). Thus, as it can be observed, this item is aimed at measuring whether teachers are able to communicate with their colleagues by means of using the appropriate digital platform without any help.

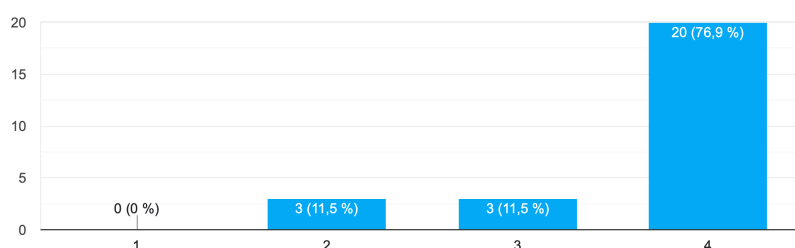
	N	Minimum	Maximum	Mean	Standard Deviation
Item 5	26	2	4	3.6538	0.6895

Table 8. Item 5

As it can be observed (Table 8), the mean here is very high when compared both with the General Coefficient and the Area 1 Coefficient. Moreover, the standard deviation is lower, which means there is more homogeneity. This implies that teachers are generally able to use the adequate digital platforms to communicate with their colleagues independently, given that the mean is very high and very close to the maximum value. In addition, the mode for this item is 4, which means it is the most repeated answer.

5. Sé comunicarme de forma autónoma con otros profesores usando la plataforma digital más adecuada en cada caso.

26 respuestas



Graph 5. Answers for Item 5

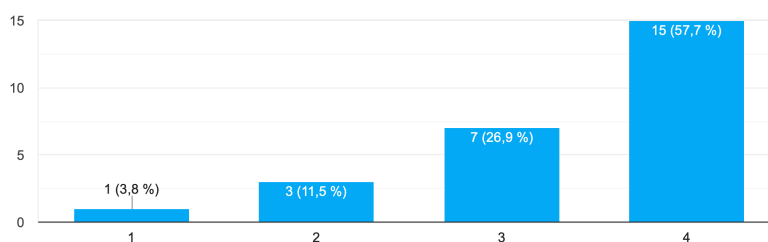
The next item found within “Area 1: Professional Engagement” is number 6, and it was expressed in the following words: *Sé usar de forma autónoma las tecnologías y plataformas digitales establecidas por la administración para llevar a cabo las funciones docentes y administrativas* (“I know how to use the technologies and digital platforms established by the administration in order to carry out both the teaching and the administrative tasks”). This time, the item measures whether teachers are able to use the digital resources and the technological devices indicated by the educational administration. By analysing this item, we obtain the following figures.

	N	Minimum	Maximum	Mean	Standard Deviation
Item 6	26	1	4	3.3846	0.8521

Table 9. Item 6

6. Sé usar de forma autónoma las tecnologías y plataformas digitales establecidas por la administración para llevar a cabo las funciones docentes y administrativas.

26 respuestas



Graph 6. Answers for Item 6

Although the mean is lower than that from item 5, it is still above the General Coefficient, and the Area 1 Coefficient as well, which means that it can be asserted that teachers are generally able to use the technologies and digital platforms pointed out by the administration both for teaching and paperwork.

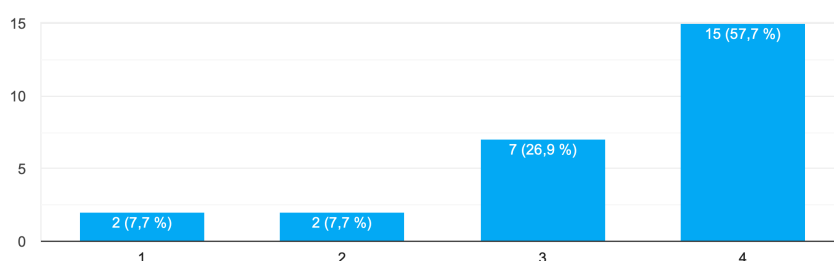
A similar scenario is found for item 7. This one was stated in the questionnaire as *Sé identificar problemas en mi práctica docente relativas al uso de tecnologías digitales y les doy solución mediante ideas que me dan otros docentes o que busco por internet* (“I can identify problems in my teaching practice that are connected to the use of digital technologies and I solve them by means of ideas by other teachers or that I search on the Internet”). The mean for this item is below those of the previous items, and yet, it is still above the General Coefficient, which means that most teachers perform well in the aspects here considered.

	N	Minimum	Maximum	Mean	Standard Deviation
Item 7	26	1	4	3.3462	0.9356

Table 10. Item 7

As it can be grasped from Table 10, there is less homogeneity in this item, which means answers have been slightly more disparate. Nevertheless, the mean is closer to the maximum, and the mode is also 4, meaning it is the most frequent answer, as it can be observed in the graph provided below:

7. Sé identificar problemas en mi práctica docente relativas al uso de tecnologías digitales y les doy solución mediante ideas que me dan otros docentes o que busco por internet.
26 respuestas



Graph 7. Answers for Item 7

If we take a look at item 8 and its results, it can be observed that they vary and differ from the items previously commented. This one deals with the teachers' enrolment in activities aimed at developing their digital competence, that is, it is the one that analyses the

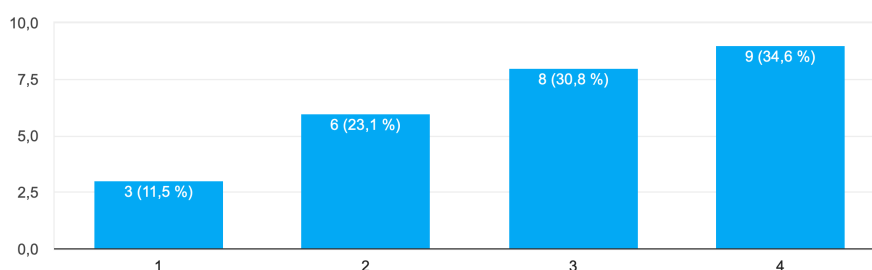
teachers' commitment to become more digitally competent. In the questionnaire, it was stated as *Participo en actividades de formación para el profesorado en las que se utilizan recursos digitales*. The figures obtained for this item show the following numbers:

	N	Minimum	Maximum	Mean	Standard Deviation
Item 8	26	1	4	2.8846	1.0325

Table 11. Item 8

8. Participo en actividades de formación para el profesorado en las que se utilizan recursos digitales.

26 respuestas



Graph 8. Answers for Item 8

Teachers almost fail in the competence here analysed. Although the majority seem to agree with taking part in activities that develop their digital competence, there are also many teachers that do not agree. The mean is 2.8846, which is the lowest ranking one from the area here described (Professional Engagement). However, the standard deviation is high, which indicates more heterogeneous answers, as we it can be observed in Graph 8. These data imply that less teachers are enrolled or take part in activities which help them develop their digital competence. This is one of the weakest points in the digital competence of teachers.

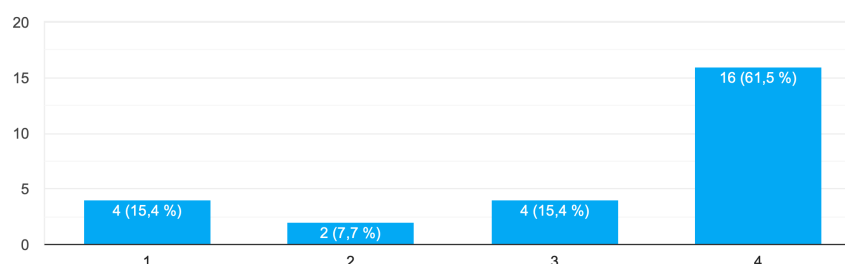
Finally, the last item found within this area (item 9) is stated as *Sé aplicar de forma autónoma medidas para proteger mis datos y los de mis alumnos/as (cambiar contraseñas, cerrar sesión en distintos dispositivos, etc.)*, and it analyses to what extent teachers protect their digital data, accounts and online profiles and those of their students.

	N	Minimum	Maximum	Mean	Standard Deviation
Item 9	26	1	4	3.2308	1.1422

Table 12. Item 9

9. Sé aplicar de forma autónoma medidas para proteger mis datos y los de mis alumnos/as (cambiar contraseñas, cerrar sesión en distintos dispositivos, etc.).

26 respuestas



Graph 9. Answers for Item 9

The mean here is very close to the General Coefficient (3.2509), which seems to indicate that the results for this item are in consonance with those of the G.C. Although most teachers affirm to know how to keep their digital data safe, there is a group of teachers who do not agree at all, thus the high standard deviation, since there is a greater distance between the answers, as they concentrate first in “4 - Totally agree” and then in “1 - Completely disagree”.

If we analyse the results obtained for the five items which belong to Area 1 as a whole, we will be able to identify in which aspect are teachers more digitally competent, and also, which one presents most difficulties.

	N	Minimum	Maximum	Mean	Standard Deviation
Item 5	26	2	4	3.6538	0.6895
Item 6	26	1	4	3.3846	0.8521
Item 7	26	1	4	3.3462	0.9356
Item 8	26	1	4	2.8846	1.0325
Item 9	26	1	4	3.2308	1.1422

Table 13. Items from Area 1

By comparing the data shown in Table 13, it can be easily observed that teachers perform best at using the adequate digital platforms in order to communicate with other colleagues (Item 5). However, keeping up with the latest digital trends by means of taking part in activities to train and expand teachers’ digital competence is the most troublesome aspect from Area 1: Professional Engagement.

4.3. Area 2: Digital Resources

The next three items of the scale correspond to the area of “Digital Resources”, which is related to the teachers’ abilities to find and organise digital resources and to modify them so that they serve for their didactic purposes. According to the *European Framework for the Digital Competence of Educators* (2017) this area deals with how teachers make use of their skills in order to identify those resources which best serve their didactic purposes and which fit the necessities of their students. It also focuses on their capacities to organise, find, structure or modify these digital resources.

These skills are measured by means of items 10, 11 and 12, each of them being focused on relevant aspects about digital resources and their treatment on behalf of teachers.

	N	Minimum	Maximum	Mean	Standard Deviation
Area 2 Coefficient	26	1.3333	4	3.359	0,8371

Table 14. Area 2 Coefficient

If we analyse the figures shown in Table 14, it can be observed that teachers perform particularly well in this area, as the mean is higher than the General Coefficient. Moreover, the standard deviation is lower in Area 2, which means there is more homogeneity in results. The mean is again much closer to the maximum than to the minimum. Moreover, both the mode and the median are “4”. This indicates that most teachers succeed at level B1 from Area 2: Digital Resources. Let us now analyse each of the different items individually.

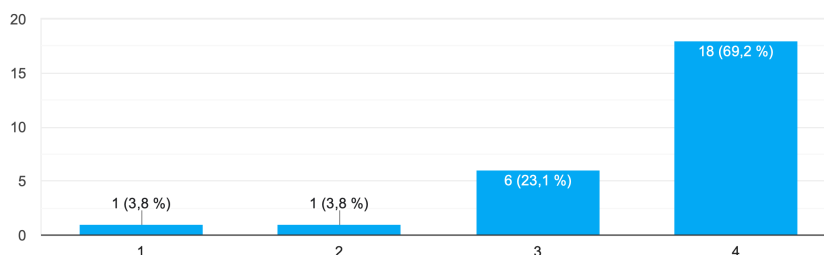
Item 10 focuses on the teachers’ abilities to use different techniques in order to look for adequate digital resources and materials, and choose them autonomously, taking into account the necessities and the interests of their students at the same time. Succeeding in this item would imply teachers know how to use search engines appropriately, and that they are familiarised with searching techniques on the Internet, for instance, in order to find the most adequate and interesting materials for students.

	N	Minimum	Maximum	Mean	Standard Deviation
Item 10	26	1	4	3.5769	0.7575

Table 15. Item 10

10. Sé adoptar estrategias de búsqueda y selección de contenidos digitales de forma autónoma, teniendo en cuenta las necesidades e intereses de mi alumnado.

26 respuestas



Graph 10. Answers for Item 10

As we can observe, both in Table 15 and Graph 10, answers are highly concentrated in “4 - Totally agree”. This explains the high figure obtained in the mean and the relatively low standard deviation. We can then assert that most teachers perform quite well in the skills covered by this item.

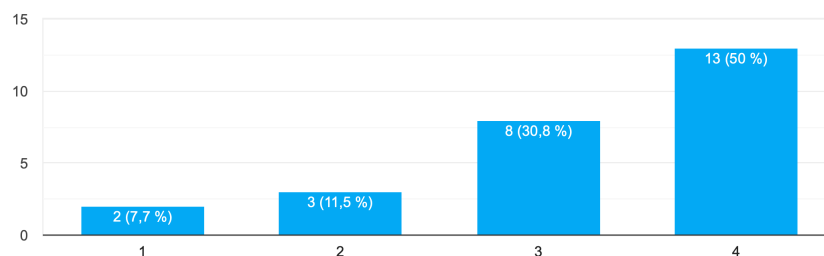
Although we can observe a similar scenario for Item 11, answers are less homogeneous, as it can be grasped from both the table and the graph provided below. This question looks at whether teachers are able to modify digital material in order to use them for specific teaching purposes.

	N	Minimum	Maximum	Mean	Standard Deviation
Item 11	26	1	4	3.2308	0.9511

Table 16. Item 11

11. Soy capaz de adaptar contenidos digitales ya existentes para usarlos en situaciones de aprendizaje concretas.

26 respuestas



Graph 11. Answers for Item 11

The mean is in consonance with the General Coefficient, but the standard deviation is slightly higher, which indicates more heterogeneity in answers. This seems to be in agreement

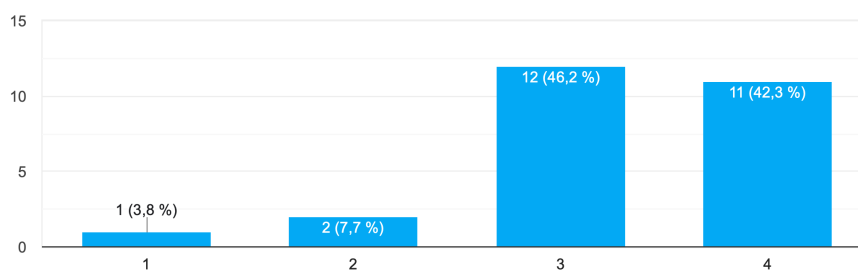
with the distribution found in Graph 11. Although most teachers affirm being able to adapt digital resources for their lessons, there are less participants who agree with this statement more confidently or strongly, as there are fewer “4”. If we consider the data analysed for items 10 and 11, we can state that it is more easily attainable for teachers to find digital content than to modify that content.

Finally, Item 12 analyses to what extent teachers are able to manage the different platforms established by the educational authorities in order to use or store didactic digital resources. We find the following results:

	N	Minimum	Maximum	Mean	Standard Deviation
Item 12	26	1	4	3.2692	0.7776

Table 17. Item 12

12. Sé utilizar las plataformas digitales establecidas por la administración y por el centro para gestionar diversos recursos educativos digitales (blogs, carpetas de espacios colaborativos, etc.)
26 respuestas



Graph 12. Answers for Item 12

By analysing Table 17, we get a mean that is quite close to the General Coefficient, meaning the results here are quite representative. Yet, if we observe Graph 12, it can be deduced that most participants are not in agreement with the statement as strongly as with previous items, since a majority chose “3” instead of “4” in the scale. Nevertheless, very few participants chose “1” or “2”, which means they are able to use the platforms appointed by the educational authorities, but could do so more effectively.

Let us now put in perspective and compare the skills analysed in Area 2: Digital Resources, in order to detect in which aspects teachers excel or falter.

	N	Minimum	Maximum	Mean	Standard Deviation
Item 10	26	1	4	3.5769	0.7575
Item 11	26	1	4	3.2308	0.9511
Item 12	26	1	4	3.2692	0.7776

Table 18. Items from Area 2

As it can be appreciated in Table 18, teachers excel in abilities to look for digital content and resources, which is attested both by the high mean observed from Item 10, and by the fact that just 2 participants did not agree with the statement here presented (Graph 10). Although most teachers do not seem to have problems with adapting digital content for their lessons (Item 11) or using the digital platforms appointed by the educational authorities for arranging digital resources (Item 12), they do not perform in these aspects as competently as those which are described by Item 10.

4.4. Area 3: Teaching and Learning

It is in this area from the *European Framework for the Digital Competence of Educators* (2017), where we can analyse how teachers deploy different strategies to improve their teaching practice and the learning processes of their students. The competences that belong to this area focus on the teachers' capacities to make use of digital technologies in an organised way that could help them improve their teaching techniques and the students' learning experiences.

These aspects are taken into account by the items 13, 14 and 15 from the scale. Teachers show a relatively good performance at this area as well, although slightly worse than in Area 2, as we can observe in the data shown in the following table:

	N	Minimum	Maximum	Mean	Standard Deviation
Area 3 Coefficient	26	1.6667	4	3.3077	0.8725

Table 19. Area 3 Coefficient

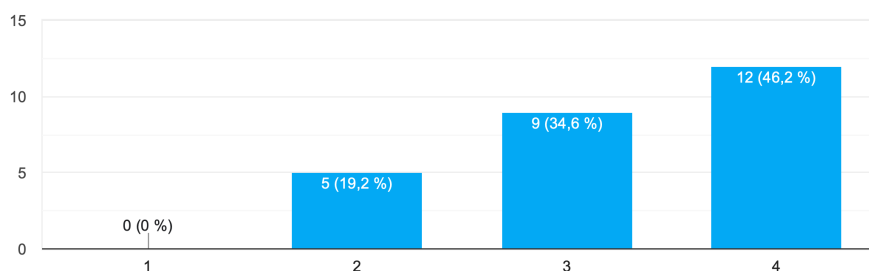
The first item from this section analyses whether teachers are able to incorporate different digital resources, from those offered by the high school, in their didactic planning, and use them autonomously (*Ítem 13. Selecciono qué recursos digitales incorporo en la programación didáctica, dentro de los que me ofrece el centro, y sé usarlos de forma autónoma*). This question looks into the teachers' commitment to make use of the different digital resources provided by the high school where they work and adopt them as part of the teaching practice that must be previously established in the official document stating the syllabus of the subject.

	N	Minimum	Maximum	Mean	Standard Deviation
Item 13	26	2	4	3.2692	0.7776

Table 20. Item 13

13. Selecciono qué recursos digitales incorporo en la programación didáctica, dentro de los que me ofrece el centro, y sé usarlos de forma autónoma.

26 respuestas



Graph 13. Answers for Item 13

It is striking that no participant answered “1 - Completely disagree” for this item, as attested by Graph 13. The mean is very close to the General Coefficient and the standard deviation is relatively low, which means there is more homogeneity in answers if we compare these data with those from the General Coefficient (Table 6). It can be asserted then that most teachers are competent in the skills here described, that is, they generally know how to use the digital resources offered by the high school, which have been incorporated in their syllabi.

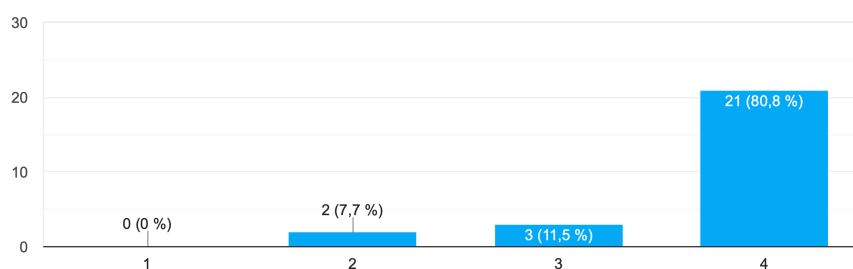
The next item analyses to what extent teachers know how to make use of the digital platforms appointed by the high school administration in order to communicate with their students in an autonomous way. These are the figures obtained for Item 14:

	N	Minimum	Maximum	Mean	Standard Deviation
Item 14	26	2	4	3.7308	0.6038

Table 21. Item 14

14. Sé comunicarme con mi alumnado a través de las plataformas digitales previstas por el centro sin necesitar ayuda para ello.

26 respuestas



Graph 14. Answers for Item 14

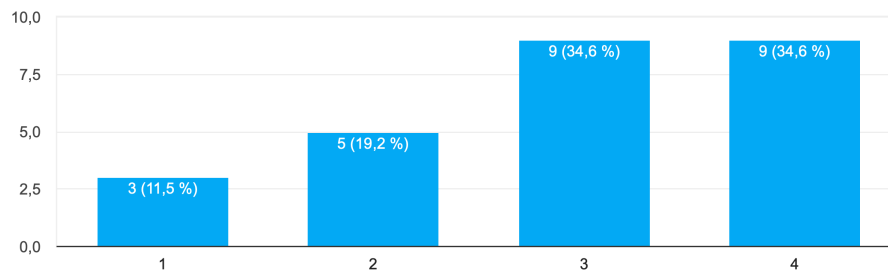
As it was the case of Item 13, the minimum value here is 2 again, which indicates teachers do not completely disagree with the statement from Item 14 (*Sé comunicarme con mi alumnado a través de las plataformas digitales previstas por el centro sin necesitar ayuda para ello*). Teachers really excel in this regard, since a vast majority totally agrees with the statement, as attested both by Table 21 and Graph 14. The mean here is very high (3.7308) and there is a low standard deviation which indicates more homogeneity. All these data indicate that teachers are very competent in the use of the digital platforms established by the administration in order to keep in contact with their students.

A very different scenario is observed in Item 15, which analyses to what extent teachers employ digital technologies to help students plan, store and consult aspects related to their learning process (*En el aula, aplico tareas adaptadas al alumnado que les permiten la planificación, documentación, registro y consulta de su aprendizaje mediante el uso de tecnologías digitales*). In this case, the mean is much lower, and the standard deviation is higher, as shown in the table provided below:

	N	Minimum	Maximum	Mean	Standard Deviation
Item 15	26	1	4	2.9231	1.0168

Table 22. Item 15

15. En el aula, aplico tareas adaptadas al alumnado que les permiten la planificación, documentación, registro y consulta de su aprendizaje mediante el uso de tecnologías digitales.
26 respuestas



Graph 15. Answers for Item 15

The data shown above seem to indicate that teachers have more problems with the competence here analysed. Although most of them seem to agree with the statement, we may claim that teachers do not incorporate these technologies which allow students to plan and consult aspects related to their learning process. Therefore, it can be observed that this is the skill where teachers falter from the area here analysed, while they excel in the use of digital platforms to communicate with their students:

	N	Minimum	Maximum	Mean	Standard Deviation
Item 13	26	2	4	3.2692	0.7776
Item 14	26	2	4	3.7308	0.6038
Item 15	26	1	4	2.9231	1.0168

Table 22. Items from Area 3

4.5. Area 4: Assessment

This area looks into the teachers' abilities to employ digital technologies in order, not only to assess and evaluate their students' learning process, but also to store that information and to share it with those concerned about it. This area deals with how teachers implement these digital technologies in order to improve already-existing evaluation techniques and with how they shape the assessment and evaluation processes of their students through them, into new innovative techniques.

	N	Minimum	Maximum	Mean	Standard Deviation
Area 4 Coefficient	26	1.3333	4	3.2564	0.8594

Table 23. Area 4 Coefficient

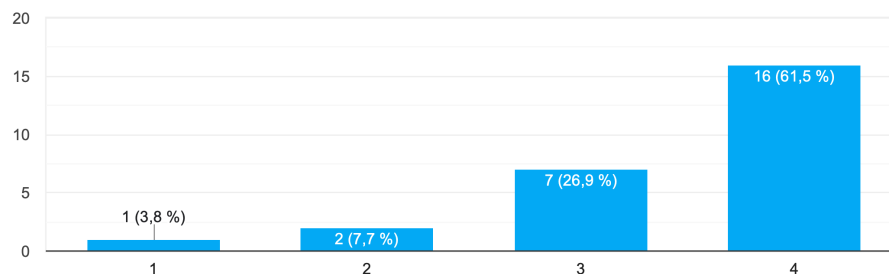
The data that we obtained in Area 4 Coefficient show a good performance in general terms in this area. Additionally, the mean is in consonance with the General Coefficient, but the standard deviation is slightly lower, which indicates there is some more homogeneity.

The skills mentioned above are dealt with by items 16, 17 and 18. The first one explores whether teachers know how to use digital technologies to assess their students' learning process, an instance being providing students with an online test where the teacher can evaluate the students' progress. We can observe that teachers are quite skilful in this regard, as most of them affirm to incorporate those technologies in their students' evaluation. Moreover, the standard deviation is lower than that from Area 4, since there is more homogeneity, as we can observe in the table and the graph provided below:

	N	Minimum	Maximum	Mean	Standard Deviation
Item 16	26	1	4	3.4615	0.8114

Table 23. Item 16

16. Sé usar diversas herramientas digitales para evaluar al alumnado de forma autónoma.
26 respuestas



Graph 16. Answers for Item 16

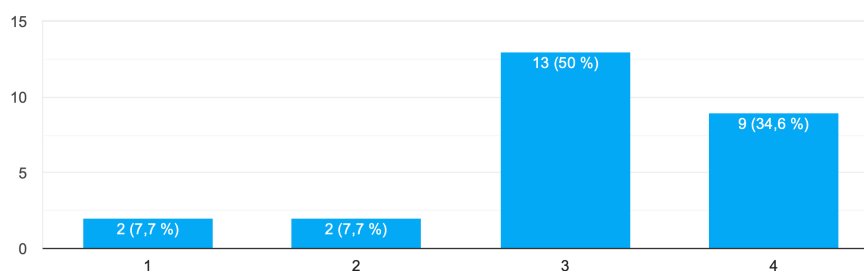
We find similar results for Item 17, which looks into the teachers' capacities to use digital technologies in order to store and analyse data about the students' evaluation.

	N	Minimum	Maximum	Mean	Standard Deviation
Item 17	26	1	4	3.1154	0.8638

Table 24. Item 17

17. Hago uso de las tecnologías digitales para almacenar, tratar estadísticamente, visualizar e interpretar datos sobre la evaluación de los procesos de enseñanza aprendizaje del alumnado.

26 respuestas



Graph 17. Answers for Item 17

In this case we can observe that most teachers chose “3”, which means they may implement those technologies but do not exploit them for all the purposes mentioned in the statement from Item 17.

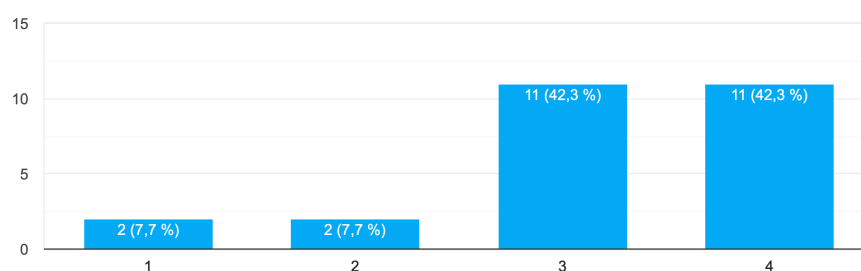
However, teachers must be familiarised with these technologies, since it is compulsory for some educational administrations to register students marks and information about their assessment in different platforms (in the autonomous region of Andalusia, this platform is called *Séneca*), and yet, teachers do not completely agree with this, which shows that they are not so confident about whether they use these platforms for all the aspects mentioned in Item 17.

Finally, it is also important to analyse to what extent teachers make use of digital technologies to make decisions, inform and orientate about their students’ learning process, taking into account the information obtained in their assessment and evaluation.

	N	Minimum	Maximum	Mean	Standard Deviation
Item 18	26	1	4	3.1923	0.8952

Table 25. Item 18

18. Empleo las tecnologías digitales para tomar decisiones, informar y orientar sobre los procesos de enseñanza y aprendizaje a partir de los datos obtenidos en la evaluación.
26 respuestas



Graph 18. Answers for Item 18

The table and the graph provided above let us observe that most teachers do not have problems with the competence here analysed, that is, they affirm to know how to inform and orientate about the students' learning process, using digital technologies for that purpose. However, it is striking that a great number of participants chose "3". In fact, options "3" and "4" are equally popular in this item, which indicates less confidence in agreeing with the statement.

Let us now compare the results obtained for all the three items found in this area, in order to identify where teachers falter and where they are more competent:

	N	Minimum	Maximum	Mean	Standard Deviation
Item 16	26	1	4	3.4615	0.8114
Item 17	26	1	4	3.1154	0.8638
Item 18	26	1	4	3.1923	0.8952

Table 26. Items for Area 4

By having a look at these figures, we can observe that teachers are more digitally competent in the use of digital technologies to assess their students' learning process, as exemplified in the analysis of Item 16. While they are slightly less competent in using digital technologies for storing, analysing, and interpreting data about the students' evaluation, given that these aspects are dealt with in Item 17, which shows the lowest mean from this area.

4.6. Area 5: Empowering Learners

The next two items address aspects that belong to the fifth area described by the *European Framework for the Digital Competence of Educators* (2017), and it deals with how teachers make use of digital tools to foster students' active participation in their own learning processes, that is, to make students take more agency in their learning.

It is considered a pivotal area within the DigCompEdu, as it is aimed at promoting the students' autonomy when realising any task. Digital technologies can be effectively used to develop students' agency and autonomy, and this area analyses how teachers cope with these competences, that is, with their implementation of digital technologies aimed at developing these skills in their students.

As it can be observed in the following table, Area 5 shows relatively good results, since the mean is higher than the General Coefficient, although the standard deviation is slightly lower, indicating more homogeneity for this area than for the results obtained in the General Coefficient.

	N	Minimum	Maximum	Mean	Standard Deviation
Area 5 Coefficient	26	1.5	4	3.3078	0.8975

Table 27. Area 5 Coefficient

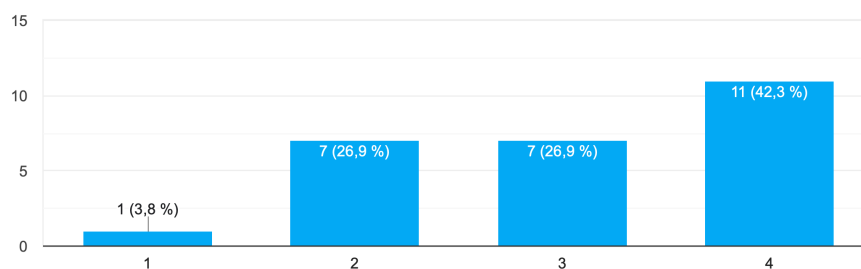
The first item explores to what extent teachers make use of digital technologies in order to help students progress at their own pace, which would include simple actions such as providing them with online resources and material so that they can learn and study at home if needed.

	N	Minimum	Maximum	Mean	Standard Deviation
Item 19	26	1	4	3.0769	0.9347

Table 28. Item 19

19. Sé usar las tecnologías digitales para que mi alumnado pueda progresar de una forma personalizada acorde a su ritmo de comprensión.

26 respuestas



Graph 19. Answers for Item 19

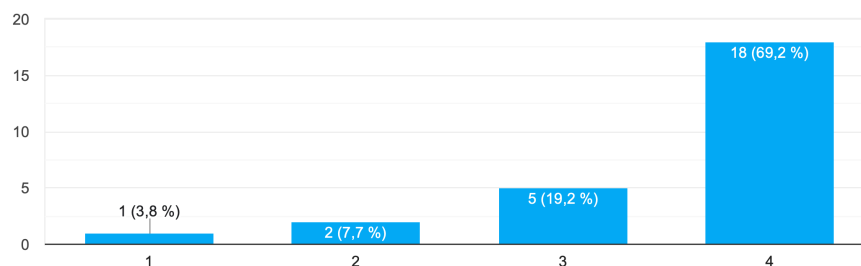
In this case, the mean is much lower, as attested by Table 28. However, most teachers agree with being able to make use of digital technologies in order to adapt to the students' pace of learning, as we can observe in Graph 19. Most of them perform relatively well in this skill too, but teachers seem to have more difficulties with this aspect in comparison with other skills from some items we have already analysed. One example will be the following, which focuses on the teachers' abilities to raise the students' interest and make them feel more responsible of their own learning through the use of digital tools. In this case, we obtain the following data:

	N	Minimum	Maximum	Mean	Standard Deviation
Item 20	26	1	4	3.5385	0.8115

Table 29. Item 20

20. Hago uso de las tecnologías digitales para tratar de motivar e implicar más a mi alumnado para que asuma más responsabilidad en su propio proceso de aprendizaje.

26 respuestas



Graph 20. Answers for Item 20

Teachers are much more digitally competent in the use of digital tools aimed at motivating students and making them assume more agency in their own learning process. The mean is much higher for Item 20, and the results present more homogeneity, as we can observe both in Table 29 and Graph 20.

Given that this area has been measured through two items only, it can be easily commented by referring to the data provided by items 19 and 20, through which we can observe that, although teachers generally perform well in the skills analysed in both items, they are much more digitally competent in motivating students and raising their interest in their own learning process than in getting adapted to the students' learning pace.

4.7. Area 6: Facilitating Learners' Digital Competence

The last area described by the *European Framework for the Digital Competence of Educators* (2017) is targeted at the way teachers make efforts to help students develop their own digital competence. It is considered one of the most important areas from the DigCompEdu, as it is the one which looks into the teachers' capacities to help students boost their skills in the use of digital technologies.

If we analyse the results obtained for Area 6, we obtain the following figures:

	N	Minimum	Maximum	Mean	Standard Deviation
Area 6 Coefficient	26	1.6	4	3.0769	0.9369

Table 30. Area 6 Coefficient

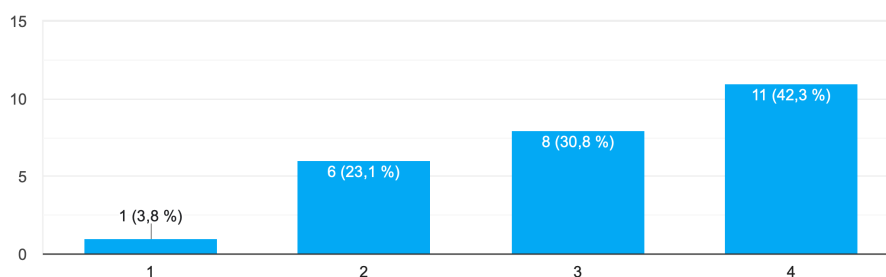
The data here shown indicates that teachers do not perform as well in this area as in others here analysed, given that the mean is lower than the General Coefficient. The standard deviation is relatively high, which points out to a higher disparity in answers. In total, five different items have been included in the scale in order to analyse this area. The first one (Item 21) dealing with the teachers' abilities to help their students search for and assess the information or resources extracted from the Internet. Item 21 offers the following results:

	N	Minimum	Maximum	Mean	Standard Deviation
Item 21	26	1	4	3.1154	0.9089

Table 31. Item 21

21. Aplico estrategias didácticas para enseñar a mi alumnado a buscar y evaluar la información procedente de entornos digitales, como internet, para que realicen una mejor selección.

26 respuestas



Graph 21. Answers for Item 21

Although the mean is not very high as in other items, the majority of teachers affirm to help their students learn how to find and assess material extracted from the Internet, with just one participant having completely disagreed with the statement.

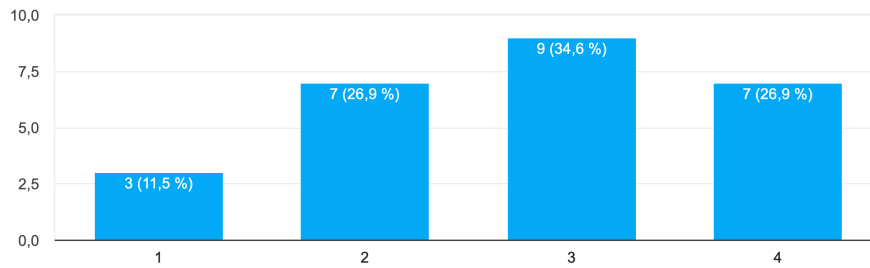
Thus, it can be concluded that teachers generally show good results in helping students become digitally competent in this regard.

The results are less positive for Item 22, which analyses to what extent teachers implement digital platforms to enhance communication between their students in order to make them collaborate (for a task, a project, etc.), obtaining the following figures:

	N	Minimum	Maximum	Mean	Standard Deviation
Item 22	26	1	4	2.7692	0.9923

Table 32. Item 22

22. Hago uso de estrategias didácticas para que los alumnos/as se comuniquen y colaboren entre ellos mediante plataformas digitales, siempre pres...su identidad digital y las de sus compañeros/as.
26 respuestas



Graph 22. Answers for Item 22

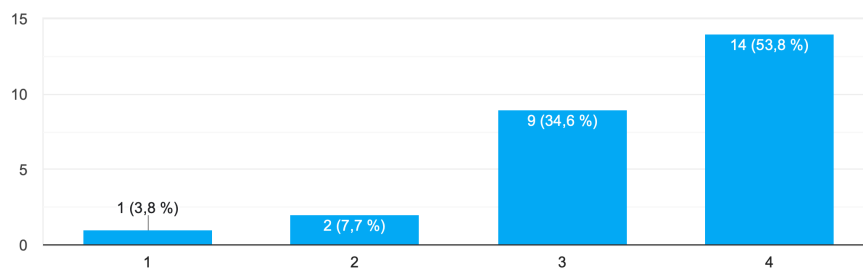
If we have a look at both the table and the graph provided above, we will observe that teachers almost fail in this skill, as we can ascertain by the low mean from Table 32. Moreover, results offer certain heterogeneity, which is attested both by the standard deviation and the distribution that we get from Graph 22. Despite a majority of teachers having chosen options “3” or “4”, there is also a great number of participants moving between values “1” and “2”, which accounts for the low mean.

A completely different scenario is observed in Item 23, which aims at determining to what degree teachers make their students elaborate tasks or projects in which they have to make use of digital tools in a creative way. The following results were obtained:

	N	Minimum	Maximum	Mean	Standard Deviation
Item 23	26	1	4	3.3846	0.8038

Table 33. Item 23

23. Hago que mi alumnado realice tareas o proyectos en los que tengan que hacer uso de herramientas digitales de forma creativa.
26 respuestas



Graph 23. Answers for Item 23

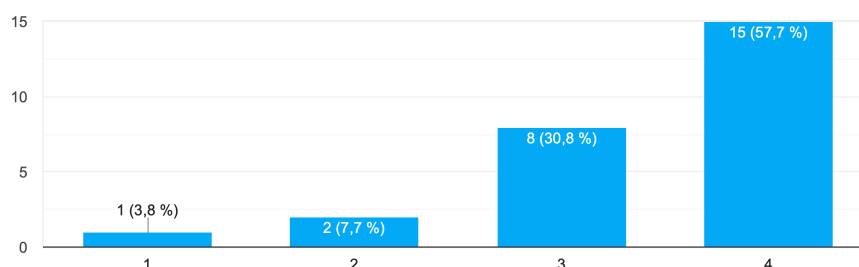
There is a much higher mean, which indicates a strong tendency towards “4 - Totally agree”. Additionally, the lower standard deviation indicates more homogeneous results, as ascertained by Graph 23. Hence, it can be claimed that teachers are digitally competent in terms of making students realise projects which require a creative use of digital tools, with just three participants who disagree with the statement.

There are even more positive outcomes for the following aspect analysed in this area, which deals with how teachers raise awareness between their students about the importance of keeping safe their digital identity and that of others, by making a responsible use of digital technologies. Item 24 shows the following figures:

	N	Minimum	Maximum	Mean	Standard Deviation
Item 24	26	1	4	3.4231	0.8086

Table 34. Item 24

24. Creo conciencia entre mi alumnado sobre la importancia de hacer un uso responsable y seguro de las tecnologías digitales y cómo cuidar su identidad digital y las de los demás.
26 respuestas



Graph 24. Answers for Item 24

The data shown above let us observe a stronger tendency towards “4” than in the previous item, as it can be observed in both Table 34 and Graph 24. This means teachers are quite competent in this regard, that is, they are aware of the importance of keeping safe their digital identity and transfer this awareness to their students.

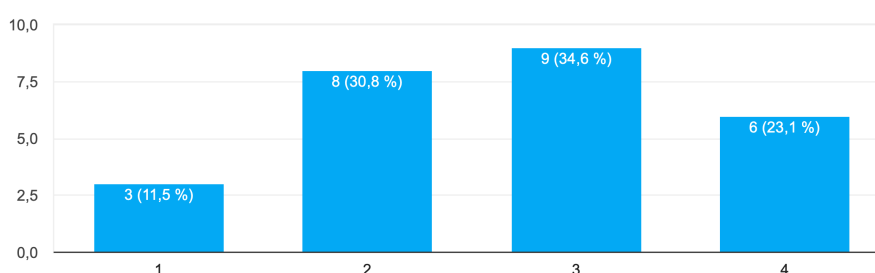
The last item from this area, and from the scale as a whole, analyses to what extent teachers help students solve possible problems with digital technologies and if they teach them how they can solve those problems on their own. The data provided below let us observe that teachers really have problems with this competence, since the mean is quite low in

relation to the General Coefficient and the means from other items in the scale. The results obtained show the following figures:

	N	Minimum	Maximum	Mean	Standard Deviation
Item 25	26	1	4	2.6923	0.9703

Table 35. Item 25

25. Ayudo a mis alumnos a resolver posibles problemas técnicos y les enseñé cómo resolverlos por sí mismos.
26 respuestas



Graph 25. Answers for Item 25

As we can observe, this is the lowest-ranking item from the scale, meaning it describes the competence with which teachers have most difficulties. Solving the technical problems that students may have and teaching them how to solve those problems by themselves seems to be most deficient skill within teachers' digital competence. Let us now compare all the five items analysed in this area through the following table:

	N	Minimum	Maximum	Mean	Standard Deviation
Item 21	26	1	4	3.1154	0.9089
Item 22	26	1	4	2.7692	0.9923
Item 23	26	1	4	3.3846	0.8038
Item 24	26	1	4	3.4231	0.8086
Item 25	26	1	4	2.6923	0.9703

Table 36. Items from Area 6

By comparing the data shown in the table above, we can observe that teachers perform really well at raising awareness about digital security and protecting one's digital

identity (Item 24). Yet, we find the lowest-ranking item from the scale in this area, where teachers struggle the most, which is Item 25, dealing with solving technical problems, as mentioned above.

4.8. Comparison of all the items

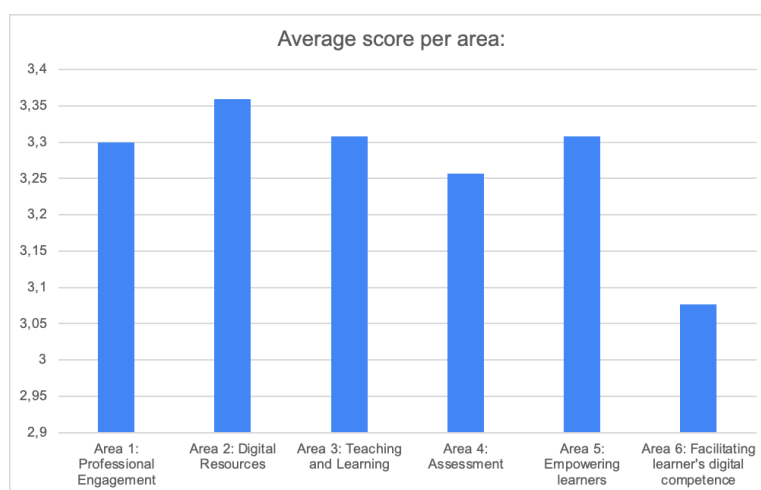
Let us now compare the results from all the different items altogether, in order to observe which competences are most developed within the digital competence of teachers, in contrast to those which need to be reinforced:

Item	Mean	Standard Deviation
Item 5	3.6538	0.6895
Item 6	3.3846	0.8521
Item 7	3.3462	0.9356
Item 8	2.8846	1.0325
Item 9	3.2308	1.1422
Item 10	3.5769	0.7575
Item 11	3.2308	0.9511
Item 12	3.2692	0.7776
Item 13	3.2692	0.7776
Item 14	3.7308	0.6038
Item 15	2.9231	1.0168
Item 16	3.4615	0.8115
Item 17	3.1154	0.8638
Item 18	3.1923	0.8953
Item 19	3.0769	0.9348
Item 20	3.5385	0.8115
Item 21	3.1154	0.9089
Item 22	2.7692	0.9923
Item 23	3.3846	0.8038
Item 24	3.4231	0.8086
Item 25	2.6923	0.9703

Table 37. Mean and standard deviation of all the items

It can be noticed that teachers are most skilful in communication through digital platforms, both with other teachers and colleagues (Item 5) and also with their students (Item 14). However, they perform worse in implementing didactic strategies to make students collaborate through digital platforms (Item 22), but teachers also have problems with solving technical problems that students may have and teaching them how to solve those problems by themselves (Item 25). The two items where teachers have had a lower performance belong to Area 6, which is connected with contributing to the development of the students' digital competence.

We will now compare the results from all the six areas analysed, finding the following, with all the coefficients represented in a bar graph:



Graph 26. Coefficients of all the areas

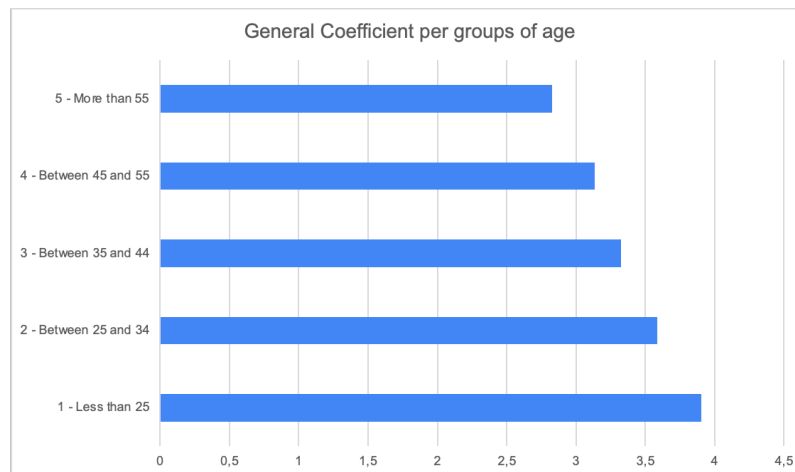
As we can observe, teachers perform better in Area 2, which deals with the use of digital resources as mentioned in previous sections. It is in Area 6 where teachers find most difficulties, in particular, they seem to have problems with the technical side of digital tools and with making students collaborate between them through digital platforms.

4.9. Analysis of the General Coefficient according to different factors

This section will be devoted to discussing the results obtained when analysing the relation between the General Coefficient and demographic factors such as age, gender, type of school and number of years working. We will first analyse how the General Coefficient is affected by age.

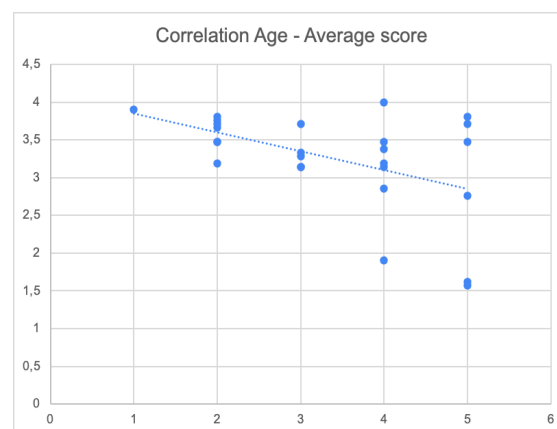
Groups of age	1 - Less than 25	2 - Between 25 and 34	3 - Between 35 and 44	4 - Between 45 and 55	5 - More than 55
General Coefficient	3.9048	3.585	3.3238	3.1361	2.8254

Table 38. General Coefficient per groups of age



Graph 27. General Coefficient per groups of age

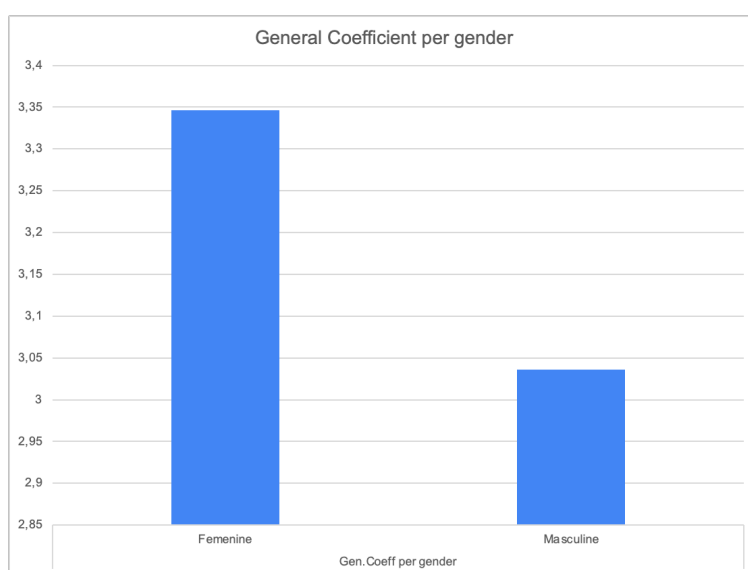
Both the table and the graph provided above let us observe that the age group that scores highest is the youngest one (“1 - Less than 25”), while the group scoring lowest is the fifth group of age (more than 55). Let us now analyse whether there exists a correlation between the the General Coefficient and the age of teachers. By calculating the correlation coefficient between the average score of each participant, that is, their General Coefficient, and their age, we obtain the following figure: -0.4741, which means there is indeed a negative correlation between these two variables, yet, this correlation is not so strong, but it is enough to claim that the older the teacher, the less digitally competent they may be. The graph below represents this correlation visually:



Graph 28. Correlation between age and General Coefficient

The x-axis (horizontal) from the graph above shows us the age group of the subjects, while the y-axis (vertical) represents the General Coefficient of participants. As we can observe, there is not so much overlapping, meaning the correlation is not perfect, but those participants striking lowest in the General Coefficient belong to higher groups of age.

It is also worth mentioning that the General Coefficient seems to be slightly higher for women (3.3466) than men (3.0357), as it is represented by the graph provided below:



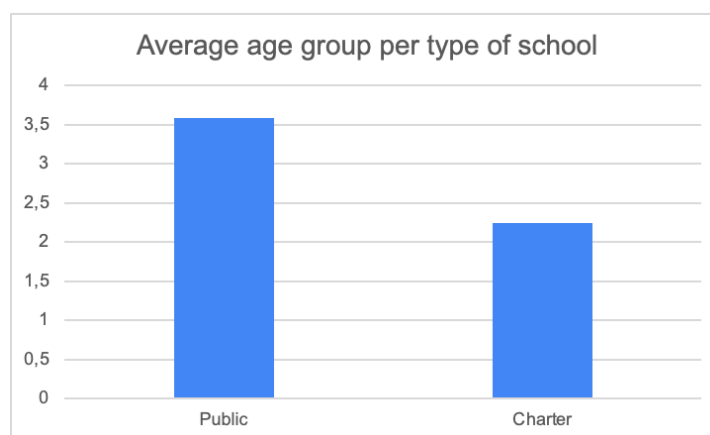
Graph 29. General Coefficient per gender

Another variable we should also consider is the type of school, which may be public or charter school, and we obtain the following results:

Type of school	Public	Charter
General Coefficient	3.1926	3.5714

Table 39. General Coefficient according to type of school

The data shown above seem to indicate that teachers from charter schools are more digitally competent than those from public schools. This might be due to the fact that the participants who work in charter schools belong to younger groups of age, as attested by the graph provided below:



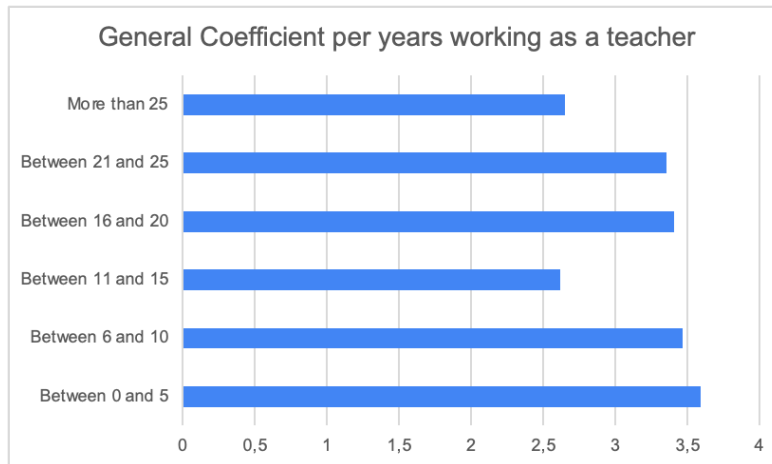
Graph 30. Average age group per type of school

The mean for the age group of teachers who work in public schools is 3.591 while the same figure for those who work in charter schools is 2.25, which means most teachers who work in charter schools belong to the second group of age (between 25 and 34). That would explain why the General Coefficient is higher in the case of participants who work in charter schools.

Finally, we should consider the General Coefficient according to the number of years that teachers have been in the profession, and we find the following data:

Years working as a teacher	General Coefficient
Between 0 and 5	3.5918
Between 6 and 10	3.4642
Between 11 and 15	2.6191
Between 16 and 20	3.4048
Between 21 and 25	3.3571
More than 25	2.6476

Table 40. General Coefficient according to years working as a teacher



Graph 31. General Coefficient according to years working as a teacher

Both the table and the graph above show us that the groups in the extremes are the ones most and least digitally competent. On the one hand, we find that the teachers who have worked between 0 and 5 years are highly competent (3.5918), while those who have been working for more than 25 years perform worse in the scale (2.6476). This factor is inevitable connected with the age of the teachers, which would explain the low performance in the case of the teachers with more years of experience.

5. Limitations of the study

The present study has followed all the different steps and requirements that the literature demands, yet, several limitations have been found in some of the stages of the project.

The first aspect we need to factor in is the small and locally reduced sample with which we have worked. Such a small sample may render biased or unrepresentative results. For instance, in our case, there was only one teacher aged less than 25. Thus, it would be interesting to carry out a study of this nature with a much higher number of participants. Moreover, the study also presents limitations as to the point in time when data have been collected, which was during the month of September, the very beginning of the school year, and some teachers may have a wrong perception of their true digital skills, which may develop in one direction or another throughout the year. In this sense, it would have been interesting to provide a longitudinal data collection, in order to observe whether any changes take place in the level of teachers' digital competence. This study fails in factoring in whether those changes or developments do take place.

It is also worth mentioning the project has been developed only from a quantitative analysis or point of view, but including a qualitative analysis, derived from interviews or open-ended questions, would surely enrich the research in many different ways.

The questionnaire was elaborated focusing on the level B1 from the DigCompEdu as developed in Spain by the INTEF (*Marco de Referencia de la Competencia Digital Docente*, 2022), which may not be the most adequate one, that is, a level above (B2), may have been more appropriate for measuring the teachers' performance in digital competence, given that B1 level is the minimum required to handle digital technologies with autonomy. Additionally, teachers may have not been fully honest in their answers. Although they were reminded of the anonymity of their answers, some of them may have preferred higher answers for fear of being labelled as not digitally competent enough.

6. Conclusions

This study tries to analyse the teachers' performance at a questionnaire inspired by the level B1 from the *Marco de Referencia de la Competencia Digital Docente* (INTEF, 2022), which, in turn, is based upon the DigCompEdu, by the European Commission. Among the most interesting findings from the project here presented we can highlight the competences in which teachers perform a better performance. Teachers excel in communication skills through the use of digital platforms, both with their colleagues and other professionals, but also with their students, as we have observed in the discussion offered in the chapter dealing with results.

One of the objectives was to find whether there was a relation between the age of the teachers and their level of digital competence, and the results seem to confirm so. The resulting correlation found in the study is not a very strong one, but previous literature on this field of research also point out that correlation, such as the research conducted by Garzón-Artacho et al. (2021), which mentions how age and other factors such as teacher training determine the level of teachers' digital competence. Thus, it can be concluded, as observed throughout the section devoted to results, that this study is consonance with previous research in this sense.

We also tried to identify the aspects that present most difficulties from digital competence, which are related to the technical side of digital technologies. Teachers really struggle when they have problems with these technologies whose solution require a more technical understanding. Teachers also need to improve in making students collaborate through the use of digital platforms. They present a much lower performance in developing the students' digital competence, as attested by the low score obtained in Area 6: Facilitating Learner's Digital Competence.

Another finding that seemed quite interesting was the good performance shown by teachers in Area 2: Digital Resources. This means they are skilful in the use of digital material for their lessons and they know how to modify that material for didactic purposes, a key ability in the use of digital technologies for teaching. The results here discussed can be of great interest both to teachers and trainers of teachers.

7. Lines for future research

Research in digital competence, and more specifically, in digital competence for educators, is a field which still needs much attention, as it is constantly changing and evolving, the same as technology is. In this sense, some lines for future research will be addressed or proposed in this section.

As mentioned in the previous chapter, it would have been interesting to conduct a study of this nature with a wider sample, or at least, with a less geographically restricted one, in order to extract more representative analyses. Additionally, as it has been previously suggested, other studies could be targeted at another level from the DigCompEdu, another option being elaborating a multilevel questionnaire, one that could analyse the subjects' level of digital competence, according to the mentioned framework (A1/A2/B1/B2/C1/C2).

Future investigations in this area of research may also take into account other variables such as teachers being involved in other charges or positions within the school administration, such as headteacher, Director of Studies, coordinators, etc. in order to analyse whether this affects in some way the level of digital competence.

A study of this nature could also be carried out by means of employing different instruments, which would allow access to more diverse data, always with the supervision of experts in this field of research. Including qualitative analysis, as mentioned in the previous chapter, would also help us expand on this field, as it could provide us with valuable information about the teachers' predisposition towards new technologies and their use in the classroom. In this sense, lines for future research might address attitudinal aspects, that is, whether teachers are willing to learn and become more digitally competent, or, on the other hand, they prefer more traditional ways.

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9. Appendices

Cuestionario sobre Competencia Digital Docente, nivel B1 del nuevo *Marco de Referencia de la Competencia Digital Docente* (Enero 2022)

A. Preguntas generales y demográficas

1. Género: M / F
2. Edad (marcar uno de los rangos de edad):
 <25; entre 25 y 34; entre 35 y 44; entre 45 y 55; +55
3. Tipo de centro en el que desarrolla su actividad docente:
 centro público centro concertado
4. Número de años trabajando como docente en Educación Infantil, Educación Primaria o Educación Secundaria/Bachillerato:
 - Entre 0 y 5 años
 - Entre 6 y 10 años
 - Entre 11 y 15 años
 - Entre 16 y 20 años
 - Entre 21 y 25 años
 - Más de 25 años

B. ÁREA 1: Compromiso profesional

5. Sé comunicarme de forma autónoma con otros profesores usando la plataforma digital más adecuada en cada caso.
 - ☐ Totalmente en desacuerdo
 - ☐ En desacuerdo
 - ☐ De acuerdo
 - ☐ Totalmente de acuerdo
6. Sé usar de forma autónoma las tecnologías y plataformas digitales establecidas por la administración para llevar a cabo las funciones docentes y administrativas.
 - ☐ Totalmente en desacuerdo
 - ☐ En desacuerdo
 - ☐ De acuerdo
 - ☐ Totalmente de acuerdo
7. Sé identificar problemas en mi práctica docente relativas al uso de tecnologías digitales y les doy solución mediante ideas que me dan otros docentes o que busco por internet.
 - ☐ Totalmente en desacuerdo
 - ☐ En desacuerdo
 - ☐ De acuerdo
 - ☐ Totalmente de acuerdo
8. Participo en actividades de formación para el profesorado en las que se utilizan recursos digitales.
 - ☐ Totalmente en desacuerdo
 - ☐ En desacuerdo
 - ☐ De acuerdo
 - ☐ Totalmente de acuerdo
9. Sé aplicar de forma autónoma medidas para proteger mis datos y los de mis alumnos/as (cambiar contraseñas, cerrar sesión en distintos dispositivos, etc.).

- ☐ Totalmente en desacuerdo
- ☐ En desacuerdo
- ☐ De acuerdo
- ☐ Totalmente de acuerdo

C. ÁREA 2: Contenidos digitales

10. Sé adoptar estrategias de búsqueda y selección de contenidos digitales de forma autónoma, teniendo en cuenta las necesidades e intereses de mi alumnado.

- ☐ Totalmente en desacuerdo
- ☐ En desacuerdo
- ☐ De acuerdo
- ☐ Totalmente de acuerdo

11. Soy capaz de adaptar contenidos digitales ya existentes para usarlos en situaciones de aprendizaje concretas.

- ☐ Totalmente en desacuerdo
- ☐ En desacuerdo
- ☐ De acuerdo
- ☐ Totalmente de acuerdo

12. Sé utilizar las plataformas digitales establecidas por la administración y por el centro para gestionar diversos recursos educativos digitales (blogs, carpetas de espacios colaborativos, etc.)

- ☐ Totalmente en desacuerdo
- ☐ En desacuerdo
- ☐ De acuerdo
- ☐ Totalmente de acuerdo

D. ÁREA 3: Enseñanza y aprendizaje

13. Selecciono qué recursos digitales incorporo en la programación didáctica, dentro de los que me ofrece el centro, y sé usarlos de forma autónoma.

- ☐ Totalmente en desacuerdo
- ☐ En desacuerdo
- ☐ De acuerdo
- ☐ Totalmente de acuerdo

14. Sé comunicarme con mi alumnado a través de las plataformas digitales previstas por el centro sin necesitar ayuda para ello.

- ☐ Totalmente en desacuerdo
- ☐ En desacuerdo
- ☐ De acuerdo
- ☐ Totalmente de acuerdo

15. En el aula, aplico tareas adaptadas al alumnado que les permiten la planificación, documentación, registro y consulta de su aprendizaje mediante el uso de tecnologías digitales.

- ☐ Totalmente en desacuerdo
- ☐ En desacuerdo
- ☐ De acuerdo
- ☐ Totalmente de acuerdo

E. ÁREA 4: Evaluación y retroalimentación

16. Sé usar diversas tecnologías digitales para evaluar al alumnado de forma autónoma.

- ☐ Totalmente en desacuerdo
- ☐ En desacuerdo
- ☐ De acuerdo
- ☐ Totalmente de acuerdo

17. Hago uso de las tecnologías digitales para almacenar, tratar estadísticamente, visualizar e interpretar datos sobre la evaluación de los procesos de enseñanza aprendizaje del alumnado.

- ☐ Totalmente en desacuerdo
- ☐ En desacuerdo
- ☐ De acuerdo
- ☐ Totalmente de acuerdo

18. Empleo las tecnologías digitales para tomar decisiones, informar y orientar sobre los procesos de enseñanza y aprendizaje a partir de los datos obtenidos en la evaluación.

- ☐ Totalmente en desacuerdo
- ☐ En desacuerdo
- ☐ De acuerdo
- ☐ Totalmente de acuerdo

F. ÁREA 5: Empoderamiento del alumnado

19. Sé usar las tecnologías digitales para que mi alumnado pueda progresar de una forma personalizada acorde a su ritmo de comprensión.

- ☐ Totalmente en desacuerdo
- ☐ En desacuerdo
- ☐ De acuerdo
- ☐ Totalmente de acuerdo

20. Hago uso de las tecnologías digitales para tratar de motivar e implicar más a mi alumnado para que asuma más responsabilidad en su propio proceso de aprendizaje.

- ☐ Totalmente en desacuerdo
- ☐ En desacuerdo
- ☐ De acuerdo
- ☐ Totalmente de acuerdo

G. ÁREA 6. Desarrollo de la competencia digital del alumnado

21. Aplico estrategias didácticas para enseñar a mi alumnado a buscar y evaluar la información procedente de entornos digitales, como internet, para que realicen una mejor selección.

- ☐ Totalmente en desacuerdo
- ☐ En desacuerdo
- ☐ De acuerdo
- ☐ Totalmente de acuerdo

22. Hago uso de estrategias didácticas para que los alumnos/as se comuniquen y colaboren entre ellos mediante plataformas digitales, siempre preservando su identidad digital y las de sus compañeros/as.

- ☐ Totalmente en desacuerdo
- ☐ En desacuerdo
- ☐ De acuerdo
- ☐ Totalmente de acuerdo

23. Hago que mi alumnado realice tareas o proyectos en los que tengan que hacer uso de herramientas digitales de forma creativa.

- ☐ Totalmente en desacuerdo
- ☐ En desacuerdo
- ☐ De acuerdo
- ☐ Totalmente de acuerdo

24. Creo conciencia entre mi alumnado sobre la importancia de hacer un uso responsable y seguro de las tecnologías digitales y cómo cuidar su identidad digital y las de los demás.

- ☐ Totalmente en desacuerdo
- ☐ En desacuerdo
- ☐ De acuerdo
- ☐ Totalmente de acuerdo

25. Ayudo a mis alumnos a resolver posibles problemas técnicos y les enseño cómo resolverlos por sí mismos.

- ☐ Totalmente en desacuerdo
- ☐ En desacuerdo
- ☐ De acuerdo
- ☐ Totalmente de acuerdo

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