

Ruíz-Palmero, J., Guillén-Gámez, F.D. & Tomczyk, Ł. (2023). Permanent training as a predictor of success in the digital competence of Education teachers carrying out the online tutorial action. *Revista Electrónica Interuniversitaria de Formación del Profesorado*, 26(1), 1-12.

DOI: <https://doi.org/10.6018/reifop.542181>

## Permanent training as a predictor of success in the digital competence of Education teachers carrying out the online tutorial action

Julio Ruiz-Palmero<sup>1</sup>, Francisco D. Guillén-Gámez<sup>2</sup>, Łukasz Tomczyk<sup>3</sup>

<sup>(1)</sup> University of Málaga, <sup>(2)</sup> University of Córdoba, <sup>(3)</sup> Jagiellonian University

### Abstract

The self-perception in digital competence of teachers has been studied in depth in recent years. However, these studies have rarely focused on the process of tutorial action and how to perform this action digitally between the tutor and the students, the teachers and the family. The main objective is to analyze the incidence of continuing education as a mandatory requirement for self-perception of teachers regarding their digital competence. For this purpose, an ex post facto design was used with a sample of 1069 pre-school and primary school teachers from all over Spain. The results showed that teachers who had previously received training in educational technology had a higher level of competence than those who had not been trained. In addition, the gender of the teachers was not a significant predictor of their level of digital competence in communicating with other teachers or with families, but it was found to be a significant predictor of their level of competence with their students. Finally, the use of digital resources such as Twitter and blogs increased this competence for teachers who already had previous experience, while for those who did not have this experience, the most significant resources were blogs and WhatsApp.

### Keywords

Educational technology; Digital competence; Tutorial action; Teachers

---

### Contacto:

Francisco David Guillén Gámez, [dguillen@uco.es](mailto:dguillen@uco.es), Calle San Alberto Magno, s/n, 14071 Córdoba,

# La formación permanente como predictor de éxito en la competencia digital del profesorado de Educación para llevar a cabo la acción tutorial

## Resumen

La autopercepción en competencia digital del profesorado ha sido estudiada en profundidad en los últimos años. No obstante, ello no ha sido apenas focalizado en el proceso de acción tutorial y como realizar esta acción digitalmente el tutor con el alumnado, con el profesorado, y con la familia. El objetivo principal es analizar la incidencia de la formación permanente como requisito obligatorio en el nivel de autopercepción del profesorado respecto a su competencia digital. Para ello, se utilizó un diseño ex post facto con una muestra de 1069 profesores de la etapa de Educación Infantil y Educación Primaria de todo el territorio español. LOS RESULTADOS evidenciaron que el profesorado que había adquirido previamente formación en tecnología educativa tenía un mayor nivel competencial frente a los que no habían sido formados. Además, el género del profesorado no resultó ser un predictor significativo en su nivel de competencia digital para comunicarse con el resto de profesorado ni con las familias, pero sí con su alumnado. Por último, el uso de recursos digitales como Twitter y blogs inciden en un aumento de esta competencia para el profesorado que ya poseía experiencia previa, mientras que para los que no poseían esta experiencia los recursos más significativos fueron los blogs y WhatsApp.

## Palabras clave

Tecnología educativa; Competencia digital; Acción tutorial; Profesorado

## Introduction

In the last two years, today's society has faced an emergency situation caused by COVID-19 (Hordatt & Haynes, 2021). The pandemic caused by this virus led educational centers at all stages of education to close their doors and carry out the teaching-learning process online through the digital resources that each institution had at its disposal, in an attempt to contain the spread (Torrás, 2021). This milestone marked a significant gap in the type of education that had been provided for decades.

This delicate situation also caused most teachers to make changes to their methodologies in record time (Aretio, 2021) and also to their teaching scenarios (Núñez et al., 2021) through learning management systems (LMS). In order for teachers to be able to face difficult and unusual situations, as stated by Ferrada-Bustamante et al. (2021), they must have prior and ongoing training in the use of technology, since this medium has been the key element to allow educational processes to be carried out online (Usmani et al., 2021).

The face-to-face working method was forced to use digital resources both for coordinating with the rest of the teaching staff of the center (Wolfe et al., 2020), as well as for communicating with students and their families. This applied to both the teaching process and to the tutoring/guidance process (Vuorikari et al., 2020), what we call tutorial action. However, due to the rapid changes that teachers had to face in just a few months with COVID-19, the roles that teachers have to play regarding tutorial action also went into a state of "confinement" (De Soroa, 2020). In relation to the process of tutorial action, Mayor & Martínez (2019, p. 234) define it as the "intentional and planned guidance process carried out

by teachers, in the exercise of their teaching function, performing a continuous and personalized accompaniment of each student and group to ensure the comprehensive development in all areas". However, this process must not only be carried out by teachers with their students, but also requires coordination with the rest of the teachers who teach that group-class, as well as with the families of these students (Lamata, 2010). Therefore, teachers require all these agents for this guidance process to be effective with students, where the use of digital resources can open new perspectives and ways of communicating, in any type of educational modality (Pantoja et al., 2020). However, the question is not related to the number of digital resources that teachers can use, but in the way, these are used in the didactic process, where there are studies that affirm that the more training teachers receive, the more effective their use of technology will be (Guillén-Gámez et al., 2020; O'Malley et al., 2013); As a consequence, this will improve the quality of the tutorial action and guidance process will be (Pantoja et al., 2020).

The scientific literature has shown in recent years that in general, the level of digital competence is low or at best intermediate at the Early Childhood Education stage (García-Zabaleta et al., 2021) with no significant difference between genders (Guillén-Gámez et al., 2022). Similar findings were made at the Primary Education stage (Cabero-Almenara et al., 2022), although on this occasion gender differences were found (Guillén-Gámez et al., 2022). For example, Guillén-Gámez & Mayorga-Fernandez (2022) analyzed the digital competence perceptions of 847 rural Primary Education teachers from across Spain, finding that the level of competence was medium and gender representing a significant predictor. In this line, Stenman & Pettersson (2020) analyzed the level of digital competence of Primary and Secondary Education teachers, resulting in a good level of competence, although a lack of knowledge for online teaching was found. Although this type of studies on teachers' digital competence has been conducted from multiple perspectives and indicators, very few studies or measurement instruments have focused on tutorial action tasks, which is the main contribution of this study.

In the literature related to the digital competence of teachers in the process of student guidance, the incidence of the use of digital applications and resources in teacher training has rarely been analyzed in depth. Among the most analyzed resources are blogs (Muñoz-Carril et al., 2020), the social network Twitter (Greenhalgh et al., 2020; Nochumson, 2020); the use of WhatsApp (Casillas et al., 2020; Yunus et al., 2019) or Facebook (Casillas et al., 2020). All these related studies have in common that they analyse the effectiveness of these resources within the teaching-learning process in a general way, without placing much focus on the framework of tutorial action and even less on the online environment. This is another area in which the current study aims to contribute.

Considering all of the above, and to respond to the new educational demands as to the use of digital resources to develop the process of tutorial action and guidance online, the authors pose these questions: Are teachers prepared to communicate digitally with the educational community? What level of self-perception in digital competence do they have? Is ongoing training in educational technology a significant predictor in the development of digital competence? Do gender differences exist? Are there digital applications that specifically affect the teachers' development? Specifically, the objectives of this study are:

- To determine the level of self-perception of teachers' digital competence in their tutorial and guidance tasks, depending on whether or not they have received ongoing training in educational technology.
- To produce a comparative analysis of any significant differences in the level of self-perception in digital competence of teachers, in relation to whether they have

received ongoing training in educational technology, as well as for each internal category of the gender variable.

— Predict the level of teacher's self-perception in digital competence as a function of the relationship of different covariates.

## Method

### Design and participants

To fulfill the purposes of the research, a non-experimental quantitative design was used. Specifically, an ex post facto design by means of surveys. Once the information had been collected, descriptive and inferential analyses were carried out to respond to the purposes of the study. For the collection of information, a non-probabilistic purposive sample was used. The sample corresponds to practicing teachers of Early Childhood Education and Primary Education from all over Spain. The data was collected during the academic year 2020-2021, where the teachers were informed of the objectives of the survey, guaranteeing their confidentiality and anonymity.

The sample was composed of a total of 1069 teachers. Specifically, 21.8% (n= 233) came from the Early Childhood Education stage with a mean age of 41.48 years ( $\pm 9.04$ ), while 78.2% (n= 836) came from the Primary Education stage, with a mean age of 43.33 years ( $\pm 9.87$ ). Regarding gender, male teachers had a mean age of 43.45 years ( $\pm 9.90$ ) and a teaching experience of 16.68 years ( $\pm 10.61$ ), while female teachers had a mean of 42.86 years ( $\pm 9.67$ ) and a teaching experience of 16.36 years ( $\pm 9.90$ ). Finally, with respect to whether or not the faculty had received in-service training in educational technology, 38.30% (n= 409) had not been given in-service training, while 61.70% (n= 660) had received training.

### Instrument

To measure the level of self-perception in digital competence of Early Childhood Education and Primary Education teachers, in relation to the use of technological resources that they use to carry out tutorial and guidance tasks, the questionnaire of Rufete et al. (2020), validated by Guillén-Gámez et al. (2021), was used. For this study, the first three dimensions of the instrument have been used:

A. Tutor's interaction with students; B. Tutor's functions with the teaching staff; and C. Tutor's functions with students' families. The level of development of digital competence in teaching was measured using a five-point Likert scale, where the value 1 is associated with "I do not use it" and the value 5 with "I use it a lot".

The instrument had the correct psychometric properties. Regarding overall reliability, the calculated indices were adequate: Cronbach's Alpha ( $\alpha = .948$ ), Spearman-Brown (.893), McDonald Omega ( $\omega = .995$ ). Validity was tested through EFA (Exploratory Factor Analysis) and CFA (Confirmatory Factor Analysis). In the EFA, the maximum likelihood method with oblique rotations was used. The Kaiser-Meyer-Olkin index was appropriate (KMO = .949) and the result of Bartlett's Chi-square test was significant ( $\chi^2 = 12777.009$ ; sig.  $< .05$ ). The proposed model explained 61.03% of the true variance in the instrument scores. For the application of the CFA, the criteria recommended by Bentler (1989) were considered. Table 1 shows the coefficients obtained and the author's recommendations. The coefficients obtained showed an adequate validity of the instrument. The SPSS V.24 and AMOS V.24 software was used to perform these analyses.

Table 1.

*Goodness-of-fit indicators of the model*

	<b>C.M./df</b>	<b>IFC</b>	<b>TLI</b>	<b>NFI</b>	<b>RMSEA</b>
<b>Model coefficients</b>	3.551	.923	.914	.901	.068
<b>Recommendations</b>	> 5	< .90	< .90	< .90	> .70

### Data analysis procedure and techniques.

Data analysis was performed using the following procedures

1. To meet the first objective, the first analysis was descriptive through the mean and deviation of each item, for each dimension of the instrument, according to whether the teachers had received ongoing training in educational technology through training courses (yes/no).
2. Red Española de Información sobre Educación (REDIE – the Spanish Education Information Network) defines continuing education or pre-service training as part of the teacher's professional development, so that, within the regulated 30 attendance hours, there are five additional hours that can be dedicated to improvement and educational research activities. In other words, this is the set of training activities aimed at enhancing the scientific, technical, didactic and professional preparation of teachers. In our case, this applies to previous training in educational technology to carry out the educational process online.
3. For the second objective of the study, the univariate ANOVA test was used to analyze whether there are statistically significant differences in the level of self-perception in digital competence of teachers in tutorial action tasks, influenced by continuing education and gender. For this purpose, the three dimensions of the instrument were used as dependent variables (DV); and the independent variables (IV) constituted, the ongoing training to develop the teaching-learning process online (yes/no), gender (male/female) and the interaction between the two.

Regarding the assumption of normality of the data, the Kolmogorov-Smirnov test detected non-normality in each of the dimensions of the instrument as well as in the overall assessment. However, Srivastava (1959) states that non-normality would not have a serious effect on the distribution of the data in large samples. Taking into consideration the sample size of the study (n= 1069), the F statistic is robust to the contrasts in this study.

4. For the third objective, classification trees were used, with the CHAID (Chi-square automatic interaction detection) method to detect relationships between pairs of significant variables using the maximum likelihood technique. At each step, CHAID chose the independent variable showing the strongest interaction with the dependent variable.

## Results

This section is divided into two sections. The first section describes and compares the level of teachers' self-perception of digital competence according to whether or not they have received ongoing training in educational technology. The second section identifies the covariates that are predictors of the level of digital competence for both trained and untrained teachers, separately.

### Descriptive results and statistical contrast

Table 2 shows the level of teachers' self-perception of digital competence in relation to whether they have received previous training in educational technology. Specifically, measures of central tendency (mean) and dispersion (standard deviation) are shown. In all the items of dimension number 1 (Functions of the tutor in relation to the students), a higher score is observed for teachers with ongoing training in technology. The item with the highest score for both types of teachers is item number. 1 "I provide information to students through digital media", with a medium-high value. In general, the digital abilities of teachers with students are not really high, since in most of the items the scores are medium.

In dimension 2 (Functions of the tutor with the teaching staff), it is observed that the level of competence is medium-high, with higher scores seen in teachers with continuing education. Specifically, the item with the highest score is No. 6 "I coordinate with the rest of the teaching team of the group-class through different digital media", for both types of teachers; while the item with the lowest score is No. 11 "I propose online collaborative environments to work with the teaching team on aspects of my tutoring".

Finally, in dimension no. 3 (Functions of the tutor with the family), the level of competence of the teaching staff is medium for both types of teachers. It is observed that it is the teachers with continuing education who have a higher digital competence to communicate with families. The highest level of competence falls on item nº 13 "I make presentations to provide digital support for group meetings with families", for both types of teachers; while the development of digital educational projects (item 12) is the least valued, for both types of teachers).

Table 2.

*Digital competence of the teaching staff in accordance with continuing education*

	without previous training	with previous training
<b>D1- Tutor's functions in relation to the student body</b>		
1. I provide information to students through digital media (blogs, websites, educational platform)	3.37±1.26	3.75±1.20
2. I provide learners with strategies for communicating safely online	2.58±1.30	3.11±1.33
3. I teach students how to solve accessibility and e-inclusion problems	2.47±1.29	3.00±1.34
4. I propose digital strategies to students to identify misinformation or fake news	2.04±1.18	2.32±1.26
5. I set students tasks with the technologies that involve collaboration between them	2.53±1.32	2.94±1.36
<b>D2- Duties of the tutor in relation to the teaching staff</b>		
6. I coordinate with the rest of the teaching team of the class group through different digital media (videoconferences, chats, WhatsApp groups)	4.05±1.06	4.24±0.93
7. I carry out classroom planning collaboratively using editable online documents	3.44±1.33	3.74±1.25
8. Telematic tools are available to develop common lines of action with the other tutors within the school's tutorial action plan	3.22±1.24	3.61±1.21
9. I use digital resources to establish common guidelines for tutorial action with the rest of the tutors	3.11±1.26	3.42±1.22

10. The teaching team has defined strategies to solve the difficulties of accessibility and inclusion of students	3.11±1.19	3.57±1.15
11. I propose online collaborative environments to work with the teaching team on aspects of my tutoring	2.78±1.27	3.24±1.28

### D3- The tutor's role with the family

12. Development of digital educational projects involving the educational community (families, teachers and students) in relation to the education center	2.52±1.26	2.80±1.33
13. I make digital presentations for group meetings with families.	3.25±1.42	3.56±1.35
14. I offer guidance to families on the possible use of technologies at home in accordance with their child's educational needs	2.99±1.19	3.40±1.18
15. I provide families with strategies to solve problems of accessibility and digital inclusion and to communicate through technology for educational purposes for their children	2.96±1.23	3.32±1.21
16. I advise families on the responsible use of ICT at home by their children	3.02±1.29	3.23±1.24

### Single factor analysis

The results of the between-groups one-way ANOVA indicate that the model is significant in each dimension of the instrument: D1- Tutor's functions in relation to the student body,  $F(3, 1065) = 23.044$ ,  $p < .05$ ,  $\eta^2 = .061$ ; D2- Tutor roles with faculty,  $F(3, 1065) = 13.421$ ,  $p < .05$ ,  $\eta^2 = .036$ ; D3- Tutor roles with family,  $F(3, 1065) = 9.813$ ,  $p < .05$ ,  $\eta^2 = .027$ . According to Richardson (2011), partial eta squared values of approximately .01, .06, and .14 indicate small, medium, and large effects, respectively.

Table 3.

Levene's test and ANOVA test

Dimension	Levene's test of equality				Between-subjects ANOVA		
	F	df1	df2	Sig.	F	Sig.	Eta Parcial Cuadrado ( $\eta^2$ )
DIM 1	1.154	3	1065	.326	23.044	.001	.061
DIM 2	1.054	3	1065	.368	13.421	.001	.036
DIM 3	.069	3	1065	.848	9.813	.001	.027

In the model proposed for dimension 1 (Tutor functions in relation to the student body) the variable lifelong learning was found to be significant,  $F(1, 1065) = 22.982$ ,  $p < .05$ ,  $\eta^2 = .021$ ; as was the gender variable,  $F(1, 1065) = 24.018$ ,  $p < .05$ ,  $\eta^2 = .022$ ; while the interaction between lifelong learning and gender was not significant,  $F(1, 1065) = .367$ ,  $p > .05$ . Figure 1.A shows that teachers who received in-service training have a higher level of competence, both in the male ( $M=3.28$ ) and female ( $M= 2.94$ ) genders compared to those who did not receive in-service training.

In the model proposed for dimension 2 (Functions of the tutor with the teaching staff) only one significant variable was found: continuing education,  $F(1, 1065) = 27.181$ ,  $p < .05$ ,  $\eta^2 = .025$ . Neither gender nor the interaction of gender with education was significant. Figure 1.B shows that teachers who received in-service training have a higher level of competence, both in the male ( $M=3.77$ ) and female ( $M=3.33$ ) genders compared to those who did not receive in-service training.

In the model proposed for dimension 3 (Functions of the tutor with the family) it was found that only the ongoing training variable was significant: previous training,  $F(1, 1065) = 18.594$ ,  $p < .05$ ,  $\eta^2 = .017$ . Figure 1.C shows that teachers who received previous training have a higher level of competence, both in the male ( $M=3.37$ ) and female ( $M= 3.02$ ) genders compared to those who did not receive previous training.

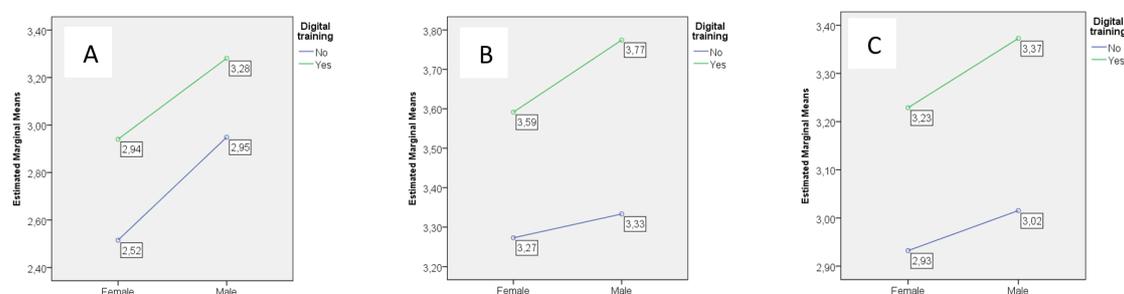


Figure 1.

*Descriptive values for each dimension of the instrument. A: dimension "functions of the tutor in relation to the students"; B: dimension "functions of the tutor with the teaching staff"; C: dimension "functions of the tutor with the family".*

In general, it has been found that ongoing training to carry out the educational process online is a significant predictor in the acquisition of the digital competence of teachers to carry out the tutorial action with students, teachers and families. However, gender does not turn out to be a significant predictor either in the relationship of the tutor with the rest of the teaching staff or with the families. For this reason, we analyze how certain applications and digital resources influence the digital competence of teachers, depending on whether or not they have previously received training.

### Segmentation trees according to prior learning

So far, it has been found that there are significant differences in the level of self-perception in the digital competence of teachers in the tutorial action process, depending on whether or not the teacher has received ongoing training to carry out the educational process virtually. But, in what order do these significant predictors affect digital competence as a function of this significant predictor? Classification trees are the ideal method to answer this question and consequently, fulfil objective number 3 of the present study. Figure 2 shows how the level of self-perception in digital competence in the tutorial action tasks is medium-high (node 0,  $M= 3.17 \pm 0.8$ ). If we take into consideration the categorization of the ongoing training variable, we observe that the competence of teachers with no training (node 1,  $M= 2.94 \pm 0.79$ ) is lower compared to those who have had previous training (node 2,  $M= 3.31 \pm 0.79$ ).

For teachers who have not received ongoing training, the use of blogs increases the level of competence (node 4,  $M= 3.15 \pm 0.77$ ), compared to those who do not use them (node 3,  $M= 2.83 \pm 0.77$ ). Moreover, if this type of teachers, in addition to using blogs in the guidance and tutoring process, also use WhatsApp to communicate either with students, teachers or family, their competence level increases (node 10,  $M= 3.33 \pm 0.66$ ) compared to those who do not use this app (node 9,  $M= 3.03 \pm 0.82$ ). However, the competence of this type of teacher could drop even further if, in addition to not using blogs, he/she would not use Google either (node 8,  $M= 2.67 \pm 0.79$ ).

For teachers who have had ongoing training, the use of Twitter causes the level of competence to be higher, with a high level (node 6,  $M= 3.85 \pm 0.76$ ) being the maximum level achievable by teachers, compared to those who do not use it (node 5,  $M= 3.26 \pm 0.77$ ). Even

if they do not use Twitter for communication and orientation with the educational community, if they do use blogs, the level of digital competence could be medium-high (node 12,  $M= 3.40 \pm 0.77$ ).

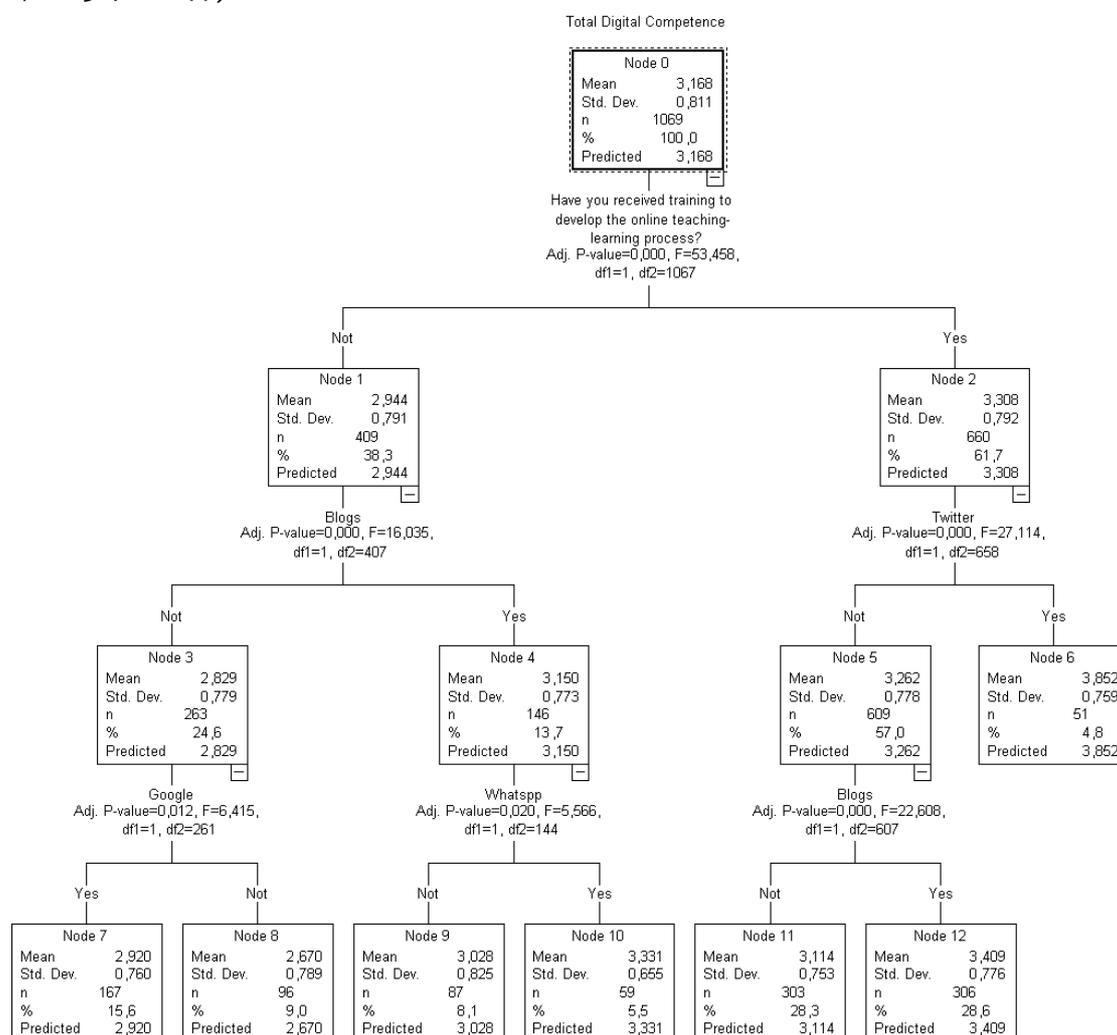


Figure 2.

*Incidence of covariates on the acquisition of digital competence in the tutorial action of teachers according to whether or not they have received previous experience in carrying out the online educational process.*

## Discussion and Conclusions

The main objective of this study was to analyze the level of self-perception in digital competence of teachers assigned to the Early Childhood Education and Primary Education stages in carrying out the tutorial action process online. This competence level was measured according to whether the teachers, in their continuing education, have received training in educational technology. In addition, the incidence of gender and of digital applications and resources was analyzed.

The first objective of the study showed that the highest level of competence of the tutor-teacher is for communicating and coordinating with the rest of the colleagues in the center, with medium-high levels. However, it was evidenced that, for communication with students and families, the level is medium. These findings coincide with those of (García-Zabaleta et

al. (2021) and Cabero-Almenara et al. (2022) in not finding adequate levels for the profession and obligations of teachers to fulfill their educational duties.

Another significant result was the impact of ongoing training on the development of teachers' digital skills. It was found that teachers who had previously undergone technology training had superior skills to carry out the tutorial action process through LMS. These results are in line with O'Malley et al. (2013) and Guillén-Gómez et al. (2020) who confirmed that the more continuing education teachers receive, the more effective their use of educational technology will be in the didactic process, and consequently, the higher the quality of the tutorial action and guidance process (Pantoja et al., 2020).

It was also shown that gender was not a significant predictor of the level of digital competence of the tutor-teacher to communicate with the center's teaching staff or with the students' families, although it is significant when it comes to using digital resources to communicate with and look after the students in the guidance process. These data partially coincide with those of Guillén-Gómez & Mayorga-Fernández (2022) regarding the dimension of the tutor's functions with their students, although they contradict the results of Guillén-Gómez et al. (2022) with the dimensions of the tutor's functions with the teaching staff and families. These results do not follow the same direction without the possibility of being able to reflect and find a plausible answer to it. Therefore, it is necessary to continue to deepen in further studies on how teachers coordinate digitally with all the agents of the educational community, in order to find answers that help to improve this problem.

Finally, it was found that depending on whether or not the teachers had ongoing training in educational technology, the incidence of digital resources for communicating and coordinating with the educational community was different. The use of digital resources such as Twitter and blogs had a positive impact on digital competence for teachers who already had previous experience, while for those who did not, the most significant resources were blogs and WhatsApp. These data are somewhat revealing as they can help teacher training institutions and centers to know how to plan training actions for teachers. In this context, it is necessary to continue deepening and analyzing the incidence of digital resources in tutorial action processes. It would be interesting to analyze the impact of the challenges raised in the latest Horizon Report 2022, which highlights relevant trends such as cybersecurity, big data and artificial intelligence.

In addition, the limitations of the study should be taken into consideration, such as its methodological design as it uses a non-probabilistic sample. In this sense, it would be interesting to expand the type of design to others that could further generalize the results, such as qualitative or mixed designs through interviews and random sampling. For this study, teachers from two educational stages were analyzed side-by-side. This way or organizing the sample could yield different results if a separate analysis were carried out, which is an aspect for future consideration.

In short, for the teacher-tutor to have an adequate digital competence in the tutorial action process, a teacher is needed who knows how to design, select and implement specific digital strategies depending on the target group (students, teaching group or families). Further research is needed to achieve an optimal guidance process, mainly with students, since this will have a positive impact both on their learning and on their personal and professional development in the near future.

## References

- Aretio, L. G. (2021). COVID-19 and digital distance education: Pre-confinement, confinement and post-confinement. *Ried-revista Iberoamericana de Educación a Distancia*, 9-32. <https://doi.org/10.5944/ried.24.1.28080>
- Cabero-Almenara, J., Guillén-Gámez, F. D., Ruiz-Palmero, J., & Palacios-Rodríguez, A. (2022). Teachers' digital competence to assist students with functional diversity: Identification of factors through logistic regression methods. *British Journal of Educational Technology*, 53(1), 41-57.
- Casillas Martín, S., Cabezas González, M., & García Peñalvo, F. J. (2020). Digital competence of early childhood education teachers: attitude, knowledge and use of ICT. *European Journal of Teacher Education*, 43(2), 210-223. <https://doi.org/10.1080/02619768.2019.1681393>
- De Soroa, J. C. (2020). La orientación educativa al descubierto. Colectivo Orienta.
- Ferrada-Bustamante, V., González-Oro, N., Ibarra-Caroca, M., Ried-Donaire, A., Vergara-Correa, D., & Castillo-Retamal, F. (2021). Formación docente en TIC y su evidencia en tiempos de COVID-19. *Revista saberes educativos*, (6), 144-168. <https://doi.org/10.5354/2452-5014.2021.60715>
- García-Zabaleta, E., Sánchez-Cruzado, C., Campión, R. S., & Sánchez-Compañía, M. T. (2021). Competencia digital y necesidades formativas del profesorado de Educación Infantil. Un estudio antes y después de la Covid-19. *EDUTEC. Revista electrónica de tecnología educativa*, (76), 90-108. <https://doi.org/10.21556/edutec.2021.76.2027>
- Greenhalgh, S. P., Rosenberg, J. M., Willet, K. B. S., Koehler, M. J., & Akcaoglu, M. (2020). Identifying multiple learning spaces within a single teacher-focused Twitter hashtag. *Computers & Education*, 148, 103809. <https://doi.org/10.1016/j.compedu.2020.103809>
- Guillen-Gamez, F. D. G., & Mayorga-Fernández, M. J. (2022). Measuring Rural Teachers' Digital Competence to Communicate with the Educational Community. *Journal of New Approaches in Educational Research*, 11(2), 323-341. <https://doi.org/10.7821/naer.2022.7.1053>
- Guillén-Gámez, F. D., Linde-Valenzuela, T., Ramos, M., & Mayorga-Fernandez, M. J. (2022). Identifying predictors of digital competence of educators and their impact on online guidance. *Research and Practice in Technology Enhanced Learning*, 17(1), 1-19. <https://doi.org/10.1186/s41039-022-00197-9>
- Guillén-Gámez, F. D., Mayorga-Fernández, M. J., & Contreras-Rosado, J. A. (2021). Validity and reliability of an instrument to evaluate the digital competence of teachers in relation to online tutorials in the stages of Early Childhood Education and Primary Education. *RED. Revista Educación a Distancia*, 21(67). <http://dx.doi.org/10.6018/red.474981>
- Guillén-Gámez, F. D., Ruiz-Palmero, J., Sánchez-Rivas, E., & Colomo-Magaña, E. (2020). ICT resources for research: an ANOVA analysis on the digital research skills of higher education teachers comparing the areas of knowledge within each gender. *Education and information technologies*, 25(5), 4575-4589. <https://doi.org/10.1007/s10639-020-10176-6>
- Hordatt Gentles, C., & Haynes Brown, T. (2021). La transición a la enseñanza en línea llevada a cabo por los docentes de América Latina y el Caribe durante la pandemia de COVID-19: desafíos, cambios y lecciones aprendidas. *Pixel-Bit*, 61, 131-163. <https://doi.org/10.12795/pixelbit.88054>

- Mayor, C. L., & Martinez, A. C. (2019). Acción tutorial y tecnología: propuesta formativa en educación primaria. *Revista electrónica interuniversitaria de formación del profesorado*, 22(3), 233-249. <http://dx.doi.org/10.6018/reifop.22.3.347231>
- Muñoz-Carril, P.-C., Gonzalez-Sanmamed, M., & Fuentes-Abeledo, E.-J. (2020). Use of Blogs for Prospective Early Childhood Teachers. *Educacion XX1*, 23(1), 247-273. <https://doi.org/10.5944/educXX1.23768>
- Nochumson, T. C. (2020). Elementary schoolteachers' use of Twitter: Exploring the implications of learning through online social media. *Professional Development in Education*, 46(2), 306-323. <https://doi.org/10.1080/19415257.2019.1585382>
- Núñez, Q. Á., Gómez, S. L., Gañete, A. P., & Gonçalves, D. (2021). Cultura profesional y TIC en la formación del profesorado en tiempos de crisis: la percepción de los docentes. *Revista electrónica interuniversitaria de formación del profesorado*, 24(2), 153-165. <https://doi.org/10.6018/reifop.470831>
- O'malley, P., Jenkins, S., Wesley, B., Donehower, C., Rabuck, D., & Lewis, M. E. B. (2013). Effectiveness of Using iPads to Build Math Fluency. *Online Submission*, 1-20.
- Pantoja Vallejo, A., Berrios Aguayo, B., & Colmenero Ruiz, M. J. Y. (2020). ICT impact in orientation and university tutoring according to students opinion. In *World Conference on Information Systems and Technologies* (pp. 245-252). Springer, Cham.
- Richardson, J. T. (2011). Eta squared and partial eta squared as measures of effect size in educational research. *Educational research review*, 6(2), 135-147. <https://doi.org/10.1016/j.edurev.2010.12.001>
- Rufete, L., Cascales, A. y Gomariz, M.A. (2020). Competencias digitales de los docentes de Educación Infantil y Primaria desde la perspectiva de la acción tutorial. <http://hdl.handle.net/10201/91240>
- Srivastava, A. B. L. (1959). Effect of non-normality on the power of the analysis of variance test. *Biometrika*, 46(1/2), 114-122.
- Stenman, S., & Pettersson, F. (2020). Remote teaching for equal and inclusive education in rural areas? An analysis of teachers' perspectives on remote teaching. *The International Journal of Information and Learning Technology*, 37(3), 87-98. <https://doi.org/10.1108/IJILT-10-2019-0096>
- Torras Virgili, M. E. (2021). Emergency Remote Teaching: las TIC aplicadas a la educación durante el confinamiento por COVID-19. *Innoeduca: International journal of technology and educational innovation*, 7(1), 122-136. <https://doi.org/10.24310/innoeduca.2021.v7i1.9079>
- Usmani, R. S. A., Saeed, A., & Tayyab, M. (2021). Role of ICT for community in education during COVID-19. In *ICT Solutions for Improving Smart Communities in Asia* (pp. 125-150). IGI Global. <http://www.doi.org/10.4018/978-1-7998-7114-9.ch006>
- Vuorikari, R., Velicu, A., Chaudron, S., Cachia, R., & Di Gioia, R. (2020). *How families handled emergency remote schooling during the Covid-19 lockdown in spring 2020-Summary of key findings from families with children in 11 European countries* (No. JRC122303). Joint Research Centre (Seville site).
- Wolfe, J., Smith, J., Neumann, S., Miller, S., Schafer, E. C., Birath, A. L., ... & Spangler, C. (2020). Optimizing communication in schools and other settings during COVID-19. *The Hearing Journal*, 73(9), 40-42.
- Yunus, M. M., Zakaria, S., & Suliman, A. (2019). The Potential Use of Social Media on Malaysian Primary Students to Improve Writing. *International Journal of Education and Practice*, 7(4), 450-458. <http://www.doi.org/10.18488/journal.61.2019.74.450.458>