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Impact of the ITC Coordination Team and ITC Coordinators on the Management of the Helvia and Pasen Platforms

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Abstract

The implementation of information and communication technologies has been one of the most innovative additions to the Andalusian education system. This region was at the forefront in the application of free software in the public administration and in primary and secondary schools. A specialised figure has been created for the use of new technologies in the different educational centres, the ICT coordinator. The ICT coordinator at Andalusian educational centres plays a key role in ensuring the proper use of information and communication technologies in the classroom. The aim is to study how the functioning of the ICT Co-ordination team and the role of the ICT Co-ordinators affect the administration of the HELVIA and PASEN platforms through a structural equation model and to analyse the differences in the effects depending on the socio-cultural level of the schools. A cross-sectional and exploratory study was carried out on a sample of 458 ICT Coordinators in Andalusia (Spain). An ad hoc questionnaire was used to collect the data. The data reveal differences in the effects of the variables depending on the socio-cultural context in which the schools are located. In conclusion, the socio-cultural context plays a fundamental role in the effect of the ICT Coordination teams together with the ICT Coordinators when managing HELVIA and PASEN.

Keywords*:* ICT Coordinators; Information and Communication Technologies; Elementary Education; Educational Platforms.

1. Introduction

There are many research studies on the integration of ICT in education (Núñez-Sánchez et al., 2015; Pérez-Rodríguez et al., 2009; Rodríguez et al., 2009). They highlight the increasing efforts of administrations to equip and adapt schools with technology. The implementation of ICT in Andalusian schools follows a trajectory initiated in Extremadura (Spain) (Aguaded-Gómez and Tirado-Morueta, 2010; Aguaded-Gómez et al., 2008). This region took the lead in the application of free software in public administration and in primary and secondary schools in 2001 (Aguaded-Gómez and Tirado-Morueta, 2010; Aguaded-Gómez et al., 2008). An ICT Centre in Andalusia is conceived as a public, compulsory education centre at Primary or Secondary level, which is equipped with computer equipment (Méndez-Garrido and Delgado-García, 2016; Amor-Pérez et al., 2011). The most innovative aspect of this massive integration of technology is that the computer is an educational tool in teaching and learning (Méndez-Garrido and Delgado-García, 2016; Amor-Pérez et al., 2011).

Policy makers as well as education stakeholders undoubtedly recognise that ICT are a key element in achieving the transformation of education and training (Sosa-Díaz & Valverde-Berrocoso, 2022; Méndez-Garrido and Delgado-García, 2016). ICT is therefore a key element for innovation and creativity, and for learning in general (Sosa-Díaz & Valverde-Berrocoso, 2022; Aguaded-Gómez and Tirado-Morueta, 2010). However, the full training and educational potential of ICT is not sufficiently reflected in formal education (Sosa-Díaz & Valverde-Berrocoso, 2022; Flores-Tena et al., 2021; Méndez-Garrido and Delgado-García, 2016). Policy makers as well as education stakeholders undoubtedly recognise that ICT are a key element in achieving the transformation of education and training (Sosa-Díaz & Valverde-Berrocoso, 2022; Aguaded-Gómez and Tirado-Morueta, 2010). ICT is therefore a key element for innovation and creativity, and for learning in general (Méndez-Garrido and Delgado-García, 2016). However, the full training and educational potential of ICT is not sufficiently reflected in formal education (Núñez-Sánchez et al., 2015; Pérez-Rodríguez et al., 2009). In this succession of programmes, there has been a growing investment in extending the use of ICT in schools (Sosa-Díaz & Valverde-Berrocoso, 2022; Aguaded-Gómez and Tirado-Morueta, 2010; Aguaded-Gómez et al., 2008). It is therefore necessary to investigate the success or failure of ICT implementation in the school environment and its relationship with the role played by ICT coordinators and school managers in making technology more dynamic (Sosa-Díaz & Valverde-Berrocoso, 2022; Aguaded-Gómez and Tirado-Morueta, 2010; Aguaded-Gómez et al., 2008).

School ICT use has become increasingly important at different educational stages (Sosa-Díaz & Valverde-Berrocoso, 2022; Méndez-Garrido and Delgado-García, 2016; Amor-Pérez et al., 2011). Consequently, a growing number of research studies have been conducted on the use of ICT to ensure learning is meaningful and effective (Sosa-Díaz & Valverde-Berrocoso, 2022; Aguaded-Gómez and Tirado-Morueta, 2010; Aguaded-Gómez et al., 2008). Studies of ICT inclusion in schools focused on the factors hindering or facilitating the incorporation of these technologies at school (Hernández-Rivero et al., 2011; Aguaded-Gómez et al., 2010). Following this, some variables common to the incorporation of ICT in school settings were identified (Hernández-Rivero et al., 2011). These variables are: school climate, management and knowledge of ICT (Hernández-Rivero et al., 2011; Aguaded-Gómez and Tirado-Morueta, 2010; Aguaded-Gómez et al., 2008).

A correct administration of the variables proposed by Hernández-Rivero et al. (2011) leads to an increase in scientific research on ICT in the different academic levels (Sosa-Díaz & Valverde-Berrocoso, 2022; Flores-Tena et al., 2021; Méndez-Garrido and Delgado-García, 2016; Amor-Pérez et al., 2011). A key figure in the incorporation of ICT in education has been ICT Coordinator (Sosa-Díaz & Valverde-Berrocoso, 2022; Flores-Tena et al., 2021; González-Pérez, 2017). Currently, ICT Coordinator focuses on the implementation and improvement of practices associated with pedagogical innovation with new technologies (Cabero-Almenara & Martínez-Gimeno, 2019; González-Pérez, 2017). Specialised studies focusing on the figure of the ICT coordinator highlight that their functions at the school are planning activities, favouring organisational dynamics, monitoring and supervising colleagues within the school, technical-educational training for teachers and solving problems that arise (González-Pérez, 2017; Amor-Pérez et al., 2011).

Among the ICT Coordinator's functions, two fundamental platforms stand out in Andalusia: PASEN and HELVIA (Colás-Bravo et al., 2019; Martínez-Serrano, 2019; Merino and Marbella, 2017). Both platforms have very different purposes. The first one is aimed at managing and facilitating the communication process between schools and families (Colás-Bravo et al., 2019; Martínez-Serrano, 2019; Merino and Marbella, 2017). Families must have an adequate level of training in new technologies (Martínez-Serrano, 2019; Merino and Marbella, 2017). Furthermore, HELVIA platform allows the organisation of curricular

contents, scheduling of different school tasks and establishing a communicative process between teachers and students (Colás-Bravo et al., 2019; Martínez-Serrano, 2019; Merino and Marbella, 2017).

Teachers' training in new technologies is often conditioned by the school's socio-cultural environment (Colás-Bravo et al., 2019; Martínez-Serrano, 2019; Merino and Marbella, 2017). This training can directly influence how to perform ICT Coordinator roles in schools (Colás-Bravo et al., 2019; Martínez-Serrano, 2019; Merino and Marbella, 2017).

The aims of this study are:

- To study the effect of ICT Coordination team functioning and the role of ICT Coordinators on the administration of the HELVIA and PASEN platforms by means of a structural equation model.
- To analyse differences in the effects according to the school's socio-cultural environment.

2. Material and methods

Sample and design

A descriptive, exploratory study was carried out with 458 coordinators from different schools from Andalusia (Spain). The sample consisted of 364 men (79.5%) and 94 women (20.5%). Ages ranged from 25 to 65 years (M = 46.88; SD = 8.088).

Instruments

In order to collect data, self-prepared instruments were used.

To assess the functioning of the ICT Coordination team, a questionnaire was drawn up with fourteen questions related to work distribution (Management and coordination with the Regional Department of Education's Advanced Management Centre, Administration of Helvia and PASEN platforms, development of the school's website, updating of school content, administration of hardware use, providing ICT educational resources, advising teaching staff on solving technical problems, guiding teaching staff on the ICT use, providing teaching staff with guidance on ICT uses, creating a website for the school's ICT resources, advising teaching staff on solving technical problems, guiding teaching staff on ICT use, creating software and digital educational resources, disseminating ICT integration experiences, evaluating ICT project at the school, promoting the ICT project at the educational institution and managing the school's profiles on social networks) (Aguaded-Gómez and Tirado-Morueta, 2010). A 5-point Likert scale was used to evaluate all these questions (0= This function is not carried out or supervised by the ICTT; 1= It is carried out exclusively by the ICTC; 2= In this function, each task is assigned to a member of the ICTT; 3= In this function, the tasks are carried out by several members of the ICTT in co-ordination with each other; 4= Its performance involves the ICTT Coordination with other members of the educational community).

To assess the ICT Coordinators' role, the answers offered were as follows (Aguaded-Gómez and Tirado-Morueta, 2010): A professional who individually supports his/her colleagues by offering technical solutions for the use of ICT (including the provision of technological resources), a coordinator who promotes teamwork to provide technical solutions for ICT use, a pedagogical advisor in ICT integration who responds to individual needs of his/her colleagues and a pedagogical facilitator who promotes the collaborative work of the teaching staff for educational improvement and innovation through the pedagogical integration of ICT. These options have been validated using a Likert scale with four options (0= Not at all agree; 1= Slightly agree; 2= Fairly agree; 3= Strongly agree).

To assess the organisation responsible for the administration of the HELVIA and PASEN platforms, the following question was used: Which organisation is responsible for the HELVIA administration? Which organisation is responsible for the PASEN management? The following answers were offered: This function is not performed or supervised by the ICTT. It is performed exclusively by the ICTC,

in this function each task is assigned to a member of the ICTT. Tasks are performed by several members of the ICTT in coordination with each other, and its performance involves coordination of the ICTT with other members of the educational community.

Procedure

Firstly, a contact was made with the different ICT schools in Andalusia. An informative letter was sent with the project's aims and purpose. Once a favourable response was obtained, the research team administered the questionnaire. Before starting to answer the different items of the questionnaire, informed consent was requested from all participants. The different participants were assured of their anonymity and of the fact data would be processed exclusively for scientific purposes. Ethical criteria and standards set out in the Declaration of Helsinki were followed.

Data analysis

The statistical programme IBM SPSS Statistics 25.0 (IBM Corp., Armonk, NY, USA) was used to carry out the descriptive analyses of the study. Frequency analyses were used to classify the sample according to sex. A test of means was also performed to calculate the mean age of the participants.

The IBM SPSS Amos 23.0 programme was used. These analyses allow us to study the differences in the effects of the variables as a function of a predictor variable (Kyriazos, 2018; Maydeu-Olivares, 2017; Loehlin and Beaujean, 2017; Kline, 2016; Ruiz et al., 2010). The variable playing this role is the school's socio-cultural environment (low, medium-low, medium-high, medium-high, high).

The theoretical model (Figure 1) proposed consists of two endogenous and two exogenous variables. The unidirectional arrows arise from the different regression weights and represent the influence lines. The causal relationships were examined by focusing on the observed associations between degree of reliability of the different measurements and the different causal relationships, in a way that allowed for the error inclusion (Kyriazos, 2018; Maydeu-Olivares, 2017; Loehlin and Beaujean, 2017; Kline, 2016; Ruiz et al., 2010). Significance levels of 0.05 and 0.001 were established.

The model fit has been adjusted for absolute fit and comparative fit indices. The most common values for absolute fit are the chi-square/degrees of freedom (X2/gl). The score has to be less than 3 (Kyriazos, 2018; Maydeu-Olivares, 2017; Loehlin and Beaujean, 2017; Kline, 2016; Ruiz et al., 2010). To assess the fit of the comparative index, the goodness-of-fit index (CFI), the Tucker-Lewis index (TLI) and the normalised fit index (NFI) should be taken into account. Ratings for these indices should be higher than 0.900 (Kyriazos, 2018; Maydeu-Olivares, 2017; Loehlin and Beaujean, 2017; Kline, 2016; Ruiz et al., 2010). The root mean squared residuals of approximation (RMSEA) has also been considered (Kyriazos, 2018; Maydeu-Olivares, 2017; Loehlin and Beaujean, 2017; Kline, 2016; Ruiz et al., 2010). Values must be less than 0.08 (Kyriazos, 2018; Maydeu-Olivares, 2017; Loehlin and Beaujean, 2017; Kline, 2016; Ruiz et al., 2010). Two levels of significance were established ($p \leq 0.001$ and $p < 0.05$).

Table 1 shows the values of the different fit indices.

Table 1 Values of the fit indices of theoretical model

X^2/gl	CFI	TLI	NFI	RMSEA
2.710 ($p < 0.05$)	0.950	0.920	0.983	0.077

For the proposed theoretical model (figure 1) it is observed that the variables ICT Coordination team functioning, and ICT Coordinators role exert a direct causal relationship on HELVIA Management and PASEN Management. Likewise, there is a unidirectional effect of the variable HELVIA Management on PASEN Management. The latter two act as endogenous variables, (they receive the effect of the exogenous variables).

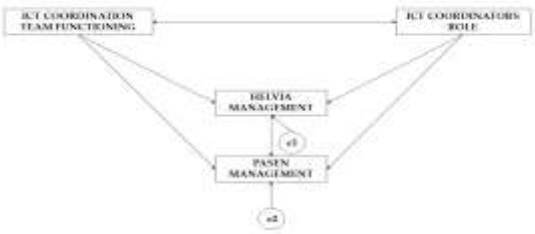

Figure 1. Theoretical model of the structural equation model

3. Results

Table 2 presents the effects for participants from schools located in a low socio-economic environment. A positive effect of the role of the ICT Coordination team on the administration of HELVIA and PASEN (β = 0.212; β = 0.271; p < 0.05) is denoted. A negative effect of the role of ICT Coordinators on HELVIA and PASEN management is obtained (β = −0.066; β = −0.050). A negative effect of HELVIA management on PASEN management is also obtained (β = −0.114). Finally, a negative reciprocal effect is obtained between the role of ICT Coordinators and the functioning of the ICT Coordination team (β = −0.041).

Table 2. Effect of variables for ICT Coordinators in schools with a low socio-economic background

Effect direction	RE				SRW
	Estimation	S.E.	C.R.	*p*	Estimation
HELVIA Management ← ICT Coordination team functioning	0.472	0.234	2.015	0.044	0.212
HELVIA Management ← ICT Coordinators role	− 0.265	0.422	− 0.629	0.529	− 0.066
PASEN Management ← HELVIA Management	− 0.082	0.077	− 1.069	0.285	− 0.114
PASEN Management ← ICT Coordination team functioning	0.433	0.170	2.542	0.011	0.271
PASEN Management ← ICT Coordinators role	− 0.143	0.300	− 0.475	0.635	− 0.050
ICT Coordination team functioning → ← ICT Coordinators role	0.059	0.001	− 0.379	0.704	− 0.041

Note: Regression Weights (R.W.); Standardised Regression Weights (S.R.W.); Estimation error (S.E.); Critical Ratio (C.R.)

Table 3 presents effects for participants from schools located in a low socio-economic environment. A positive effect of the role of the ICT Coordination team on the administration of HELVIA and PASEN (β = 0.168; β = 0.187; p < 0.05) is found. A negative effect of the role of ICT Coordinators on HELVIA and PASEN management is obtained (β = −0.042; β = −0.016). A negative effect of HELVIA management on PASEN management is also obtained (β = −0.067). Finally, a negative reciprocal effect is obtained between the role of ICT Coordinators and the functioning of the ICT Coordination team (β = −0.140).

Table 3. Effects of ICT coordinators' variables at schools with a medium socio-economic status

Effect direction	RW				SRW
	Estimation	S.E.	C.R.	*p*	Estimation
HELVIA Management ← ICT Coordination team functioning	0.313	0.096	3.244	0.005	0.168
HELVIA Management ← ICT Coordinators role	− 0.138	0.170	− 0.813	0.416	− 0.042
PASEN Management ← HELVIA Management	− 0.040	0.031	− 1.283	0.199	− 0.067
PASEN Management ← ICT Coordination team functioning	0.211	0.059	3.584	0.002	0.187
PASEN Management ← ICT Coordinators role	− 0.032	0.102	− 0.313	0.754	− 0.016
ICT Coordination team functioning → ← ICT Coordinators role	− 0.001	0.036	− 2.676	0.007	− 0.140

Note: Regression Weights (R.W.); Standardised Regression Weights (S.R.W.); Estimation error (S.E.); Critical Ratio (C.R.)

4. Discussion

After answering the research aims, this section attempts to contextualise findings with those of another similar research.

A difference is noted in the effects of variables depending on schools' socio-economic level. In terms of effect of the ICT Coordination team's functioning on the administration of HELVIA and PASEN platforms, there is a greater effect at schools with a low socio-economic level. It has been observed that ICT is a fundamental tool for the acquisition of different basic knowledge (Hernández-Rivero et al., 2011). The ICT Coordination team, together with the ICT Coordinator, has to act as a planner, a problem-solving agent for the project implementation, a link, an internal facilitator and a teacher trainer (Hernández-Rivero et al., 2011). Differences have been noted in the use of ICT depending on the socio-cultural level of schools (Fernández-Batanero et al., 2018; Núñez-Sánchez et al., 2015; Coll et al., 2008; Aguaded-Gómez et al., 2008). This shows how training of ICT Coordination teams and ICT Coordinators can vary depending on the school's socio-cultural background (Martínez-Serrano, 2019; Fernández-Batanero et al., 2018). The coordination teams have a greater effect on the administration of HELVIA and PASEN. Despite socio-cultural differences, it has been observed these platforms are useful for maintaining contact between schools and families (Martínez-Serrano, 2019; Fernández-Batanero et al., 2018; Méndez-Garrido and Delgado-García, 2016).

Regarding the effect of the role of ICT co-ordinators, a negative effect is observed for all participants. It is noted that this effect is greater for coordinators at schools located in low socio-cultural environments. It has been noted that the role of the ICT co-ordinator requires continuous training in different areas related to ICT (Sosa-Díaz & Valverde-Berrocoso, 2022; Méndez-Garrido and Delgado-García, 2016; Llamas-Salguero and Ruiz-Peña, 2015). It has been reported that the working conditions are not the most suitable as they have a very limited release timetable that they combine with other teaching tasks (De Pablo-Pons and Vaquero, 2020; (Sosa-Díaz & Valverde-Berrocoso, 2022; Méndez-Garrido and Delgado-García, 2016; De Pablo-Pons et al., 2008). These negative relationships can be interpreted as professional saturation on the part of ICT coordinators (Fernández-Suárez, 2021). ICT coordinators encounter different problems such as the use of unfriendly software, incompatibility problems with Windows and a poor infrastructure that causes technical problems (Fernández-Sánchez et al., 2011; Méndez-Garrido and Delgado-García, 2016). Studies focusing on the figure of the ICT Coordinator suggest that their main tasks are planning activities, promoting organisational dynamics, monitoring and supervising colleagues inside, technical-educational training of teachers and solving problems that arise (Sosa-Díaz & Valverde-Berrocoso, 2022; Flores-Tena et al., 2021; Amor-Pérez et al., 2011; Larragueta and Lázaro, 2008; De Pablo-Pons et al., 2008).

It is important to note limitations of this study. As it is a cross-sectional study, it is only possible to establish effects at the point in time at which data were collected. The data should be interpreted with caution, as the sample belongs to a very specific geographical area. For future research it would be interesting to add interviews with the different coordinators. This would allow a deeper understanding of the opinions of the study sample.

5. Conclusions

Findings of this study show that administration of the PASEN and HELVIA platforms is negatively affected by the ICT Coordinator's functions. These effects are greater for ICT Coordinators who are in a school with lower middle socio-cultural environment. This indicates that the ICT Coordinator's training is directly influenced by the school's socio-cultural environment.

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Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

The data used to support the findings of current study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare no conflict of interest.

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