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Research Article

Use, Knowledge, and Perception of Education in Technological Resources of Teachers in Extremadura Prior to the Impact of COVID-19

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Abstract: The technological infrastructure in educational centres in Extremadura has grown considerably since the 1990s. Numerous technological resources have been implemented to help teaching and to improve students' digital competence. This study has aimed to observe the use of ICT resources by teachers in Extremadura and their perceptions of their application in the classroom before the impact of the COVID-19 pandemic on education. A total of 1953 teachers from Extremadura have participated and a cross-sectional descriptive design with a survey has been used. A questionnaire was designed for data collection and validated by carrying out a series of processes, such as the preparation of a first draft based on a previously applied questionnaire, adaptation and review by the research team, validation by experts and reliability checking. The results have shown differences according to gender, level of teaching performance and teaching experience, in the use of IT resources and training in technology. Likewise, it was found that there is a clear positive correlation between these parameters analysed in the teaching staff of Extremadura. The results obtained are of great value and open up new lines of research to compare the differences in the use, knowledge and perception of teachers' education in ICT resources.

Keywords: ICT; Digitization; Perception; Teacher Education

1. Introduction

At the end of the 1990s, the Regional Government of Extremadura, with its acquired educational competences, decided to establish the technological resources and network infrastructures necessary to change the Extremadura educational model with the implementation of the educational technology network.

Since then, all public pre-schools and primary education schools have classrooms dedicated to the use of technology available to teachers within the formal education system for this purpose. On the other hand, the secondary education centres in Extremadura began with the implementation of one computer for every two pupils in all their classrooms, becoming at that time the Autonomous Community with the highest ratios (computer-pupil) in our country. All this caused a change of model that affected professionals and teachers in our educational system, who had to voluntarily adapt the methodology for teaching their classes using the technology that the Regional Government of Extremadura put at their disposal.

Information and Communication Technologies (ICT) represent a substantial change to be analysed in all sectors of society. In the specific case of education, it is essential to know the implementation, training and use that teachers carry out in Extremadura's classrooms, in order to subsequently analyse whether the basic pillars for building digital competences are being applied in the Extremadura Education System. However, the changes brought about by the appearance of the pandemic caused by COVID-19, which forced a change from a face-to-face training model to an online one, where students were obliged to have the necessary technological resources to be able to communicate and develop the teaching/learning process together with the teacher in their own homes, have increased the digital gap, which already existed before (Rodicio, Ríos, Mosquera and Penado, 2020). On the other hand, teachers have had to improve their knowledge of ICT resources in order to be able to provide quality virtual training (García and Taberna, 2021), although in general, as García et al. (2020) state, the general transformation from face-to-face to virtual training in Spain has been carried out in an acceptable manner.

The results obtained in this research take on great relevance, which will allow them to be compared with future studies that analyse the use, knowledge and perception of Extremadura teachers of their training/ education in ICT resources after the pandemic. The research question, prior to the appearance of COVID-19, was: What use do teachers in Extremadura make of ICT resources and what perceptions do they have of their application in the classroom? The research context and data were developed prior to the appearance of the COVID-19 pandemic.

This research has sought to address the following objectives:

- To know and analyse the uses that teachers and professors make of the technological resources existing in the Extremadura education system, as well as the degree of knowledge they have of them (O1).
- To observe the training that Extremadura teachers and professors have in computer media and their perceptions of the implementation of technological resources in general in Extremadura classrooms and the importance they give to them (O2).
- To determine whether there are differences in the use, knowledge and training of technological resources according to gender, performance level and teaching experience (O3).
- To check the existing relationship between the use of computer media in their practices, the perception of their training in new technologies, the opinion (impression) they have of the importance of this training and the preparation for the use of ICT in the classroom at Extremadura Education Centres (O4).

Firstly, an analysis is made of teachers' use, knowledge, training and perception of the implementation of ICT resources. Studies such as those carried out by Llorente (2008) and Almerich et al. (2011) show a low level of competence and use of ICT resources by teaching staff. The greatest number of shortcomings have been observed in the functionalities, tools and advanced actions of the resources (Muir-Herzig, 2004; Condie et al., 2005). The use of ICT resources is a challenge for teaching staff, but it also implies a greater effort for them (Sanabria and Hernández, 2011), generating a change or renewal in the methodology of the teaching staff who use ICT resources in their teaching.

Most teachers report positive feelings and evaluations towards ICT and consider them to be valuable aids for pupils' learning (Tejedor and García, 2006a; 2006b), although they are quite critical with regard to the possibilities of use, due to the lack of software, the organisation of the school and teacher training/ education. They feel that integrating technologies into their teaching task entails major changes which may lead to feelings of excessive burden and reactions of anxiety and resistance.

Gordillo et al. (2009) and Orellana et al. (2010) agree that teachers consider that the use of ICT is important and that if they do not learn to use them, they will be left behind, as ICT resources are excellent tools for educational innovation, they improve the quality of education, facilitate the development of classes and contribute positively to better student learning, increasing their active participation.

There are more positive attitudes towards ICT among teachers who have greater possibilities of interacting with them (Fernández and Bermejo, 2012). Furthermore, the teacher's opinion of the didactic potential of new technologies influences their use in teaching practice (Domingo and Marquès, 2011), although resistance to change, lack of training in the use of technologies, lack of self-esteem and the degree of teacher frustration are problematic aspects regarding the use of ICT by teachers.

On the other hand, Area (2009) indicates that the teacher is one of the most influential factors in the way ICT are adapted to the classroom and the extent to which students achieve adequate digital competence. Moreover, the different patterns used by teachers to incorporate ICT in the classroom are related to the teacher's level of performance (Ramírez, et al., 2016) and are resources on which teachers rely for the development of activities and the acquisition of content by students.

With regard to teacher education in the knowledge of ICT resources, according to Llorente (2008), this has focused on improving their competence in the technical-instrumental use of ICT, ignoring their didactic training. In other words, it has focused on improving their knowledge of how to use applications such as Word, Access, Excel or Power Point more efficiently. However, it must be clear that in order to properly integrate ICT at educational centres, the key factor is teacher capacity. A correct integration of ICT requires a variety of quality digitalised content, with easy access, allowing the governing bodies of the centre to support its use and the teaching staff to be truly trained in its use and incorporation into their didactic model.

In reference to the implementation of ICT resources at their educational centres, the study carried out by Sene (2017) shows that teachers have a positive perception regarding the use of ICT at school but do not consider that training on ICT resource knowledge is adequate. In addition, teachers demand a relevant update, while requesting their use as a learning resource, which should be present in the planning of academic, management and administrative activities (Mendieta, Cobos and Vázquez, 2016). However, the teaching/learning processes should lead teachers to reflect on why and for what purpose ICT resources should be used in order to understand their true integration within educational centres (Hernández et al., 2018).

Specifically, Cuadrado's study (2008), which analysed the conception, attitude, use and training of teachers in the Autonomous Community of Extremadura, concluded that the teaching staff show a very positive predisposition

towards the use of ICT, improving as the years go by. However, a large proportion of teachers state that they do not feel trained to work using ICT.

Secondly, the factors influencing the use and integration of ICT at educational centres are analysed. There are many factors that influence the correct integration and use of ICT at educational centres. Being able to establish a relationship between them will help to improve the teaching/learning process mediated with ICT resources. According to Almerich et al. (2015), in teachers' change, influences among others their knowledge, their beliefs or perceptions and the context in which they perform (Ertmer and Ottenbreit, 2010). These authors also highlight self-efficacy in the use of electronic devices as a key element in teachers' use of ICT.

The positive relationship between the use and the knowledge of ICT resources is clear, as several studies have shown, both in teaching staff and in initial teacher training (Tejedor and García, 2006a; 2006b; Mirete, 2016; Cabanillas et al., 2018; Cabanillas et al., 2019), which implies that as ICT resources are used to a greater extent, teachers will improve their knowledge, leading to an improvement through their own practice.

ICT competences are related on the one hand to attitudes (Knezek and Christensen, 2008) and encourage use (Suárez, et al., 2010), observing that a positive attitude towards ICT resources among teachers leads to their greater use in their teaching work and to an improvement in their conceptions of their implementation at educational centres. In the same way, there is a direct relationship between teacher education and the use of ICT resources, as it is essential to acquire pedagogical knowledge by adapting the use of technological resources to the educational characteristics that are to be given (Hernández, et al., 2018).

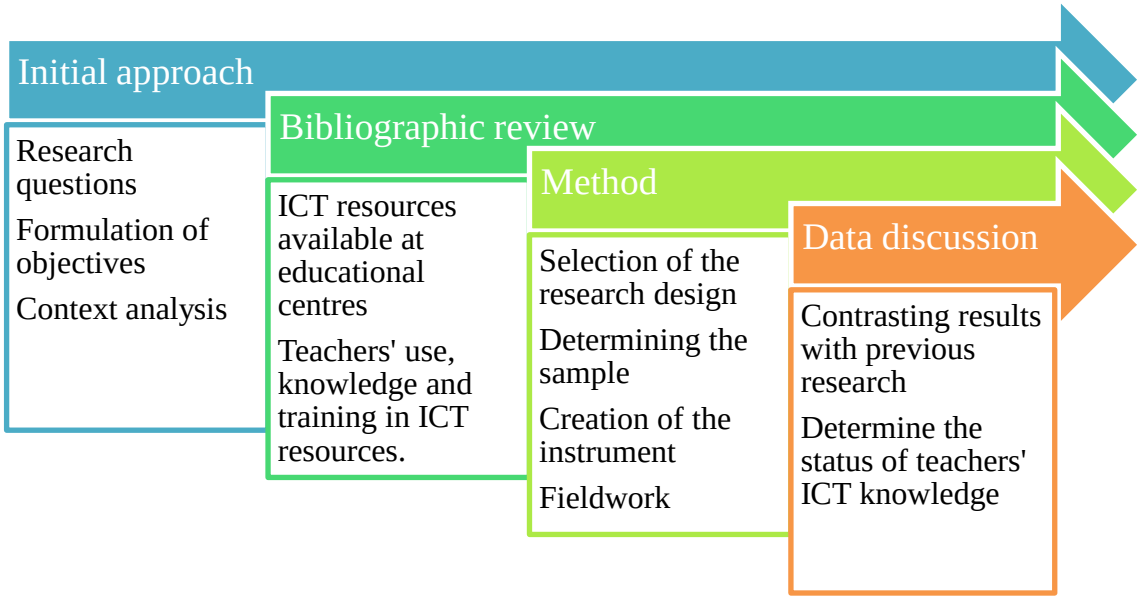
On the other hand, in general, the scientific literature shows a high number of references in favour of men, with a better attitude and greater use of ICT (Valdés et al., 2011; Ashong and Commander, 2012). Although studies such as García et al. (2011) show that women have clearly more favourable attitudes towards ICT than men. Also, studies such as the one carried out by Romero (2011) observed that there are significant differences in relation to gender, in two ways: greater knowledge on the part of male teachers and greater frequency of use by female teachers.

In relation to the differences depending on the educational stage of the teacher, Sandoval, et al. (2020) found no differences in the attitude towards the use of ICT and with regard to the influence of teaching experience, according to Cuadrado (2008), teachers with more experience have less knowledge and ability to use ICT resources in the classroom. On the other hand, Macalapú (2021) found no differences according to the level of performance or teaching experience in the attitude, use and mastery of ICT resources. However, Cabanillas et al. (2020a) conclude that factors such as age and level of teacher education are important factors in the construction of teachers' level of ICT resource competence.

2. Method

Figure 1 shows the procedures carried out for the development of the research.

Figure 1. Diagram of the phases in which the research was carried out (own development).



The research was conducted in four phases, which are described below:

- In the first phase, the initial approach to the research was developed on the basis of the researchers' interest in finding out how teachers in Extremadura use ICT resources and what perceptions they have of its application in the classroom, making it possible to establish the research questions and objectives.
- In the second phase, a bibliographical review was carried out to observe the main ICT resources available at schools in Extremadura. On the other hand, research was also reviewed on the different uses and knowledge that teachers in Extremadura have of ICT resources, as well as their perception of their education and training.
- In the third phase, the method was developed through the selection of the most appropriate design for the research, the determination of the population and the sample, the creation of the instrument for data collection and the fieldwork, carrying out the data collection in the educational centres in Extremadura.
- In the fourth phase, the results obtained were contrasted with the research analysed in the review of the theoretical framework, confirming or rejecting the trend lines observed previously.

A quantitative methodology was used with a cross-sectional descriptive survey design. A descriptive and inferential data analysis was carried out in order to respond to the research objectives.

The population at the time the survey was launched and according to the data provided by the Regional Government of Extremadura was of 13,943 teachers. Incidental sampling with a confidence level of over 95% was used.

A total of 1953 teachers in Extremadura took part in the research, 38.66% of them men (755) and 61.34% women (1198). 6.76% of the teachers work in pre-school education (132), 31.54% in primary education (616), 49.97% in secondary education (976) and 11.73% teach at several levels of education. 13.67% of the surveyed teachers have between 0 and 5 years of teaching experience (267), 12.95% have between 6 and 10 years (253), 21.56% have between 11 and 15 years (421) and 51.82% have more than 16 years of experience (1012).

A questionnaire was used with the following validation process:

- Development of the first draft based on a previously applied questionnaire. In this case, the document published in the manual of the University of Extremadura entitled: "La informática en los centros de educación infantil y primaria en Extremadura" by Casas et al. (2012) was used as a reference; this research is developed by means of a quantitative questionnaire in line with the research.
- Review and adaptation by the research team: Based on the agreement of the team, it was decided to maintain the structure recognised in the document, but modifications were made by updating the tools used in 2018 in the educational centres.
- Creation of the validation table for experts: For the validation of the final questionnaire, a document was drawn up which analysed the quality of the different sections of the questionnaire on a qualitative scale (excellent, good, average and poor):
  - Section A: Introduction.

- Section B: Questions and items in the questionnaire.
- Section C: Answers to the questionnaire.
- Section D: Overall assessment of the questionnaire.

The validation table was provided to 5 experts in the field. The overall perception is positive being an excellent evaluation for 4 of the experts and good for 1.

- Reliability testing of the questionnaire: Measured by Cronbach's Alpha coefficient, with a value of 0.947 for the complete questionnaire.

Table 1 shows the dimensions that compose the questionnaire, its description, the number of items that compose it and the Cronbach's Alpha value obtained when analysing its reliability.

Table 1.

Questionnaire dimensions.

Dimension	Description	Scale	Nº of ítems	Cronbach´s Alpha
D0: Socio-demographic data	Gender, level of teaching performance and experience	------- --	3	---------
D1: Use of computer resources in their practices	Degree to which the teacher uses the different ICT resources in the course of his/her teaching work.	6	21	0,937
D2: Perception of their education in new technologies	Teacher's assessment of their own education in ICT resources	5	2	0,838
D3: Computer education of the teaching staff	Teachers' education and knowledge of different IT resources	4	9	0,909
D4: Opinion (perception) of the importance of such education	Teachers' assessment of the degree of need or importance of acquiring training in ICT resources.	4	20	0,922
D5: Readiness for the use of ICT in the classroom	Teachers' capacity to use ICT resources efficiently in the classroom.	4	5	0,943

Note: Own development

3. Results

Firstly, the descriptive data analysis is reflected, describing the mean values (M) and standard deviation (SD) of the items of each of the dimensions analysed. Firstly, analysing the values obtained for each of the dimensions, we find a high degree of use of computer resources in their practices by the teaching staff (M = 4.52; SD = 0.819) together with a high perception (M = 3.80; SD = 0.764) and impression (M = 3.05; SD = 0.498) of the computer training they have. However, training (M = 2.51; SD = 0.626) and teacher preparation for the use of ICT in their classrooms (M = 1.99; SD = 0.775) are closer to the central value, representing a medium value.

Table 2 shows the results obtained for D1. It can be seen that the teaching staff use computer media to a greater extent in their practice to present information (M = 5.19; SD = 0.902) and to capture students' attention and motivate them (M = 5.17; SD = 0.902). However, they use ICT to a lesser extent for working with students with Special Educational Needs (M = 3.67; SD = 1.663) and for recreational and extracurricular activities (M = 3.80; SD = 1.447).

Table 2.

Results D1: Use of computer media in their practices.

Item	M	SD
Creativity development	4,33	1,134
Clarifying abstract concepts	4,72	1,031
Working with students with Special Educational Needs	3,67	1,663
Controlling the established curriculum	3,96	1,305
Recreational and extracurricular activities	3,80	1,447
Assessing students' knowledge and skills	4,15	1,300
Enabling new relationships between teachers and students	3,99	1,422
Provide feedback	4,13	1,410

Allowing access to more information	5,19	0,904
Facilitating self-learning and individualising learning	4,76	1,113
Facilitating knowledge transfer	4,85	0,995
Engaging and motivating students	5,17	0,902
Facilitating group work	4,48	1,218
Submitting information	5,19	0,902
Facilitating recall of information and reinforcing content	4,94	0,971
Creating/modifying attitudes in students	4,38	1,198
Develop practical activities related to the contents	4,87	1,003
Learning to manage their own resources	4,65	1,151
Demonstrating and simulating phenomena and experiences	4,44	1,257
Teacher education and advanced training	4,72	1,150
Connecting students to the technologies of today's culture	4,82	1,135

Note: Own development

In reference to D2, the lowest average is obtained for the instrumental technical mastery of IT Media and New Technologies (M = 3.78; SD = 0.843) compared to the mastery for the didactic-educational use of IT Media and New Technologies (M = 3.84; SD = 0.789). However, both averages are above the central value, showing an adequate command of ICT resources by the teaching staff.

Table 3 shows the M and SD obtained for each of the items that make up D3. Training in computer equipment (M = 2.97; SD = 0.741) and in the computer resources used for practice and exercise (M = 2.77; SD = 0.725) stand out. On the other hand, the resources for which teachers have the worst education are computer-aided design (M = 1.95; SD = 0.892) and local networks (M = 2.26; SD = 0.825).

Table 3.
Results D3: Computer education of the teaching staff.

Ítem	M	SD
Basic computer equipment	2,97	0,741
Computer peripherals	2,68	0,874
Local networks	2,26	0,825
Hypertext-HypermediaMultimedia	2,31	0,854
Computer-aided design	1,95	0,892
Computer media used for tutoring	2,64	0,790
Computer media used for practice and training	2,77	0,725
Computer media used for the demonstration	2,70	0,767
Computer Media used for simulation and gaming	2,45	0,782

Note: Own development

Table 4 below analyses the M and SD obtained for D4. The importance of training in computer-aided design (M = 3.93; SD = 0.857) and basic computer equipment (M = 3.46; SD = 0.616) stand out for the teaching staff. However, for the teaching staff, the training acquired in Congresses, Conferences, Symposiums, Meetings... (M = 2.49; SD = 0.866) and in the training courses developed in ICEs (M = 2.77; SD = 0.808) are less important. All the averages are above the central value, which indicates that teachers attach a high importance to teacher education in ICT resources.

Table 4.
Results D4: Opinion (perception) of the importance of such education.

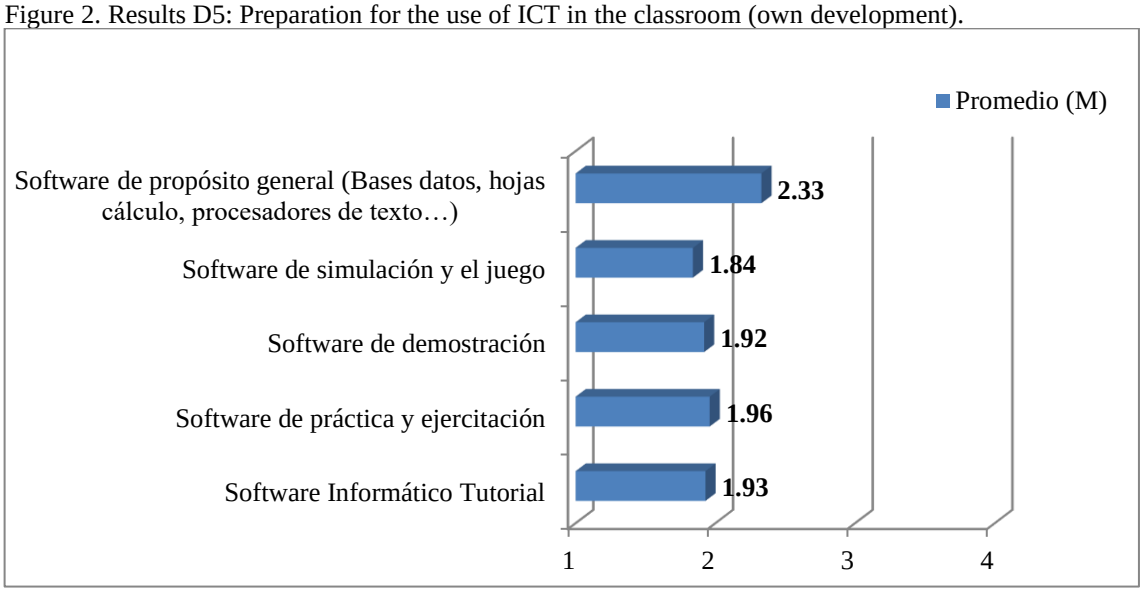
Ítem	M	SD
Basic computer equipment	3,46	0,616
Computer peripherals	3,26	0,706
Local networks	3,07	0,774
Hypertext-HypermediaMultimedia	3,15	0,732
Computer-aided design	3,93	0,857
Computer media used for tutoring	3,24	0,632
Computer media used for practice and training	3,36	0,576
Computer media used for the demonstration	3,29	0,617
Computer Media used for simulation and gaming	3,10	0,747
Tutorial Computer Software	2,98	0,745
Practice and training software	3,05	0,727

Demonstration software	3,01	0,732
Simulation software and gaming	2,91	0,788
General purpose software (Databases, spreadsheets, word processing...)	3,19	0,728
Training courses developed in the Institute of Education Sciences	2,77	0,808
In-house training courses	3,08	0,810
Congresses, Conferences, Symposiums, Meetings...	2,49	0,866
Permanent Seminars	2,81	0,811
Educational Research Projects	2,96	0,828
Innovation Projects and Training in Centres	3,12	0,821

Note: Own development

Finally, figure 2 shows the results obtained for D5. Preparedness in general purpose software stands out slightly (M = 2.33; SD = 0.978). On the other hand, simulation software and gaming is the one for which teachers are least prepared to use (M = 1.84; SD = 0.797).

Figure 2. Results D5: Preparation for the use of ICT in the classroom (own development).



Secondly, the inferential data analysis is shown, carried out with the use of IBM SPSS software version 21. We have worked with a confidence level of 95% and an error of 5% for hypotheses 1-15. For H16 we worked with a confidence level of 99% and an error of 1%.

Non-parametric tests have been used to contrast the hypotheses, since when testing for normality test (Kolmogorov-Smirnov test), randomness (Rachas test) and homoscedasticity (Levene test), the dimensions did not adapt to the principles of normality ($p>0.05$). For the selection of the contrast test, the criteria described by Cubo (2011) were followed, determining which test to perform depending on the number and type of groups to be compared.

In summary, the results obtained in hypotheses 1-15 and the tests used to contrast them are shown in table 5.

Table 5.
Results for hypotheses 1-15.

Hypothesis		Result and test
Hip.1: There are significant differences related to the gender of the teacher and the use of computer media in their practice.	**p=0,000**	Accepted U de Mann Whitney
Hip.2: There are significant differences related to the gender of the teacher and the perception of their education in new technologies.	**p=0,000**	Accepted U de Mann Whitney
Hip.3: There are significant differences related to the gender of the teacher and the computer skills of the teacher.	**p=0,000**	Accepted U de Mann Whitney

Hip.4: There are significant differences related to the gender of the teacher and the opinion (perception) of the importance of such education.	p=0,845	Rejected U de Mann Whitney
Hip.5: There are significant differences related to teacher gender and preparation for ICT use in the classroom.	**p=0,000**	Accepted U de Mann Whitney
Hip.6: There are significant differences related to teaching performance at different levels of education and the use of computer media in their practices.	p=0,079	Rejected H de Kruskal Wallis
Hip.7: There are significant differences related to teaching performance at different levels of education and the perception of their education in new technologies.	p=0,530	Rejected H de Kruskal Wallis
Hip.8: There are significant differences related to teaching performance at different levels of education and the computer education possessed by the teacher.	p=0,257	Rejected H de Kruskal Wallis
Hip.9: There are significant differences related to the performance of teaching at different levels of education and the opinion (perception) of the importance of such education.	**p=0,025**	Rejected H de Kruskal Wallis
Hip.10: There are significant differences related to teaching performance at different levels of education and ICT readiness in the classroom.	p=0,847	Rejected H de Kruskal Wallis
Hip.11: There are significant differences related to teaching experience and the use of computer media in their teaching practice.	**p=0,000**	Rejected H de Kruskal Wallis
Hip.12: There are significant differences related to teaching experience and the perception of their training in new technologies.	p=0,170	Rejected H de Kruskal Wallis
Hip.13: There are significant differences related to the teaching experience and computer education possessed.	p=0,158	Rejected H de Kruskal Wallis
Hip.14: There are significant differences related to teaching experience and the opinion (perception) of the importance of such education.	**p=0,000**	Accepted H de Kruskal Wallis
Hip.15: There are significant differences related to teaching experience and preparation for the use of ICT in the classroom.	p=0,057	Rejected H de Kruskal Wallis

Firstly, for the analysis of the hypotheses related to the contrast of the dimensions under study according to gender, the results show that female teachers make a significantly greater use of computer resources in their teaching than male teachers (p=0.000). Similarly, it has been observed that male teachers have a better perception of their training in new technologies (p=0.000), better computer training (p=0.000) and better preparation for the use of ICT than female teachers (p=0.000).

However, no statistically significant differences were found between men and women in the perception of the importance of education in technological resources for teaching (p=0.845).

Secondly, for the analysis of the hypotheses related to the contrast of the dimensions under study according to the level of teacher performance, it was found that there are significant differences between primary and secondary education teachers in the use of computer media for their practices (0.019) and statistically significant differences have also been observed according to teaching performance at the different educational levels, in the teachers' perception of the importance of teacher education (p=0.025).

However, there are no statistically significant differences in terms of teaching performance at different educational levels and the use of computer media in their practices (p=0.079), teachers' perception of their education in new technologies (p=0.530), teachers' computer training (p=0.257) and preparation for the use of ICT in the classroom (p=0.847).

Thirdly, for the analysis of the hypotheses related to the contrast of the dimensions under study in terms of teaching experience, it was found that there are statistically significant differences in the use of computer media in their practice (p=0.000) and the opinion (impression) held of the importance of such training (p=0.000).

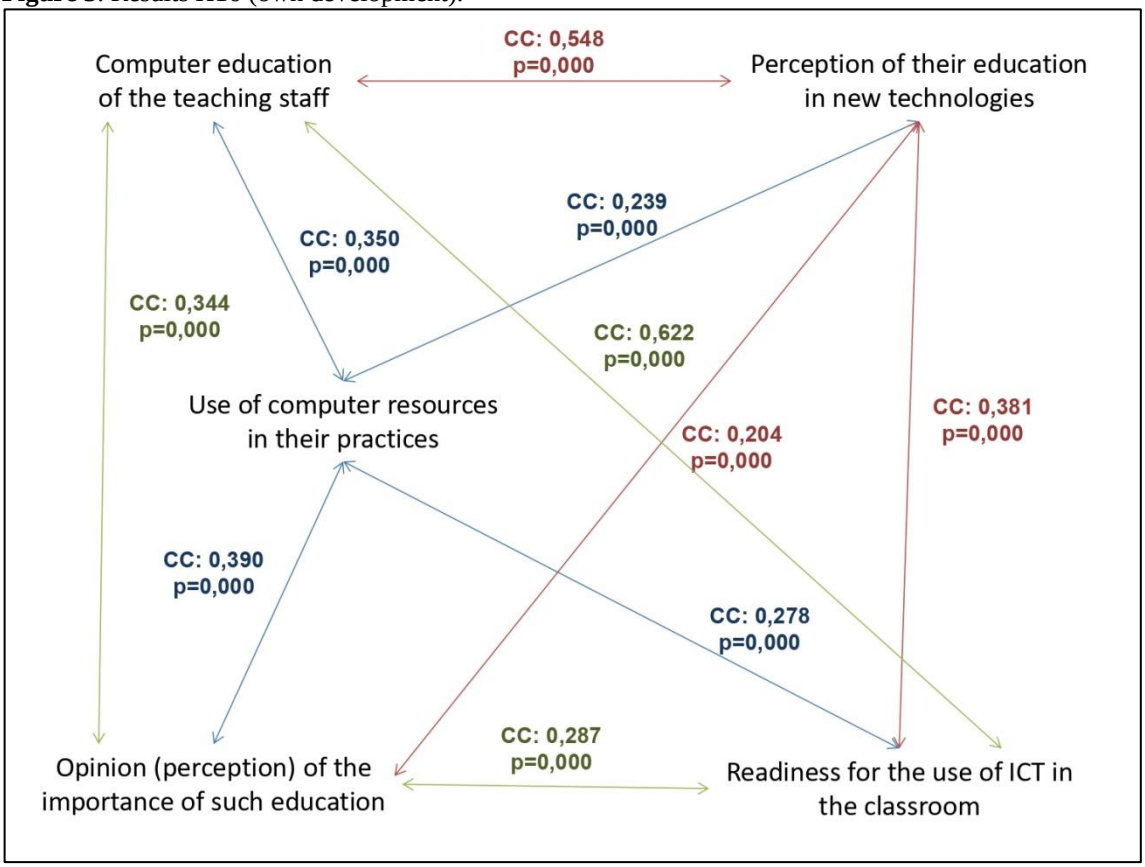
However, there are no statistically significant differences in terms of teaching experience and perception of their training in new technologies (p=0.170), computer training they have (p=0.158) and preparation for the use of ICT in the classroom (p=0.057).

Finally, in reference to H16, it can be highlighted that all the correlations analysed between the dimensions under study are significant and positive. With the highest correlation coefficients (CC), the correlation between computer education and the teacher's preparation for the use of ICT in the classroom stands out (CC=0.622), being plausible that the greater the teacher's preparation and knowledge of computers, the greater the teacher's capacity for the use of ICT in the classroom.

In the same way, the correlation between the perception of their education in new technologies and the computer education they have (CC=0.548) stands out, highlighting that trained teachers have a more positive perception of his/her education in ICT, which will help them to gain in security and confidence when using technological resources in their classes.

Figure 3 shows the summary of the results obtained for H16, which has been created by the research team using graphic editing software. It visually highlights the relationship between each of the variables analysed.

Figure 3. Results H16 (own development).



4. Data discussion and conclusions

In response to research O1 and O2, a high degree of use of IT resources in their practices by teachers has been observed, together with a high perception and feeling of the IT training they have, following the line of Sene (2017) whose results show that teachers have a positive perception regarding the use of ICT at school, but they contrast with studies such as those carried out by Llorente (2008) and Almerich et al. (2011), which show a low level of competence and use of ICT resources by the teaching staff.

Teachers in Extremadura preferentially use computer resources to present information and to capture students' attention and motivate them, agreeing with Cabanillas et al. (2020b) and Cabanillas et al. (2020c) in that the use of ICT resources can motivate pupils. They are prepared for the use of ICT resources in the classroom, highlighting the use of general programmes such as Word, Excel, etc. for the development of their teaching.

In reference to O3, it was found that female teachers use computer resources in their teaching work to a greater extent than male teachers, but men have greater knowledge and education in computer resources, coinciding with the results obtained by Romero (2011) showing greater knowledge by male teachers, and greater frequency of use by female teachers.

In relation to the level of performance, differences were found between primary and secondary school teachers in the use of computer resources in their practices and in the perception of the importance of teacher education at all levels of education. On the other hand, significant differences were also found according to teachers' experience in the use of computer resources and their perception of their education. Therefore, differences were observed in some of the sections analysed, in contrast to Macalapú (2021), whose results found no differences in the use or mastery of ICT resources.

Finally, in relation to O4, a clear significant positive relationship was observed between the variables analysed, coinciding with previous studies relating the use and knowledge of ICT resources (Tejedor and García, 2006a; 2006b; Mirete, 2016; Cabanillas et al., 2018; Cabanillas et al, 2019) and those relating ICT competences with attitudes and use (Knezek and Christensen, 2008; Suárez, et al., 2010) as well as those relating education and use (Hernández, et al., 2018), since it is necessary for teachers to be educated in order to be able to teach and use ICT resources appropriately in their teaching work.

For all these reasons, we can conclude that differences have been found in the use, knowledge and perception of training in ICT resources among teachers in Extremadura according to gender, level of teaching performance and experience. This research opens up new lines of research that allow us to observe whether, during the pandemic and once it is over, the differences observed among teachers in Extremadura are maintained or whether other differences are found, since it is clear that, as they were used frequently during the confinement, teachers will consolidate their use in the new normality (Navarro, 2020).

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