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FAMILIES' PERCEPTIONS OF THE USE OF DIGITAL TECHNOLOGIES IN FAMILY-SCHOOL COMMUNICATION

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ABSTRACT

Aim/Purpose	This study examines how digital technologies are used to support communication between families and educational centers, understood as formal primary and secondary schooling institutions, during and after the COVID-19 pandemic. The research explores parents' perceptions of these communication practices, their perceived influence on family involvement, and the challenges and opportunities associated with digitally mediated family-school relationships.
Background	The rapid digitalization of educational communication during the pandemic transformed established family-school interactions worldwide. Understanding families' beliefs, everyday practices, and perceived difficulties in using digital technologies is essential to inform more inclusive and participatory communication strategies that remain relevant beyond emergency contexts.
Methodology	The study uses a mixed-methods approach combining quantitative and qualitative methods through a convergent or concurrent triangulation design. For the quantitative phase, the COMCEFAM questionnaire (Questionnaire on Communication between the School and Families) was used, which was designed and validated for this purpose. It consists of 36 items and was administered to the families of primary and secondary school students. For the qualitative phase, a parent discussion group was used to explore in depth experiences and perceptions related to digital communication with schools.

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Contribution	This study's contribution concerns parents' perceptions of the use of digital technologies in family-school communication during and after the pandemic, the impact of this communication on family involvement in the school, and possible proposals for the use of digital technologies that promote new scenarios for family participation.
Findings	Results indicate a broadly positive perception of digital technologies as tools for family-school communication. A large majority of respondents agreed that digital technologies are useful for communication (88.22%) and necessary in contemporary society (85.20%). However, perceived support for family participation through digital means was moderate, and only 30.48% of families reported receiving training from educational centers on using these technologies. Qualitative findings highlight persistent challenges, including the dispersion of communication channels, unequal digital competencies, and the predominance of informational rather than participatory communication practices.
Recommendations for Practitioners	Promote training and digital literacy for families and teaching teams. Implement procedures that promote educational, participatory communication rather than focusing solely on the exchange of information.
Recommendations for Researchers	Analyzing and understanding family-school communication is essential for designing quality proposals that enable effective and equitable communication between families and schools, regardless of context and the availability of devices and technological training.
Impact on Society	Highlights the importance of communication between families and schools to improve family involvement in academic issues. Identifies additional challenges, such as the lack of preparation among teachers and families
Future Research	Discuss possible proposals for the use of digital technologies that promote new scenarios for family participation, both for everyday situations and for unexpected emergencies.

Keywords	family attitudes, digital technologies, family-school relationships, family-school digital communication

INTRODUCTION

Family-school communication refers primarily to the forms of collaboration and family participation in students' educational processes. Extensive research has shown that family involvement plays a relevant role in students' educational trajectories, shaping their attitudes toward school and their engagement with learning. Within this framework, communication between families and schools, particularly when mediated by digital technologies (DT), has been identified as a key dimension of parental involvement, influencing and reinforcing other forms of participation (Egido Gálvez, 2020; Heath et al., 2015; Kraft & Dougherty, 2013).

Analyzing in depth the beliefs, daily practices, and main difficulties parents face when trying to use digital technologies in their relationships with educational institutions can help propose strategies that promote new scenarios of family participation, seen as really necessary in the emergency situations experienced during the COVID-19 pandemic.

With the arrival of the pandemic, family-school collaboration underwent significant changes, both during and after the pandemic. Among other things, families had to assume a more active role in their children's education, particularly at the early levels, due to the closure of centers and the abrupt transition to distance learning. With the reopening of the centers, the main responsibility returned to

the schools, although families continue to play an important role in their children's education (Salinas Ibáñez, 2020).

The challenges faced by teachers and families during this time fit the description of Barbour et al. (2020) for the educational response to COVID-19 in Canada. These authors establish four phases that can be generalized to a wide variety of situations: Phase 1 - rapid transition to remote teaching and learning; Phase 2 - (re)incorporation of the basics; Phase 3 - prolonged transition during continued upheaval; and Phase 4 - a new emerging normality.

At first, digital technologies were the immediate and most effective solution to school closures. Thus, these technologies became the problem and solution to a complex social and educational situation, revealing several inconsistencies and setbacks that remained hidden under the normality of pre-pandemic education, such as the enormous challenge posed by their immediate use within a purely face-to-face educational system, the limited training of families in their use, the limited access to them by many students, and the diversity of platforms and supports and their role in educational processes.

The contribution of this study is to examine parents' perceptions of the use of digital technologies in family-school communication during and after the pandemic, the impact of such communication on family involvement in the center, and possible proposals for the use of digital technologies that promote new scenarios of family participation.

Once the study has been contextualized, the rest of the document is organized as follows. The following section reviews the literature. Next, the research methodology and questions are presented. After the methodology section, we discuss the results. Finally, the contributions and limitations of the research are presented.

LITERATURE REVIEW

A review of the literature related to this work reveals foundations that connect with different research topics. Family-school communication is at the core (Epstein, 1995; Smith et al., 2020), especially when such communication is mediated and enhanced by technology (Gaspar et al., 2025; Macià & Garreta, 2019; Patrikakou, 2016). However, it is also useful to approach the subject under investigation from other perspectives, such as parental mediation (Atkin et al., 1991; Livingstone & Helsper, 2008), the digital divide (Borg & Smith, 2018; UNESCO, n.d.), and home schooling (Bol, 2020), among others.

Family-school communication constitutes one of the focuses of interest when studying the collaboration and participation of parents in the educational process. The literature on the subject finds that this participation influences the academic process of students, their attitudes towards school, and their school success (Barger et al., 2019; Castro et al., 2015; Desforges & Abouchaar, 2003; Egido Gálvez, 2020; Hill & Tyson, 2009; Jeynes, 2015; Park & Holloway, 2017; Roth Eichin & Volante Beach, 2018; Wilder, 2014).

The effective use of digital media in this family engagement has been frequently studied, concluding that it contributes to increasing participation and overcoming some of these limitations by being considered more efficient, immediate, effective, and convenient (Bacigalupa, 2016; Bardroff & Tann, 2012; Blau & Hameiri, 2012; Bouffard, 2008; Goodall, 2016; Ho et al., 2013; Macià & Garreta, 2019; Özdamli & Yildiz, 2014).

All forms of relationships between families and schools underwent changes during the pandemic; changes that could be observed both during and after the pandemic. Among the changes that the situation of the use of digital technologies in family-school communication experienced with the pandemic, the following stand out: the abrupt adaptation to distance learning, the lack of preparation, the insecurity and stress experienced, the unequal access to digital platforms, and the low level of digital skills of teachers, students, and parents, which affected the quality and effectiveness of education

(Carrión-Martínez et al., 2021; Fontana & Camilli, 2023; Otero-Mayer et al., 2021; Serrano-Díaz et al., 2022).

One of the first things that was perceived in the initial phases was an inequality in access to education, given that this improvised "home schooling" depended both on the accessibility and mastery of digital technologies, and on the support for study that the family context could offer, depending on its technical resources, its academic level and the time available (Sahlberg, 2020; Serrano-Díaz et al., 2022). Families did not have sufficient capacity to combine time and share resources and spaces (Díez Gutiérrez & Gajardo Espinoza, 2020; Garbe et al., 2020; Hortigüela-Alcalá et al., 2020; Seabra et al., 2021). According to Sánchez-Garrote and Cortada-Pujol (2015) or Macià and Garreta (2018), the existing digital divide in Spain arises not so much from accessibility issues as from the lack of knowledge and skills among families.

The lack of knowledge and skills on the part of families affects the quality of parental mediation in the relationship that minors have with technology (Livingstone et al., 2023), and within this, the technology-mediated learning experiences proposed by schools are particularly important. However, this lack of skills on the part of families affects the three types of parental mediation strategies proposed by Livingstone and Helsper (2008): active mediation, restrictive mediation, and co-use. Although parental mediation began to be studied in relation to television use in 1990 (Atkin et al., 1991), the parental mediation strategies (Livingstone & Helsper, 2008) remain crucial for well-being in a digital society (Lafton et al., 2024; Livingstone et al., 2023).

In the context of our work, parental mediation is directly connected to the digital skills that minors must develop. If we use the four-dimensional classification of digital skills identified by Helsper et al. (2021) (1. technical and operational skills; 2. information navigation and processing skills; 3. communication and interaction skills; and 4. content creation and production skills), this construct affects young people's cognitive development, performance in school activities, and the healthy, ethical, and safe use of digital technologies.

If we look at the emerging new normality phase of Barbour et al. (2020), it is clear that, despite the rapid pace at which schools and families have adapted to these technologies, these have been little focused on didactic or pedagogical purposes (Bonal & González, 2020; Carrión-Martínez et al., 2021; Hortigüela-Alcalá et al., 2020). In this situation, parents sometimes felt overwhelmed by the number of resources offered by the school.

Digital technologies were the immediate and most effective solution to the school closures in most countries caused by the pandemic. This made them appear, at the same time, as a problem and as a solution to a complex social and educational situation. They revealed several inconsistencies and setbacks that remained hidden under the normality of pre-pandemic education, such as the enormous challenge posed by their immediate use within a purely face-to-face educational system, the scarce training of families in their use, the limited access to them by many students, and the diversity of platforms and supports.

Different studies have already pointed out that although the integration of digital technologies (emails, electronic newsletters, text, applications such as Instant Messaging (mostly WhatsApp), mobile devices, or online platforms) in pedagogical communication between school and family has been increasing over the years, they have often been used mainly to transmit predominantly unidirectional information (Hohlfeld et al., 2010; Macià & Garreta, 2019; Patrikakou, 2016; Sánchez-Garrote & Cortada-Pujol, 2015; Thompson et al., 2015; Wasserman & Zwebner, 2017). However, the implementation of these technologies is far from widespread, especially when it comes to engaging in two-way correspondence between parents and teachers. Leveraging these digital technologies during and after the pandemic has provided clues as to how digital communication can enhance collaboration between teachers and parents (Abubakari, 2020; Chen & Rivera-Vernazza, 2022).

These results have been observed both in Spain (Otero-Mayer et al., 2021; Serrano-Díaz et al., 2022) and internationally (Garbe et al., 2020). Studies are available from different countries: Chen and Rivera-Vernazza (2022) or Jordan et al. (2025) for the United States; Seabra et al. (2021) for Portugal; Lau and Lee (2021) for Hong Kong; Barbour et al. (2020) for Canada; and Abubakari (2020), who studied the issue in Ghana. The quality of student and parent involvement in school tasks and activities through digital technologies depends largely on learning conditions, especially the type of support provided by teachers (Donnelly et al., 2022; Gershy & Katz, 2023) and the support available at home (Bol, 2020; Sahlberg, 2020).

One of the first things that was noticed in the various studies was inequality in access to education, because the improvised "home schooling" depended both on accessibility and mastery of digital technologies and on the study support that the family environment could offer, depending on its technical resources, academic level, and available time (Bol, 2020; Sahlberg, 2020; Serrano-Díaz et al., 2022). The suspension of in-person school activities highlighted the wide gaps between families and schools in their educational roles, revealing multiple forms of exclusion that limit the equalizing function schools should fulfill (Tarabini, 2020).

The digital divide was evident in our study, as it is in others. It was evident in the disparity of economic resources (Save the Children, 2020), in the lack of Internet access (Bol, 2020; Rodicio-García et al., 2020), the lack of digital skills (UNESCO, n.d.), or, more specifically, the inability of families to provide curricular support (Garbe et al., 2020; Rodicio-García et al., 2020).

Physical access is just one of many barriers to digital inclusion. There is an important distinction between mere access and being able to effectively use information and communication technologies (ICT) in everyday life. That is why efforts are being made to understand the factors that drive digital inclusion and to design (and evaluate) strategies to reduce exclusion (Borg & Smith, 2018).

To improve the management and social use of digital technologies, especially in family-school communication, both teachers and families need greater mastery of the four areas of digital literacy identified by Helsper et al. (2021) and Livingstone et al. (2023).

METHODOLOGY

This study aims to contribute to the knowledge of the use of digital technologies in family-school communication, both during the pandemic and once normality has been restored. It explores different aspects of beliefs, daily practices, and the main difficulties faced by parents when they try to use digital technologies in their relationships with schools. In this sense, the research questions are:

- What was the parents' perception of the use of digital technologies in family-school communication during and after the pandemic?
- What was the impact of such communication on family involvement in school activities?
- What could be the possible proposals for the use of digital technologies to promote new scenarios of family participation?

The study uses a mixed method that combines quantitative and qualitative methods. This method collects and analyzes qualitative and quantitative data, using both research methodologies to highlight and enhance our understanding of the topic. It is a research methodology that has gained prominence for its applicability to research problems when quantitative or qualitative paradigms alone are insufficient (Creswell & Plano-Clark, 2018; Teddlie & Tashakkori, 2010).

In this case, the mixed-methods design gives equal weight to quantitative and qualitative aspects through a convergent or concurrent triangulation design. The design is based on the simultaneous collection of quantitative and qualitative data, their separate analysis, and comparison of the results. In this way, an integrative interpretation can be established by assessing similarities and differences (Creswell & Plano-Clark, 2018) (Figure 1).

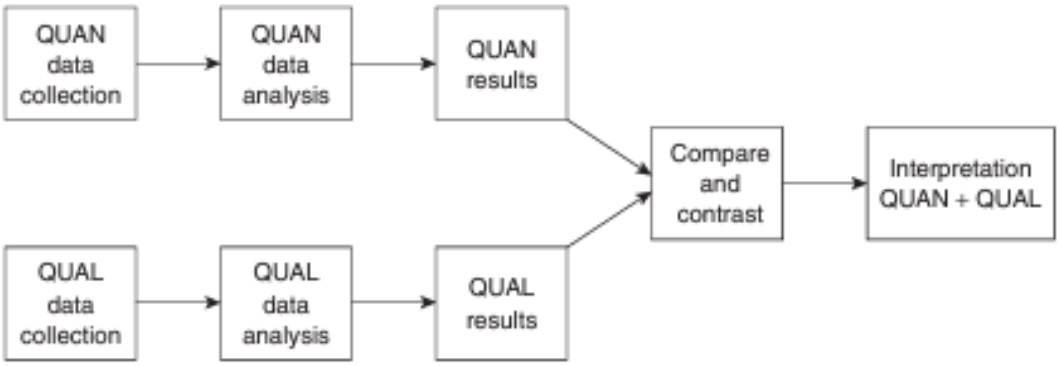

Figure 1. Convergent mixed methods design (adapted from Creswell & Plano-Clark, 2018)

Data Collection

A descriptive study was chosen to determine the following: technological availability; the self-perception of families regarding their digital competence; the form and frequency with which they communicate with the center and vice versa; the purpose of this communication; and the opinion on the use of digital technologies for the participation of the families themselves in the teaching-learning process of their sons and daughters.

For the quantitative phase, we used the COMCEFAM questionnaire (questionnaire of opinion on communication between the educational center and families), designed for this purpose and validated, which consists of 36 items and was applied to the families of primary and secondary school students enrolled in publicly funded educational centers in the Balearic Islands (Salinas & de-Benito, 2025).

Data collection was carried out online via a link to the questionnaire, along with the presentation of the free and informed consent form. After acceptance, participants were presented with the questionnaire to complete. Parents were invited to participate in the research through parents' associations and schools. Since we were interested in analyzing parents' perceptions of the use of digital technologies in family-school communication during and after the pandemic, 12 of the 36 COMCEFAM items were selected for the study (Table 4).

For the qualitative phase, a focus group was used to conduct an in-depth analysis of parents' beliefs, daily practices, and main difficulties when communicating with the centers via the Internet. The aim of this study is not to generalize the results but to address a perceived need among centers and families. For the qualitative phase of the study, the participating parents were selected from those who had responded in the quantitative phase by completing the questionnaire, checking the box at the end to agree to participate, and providing their contact information. Although more parents were interested, it was difficult to set a date when all could assist, so the group date was set for a time when most participants could attend. The group size for this phase was finally five participants. Information on the participants in the qualitative part is shown in Table 1.

To obtain qualitative data for the study, a discussion group was organized to address the mechanisms required for families' participation in communication with educational centers, using open-ended questions. The questions asked were the following:

> What happened with the communication between families and the different centers during the COVID-19 stage?
>
> Did the families feel competent in the use of the technologies proposed by the centers for the learning process?
>
> Who is responsible for the digital competence training of families?

This study took place a month after the questionnaire responses were analyzed. The discussion group was led by two experts, who began with an initial description of our research and a presentation of the participants. As the expert started with the first question, participants not only answered it but also engaged in a guided conversation with the expert about the research topic.

Table 1. Participants in the qualitative phase

ID#	Gender	Education	Profession	Number of children	Stage
P1	W	Pedagogue	Manager	2	Secondary
P2	W	Teacher	Stay-at-home parent	2	Primary
P3	M	Teacher	Teacher	2	Primary/Secondary
P4	W	Physiotherapist	Teacher	1	Primary
P5	W	Biologist	Self-employed	3	Primary

Data Processing

As shown in Figure 1, the analysis of questionnaire and focus group data was conducted in parallel to develop an integrative interpretation by assessing similarities and differences (Creswell & Plano-Clark, 2018).

Analysis of the Questionnaire Data

The 12 items under study use a 5-point Likert scale, ranging from totally disagree (1) to totally agree (5). Of the 3,274 surveys answered, 2,110 were valid for the data analysis, and 1,460 for the data of the present study, in some cases, and 1,486 in others. This difference is because the questions were not obligatory, so some were left unanswered.

Of the participants, 81.37% were women, 17.54% men, and 1.09% did not specify. These percentages were similar to those reported in other studies (Garbe et al., 2020; Lau & Lee, 2021; Seabra et al., 2021). The mean age of participants is 40.7 years, with a wide age dispersion (s = 7.5). The number of minors at home averaged 1.7, and they attended mostly public centers.

The application used was statistical software R, version 2023.09.1+494 (R Core Team, 2023).

Analysis of the Discussion Group Data

The focus group was organized by videoconference under the supervision of the researcher. Videoconferencing was selected as a suitable medium given the participation of the group of subjects from three different islands. Parents were informed about the research and asked for their informed consent. A recording device was used to record the session, and notes were taken. To prepare for analysis, all interventions were transcribed into Word files.

The transcription was organized into 198 units of information. The coding of these was carried out by 3 coders, and of the 198 units, 139 were coded by at least one coder. Through thematic analysis, the researchers reviewed the data in search of coinciding or differentiating aspects to find themes and categories related to the research objectives. After creating a category system, the three researchers coded the data individually, and to reach a consensus, the themes were discussed together in periodic meetings.

To evaluate the coding decisions, inter-rater reliability was determined and since our study considers three researchers (A, B and C) in the coding process, Fleiss Kappa (Fleiss et al., 2003) is a coefficient of the degree of coherence between coders, since it is based on the same formula proposed by Cohen (1988), but generalized for more than two coders (Table 2).

Table 2. Fleiss Kappa – global agreement

	Kappa	Asymptotic			95% asymptotic confidence interval	
		Standard error	Z	Sig.	Lower limit	Upper limit
Global agreement	.626	.026	24.378	<.001	.576	.676

Based on the research questions, three categories were defined: (1) families' perception of the use of ICTs in family-school communication, (2) the impact of such communication on the level of family involvement in the school, and (3) proposals for strategies for the use of ICTs to promote new scenarios of family participation (Table 3). In this table, category 0 corresponds to comments that are not associated with any of the above categories.

Table 3. Fleiss Kappa – agreement on individual categories

Punctuation	Conditional probability	Kappa	Asymptotic			95% asymptotic confidence interval	
			Standard error	Z	Sig.	Lower limit	Upper limit
0	.674	.522	.041	12.717	<.001	.441	.602
1	.752	.691	.041	16.849	<.001	.611	.772
2	.699	.628	.041	15.316	<.001	.548	.709
3	.810	.787	.041	19.179	<.001	.707	.867

Fleiss et al. (2003) offer a classification of Kappas that can help us to interpret the coefficients obtained. These authors classify Kappas as regular (0.40-0.60), good (0.61-0.75), and excellent (>0.75), so it can be concluded that, in this case, a good overall agreement between coders was obtained (Table 2).

Regarding each of the categories (Table 3), it can be observed that the four categories also show good agreement, with excellent agreement for categories 1 and 3.

RESULTS

In this section, we present the results of the study. We have organized the results according to the research questions posed and the research method. We then answer these questions and propose possible interpretations of the results in the discussion.

RESULTS OF THE COMCEFAM QUESTIONNAIRE

The results correspond to the 12 questions selected from the questionnaire, which address parents' perceptions of family participation in communication processes with educational centers mediated by digital technologies.

As mentioned, the questionnaire is Likert-type and asks to what extent you agree with the following statements regarding the different items. The mode, arithmetic mean, and standard deviation of the responses corresponding to each item are presented in Table 4. From the data obtained, it can be derived that families value the function of technology for communication with educational centers, as well as for learning and life in society.

With a mean of 4.28 and 88.22% agreeing or totally agreeing (Table 5), families clearly value the usefulness of technology in family-school communication, as well as the need for digital technologies in

today's society (mean of 4.21 and 85.2% respectively) or the ease of use of the technologies used for such communication (mean of 3.97 and 76.44%).

Table 4. Descriptive statistics of the COMCEFAM questionnaire (by item)

Item	μ	Mode	$\bar{X}$	σ
Digital technologies are useful for family-school communication (1)	1460	5	4.28	0.66
Digital technologies for family-school communication are easy to use (2)	1460	4	3.97	0.80
Digital technologies favor family participation (3)	1460	4	3.79	1.01
Digital technologies facilitate learning (4)	1460	4	3.69	1.02
Digital technologies allow organizing the activities proposed by the school (5)	1460	4	3.82	0.81
Digital technologies are necessary in society nowadays (6)	1460	4	4.21	0.66
The family participates on its own initiative in the school activities proposed for your child (7)	1486	4	3.65	1.19
As a parent, you participate virtually in your child's school activities proposed by the school (8)	1486	4	3.38	1.40
The school and/or teachers encourage family participation in your child's school activities through digital technologies (9)	1486	4	3.24	1.47
Digital technologies allow you to participate appropriately in your child's school activities (10)	1486	3	3.30	1.27
The school organizes training activities for families on the use of digital technologies (11)	1486	3	2.77	1.60
I have encountered difficulties in using the digital technologies proposed by the school and/or the tutor (12)	1486	2	2.37	1.32

Something similar occurs with families' perceptions of the potential of technology to organize the center's daily activities (mean of 3.82, with 67.26% agreeing or strongly agreeing). Regarding the families' perception of the possibilities of technology to favor their participation, the responses continue to show a favorable attitude (mode of 4 and 75.55% agreeing or strongly agreeing), although with a slightly lower mean (3.79). When the question focuses on learning and the possibilities of digital technologies to favor it, the perception of families continues to be positive, although slightly lower (mean of 3.69 and 60.82% agreeing or strongly agreeing).

Regarding family participation in the school activities proposed to their children, a large proportion of families are willing and motivated to become actively involved (means of 3.65 and 59.42% respectively). This participation is rated slightly lower when asked about virtual participation in these activities (mean of 3.38 and 50.40%). Along these lines, it is also valued that digital technologies allow adequate participation in school activities (mean of 3.30 and 46.3% agree or strongly agree). As to whether they have encountered difficulties using the digital technologies proposed by the center and/or the tutor, the majority report not having encountered any (only a mean of 2.37 and 56.8% corroborate this).

On the other hand, the families surveyed affirm that the center and/or teachers are committed to encouraging parents' participation through digital media (mean of 3.24). In this case, the responses are more dispersed (29.48% agree, only 15.95% strongly agree, and 28.67% are in the middle).

As to whether the center organizes training actions for families on the use of digital technologies, the evaluation is among the lowest (mean of 2.77). It presents a high dispersion (42.60% disagreed or strongly disagreed, while only 30.48% agreed or strongly agreed).

Table 5. Dispersion of results obtained in the COMCEFAM questionnaire

Item	1	2	3	4	5
Digital technologies are useful for family-school communication (1)	1.51%	1.78%	8.49%	43.15%	**45.07%**
Digital technologies for family-school communication are easy to use (2)	1.51%	5.07%	16.99%	**47.47%**	28.97%
Digital technologies favor family participation (3)	2.95%	6.92%	24.52%	**39.32%**	26.23%
Digital technologies facilitate learning (4)	3.56%	7.19%	28.42%	**38.70%**	22.12%
Digital technologies allow organizing the activities proposed by the school (5)	2.26%	3.63%	26.85%	**44.79%**	22.47%
Digital technologies are necessary in society nowadays (6)	1.10%	2.05%	11.58%	**44.79%**	40.41%
The family participates on its own initiative in the school activities proposed for your child (7)	5.85%	6.26%	28.47%	**35.33%**	24.09%
As a parent, you participate virtually in your child's school activities proposed by the school (8)	10.03%	10.30%	29.27%	**32.50%**	17.90%
The school and/or teachers encourage family participation in your child's school activities through digital technologies (9)	11.10%	14.80%	28.67%	**29.48%**	15.95%
Digital technologies allow you to participate appropriately in your child's school activities (10)	9.42%	11.10%	**33.18%**	32.64%	13.66%
The school organizes training activities for families on the use of digital technologies (11)	20.66%	21.94%	**26.92%**	20.59%	9.89%
I have encountered difficulties in using the digital technologies proposed by the school and/or the tutor (12)	28.33%	**28.47%**	25.64%	13.39%	4.17%

Note: 1 - strongly disagree, 2 - disagree, 3 - neither agree nor disagree, 4 - agree, 5 - strongly agree

Results of the Discussion Group

For the presentation of the results of the discussion group, we chose to organize the comments according to the different items selected from the COMCEFAM questionnaire. The organization of the comments is as follows.

To ensure clarity and consistency in reporting the qualitative data, the comments from the discussion group are organized according to the three analytical categories guiding the study: C1, referring to parents' perceptions of the use of digital technologies in family-school communication during and after the pandemic; C2, referring to the perceived impact of this communication on family involvement in school activities; and C3, referring to proposals for the use of digital technologies to foster new scenarios of family participation. Within each category, illustrative quotes are provided to support the thematic interpretations. Each quotation is followed by a reference to the participant who expressed it, using the format (C#, P#), where P# identifies the speaker. Quotations are embedded at the end of the relevant explanatory sentences to maintain narrative coherence and to clearly connect participants' contributions with the thematic unit they exemplify.

1. Digital technologies are useful for family-school communication

Digital technologies (DTs) have proven to be useful tools for facilitating communication between families and schools. They allow receiving information immediately and establishing a first contact that, if necessary, can be complemented with face-to-face meetings: "First by email. Then I have gone in person." (C1, P1).

Tools such as instant messaging (IM) apps, email and the application for educational management in the Balearic Islands (GESTIB) are valued for their usefulness: "it was very good the WhatsApp" (C1, P3), "I leave written record by email" (C1, P2) and "the GESTIB would not be a bad tool" (C2, P1). However, it is noted that some are not practical for everyday use: "I don't find it practical for day-to-day use" (C1, P5). (GESTIB is a regional web-based educational management platform used in publicly funded schools to support administrative processes and facilitate communication between schools, teachers, students, and families, including access to academic information, notifications, and official school communications.)

During the pandemic, parents and students used the designated digital tools effectively; mainly email and Instant Messaging apps: "We communicated with teachers, well via email and also via WhatsApp" (C1, P1). However, challenges arose, such as the need to adapt to multiple communication channels: "it forces us families to master different communication and information channels" (C1, P4), and the economic cost associated with access and maintenance of devices: "families have to assume this expense" (C3, P5).

The involvement and digital skills of teachers are determinant for an effective use of technologies, with individual initiatives prevailing over institutional guidelines: "it depended a lot on the digital skills of each teacher" (C2, P4). Likewise, the importance of training families so that they can take advantage of these tools is highlighted: "the training of families, I see it as very important" (C2, P1).

Finally, it is considered essential to have a digital plan that is operational and understandable, avoiding confusion and ensuring effective communication: "I tried to teach with Zoom and it did not work very well (...) we work with the classroom, with the GESTIB and with email with the agenda of a lifetime and with 'the girl comes and tells me'" (C1, P2).

2. Technology is easy to use

The diversity of communication channels can be confusing for families, "Having this diversity of channels can be a bit confusing" (C1, P5), "some of them are redundant" (C1, P4), "in infant and primary, it is valued to maintain traditional methods, such as the school agenda" (C1, P4).

Limitations were mentioned, such as the slow response time, "until relatively recently I received a WhatsApp" (C3, P3), and inequalities in technological training between families and teachers, "There were teachers who did not connect due to lack of training" (C1, P3). Despite this, some families perceive communication as fluid, "communication for me is fluid" (C1, P1).

A clear institutional strategy and adapted training are considered essential to ensure the effectiveness of technological tools, "it is a good idea that we have to take advantage of" (C1, P2).

3. DTs favor family participation

DTs facilitate family involvement, especially in primary education, "in primary education, families are much more attentive to their children" (C3, P1).

However, the lack of training and clear strategies can generate stress, especially when families must combine telework with school tasks, "we were working from home, and we had to act as teachers at home" (C2, P5).

In addition, families assume additional responsibilities, such as supervising screen time and content, "parents also have an added job of contention" (C3, P5).

The need for an institutional strategy and specific training for DTs to be effective is valued, "it is a good tool (...), but I think it leaves a lot to be desired" (C1, P2).

4. DTs facilitate learning

Technology is perceived as a tool with great potential that should be properly exploited, "it has many potentials that have to be exploited in the best way" (C1, P?), such as "the personalization of learning" (C1, P3).

However, the pedagogical usefulness of some DTs activities is questioned, especially those instrumental ones that are considered not very innovative and with limited objectives, "they send them many things in the classroom that in the end have nothing innovative beyond the fact that they have an objective to learn how to use that technology" (C2, P4).

5. The DTs allow organizing the activities proposed by the center

As mentioned above, there is a diversity of channels, so it is proposed to centralize the information in a single platform that allows clear and direct access, "a place where you can arrive and find all the information is easier" (C3, P1). The need for specific training so that families can use these tools more effectively is also highlighted, "a session on how to use GES-TIB could be included in the first course meeting" (C3, P4).

In addition, it is important to consider the economic impact of these tools on families and the maintenance they require, aspects that influence their adoption, "the cost for families to have these new technologies at home" (C2, P2).

6. DTs are necessary in society nowadays

Families agree that DTs are essential, "all technology is here to stay" (C1, P3), and consider that they offer multiple benefits when used appropriately, "we must try to learn from these tools because they can give us a lot" (C3, P3). Examples such as online meetings highlight their practical usefulness, "imagine how we could have done it to meet (...) it would have been much more complicated" (C2, P3).

However, the accelerated introduction of DTs during the pandemic generated certain imbalances, especially in young children, "the pandemic forced a little digitalization without time, for children who were too young" (C1, P5). In addition, the impact of excessive use is of concern, both for possible addiction and for the early exposure of minors to devices, "I have seen children of 8 or 9 years old walking with a cell phone (...) it breaks all my schemes" (C1, P5). Some families opted to minimize screen time at an early age by means of alternatives, "we printed everything and they were doing flash cards" (C3, P5).

Families emphasize the need for a social debate to define guidelines on their introduction in childhood, "we need a debate on the pros and cons of introducing technology at certain ages" (C3, P5).

7. The family participates on its own initiative in the school activities proposed for your child

Regarding the participation of families on their own initiative in school activities, the perception they have is positive, especially in primary school "families are much more aware of their children's education (...)" (C3, P1), but it is important that the strategy focuses on the use of a single tool: "If they started working with parents from primary school" (C3, P1). Furthermore, they point out that when there are different channels of communication, "parents may not be very involved (C1) in their children's studies, either for whatever reasons: work or whatever" (C3, P2). As strategies, they point out that "APIMA tries to do things with the families" (P1), but there is no participation because we are in a "come on, come on, come on … fast, everything fast …" (C3, P3). Above all, as the sons and daughters get older, involvement seems to decrease since "Very few parents go to the high school meetings every year" (C1, P1). This leads the mothers to think, for the most part, that "now in the Institute we sometimes say we are the heavy mothers" (C2, P1).

8. As a parent, do you participate virtually in your children's school activities proposed by the school

As regards participation, the families mention that they usually use email to communicate with the center, especially when they wish to make suggestions or deal with important issues, "I use email if there is a suggestion to the center" (C1, P2). However, it is recognized that "the degree of parental commitment" (C1, P2) varies according to personal situations.

A common challenge is the lack of knowledge of tools such as GESTIB, which can negatively affect participation, "we know how many people do not open them" (C2, P3). However, tools such as Google Classroom facilitate participation, as parents can access their children's school materials and activities, "I upload shared folders with images and explanations of what they are working on" (C2, P2).

9. The school and/or teachers encourage family participation in your children's school activities through DT

The school encourages family participation through DT. During the pandemic, IM apps were used for notifications and daily tasks, although the frequency depended on the competencies of each teacher and the center's policy "through the WhatsApp channel I received almost daily notifications from the teacher and tasks to do" (C1, P5). "We have a center that tries to force the use of these technologies, e.g. the classroom" (C1, P2) although "it depended a lot on the digital competences of each teacher" (C2, P4). and on family involvement "we come back to the same thing, the involvement, the degree of commitment of the parents, and depending on the situations" (C1, P2).

After the pandemic, these tools are focused on administrative communications, with GESTIB becoming the key for official notifications thanks to the efforts of the teaching staff. "I think they got their act together and began to use the GESTIB tool very well" (C1, P4), although it is seen as impractical for day-to-day use. "In terms of receiving communications, I think it would be very practical if GESTIB were a repository for official communications, etc., but it does not seem practical for day-to-day use" (C1, P5).

The importance of teachers being trained in DT was also highlighted, since their effectiveness depends on their digital competencies "it depended a lot on the digital competencies of each teacher" (C2, P4). In addition, family commitment was pointed out as essential for good communication "we come back to the same thing, the involvement, the degree of commitment of parents, and depending on the situations, that is, we cannot" (C2, P2).

Conflicts were discussed with other agents, such as APIMA, whose intervention was not always well received by teachers "teachers felt very, very attacked in that sense" (C3, P3).

Finally, the digital divides between families and how this affects support for their children were addressed. Families with greater digital competencies can offer more effective support, which generates inequality among students, "Families that can perhaps help children to know or to enter, well, that also makes a huge difference" (C2, P3).

10. DTs allow you to participate adequately in your child's school activities

Although some perceived digitization as rushed during the pandemic, the overall assessment was positive. Technologies, such as GESTIB, were considered adequate to facilitate communication with the school. "The technologies they are using seem fine to me, adequate, including the GESTIB" (C1, P1), "We have many, many ways to communicate with the center, and I do think that the GESTIB would not be a bad tool" (C2, P1).

The availability of a centralized space for information was also highly valued, which facilitated access to families "I think that a parent who knows that he/she has all the information there is easier to enter than one who does not have to look for information in several places" (C3, P1), "There is a lot of

information through different channels, so that forces us families to master different communication and information channels" (C1, P4).

Participants agreed that technology is essential and should be used appropriately, paying attention to its use at different ages, "as a society, we need a debate on what are the pros and cons of introducing technologies at different ages" (C3, P5). Another participant mentioned the dualities of technology in education:

My experience or my point of view towards technology and education is that it has many lights and shadows. There are times when technology is a super-powerful tool that works very well, but I have the feeling that it is a bit abused (C2, P5).

The need for accompaniment in the gradual introduction of these tools was emphasized, "there is a lack of accompaniment to gradually learn or introduce these technologies" (C3, P4). In addition, access to different information channels forces families to master several systems, so it was suggested to agree on a single operating system for communication between the school and the families, including a system of notifications when notifications do not arrive. "When notifications don't arrive many times, because if you don't get into the application, you don't know that there is something" (C1, P2).

Some families perceive this as an extra responsibility, "it puts us as parents in a situation of having to be aware of something we were not used to being aware of" (C2, P2).

Another challenge is the cost of technological devices, "we families have to assume this expense, and this moral burden of having to be filling our children's education with electronic gadgets" (C3, P5). Sustainability is also a concern for some families, since specific devices could become obsolete, "you have to be connected to a chromebook to a specific brand of computer that will end up being junk" (C2, P5).

11. The center organizes training actions aimed at families for the use of DT

There is evidence of the need for technological training for families, who express their interest in learning how to use digital tools: "So I think we should try to learn about these tools because they can give us a lot" (C3, P3). It is not only essential to train teachers, but also families, "well, teacher training, family training and understanding where this society is going" (C3, P3).

In addition, the need to teach parents to use these tools effectively is highlighted, "that they teach us parents to use the tool as well and that it has a little bit of a compendium of many things that we can intervene, get in touch, even give our opinion" (C3, P1). The importance of practical training is another concern: "I think it needs either to tinker or for someone to give us information on how the tool works" (C3, P1).

Likewise, it is emphasized that training in digital skills should be a priority, "it is necessary to train families in digital skills" C3, P4). In this sense, they suggest meetings at the beginning of the course to facilitate training, "if they want to make us use the GESTIB, then hey, at the beginning of the course, as there is a meeting of the Claro, then yes" (C3, P1).

Support in the use of these technologies is necessary "but it is true that it is complicated if they do not help you" (C2, P1). However, some perceive that the digital competence of the teacher is insufficient, "which parent has received training on how to interpret this, if the teachers themselves do not even know how to explain it" (C1, P2). The need to improve their training is recognized, since "it has all been a bit of a leap in the dark" (C1, P2).

Some consider that the responsibility for training lies with the center and the Regional Ministry of Education, "I do believe that the school or institution, and the Regional Ministry of Education is the one that has to train me" (C3, P4) and "the Regional Ministry of Education itself I think could assume this role and offer this service" (C3, P5). They also mention the need for specific training, "I think that the center should be able to train parents" (C3, P1).

Finally, the role of APIMA in supporting families is highlighted (C3, P1), "one of the things we try to work on at APIMA is to give this support to families".

12. I have encountered difficulties in using the DTs proposed by the center or the tutor

Regarding having encountered difficulties in using the DTs proposed by the center or the tutor, there are different opinions. These opinions seem to be due to differences in the age of the children. In relation to the perceived difficulties, the high level of stress experienced by many families during the pandemic stands out (C2, P5). For us, it was very stressful because we were teleworking and we had to act as teachers at home. In addition, the lack of teacher training was a significant obstacle. "The children miss the teacher a lot, so we tried to make meetings with the zoom and it did not work very well" (C1, P2). Some of the measures adopted by the center are also criticized, which are seen as insufficient. The has adopted measures that is a "I want to and I can't, and the variety and quantity of channels used for communication can be confusing" (C1, P2). Another aspect mentioned is the multiplicity of information channels, which causes confusion: "there are like different channels through which the information reaches you, and that can be a bit confusing and chaotic. In addition, the convenience for children to have a digital presence" (C1, P5).

DISCUSSION

The results provide insight into the dynamics between families and educational centers regarding perceptions of DT, as well as the possibilities, difficulties, and challenges associated with its use. They also contribute to research analyzing the effects of the pandemic on educational processes and the digital transformation of teaching, providing information for the design of solutions that consider all elements of the context (pedagogical, organizational, and technological) in the event of future crises of any kind. Consistent with previous research, the findings reinforce the central role of family–school communication in fostering parental involvement and supporting students' academic trajectories (Barger et al., 2019; Desforges & Abouchaar, 2003; Egido Gálvez; Jeynes, 2015; Jordan et al., 2025). Beyond describing perceptions, the discussion allows for an interpretation of how and why digital communication practices have been consolidated, as well as their current limitations.
These findings confirm that digital technologies are generally perceived as encouraging family participation, as reflected in the questionnaire responses.

This perception aligns with studies highlighting the efficiency and immediacy of digital media as facilitators of family engagement (Goodall, 2016; Ho et al., 2013; Macià & Garreta, 2019). However, qualitative data reveal a variety of opinions, depending on the educational stage. Barriers such as economic cost, reliance on external support, and the absence of a clear institutional strategy were particularly salient. These results support earlier research suggesting that the effectiveness of digital communication depends less on the tools themselves and more on the pedagogical and organizational conditions that shape their use. Among the pedagogical aspects, parental training emerges as a key factor, while, at the organizational level, the availability of time to support children is identified as a critical condition. These elements are valued as fundamental, together with technological aspects such as access to digital resources and families' ability to use them effectively (Bol, 2020; Sahlberg, 2020; Serrano-Díaz et al., 2022). It is important to highlight that the results align with previous studies indicating that the integration of DT in family–school communication has often been used predominantly for unidirectional information transmission (Macià & Garreta, 2019; Patrikakou, 2016; Sánchez-Garrote & Cortada-Pujol, 2015; Thompson et al., 2015), while their potential for promoting active participation remains underutilized.

The high questionnaire score (65.55% agreed or strongly agreed) confirms that DT can encourage family participation, yet qualitative data reveal variations across educational stages. Participants high-

lighted issues such as ICT costs, dependence on external support, and unclear administrative strategies, echoing Carrión-Martínez et al. (2021) and Otero-Mayer et al. (2021), who reported that insufficient organizational preparation limited the effective adoption of digital tools during the pandemic.

Although digital technologies are widely perceived as useful and easy to use, the dispersion of communication channels has emerged as a recurrent problem. The coexistence of multiple platforms, often without coordination, appears to undermine clarity and engagement. This aligns with the literature indicating that the integration of digital technologies in family-school communication has often been predominantly unidirectional and fragmented, limiting engagement (Hohlfeld et al., 2010; Macià & Garreta, 2019; Patrikakou, 2016; Sánchez-Garrote & Cortada-Pujol, 2015; Thompson et al., 2015). Centralized platforms such as GESTIB were valued positively, confirming that structured tools can improve clarity and facilitate participation.

The perception that digital technologies are necessary in contemporary society was strongly supported (Jordan et al., 2025). At the same time, families expressed critical views of the accelerated digitalization imposed during the pandemic, especially in early education. This ambivalence reflects findings from pandemic-related studies that highlight insecurity, stress, and insufficient preparation among families and teachers during emergency remote education (Carrión-Martínez et al., 2021). In this sense, it is important that schools promote open communication about the educational process, involving families and sharing resources (Hohlfeld et al., 2010).

Digital technologies were also perceived as having the potential to facilitate learning, particularly through personalization. However, this potential was not always realized in practice, as communication remained largely focused on organizational and administrative issues rather than pedagogical dialogue. This observation is consistent with previous research showing that digital family–school communication is frequently reduced to information transmission, with limited impact on learning processes (Bonal & González, 2020; Hortigüela-Alcalá et al., 2020).

Importantly, the results suggest that some digital technologies failed to engage families beyond basic informational functions. This limited engagement can be partly explained by differences in digital competence, which are often associated with socioeconomic variables. In line with Sánchez-Garrote and Cortada-Pujol (2015) and Macià and Garreta (2018), the findings indicate that the digital divide is less related to access and more closely linked to skills, confidence, and prior experience with technology. Families with higher digital competence reported greater involvement, while others experienced confusion or disengagement.

From a policy and practice perspective, the findings highlight the need for explicit institutional strategies that integrate digital communication into broader pedagogical and organizational models. Without clear guidelines, training, and coordination, digital technologies risk reinforcing existing inequalities rather than promoting inclusive participation. The post-pandemic context thus represents an opportunity to rethink digital family–school communication as a shared responsibility involving educational administrations, schools, and families.

CONCLUSIONS

This work aims to contribute to improving education, specifically in terms of interpreting the role of technology in enriching communication between families and schools, an aspect that is key to making these families feel involved and participate in their children's education, on the one hand, and fundamental to achieving academic success for students, on the other. Despite this, the study has some limitations that should be acknowledged. The findings are based on families' self-reported perceptions, which may be influenced by subjective interpretations. Although families from both primary and secondary education participated, the results cannot be generalized to all educational contexts. In addition, the qualitative data were obtained from a single discussion group, which limits the diversity of perspectives represented.

The main takeaway of this study is that digital technologies are widely accepted by families as necessary and useful tools for family–school communication, confirming their relevance in contemporary educational systems (Jordan et al., 2025). However, in line with previous research (Hohlfeld et al., 2010; Macià & Garreta, 2019; Patrikakou, 2016), the findings show that digital communication remains largely unidirectional and informational, limiting its capacity to foster meaningful family participation. Effective communication continues to be a key condition for parental involvement and student success, as highlighted in the literature (Barger et al., 2019; Egido Gálvez, 2020; Jeynes, 2015).

The study has relevant implications for educational practice and policy. From a pedagogical perspective, digital communication should be intentionally designed to promote dialogue, interaction, and shared responsibility for learning. Organizationally, schools need coherent communication strategies that reduce channel dispersion, establish clear protocols, and ensure consistency in the use of digital tools. At the policy level, the findings reinforce the importance of promoting digital competence among families and teachers to prevent the reproduction of inequalities linked to socioeconomic factors, in line with previous research on the digital divide (Macià & Garreta, 2018; Sánchez-Garrote & Cortada-Pujol, 2015).

Furthermore, the results highlight the need to address family–school digital communication from a multi-level perspective. At the micro level, daily practices should prioritize accessible and meaningful communication that takes into account families' diverse digital competencies. At the meso level, schools should promote coordinated and participatory communication models that strengthen collaboration and shared educational goals. At the macro level, educational policies should support these practices through clear guidelines, training initiatives, and equitable access to digital resources.

In short, understanding these strategies as part of an open educational practice, in line with Cronin's (2017) postulates, allows schools and educational administrations to promote the development of agentic decisions at the macro, meso, and micro levels. By addressing the main contextual elements related to pedagogical, organizational, and technological decisions, such plans can foster meaningful family participation, support inclusive and equitable communication, and strengthen the overall educational process.

Building on this multi-level, open-practice perspective, future studies should explore how digital communication initiatives can be designed to expand family participation across different scenarios. Particular attention should be paid to identifying approaches that remain effective in both routine educational interactions and contexts of uncertainty or disruption. Analyzing how pedagogical intentions, organizational coordination, and technological choices interact in these situations would provide valuable evidence to inform more adaptable, participatory, and resilient family–school communication models.

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