Digital Learning and Public Policy in schools: a transformative paradigm for a changing world

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Abstract

This study explores models of digital learning in public educational institutions, focusing on good practices aimed at bringing about instrumental and methodological change, and encouraging the adoption of new values and greater social justice. It identifies challenges and opportunities to propose a dynamic model of public policy on digital education. Eighteen public educational institutions associated with good digital practices in Andalusia (Spain) participated in the study. Using a descriptive method with a survey design, three questionnaires were administered at the institutions. The results confirm the importance of collective practice in encouraging the introduction of digital technologies in educational institutions. The conclusions show that a participatory culture and innovative teaching initiatives can facilitate the digital integration, on which the proposed policy model is based. The study proposes a policy model based on how participatory culture and innovative teaching initiatives can facilitate digital integration in schools. This dynamic, reflexive policy model proposed can be adapted to emerging social changes and used by policymakers, management staff and teachers in primary and secondary education.

Keywords

Educational policy, Public policy, Education, Technology, Digital learning.

Introduction

Contemporary society is characterised by the absence of fixed frameworks, allowing reality to be analysed with ease; Bauman (2017) refers to this phenomenon as ‘hybridity’. This concept and the extraterritoriality asserted by a digital culture that seeks to overcome borders are part of what the philosopher terms ‘liquid modernity’. In education, new approaches and methods of teaching, learning and social organisation have emerged both in and out of schools, leading to significant changes in our understanding of the role of educational institutions, their possibilities and their responsibilities. The COVID-19 pandemic that began in 2020 has had a major impact on the role of teachers (Arata, 2021) and on the place of technology in schools (Al-Naabi et al., 2022). As well as transforming the school environment (Doueihi, 2011), new digital applications also influence forms of mediation and offer “new types of mediated interaction” (De Pablos, 2018). These interactions were accelerated by the pandemic, creating a framework for reflection in the study of public policy prior to the pandemic (Trust and Whalen, 2020), which this study describes and analyses.

In this framework, it is important to consider that we are in the so-called anthropocentric era, in which postdigital education plays a major role. This postdigital education is characterised by the merging of two apparently separate spaces, which have come together "into one pedagogical postdigital space" (Tesar and Hood, 2019). In order to guarantee an education with appropriate ethical and moral values, where technology serves education and does not simply drag education into its own territory, reflection is needed both in terms of teaching practice and in terms of the policies that mark the transformations in schools. This reflection must be done from the perspective of postdigital theory, which helps to understand the relationship between technology and humanity, exploring the ethical implications in the educational world (Buchanan et al., 2022).

Digital learning policies to transform public schools

Government policies are a key component in the transformation of public schools (Uvarov, 2019). The policy response can accelerate or slow down the educational response depending on the importance assigned to digital technologies as a tool or as a form of mediation. The degree to which these technologies are incorporated in schools will depend on whether political and economic considerations are prioritised over educational ones. This is compounded by a lack of democratic participation in the design and development of these policies (Rasmussen and Reher, 2019). When major changes are on the horizon in schools, it is crucial that stakeholders' voices are heard, especially those of teachers, who are most familiar with the reality in the classroom (Cuenca, 2019). Education policies must be designed to reflect pluralism and diversity (Buchanan et al., 2022). This is why it is so important to listen to teachers and take their experiences into account, although their numbers and diversity make this task complex. Educational research can play an important role in connecting teaching practice and policy in a functional and dialogic way, allowing them to influence each other and move away from inflexible and bureaucratic administrative processes.

In Europe, at least three different types or styles of governance on media and information literacy have been observed with a 3D model (Development-Delegation-Disconnection) (Frau-Meigs et al., 2017), which points to the potential instrumentalization of good practices for economic reasons but overlooks forms of abuse whose risks are already known, including hate speech and radicalisation (Drotner et al., 2017). Introducing digital technologies without critical media education from schools dramatically increases the risk that educational platforms, especially those developed by GAFAM (Google, Amazon, Facebook, Apple and Microsoft), may impose and regulate the use of these technologies according to their own good practices. In this regard, the technological solution proved timely in educational settings during the pandemic, when large and numerous commercial alternatives for online education emerged (Teräs et al., 2020).

Education systems integrate digital technologies without really taking on board the change they bring about in school environments. They have been introduced following traditional methodologies or with innovations adapted to technology, without prior examination of the objective to be achieved and the possibilities they offer to achieve it. Even in non-digitised environments they are present in some form. This fact requires a multidimensional and reflective approach that helps to rethink the role of technology at the social and educational level, promoting a critical view of educational technology and using it to its benefit rather than adapting to it (Buchanan et al. 2022), .

Since the mid-20th century, good practices in education have been one of the main focuses in the study of teaching and learning processes (Henning, 2019) and are understood as successful practices that result in improved teaching and learning (Guzmán, 2018). The concept of good practice was developed by Hammer (1990), who defines it as a way of doing a job that produces a good result. He also proposes that it should be innovative, evaluable and replicable. For this reason, the schools were selected with the help of the Teachers' Centre, which had previously assessed schools with this profile in relation to technology integration. Good practices shed light on different ways of incorporating digital technologies into the classroom (Alonso-García et al., 2019) and allow their use in different contexts to be evaluated (Silova et al., 2020). Knowing the functional status of these practices and the value attributed to them (showcase, example, exception, etc.) (Benavente and Panchaud, 2008), makes it possible to identify their functionality and obtain information to evaluate processes and public policies (Costa et al., 2017).

An analysis of schools with good digital learning practices can reveal desirable characteristics to inform the development of a technology-mediated educational process at structural, pedagogical and cultural levels in environments with some experience of digital technologies prior to the pandemic. It offers an opportunity to reflect on and analyse the impact of public policies aimed at transforming public schools (Papanastasiou, 2019).

The success of processes for establishing and developing good practices in digital learning depends on numerous variables, given the technical complexity and diversity of stakeholders involved. Learners are key to understanding the outcomes of these practices and factors influencing aspects such as the internalisation of digital technologies should be analysed (Pea and Cole, 2019). Knowledge of the impact on teaching practice is equally crucial in understanding good ICT practices (Romeu-Fontanillas et al., 2020). Finally, management teams play a central role in the design and planning of good practices, especially when it comes to implementing government policies in each school (Blau et al., 2020; Wu et al., 2019).

This research explores ways of incorporating technology in public schools, taking as a reference schools with good digital learning practices. It delves into the factors that encourage and facilitate the

introduction of digital technologies with the aim of bringing about change not only at the instrumental and methodological level, but also in overall practices in schools. Transforming schools involves a series of key challenges and opportunities, which must be taken into consideration in future public policies. A dynamic experimental model is proposed on the basis of the results obtained, some of which are presented in this paper.

Research methodology

Objectives

The main aim of this study was to explore the ways in which digital technologies are incorporated into public educational institutions with good practices in digital education in Andalusia. To do this, a quantitative approach based on a descriptive method and a survey design was used. The data collection instruments were three ad hoc questionnaires for each group of participants: pupils, teachers and management staff. This quantitative design was supplemented with qualitative research using grounded theory to explore some of the emerging themes in greater depth. A series of open questions aimed at teachers and management staff provided data on their visions of the future of digital learning at their schools.

In line with the above, the research question posed was: What elements facilitate the integration of digital technologies in educational centers with good practices in Andalusia? As for the starting hypotheses, four hypotheses were put forward:

1. There are elements that are related to a greater internalization of digital technologies in students of educational centers with good practices in Andalusia.
2. There are aspects that enhance the effects of digital technologies in the teaching practice of educational centers with good practices in Andalusia.
3. There are elements that caused a greater impact of the last political plan of digitization of educational centres with good practices in Andalusia.
4. The current policy model for the integration of digital technologies in schools can be improved by considering the voices of those involved in digital learning processes.

With the aim of obtaining relevant information about the participants, aspects associated with different dimensions were analysed. Among pupils, the degree of internalisation of digital technologies was explored; among teachers, the effects of digital technologies on teaching practice were examined, and among management staff, the impact of the latest policy approved by the government on their school was studied.

Thus, the following specific objectives were established:

- Identify elements associated with the level of internalisation of digital technologies among pupils.
- Determine aspects relating to the effects of digital technologies on teaching practice.
- Identify elements relating to the impact of the most recent digital learning programme developed in public educational institutions in Andalusia.
- Design a model to improve digital learning policies in public educational institutions.

Methodological design

Given the characteristics of the study, non-probability, purposive sampling was used (Bisquerra, 2004), taking the educational institution as the sampling unit. In non-probability sampling, the selection of the sample does not depend on probability, but is adjusted to other criteria related to the characteristics of the research or of the sampler. To be selected for the study, the schools had to have good practices for digital learning in place as the aim was to identify elements associated with these types of practices. These criteria were passed on to two Teachers' Centres in the province of Seville and one in the province of Cádiz, which selected the educational institutions. These centres are responsible for monitoring and evaluating schools, providing training and supporting innovation and improvement. Therefore, with all the information available to them after years of monitoring schools in the province, they made the selection of schools on the basis of the criteria given. In total, they selected 18 public

educational institutions (n=18) that met the selection criteria: 11 primary schools (CEIP) and 75 secondary schools (IES).

With regard to the pupils, a total of 1882 individuals participated in the study. Their mean age was 12.31 (SD=2.305), with a range from 7 to 20 years old. 50.8% were boys and 49.2% were girls. 53.2% were at secondary school, while 46.8% were at primary school.

As for the teachers, 136 individuals participated in the study with a mean age of 43.45 (SD=7.235) and a range from 27 to 60 years old. 58.9% were women and 41.1% were men. 55.1% were working at secondary schools, while 44.9% worked at primary schools. They had a mean of 16.35 years of teaching experience (SD=8.978) and an average of 7.72 years of experience using digital technologies in the classroom (SD=4.585).

A total of 48 management staff participated in the study. Their ages ranged from 33 to 59, with a mean age of 45.53 (SD=6.829), and an average of 3.71 years in their current posts (SD=4.956). 60% were male and 40% were female. 56.3% worked at secondary schools, while 44.7% worked at primary schools.

Data collection instruments

As mentioned above, the data collection instruments were three ad hoc questionnaires for each group of participants: pupils, teachers and management staff. These questionnaires were developed using a table of specifications in order to ensure content validity. A table of specifications was drawn up for each questionnaire, identifying the dimensions and sub-dimensions to be studied, in accordance with previous research. This design process was carried out collaboratively within the research group. The three specification tables resulted in the scales and items for each of the questionnaires. Once developed, they were also evaluated by a group of experts for the same purpose.

The first part of the questionnaires collected identifying data for each participant (sex, age, education level, etc.), as well as presenting a series of specific questions for each group:

- Pupils: how old were you when you first used a computer, mobile, tablet and video game console?; do you have the internet at home?; do you have a computer at home?; were you given a netbook at school?; how many technological devices do you use at home?
- Teachers: how long have you been a teacher?; how many years have you been teaching with digital technologies?; have you been an ICT coordinator at your school?; have you participated in the Plan Escuela TIC 2.0 (the latest national plan for introducing digital technologies into schools from the Spanish government)?; are you currently participating in any working groups on digital learning innovation?; have you completed any training courses on digital learning?; are you keen to retrain in using digital technologies?
- Management staff: how long has your school been using digital technologies in the classroom and when were they introduced?; have you participated in any previous programmes on ICT in the classroom?; approximately what percentage of your teaching staff have participated in digital learning programmes?; what percentage of your teaching staff are currently participating in a programme for digital learning innovation?; what percentage of your teaching staff have received training in digital learning?; what incentives does your school offer for teachers to train in digital learning?

Following this, 5-point Likert scales (1-5) were drawn up to ascertain the extent to which participants agreed or disagreed with a series of statements and to establish the frequency with which they performed certain activities. In the case of pupils, the scale described ‘Internalisation of the use of digital technologies’, while the scale for teachers explored ‘Effects of digital technologies on teaching practice’ and the scale for management staff analysed the ‘Impact of Plan Escuela TIC 2.0 on the school’ as this was the most recent plan to be implemented in Andalusia.

The scale on 'Internalisation of the use of digital technologies' was composed of 11 items, which can be seen in the findings section (Figure 3). The scales 'Effects of digital technologies on teaching practice' and 'Impact of Plan Escuela TIC 2.0 on the school' were composed of a number of dimensions which in turn were composed of a set of items. In the analysis, the results of the dimensions are shown in order to obtain an overview. However, the items comprising each dimension are shown in Figures 1 and 2 for a better understanding of the results.

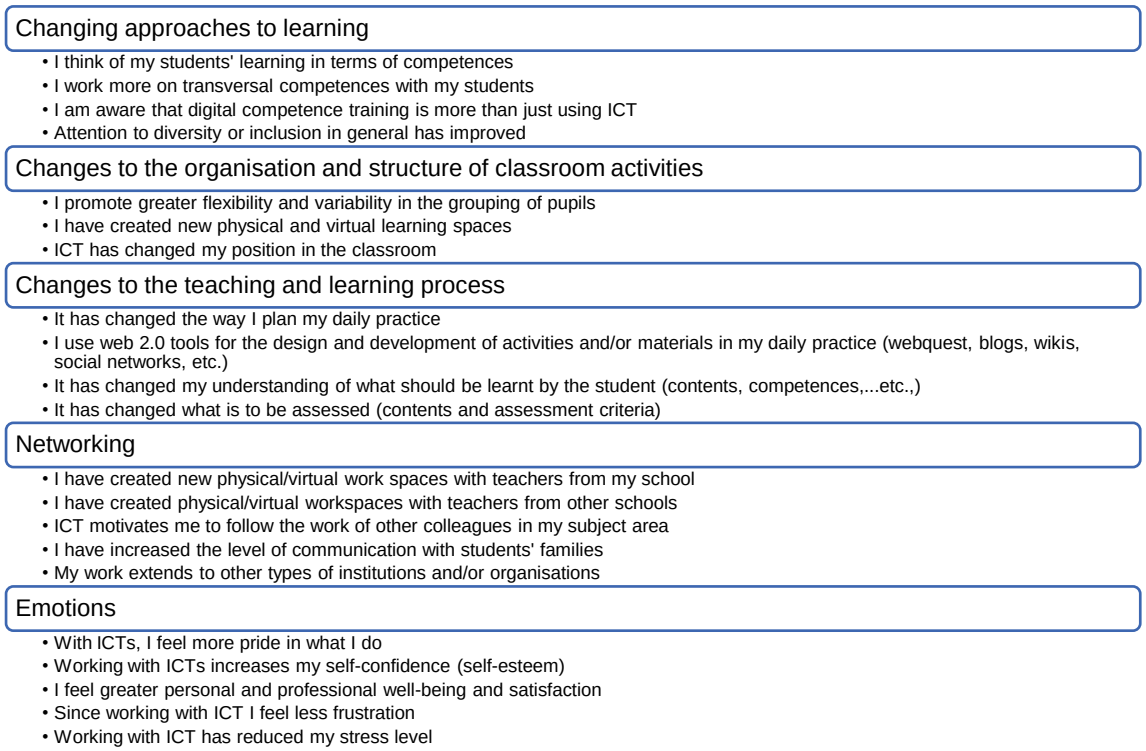
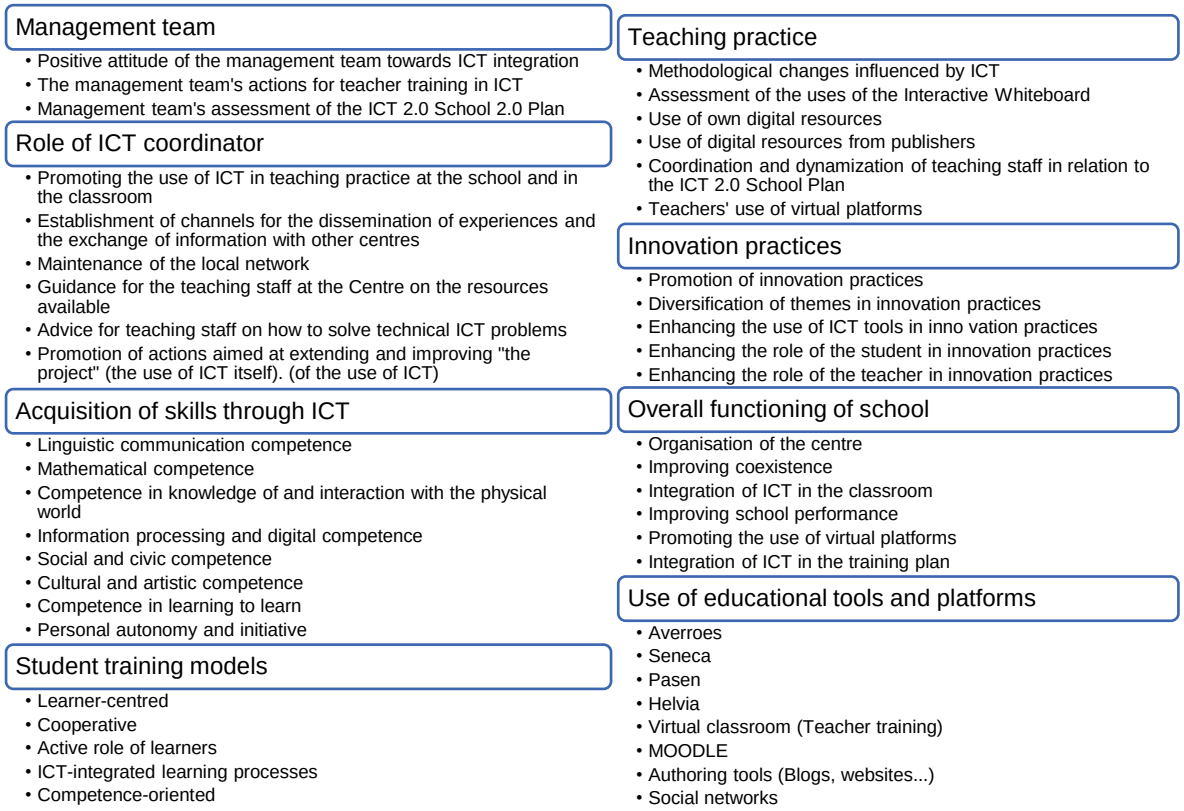


Figure 1. Items on the 'Effects of digital technologies on teaching practice' scale



Teacher training

- Adaptation of the ICT training offer to teaching needs
- Updating the content of ICT training courses
- Creation of physical/virtual spaces for teacher training in ICT
- Creation of ICT training networks with other centres and institutions
- Advice for teaching staff in relation to teaching practice with ICT

Figure 2. Items on the 'Impact of Plan Escuela TIC 2.0 on the school' scale

As mentioned above, the scales were designed using a table of specifications and evaluated by a group of experts to guarantee the instrument's content validity. For each of the scales, the reliability was measured with Cronbach's alpha and the construct validity was checked using exploratory factor analysis. Both the reliability ($\alpha>0.8$ on all three scales) and the validity (factors explaining at least 38.8% of the variance and saturating above 0.5) demonstrated the quality of the instruments used.

After administering the scales, the teaching and management staff were asked to describe their vision of a realistic and idealistic future of digital learning in their respective schools. Several dimensions were covered: provision of infrastructure and resources, organisation and functioning of the school, teaching and learning process, digital materials and content, virtual platforms, digital divide and other aspects. Although the results of the qualitative analysis are not presented here, they played an important role in the design of the transformative model presented in the study conclusions.

Statistical analysis

The data underwent two types of statistical analysis: a descriptive and a contrast analysis. Descriptive analysis was performed using the basic descriptive statistics, mean and standard deviation (SD). For the contrast analysis, tests were first performed to check whether or not the sample met the criteria for normality. If there was normality in the distribution of the mean, parametric statistics were performed: Student's T, if the independent variable to be tested had two groups, and ANOVA if it had more than two groups. If there was no normality in the distribution of the mean, non-parametric Mann-Whitney U statistics were used if the independent variable had two groups and Kruskal-Wallis H if it had more than two groups. The analyses were carried out using SPSS Version 24, with a significance level of $P \leq 0.05$.

Findings

In the descriptive analysis, the mean for the 'Internalisation of the use of digital technologies' scale was 3.31 (SD=0.909). Figure 3 shows the means for each of the items on the scale. All items on the scale were rated highly, ranging from 1 to 5. The item with the highest score was 'I complete the activities I am asked to do with the computer without difficulty', followed by 'I use the internet in very different ways to do things that interest me'. Meanwhile, the items scored lowest by the pupils were: 'I have felt the need to use the computer to work in class, even when the teacher doesn't tell us to use it' and 'I've learned things at school that I wouldn't be able to do now without a computer'. The results point to strong internalisation of the use of digital technologies, although some areas of improvement to ensure that pupils are able to use these technologies for their own individual purposes were identified.

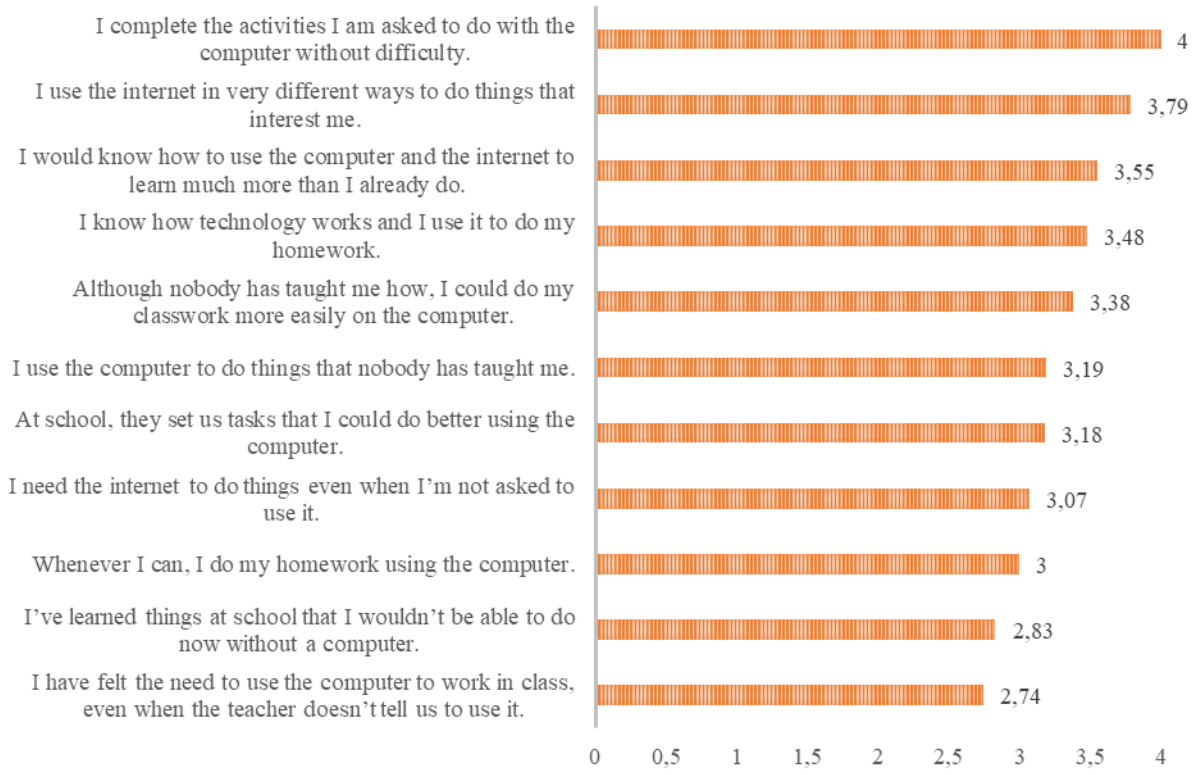


Figure 3. Means of items on the 'Internalisation of the use of digital technologies' scale

With regard to the changes in teaching practice among teaching staff brought about by digital technologies, the scale obtained a mean of 3.10 (SD=0.803). Figure 4 presents the means for each of the five dimensions on the scale. All dimensions obtained values exceeding the mean value on the scale (2.5). The dimension with the highest score was 'Changing approaches to learning', followed by another two dimensions related to methodological changes: 'Changes to the organisation and structure of classroom activities' and 'Changes to the teaching and learning process'. Meanwhile, the dimension with the lowest score was 'Emotions', followed by 'Networking'. Therefore, digital technologies had a greater impact on teaching practices among teaching staff in methodological or didactic terms than in personal and interpersonal terms.

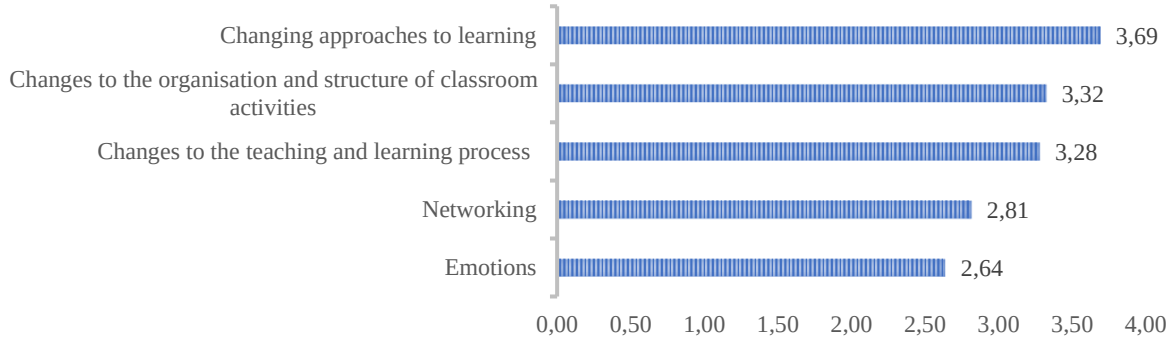


Figure 4. Means of dimensions on the 'Effects of digital technologies on teaching practice' scale

Among the management staff, a mean of 3.74 (SD=0.721) was observed with regard to the impact of Plan Escuela 2.0 on their schools. A closer analysis of the dimensions revealed the results shown in Figure 5. Generally speaking, high scores were obtained for all dimensions. The impact of the plan on the management team and on the role of the ICT coordinator scored particularly highly, as did the

acquisition of skills through ICT. A less significant impact was observed on the school itself, although it scored highly nonetheless, on teacher training and on the use of educational tools and platforms. Therefore, the results point to a greater impact on staff and competence acquisition than on more instrumental dimensions such as the use of educational tools and platforms.

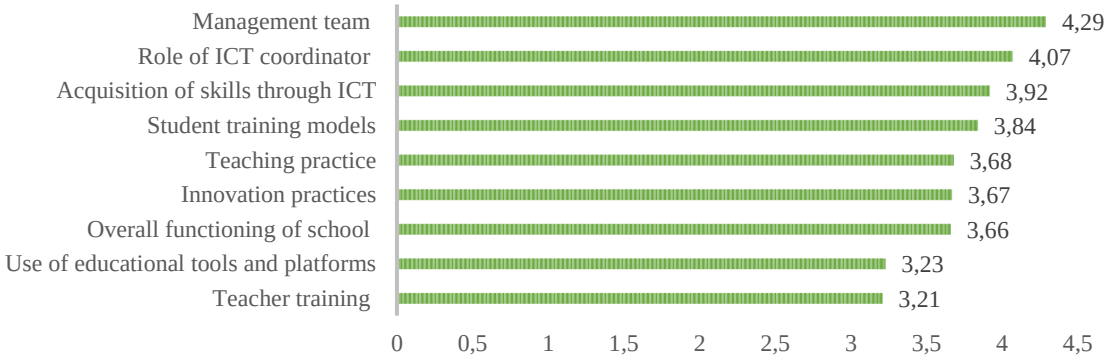


Figure 5. Means of dimensions on the 'Impact of Plan Escuela TIC 2.0 on the school' scale

Table I shows the factors associated with the three study dimensions: internalisation of the use of digital technologies among students, effects of digital technologies on teaching practice among teaching staff and impact of Plan Escuela TIC 2.0 on the school according to management staff. Only significant values are presented in the table.

Table I. Results of contrast analysis of study dimensions with identifying data

	Internalisation of the use of digital technologies
Education level	.000[1]
Sex	.000[1]
Do you have the internet at home?	.000[1]
Do you have a computer at home?	.000[1]
Were you given a netbook at school?	.001[1]
Age	.000[3]
Primary school	.000[3]
Secondary school	.021[4]
Number of computers and tablets used at home	.000[3]
Years of having a computer at home	.002[3]
Age of first use of a computer	.000[3]
Age of first use of a video game console	.001[3]
	Effects of digital technologies on teaching practice
Have you been an ICT coordinator at your school?	.000[2]
Did you participate in Plan Escuela TIC 2.0?	.001[2]
Are you currently participating in any working groups on digital learning innovation?	.022[2]
Have you completed any training courses on digital learning?	.020[2]
Are you keen to retrain in the use of digital technologies?	.005[2]
	Impact of Plan Escuela TIC 2.0 on the school
Percentage of teachers participating in ICT innovation programmes (dichotomised)	.031[2]

Note. (1) Mann–Whitney U; (2) Student's t; (3) Kruskal–Wallis H; (4) ANOVA.

In the 'Internalisation of digital technologies among pupils' dimension, a series of related factors were identified. The H0 of equality of means was rejected for the listed variables at 95% confidence. The following differences in means for the groups were confirmed:

- Education level: greater degree of internalisation at secondary level than at primary level.
- Sex: greater degree of internalisation in boys than in girls.
- Internet at home: greater degree of internalisation among pupils with internet at home than among those without the internet.
- Computer at home: greater degree of internalisation among pupils with a computer at home than among those without a computer.
- Netbook: greater degree of internalisation among those who received a netbook as part of Plan Escuela 2.0 than among those who did not.
- Age: greater degree of internalisation among pupils aged over 15 than among pupils aged under 10.
- Primary level: greater degree of internalisation in Year 5 at primary level than in Year 3.
- Secondary level: greater degree of internalisation in Year 10 at secondary school than in Year 7.
- Number of computers and tablets used: greater degree of internalisation among pupils using 6 devices than among those using 0.
- Years with a computer at home: greater degree of internalisation among pupils with a computer at home for less than 3 years than among those who had had a computer for 6-9 years.
- Age of first use of computer: greater degree of internalisation among pupils who began to use a computer aged under 5 than among those who started when they were 8-10.
- Age of first use of video game console: greater degree of internalisation among pupils who began to use a video game console aged under 5 than among those who started aged 10 or over.

The 'Effects of digital technologies on teaching practice' dimension showed significant differences for a series of factors, where the H0 of equality of means was rejected at 95% confidence. The trends in the differences found in the means for each group were then identified:

- ICT coordination: greater effects were observed in the teaching practice of teachers who had been ICT coordinators.
- Participation in Programa Escuela 2.0: greater effects of ICT on teaching practice were observed among teachers who had participated in Programa Escuela 2.0.
- Current participation in a working group on digital learning innovation: greater effects on teaching practice were observed among those who were participating in a working group on digital learning innovation.
- Training on digital learning: greater effects on teaching practice were observed among those who had completed a training course on digital learning.
- Retraining in digital technologies: greater effects on teaching practice were observed among those who were keen to retrain in the use of digital technologies.

With regard to the 'Impact of Plan Escuela TIC 2.0 on the school' dimension, no significant differences were detected in relation to the identifying data, with the exception of the 'Percentage of teaching staff participating in digital learning innovation programmes' factor, where the H0 of equality of means was rejected at 95% confidence. Once the means for the groups had been confirmed, it was found that Plan Escuela TIC 2.0 had a greater impact and continuity in schools where more than 50% of the teaching staff were participating in digital learning innovation programmes.

Conclusion

Several findings emerged from the search for elements associated with the introduction of digital technologies in public educational institutions with good digital learning practices. In terms of the impact on students, it is apparent that a digital divide persists as differences were observed by sex, purchasing power (availability of internet at home, number of computers and tablets) and digital practices (age of first use of electronic devices). This finding corroborates previous studies, which confirm the persistence of the digital divide both before (Pérez-Escoda et al., 2016; Freiman et al., 2018) and after the pandemic (Ong, 2020; Lai and Widmar, 2021). Public educational institutions must take each pupil's situation into consideration and attempt to compensate for differences in digital skill levels.

The use of electronic devices from an early age is associated with a greater degree of internalisation of digital technologies. However, this early use of technology must consider postdigital theories that call for a deep reflection on the implications of digital education for children. This fact poses unique

challenges to child-related policy, as it aims to preserve that innocence. The forces of the digital world must not be allowed to invade the world of children without a prior analysis of the repercussions they may have, especially at the ethical and moral level (Tesar and Hood, 2019). Some people consider that the best option is to keep children away from technology. However, given the digitalisation of processes in which we are immersed, it seems that rather than a ban, a good education in its use is important. This education should be moral and ethical, rather than instrumental or pedagogical. Therefore, policies must start from the same basis, where ethical and moral reflection prevails over pedagogical and, of course, economic and political interests. This aspect is key in order not to dehumanise learning processes and education in general (Hood and Tesar, 2019).

This points to the need for a dual approach. Firstly, action must be taken to raise awareness among the whole school community of the academic and social barriers and benefits involved in digital learning (Iglesias et al., 2017). This awareness-raising should include a thorough analysis of the moral and ethical implications of digital learning in school environments, especially with regard to its impact on children, who inhabit a digital world that is governed by principles set by people who were not born into the digitalised environment (Tesar and Hood, 2019). Secondly, digital learning policies must be developed to address existing inequalities and alleviate the digital divide between pupils (Plotichkina et al., 2020).

Teachers who participate actively in digital learning projects experience improvements to their teaching practice, as do those who use their time to retrain in digital technologies and attend training courses. It is interesting to note that variables such as sex, age, level or subject taught, years of experience as a teacher and years of experience using digital technologies do not have a decisive impact on teaching practice. This finding echoes previous studies, such as Tondeur et al. (2018) and Moreno-Rodríguez et al. (2018), which demonstrate the absence of gaps associated with sex, age and other aspects in teaching practice using digital technology. The findings of this study confirm the importance of actual practice and a positive attitude towards training on digital learning, corroborating similar studies (Alvarado et al., 2020; Baydas and Yilmaz, 2018; Bai et al., 2019; Díaz-Barahona et al., 2019). Once again, teachers' involvement and participation are a crucial factor, which can be enhanced by creating a culture of participation and transformation that is valued in public policy.

Schools where a greater proportion of teachers participate in innovation programmes achieve greater success in expected outcomes. Neither training, number of years as an ICT institution nor digital learning innovation projects influence these outcomes; active participation from school staff has the greatest impact. Therefore, schools must take measures to engage teaching staff in these types of initiatives and to build a participatory culture. This corroborates the results of previous studies (Seraji et al., 2020; Pérez-Ortega, 2017). In this regard, a project-oriented organisational philosophy would encourage this kind of innovation by involving staff in projects to bring about change to the school's culture, values, structure and teaching (Turner and Miterev, 2019). This project management approach is used with the aim of triggering institutional change by identifying complex processes and the technical requirements for empowerment and accountability underpinning them (Álvarez-Dionisi, 2016). This process must in turn be critical of the practices of integrating digital technologies, in order to observe whether these practices are accommodations to technology or are really a pedagogical transformation, carrying out this analysis from the ethics of teaching (Buchanan et al. 2022). This critical and moral rethinking creates a unique opportunity for the transformation of schools. As noted above, the support and involvement of the entire educational community is a key factor (Gobby and Niesche, 2019).

The study findings point to elements that could be taken into consideration to improve digital learning in public schools.

The quantitative results are complemented by the findings from the qualitative study, presenting a series of challenges and possibilities for transforming public schools. This study aims to provide evidence of the reality of educational institutions for use in public policymaking, identifying aspects that could inform areas for action in future digital learning plans and programmes. Figure 6 presents a SWOT matrix summarising the results of the qualitative study.

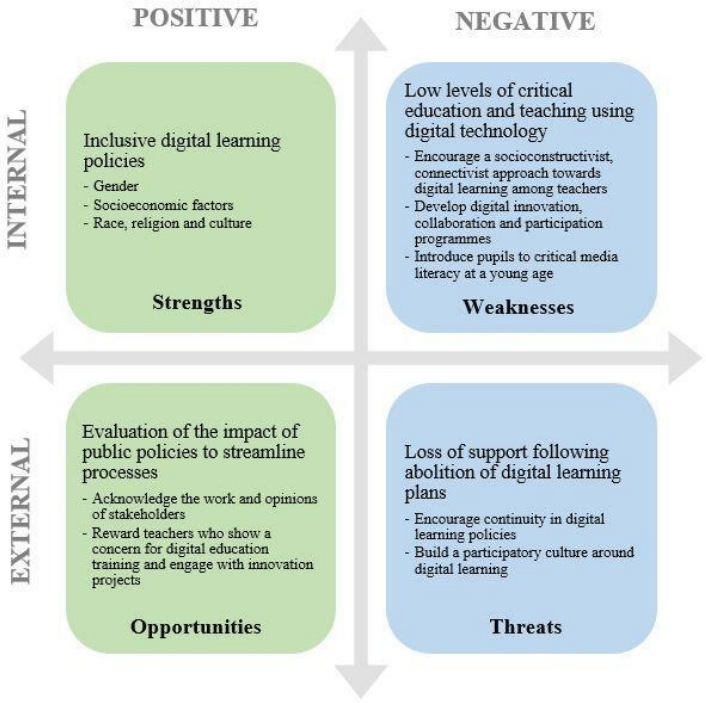


Figure 6. Qualitative analysis of public policies in Andalusia, Spain

In line with the qualitative results, two key aspects related to the design of effective digital learning policies for transforming public schools should be noted. It is important to listen to and value the contributions made by professionals working at educational institutions and to incorporate their opinions and experiences into digital learning plans and programmes. To ensure reflexive and progressive development, collaboration between researchers, policy makers and teachers should be encouraged, especially between those involved in the day-to-day activities of schools and those who theorise or reflect on these activities to give them coherent and lasting meaning. This will allow a retroactive, reflexive, incremental design to be developed.

Drawing on the results obtained, a (self-)regulating, (re)distributive model (see Figure 7) was produced on the basis of three components: Evaluation-Training-Planning (ETP) (Anderson, 2011). The model represents a shift away from a traditional project management approach or project-oriented organisational structure (planning, organising, leading and controlling), inverting it to create a reflexive, dialogic political model that distributes and regulates from the bottom up through agile, critical project management. The results of this study show that evaluating specific school settings rather than imagined or standard spaces can allow processes of self-regulation and redistribution to develop on the basis of the needs of those who implement and are impacted by these processes. This model is more functional than the pyramid model (less agile and more bureaucratic and technocentric) and links face-to-face and distance practice with the value of technology without losing sight of the humanity that exists in the integration of digital technologies.

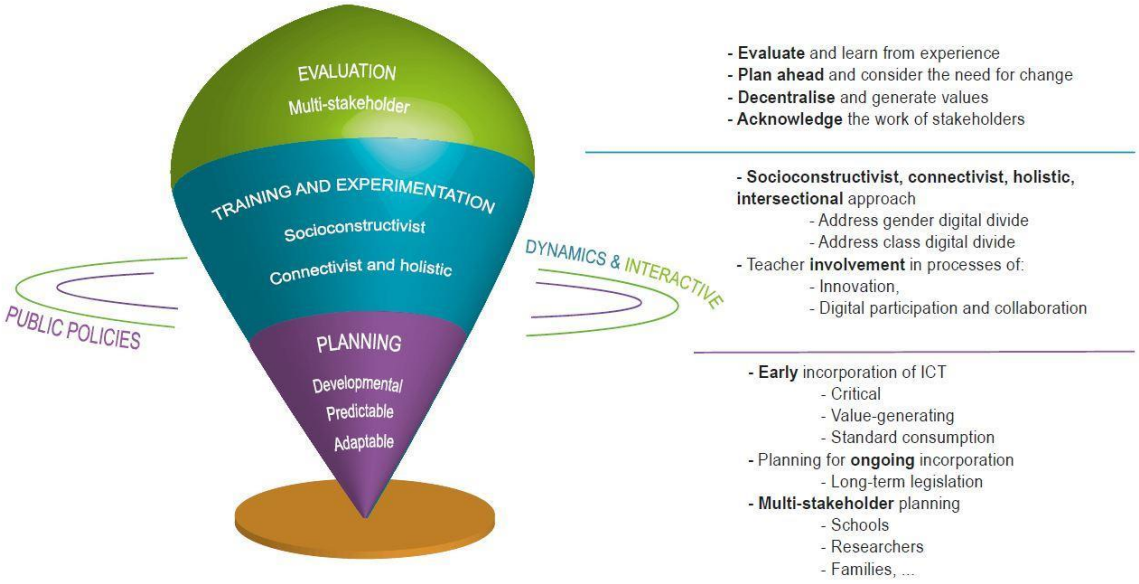


Figure 7. Dynamic interactive paradigm of public digital learning policies

The models of good practices observed are shaped by a freedom of action that must be maintained in public settings that are not considered exemplary in order to enable them to identify their own good practices. To ensure that good practices serve as more than a mere showcase of non-transferable attempts, public policies should be based on the concept of sense-making practices (Frau-Meigs et al., 2017), whereby the setting and stakeholders accord success or exemplarity to digital learning practices at the local level. The introduction and internalisation of digital technologies must reflect a genuine appropriation of these technologies, adapting them to the idiosyncrasies of educational institutions and those who work and study in them. While the pyramid model of public policy is entirely prescriptive and applicationist (Paquelin, 2009), the spinning top model proposed allows for a more holistic, pluralistic, multi-stakeholder approach that reflects the local context.

The proposed model echoes studies that argue for the importance of continuity in digital learning policies and of a dynamic policy model based on research and action that aims to achieve constant improvement. This study has a clear limitation in that it was conducted in a local context. However, the scientific literature shows that this is a common aspect in many countries (Frau-Meigs et al., 2017; Williamson et al., 2020), so this model can be extrapolated to other contexts. In fact, we have observed international studies that support a participatory and co-design process in the digitization of teaching (Jandrić and Knox, 2022). At the same time, studies claim that it is time to initiate a productive policy that goes beyond a superficial commitment to changes that address the consequences of postdigital environments on humanity in general and on learning contexts in particular (Tesar and Hood, 2019). Ethics in digital technology integration practices should be a cross-cutting element for policy makers, educators and learners themselves (Buchanan et al. 2022).

Politicians and educators seek to integrate digital technologies into the classroom to improve learning processes, without stopping to consider aspects related to the consequences that this postdigital education will have in the future (Hood and Tesar, 2019). There are important questions that need to be asked before designing these policies, such as: what is it like to be a child in this digital age, how does he or she relate to the digital world, what role should technology play in digital environments, what boundaries should we consider? These questions are necessary because as Hood and Tesar (2019: 309) point out: "Digital does not create a new reality; it rather merges the existing realities. What is real is perhaps no longer needed; and what is needed needs to be reconceptualized within the Anthropocene". This critical process of reflection must be supported by a dynamic policy model, such as the one proposed in this study, which allows for adapting to change in a flexible and agile way.

In line with the above, this approach requires active listening to different points of view, criticising but always towards improvement. This process should be carried out using a dialogical pedagogy that ships

a common understanding, building and connecting communities (D'Olympio, 2017). Moreover, this dialogic pedagogy can serve as a basis for learners to help them use digital technologies in ways that inform, connect and build social communities (Buchanan et al. 2022) by humanising the digital world. Specifically, Figure 8 sets out a series of actions to implement the proposed model from a dialogic perspective. Although this is a local study, these proposals can be applied to other contexts, as they are open to the context and can be adapted according to the political and educational functioning.

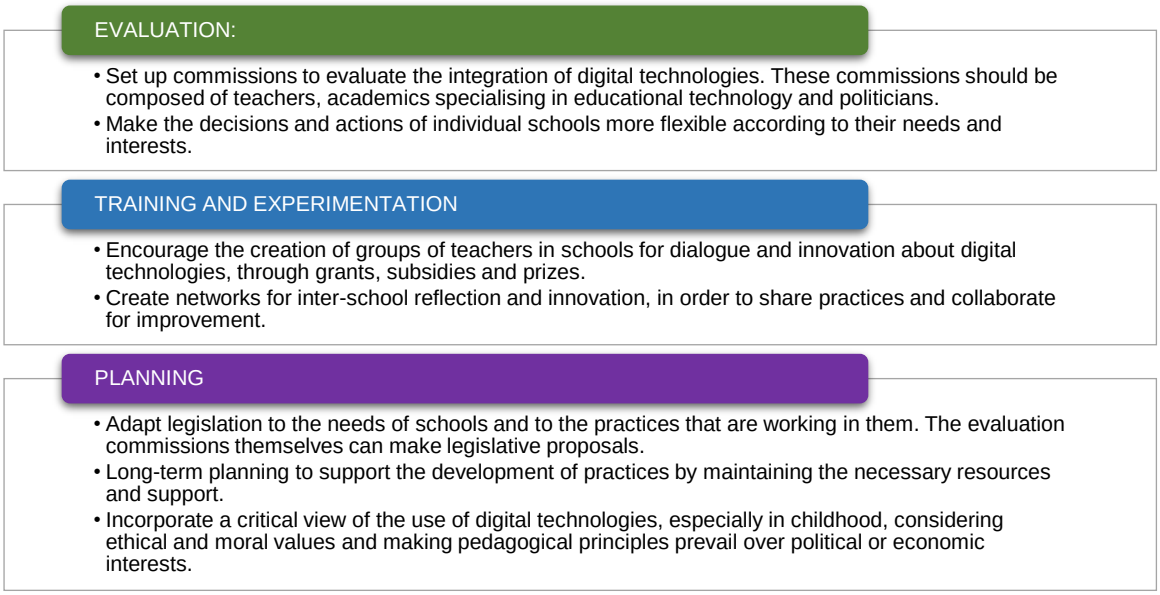


Figure 8. Concrete actions for the implementation of the proposed policy model

The COVID-19 pandemic has reinforced the need for a shift towards a dynamic, reflexive policy model that can be adapted to emerging social changes, focusing on the human beings involved in educational processes and their needs. This work in turn opens up new areas of inquiry into concrete aspects of educational technology policy such as privacy concerns, data protection, and the potential for digital technologies to exacerbate social inequalities. These areas have a major social and educational impact, and a thorough analysis of the implications is crucial in order to adapt education legislation to the postdigital learning era.

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