

Digital media for family-school communication? Parents' and teachers' beliefs

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ABSTRACT

The use of digital media for parent-teacher communication is increasing. However, many parents and teachers are still reluctant to use such media to enhance two-way pedagogical communication between parents and teachers. This paper explores which of the parents' and teachers' beliefs have an influence on ICT implementation for such communication. We first developed a theoretical model as an adaptation of the Decomposed Theory of Planned Behaviour tailored specifically to address technological acceptance in parent-teacher interactions. Then we applied the proposed model to our data in order, firstly, to examine which beliefs support or constrain the use of digital media and, secondly, to compare the participants' views (parents and/or teachers from schools with different degrees of ICT implementation for parent-teacher communication) on using e-mails and online platforms to communicate with each other. The data were obtained from interviews with 30 families and 35 teachers from 11 different schools in Spain. The findings revealed that parents and teachers hold a set of beliefs about the use of digital media: *beliefs about the medium* (based on the characteristics of e-mails and online platforms) and *beliefs about the context* (based on their perceptions of the setting and of themselves), with the latter being the most important barriers to the use of digital media, particularly for teachers. The findings also showed that parents and teachers display more positive stances on the use of digital media in schools where the management team promotes the use of e-mails or online platforms for family-school communication. A major implication of these findings is that management teams should take the first step to introduce digital media to communicate with families. These findings are also important for researchers as they provide a framework to guide further studies, and give an insight into a field in which the literature is scarce.

Keywords: Digital communication; learning communities; elementary education.

1. INTRODUCTION

Communication is of key importance to a successful family-school partnership. Better and more frequent communication between parents and teachers enhances parental involvement (Graham-Clay, 2005; Kraft & Dougherty, 2013; Swick, 2003) which, in turn, increases pupils' academic achievement (Epstein, 2005; Henderson & Mapp, 2002; Jeunes, 2015; Park & Holloway, 2017; Wilder, 2014). Nevertheless, effective communication remains a challenge (Ozcinar & Ekizoglu, 2013). Language barriers, incompatible schedules, a lack of trust, cultural differences and socioeconomic factors are just some of the reasons behind low-quality communication in many schools (Garreta, 2015; Henderson & Mapp, 2002; Murray, McFarland-Piazza, & Harrison, 2015).

Within this context, technology is heralded as a tool for overcoming some of these constraints (Özdamli & Yıldız, 2014) and, consequently, for strengthening partnerships between families and schools (Bacigalupa, 2016; Bardroff & Tann, 2012; Blau & Hameiri, 2012; Goodall, 2016; Kosaretskii & Chernyshova, 2013). Digital media are considered more efficient, more immediate, more effective and more convenient than traditional outreach models (Blau & Hameiri, 2017; Ho, Hung, & Chen, 2013; Olmstead, 2013; Wasserman & Zwebner, 2017). Further, digital communication between parents and educational staff is associated with higher academic achievement and higher educational expectations (Bouffard, 2008; Thompson, 2008).

However, Information and Communication Technologies (ICT) implementation is far from widespread, especially when it comes to entering into two-way correspondence between parents and teachers (Macia, 2016; Bouffard, 2008; Rogers & Wright, 2008; Thompson, 2008). Although some studies (Hohlfeld, Ritzhaupt, & Barron, 2010; Thompson, Mazer, & Grady, 2015) suggest that while ICT integration to enable pedagogical communication, such as e-mails, mobile devices or online platforms, has increased over the years, they are often used primarily to broadcast information (Ozcinar & Ekizoglu, 2013; Sánchez & Cortada, 2015; Selwyn, Banaji, Hadjithoma-Garstka, & Clark, 2011). As Lewin and Luckin (2010) stated, «the communication was, as it has been in the past before the investment in technology, predominantly one-way» (p. 756). This therefore raises a question that needs to be addressed: why is it that digital media are not frequently used to exchange messages between parents and teachers, despite their potential benefits in bridging the communication gap between families and teachers?

In this sense, Thompson et al. (2015) sought to explain why parents choose digital media or traditional channels for specific topics and situations. They showed that the use of available visual and auditory cues, the possibility of building a better relationship and the existence of communication during pick-up and drop-off times represented salient reasons for choosing face-to-face (FTF) communication. Conversely, convenience, the proliferation of smartphones and the effectiveness of composing a message due to the asynchronous qualities of e-mail were factors influencing parents' preference for digital modes (Thompson et al., 2015). Another pattern of use is that parents and teachers tend to choose oral communication for complex and academic-related issues and e-mail for messages involving simple and concrete information (Bouffard, 2008; Hu, Wong, Cheah, & Wong, 2009; Thompson, 2008). The likelihood of misinterpreting a message due to a

lack of non-verbal cues, and concerns about e-mail replacing FTF communication were two important problems also perceived by families and teachers (Hu et al., 2009; Thompson, 2009).

Thus, while extant literature is valuable as the starting point for understanding the use of ICT, it is still limited and only provides a partial picture of some beliefs that may influence the acceptance of digital media for family-school communication. What is needed is a systematic and holistic study specifically done to report families' and teachers' beliefs about the use of digital media for pedagogical communication to obtain a more comprehensive overview. In order to narrow this research gap, this paper examines parents' and teachers' beliefs about the use of two such media, e-mails and online platforms, in an attempt to develop a general and wide-ranging understanding of the use thereof in two-way communication. Specifically, this study will address the following two objectives: 1) to develop a theoretical model for application to future research when analysing beliefs influencing the use of digital media for parent-teacher communication; and 2) to use our proposed model to identify the most important beliefs that promote or constrain the use of digital media for family-school communication and to ascertain the differences in participants' discourses regarding such beliefs.

2. CONCEPTUAL FRAMEWORK AND PURPOSE OF THE STUDY

2.1. The importance of beliefs on technology integration

The literature vividly demonstrates that two sets of barriers must be overcome to bring about successful integration of ICT in teaching (Ertmer, 1999, 2005; Hew & Brush, 2007): first-order barriers (Ertmer, 1999), which are extrinsic to the teacher and refer to environmental readiness, such as equipment, time, access, training and technical support; and second-order barriers, which are basically rooted in teachers' beliefs. Similarly, the Will, Skill, Tool model (WST; Knezek, Christensen, & Fluke, 2003) postulates that enhancing an educator's will (attitudes towards, perceptions of and beliefs about technology), skill (technology competency) and tool access (access to technological tools) leads to higher technology integration (Knezek et al., 2003). More recently, leadership action and change management in schools (Pelgrum & Voogt, 2009), as well as teacher collaboration or support from their peers, have been found to be important determinants of ICT implementation for pedagogical use (Drossel, Eickelmann, & Gerick, 2017; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012; Gil, Rodríguez, & Torres, 2017).

In the domain of family-school communication, the extant literature highlights similar factors. First, Blau and Hameiri (2012, 2017) found that the more active a teacher was in using digital media to communicate with parents, the more active parents were in doing so too, which underscores the importance of taking the social system into account when studying family-school communication. The lack of access to the Internet faced by many parents, especially those who live in economically disadvantaged areas, could be an important weakness in regard to the use of digital media for strengthening family-school communication (Heath, Maghrabi, & Carr, 2015; Selwin et al., 2011). Some

families' limited computer literacy –another element of the digital divide– is also a factor that influences the use of digital media for communication purposes (Lewin & Luckin, 2010; Ozcinar & Ekizoglu, 2013). Finally, concerning the *will* aspect, a large majority of parents and teachers prefer traditional channels, such as school-to-home notebooks or FTF conversations, to digital media (Heath et al., 2015; Macia & Garreta, 2018; Rogers & Wright, 2008). Within the multiple conditioning aspects identified, this study takes the second-order barriers as the main variable of analysis, as beliefs are commonly cited as a factor that is critical to the successful integration of ICT in schools (Drossel et al., 2017; Hew & Brush, 2007; Inan & Lowther, 2010; Kim, Kim, Lee, Spector, & DeMeester, 2013; Prestridge, 2012). Moreover, when looking at a broader context, beliefs are also considered key determinants of any human's decisions and actions. According to Rokeach (1968), beliefs are the best indicators of the decisions that individuals make throughout their lives, establishing a strong alignment between beliefs and actions. Ajzen (1991) also echoes the function of beliefs in behaviour, suggesting that «it is at the level of beliefs that we can learn about the unique factors that induce a person to engage in the behaviour of interest and to prompt another to follow a different course of action» (p. 206-207). Similarly, Fullan (2001) asserts that any educational change depends on «what teachers do and think –it's as simple and complex as that» (p. 129). However, the relationship between espoused beliefs and technology use in the educational context is sometimes unclear in terms of causality (Kim et al., 2013; Tondeur, Van Braak, Ertmer, & Ottenbreit-Leftwick, 2017), which means that changes in beliefs could also follow, rather than precede, changes in behaviour. There may also be cases where teachers' beliefs are not aligned with their actual involvement in digital media (Ertmer et al. 2012). Despite these weak points in the study of beliefs, we support the idea that, when studying family-school communication, beliefs can be considered a salient factor to understand parents' and teachers' behaviours (Ho et al., 2013). This is why this study takes beliefs as the main variable of analysis.

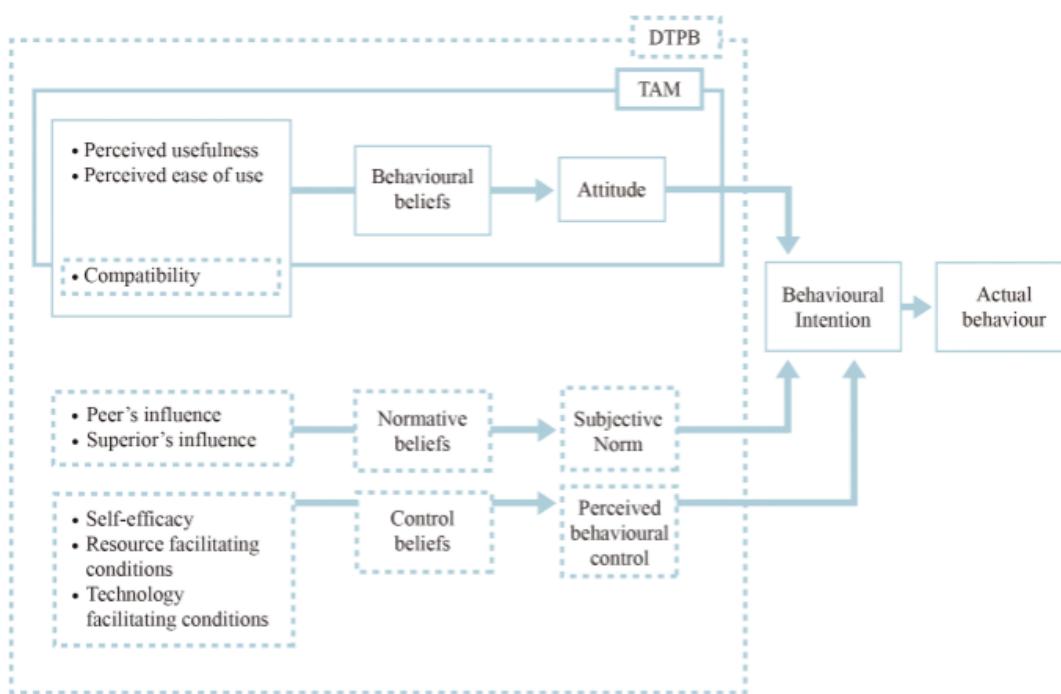
2.2. Theoretical models for examining technology acceptance

As we move into a technology-based society, a variety of perspectives have been applied to provide an understanding of the conditions that affect technology use. An important stream of research has attempted to explain the usage of ICT from the perspective of intention-based models (Taylor & Todd, 1995), in which beliefs are the primary determinants of actions. Within this stream, there are multiple models such as the Theory of Reasoned Action (TRA; Fishbein & Ajzen, 1975), the Technology Acceptance Model (TAM; Davis, 1986), the Theory of Planned Behaviour (TPB; Ajzen, 1991) or the Decomposed Theory of Planned Behaviour (DTPB; Taylor & Todd, 1995).

TRA and its extension (TPB) are general models designed to predict and explain behaviour across a wide variety of domains. These models posit four levels of study: beliefs, which are in the lowest level; constructs resulting from those beliefs (attitude, subjective norm and, in TPB, perceived behavioural control); behavioural intention; and, finally, actual behaviour. TAM and DTPB, as adaptations of TRA and TPB, respectively, were tailored specifically to address technological acceptance (Davis, Bagozzi, &

Warshaw, 1989). In their attempt to explain users' acceptance of new technologies, TAM and DTPB decomposed each construct into salient beliefs regarding the behaviour of embracing or rejecting a new technological application, device or system (Taylor & Todd, 1995). The difference between the two models stems from the focus and scope of their analysis. Figure 1 shows these differences, with the TAM model drawn in a continuous line and the DTPB model drawn in a dashed line.

FIGURE 1
The Technology Acceptance Model (TAM) and The Decomposed Theory of Planned Behavior (DTPB)



TAM examines beliefs about the characteristics of technology (Davis et al., 1989) using only two key beliefs (usefulness and ease of use) shaping attitudes towards technology and, consequently, the use thereof (TAM in Figure 1). Perceived usefulness refers to the degree to which a person believes that using a particular tool or digital system will help him or her perform a job better. Perceived ease of use is defined as the degree to which a person believes that the performance benefits of usage are outweighed by the effort of using the application (Davis et al., 1989). On the other hand, DTPB also looks at the effects of external and social factors as direct determinants of behavioural intention. This model decomposes both external constructs (subjective norm and perceived behavioural control) into more specific beliefs (DTPB in Figure 1). Focusing on normative beliefs, Taylor and Todd (1995) decomposed the beliefs into peers' influence and superiors' influence. Self-efficacy (confidence in one's ability to succeed in performing the behaviour), resource facilitating conditions (external conditions such as time or money) and technology facilitating conditions (technology compatibility issues) are the specific beliefs in the control dimension.

All these models, despite their limitations (Ajzen, 2011; Sniehotta, Presseau, & Araújo-Soares, 2014), are useful for analysing ICT integration across a range of organisational settings and users. Within the educational context, many authors have applied them when studying ICT implementation for pedagogical use using quantitative (Holden & Rada, 2011) or qualitative approaches (Chien, Wu, & Hsu, 2014; Ifenthaler & Schweinbenz, 2013), or a combination of both (Smarkola, 2008). In the domain of family-school communication, these models are also gaining in interest (Ho et al., 2013). Moreover, some authors (Hu, Clark, & Ma, 2003; Sánchez, Olmos, & García, 2016; Teo, Lee, & Chai, 2008) have adapted and extended these models to study the educational context because schools are governed by different dynamics from other organisational contexts, and teachers' technology acceptance may differ from that of business workers examined in the majority of previous research (Hu et al., 2003). Following the same reasoning, we argue that beliefs about the use of digital media may considerably differ from the ones affecting teachers' ICT use in their classrooms; hence, an adaptation of these models is required in the study of family-school communication.

TAM (Davis, 1986) is one of the most widespread models in earlier studies, and it has proven to be a useful theoretical underpinning to explain the use of technological tools (King & He, 2006; Legris, Ingham, & Collerette, 2003). However, this paper will take the DTPB model as the analytical framework because we consider that normative beliefs and control beliefs may greatly influence the decision to communicate using digital media.

2.3. Research questions

This research has two different objectives. First, it seeks to design a specific framework that will serve as the underpinning literature for future studies on personal factors influencing the use of digital media for family-school communication. In this regard, this paper will address the following research question:

RQ1: Which beliefs influence the use of digital media for family-school communication?

The second objective is to apply the proposed model to our specific data in order to document the most important beliefs that may promote or constrain the use of digital media for family-school communication and to know which participants support them. Bearing this in mind, the paper will answer the following research questions:

RQ2: Which beliefs primarily support the use of digital media for family-school communication and which ones mainly constrain their use?

RQ3: Are there differences between parents' and teachers' discourses?

RQ4: Are there differences among participants' views when considering the degree of ICT implementation by the school for family-school communication?

3. METHOD

3.1. Research design

This paper reports on one aspect of a larger research project focusing on parental involvement in schools, whose aim was twofold: knowing how parents are involved in their children's education, both at home and at school; and exploring parents' and teachers' discourses and beliefs regarding such involvement. The study adopted an ethnographic approach as it enables a better understanding of the descriptive and interpretative aspects, such as values, ideas and practices pertaining to specific cultural groups (Poupart, 2010). The techniques used for collecting data were mixed, using semi-structured interviews, document/web/blog analysis and observation. Twenty schools participated in the study. The schools were selected by means of purposive sampling. Experts interviewed in a preliminary phase of the research project (specifically, 46 education technicians and those responsible for different education administrations who have an in-depth knowledge of the implementation of innovative experiences in some schools) were asked to inform us about schools that were implementing interesting communicative and participative practices with parents. From the schools recommended, a sample was designed using size, location and type criteria (including rural and urban schools and low and high socioeconomic-status schools in several regions of Spain). Specifically, the schools were located in four different autonomous communities (Aragon, Catalonia, the Balearic Islands and La Rioja). In each school, interviews were conducted with five parents and five teachers, who were selected using purposive sampling too. Regarding the teachers' group, interviews were held with the head teacher, a professional staff member in a position of responsibility, and three teachers from different school levels (initial, intermediate and higher cycles of primary education). Regarding the families, interviews were held with two parents who were active members in the schools, and three others who covered the whole range of the aforementioned school levels.

3.2. Method and instrument

In keeping with the research questions, this paper will focus on the semi-structured interviews. This specific method served to make the interviewees' implicit knowledge more explicit, giving a deeper understanding of the interviewees' subjective viewpoints (Flick, 2014; Poupart, 2010) and allowing us to better understand the significance of social actions (Robert & Lisdero, 2016). Prominent researchers concerned with the study of beliefs (Fishbein & Ajzen, 1975; Pajares, 1992) have also considered qualitative methods to be the most appropriate ones. They (Fishbein & Ajzen, 1975; Pajares, 1992) have suggested that, for researchers to identify salient beliefs about the behaviour under investigation, it is useful to conduct free-response interviews with representative members of the subject population. We therefore chose semi-structured interviews containing general points of discussion. The interview schedule was designed by the research team (which consisted of 15 researchers from five different universities) and was subsequently improved and validated by the experts interviewed in the preliminary phase of the study.

The final schedule consisted of six thematic sections in accordance with Epstein's (1992) model of parental involvement: parenting, communicating, volunteering, learning at home, decision-making and collaboration with the community. Sample questions for each section are listed in Appendix 1. Regarding the family-school communication dimension, three key issues were established to guide the interviews: 1) traditional communication channels: use and personal assessment; 2) one-way digital communication media: use and personal assessment; and 3) two-way digital communication media: use and personal assessment. This research design allowed us to obtain valuable statements to build on participants' real concerns and judgments, a kind of information that is hard to obtain –and may even be biased– when more specific structured interviews are used. Specifically, the questions asked about the third issue (two-way digital communication media: use and personal assessment) were the following: 1) Are e-mails and/or online platforms used in this school for parent-teacher communication? 2) If so, when? 3) What do you think about them? The first and second questions gave us information about whether and how digital media were used for pedagogical communication and served to classify the schools according to their degree of ICT implementation and use of digital media. The third question specifically sought the interviewees' beliefs about and opinions on the use of these media in the school setting, which is the central aim of this paper.

3.3. Participants

Of the 20 schools that participated in the larger research project, five had a protocol of e-communication with families through e-mails or online platforms, although the implementation thereof was still in the initial phase. That meant that the use of digital media was optional for the teachers and was complementary to the traditional channels. These schools are labelled as *ICT schools*. The remaining schools, labelled *non-ICT schools*, did not use e-mails or online platforms for communication between parents and teachers, and their future use was not a core objective for the management team. This fact led to a non-response to the opinion questions by the majority of the parents and the teachers in those *non-ICT schools*. They primarily stated that they did not use these kinds of media to communicate and were therefore unable to comment on the issue in depth. While the participants from the five *ICT schools* all expressed their agreement or disagreement with the use of digital media, the nature of the questions asked (open, free-response) led to a lack of meaningful information about the reasons behind some participants' positions (they did not comment on the advantages of or their concerns about e-mails or online platforms). It should be noted that the researchers did not force the participants to give a personal opinion on the use of ICT in schools because they wanted this information to emerge spontaneously so as not to bias or influence the parents' and the teachers' discourses.

The outcome of this approach to the research question was that some interviews were dropped from the data analysis process because they did not provide information about the object of this study (the participants' beliefs). From the «useful» interviews, we decided to take into consideration those interviews where at least three informants from

the same school gave us information about the advantages and/or disadvantages of digital media for communication purposes. This decision was motivated by the qualitative approach taken in the study, in which the meaning is culturally defined (Twinning, Heller, Nussbaum, & Tsai, 2017). This purposive sampling also allowed the researchers to triangulate the data. The participant selection process resulted in a total of 11 schools (five *ICT schools* and six *non-ICT schools*) and 65 educational agents interviewed (30 families and 35 teachers). Table 1 shows a breakdown of the schools' characteristics and the number of agents interviewed at each school.

TABLE 1
Schools' characteristics and the informants selected for the study

	Use of digital media	Type	Setting	Socioeconomic status of families	Informants selected
School 1 (S1)	Online platform	Private	Urban	Medium	3 parents; 3 teachers
School 2 (S2)	Online platform	Private	Urban	Low to medium	6 parents; 4 teachers
School 3 (S3)	Online platform	Private	Urban	Low to medium	4 parents; 4 teachers
School 4 (S4)	E-mail	Public	Urban	Medium	1 parent; 2 teachers
School 5 (S5)	E-mail	Public	Urban	Medium	3 parents; 3 teachers
School 6 (S6)	No	Public	Urban	Low to medium	2 parents; 2 teachers
School 7 (S7)	No	Public	Urban	Low to medium	2 parents; 3 teachers
School 8 (S8)	No	Public	Rural	Medium	3 parents; 5 teachers
School 9 (S9)	No	Public	Rural	Medium	4 parents; 4 teachers
School 10 (S10)	No	Private	Urban	Low	2 parents; 2 teachers
School 11 (S11)	No	Public	Urban	Very low	1 parent; 2 teachers

3.4. Data collection and data analysis

The data were collected from April 2014 to November 2014 by the members of the research team. We conducted in-depth, semi-structured interviews with parents and teachers. Each interview, which lasted on average 60 minutes, was carried out FTF and was digitally audio-recorded. The interviews were carried out with no one else present in suitable places where participants would not be interrupted. Specifically, the interviews with teachers took place at their schools, while the interviews with families were held at locations arranged with them (at school, at their houses or in public places). Sufficient time was also set aside to deal with all the key issues contained in the thematic script

devised for the interviews (the duration of which had already been agreed with the participants). As each interviewee was aware of the project and the use to which the information would be put, the interviews began with a general reminder of the subject thereof and, in particular, with a detailed explanation of the related ethical issues. The participants were informed that the research met strict ethical criteria regarding the information obtained from the interviews, i.e., that such information would not be disseminated unless the anonymity of the interviewees and the people mentioned in the interviews could be guaranteed. In order to ensure such anonymity, the interviews were transcribed verbatim, always labelling the transcriptions with acronyms representing the general profile of the interviewee and of the school, and no examples that could be identified were mentioned. We also agreed to send any publications resulting from this project to those who requested them.

From the data set, transcripts of informants' comments on the key issue of «two-way communication media: use and personal assessment» were selected (as this issue was directly related to the aim of the study). During the initial phase, the first author read the transcripts and repeatedly labelled the segments of text in order to create an initial list of dominant themes. At this stage, 65 interviews (30 with families and 35 with teachers from 11 different schools) were selected as: 1) they provided valuable information about the advantages of and their concerns about digital media for pedagogical communication; and 2) they met the purposive sampling criteria explained in section 3.3.

The specific data selected was coded using inductive analysis (Thomas, 2006). In this second phase, theoretical acceptance models (specifically DTPB) provided some categories that were used to place and replace the initial themes emerging from the data. This meant that the codes and broader categories were developed using both an *etic* perspective, by looking at previous literature, and an *emic* perspective, detecting new concepts from the participants' views (Glaser & Strauss, 2010). Specifically, this second phase consisted of two sequential processes. First, during a process of discussion (working together at a one-day workshop) the two authors re-read the entire set of statements to identify which themes were related to some of the existing categories in previous literature, and which themes did not mirror any theoretical dimension of the DTPB model. Indeed, this process served to create a final list of dominant themes that met with the agreement of both authors. At this stage, we decided to re-read the entire set of data (and not simply to work with the list of dominant themes proposed in the initial phase) to look at the participants' comments within their full context to better understand the meaning of their utterances. Secondly, a process of theoretical coding was carried out, comparing and connecting the different themes with and to each other, and creating broader categories with their associated themes and sub-themes. This process, which was carried out at a two-day workshop by the two authors, led us to identify a set of categories and codes that were taken as the coding frame to review all data in order to ensure coding consistency (Miles, Huberman, & Saldaña, 2014). Table 2 shows the final categories with their quantities and related sample quotes. The final process of coding review was carried out by the first author, although all uncertain statements were negotiated by both authors until 100% agreement was reached.

TABLE 2
Categorization of beliefs, their quantities, and sample quotes

Categories	Quantities	Sample quotes
<i>Beliefs about the medium</i>	60	
Perceived usefulness	32	
Efficacy	11	«There are people who have e-mail, but there can be errors with this medium and messages may not arrive.» (Parent S9)
Convenience	9	«You often remember what happened yesterday, something my son told me, you remember that now, when you pick him up. At home... well, we have the option, but it's not usual because it's not useful.» (Parent S2)
Immediacy	8	«The calendar is much more immediate. If they sign it, the following day I have it. Using online platforms or e-mail, they can register now or after a week.» (Teacher S1)
Time	4	«We're too lazy to do this. Because logging in to the session involves entering your password, you do not have it at that time, and the information often goes unread.» (Parent S2)
Perceived ease of use	7	«It's easy because, when you log in to a computer session, you already know everything.» (Parents S9)
Compatibility	21	
Necessity	7	«Our school doesn't use digital media to communicate with families because there's direct contact with teachers every day.» (Parent S6)
Application	14	«What's more valuable in personal relations is direct communication. Talking through a machine isn't the same, it's much more distant.» (Teacher S3)
<i>Beliefs about the context</i>	54	
Self-efficacy	6	«I'm someone who, because of my age and training, doesn't know how to use them. I know they're important instruments in our work, but what's valued is personal contact.» (Teacher S3).
Technology facilitating conditions	26	«We don't use digital media to communicate. We usually use face-to-face communication. In our school, we have a lot of students that are socially and economically disadvantaged, and they don't have computers at home.» (Teacher S11)
Others' facilitating conditions	22	
Others' use	12	«There are families that, for many reasons, may not constantly be online, but with families I talk to, we do use it.» (Parent S1)
Others' knowledge	4	«I believe that a training course is necessary because I don't think all parents know how to use e-communication. It isn't the case that everyone knows how to use technology, it's normal, I understand.» (Teacher S8)
Others' attitudes	6	«When parents need to contact teachers or any other member of staff, they just go to the school in person. They prefer a personal approach.» (Teacher S10)

4. RESULTS AND DISCUSSION

The first part of the findings reports on our proposed model, which is an adaptation of the DTPB model tailored specifically to analyse the use of digital media for parent-teacher communication. This section provides evidence for the first research question. We then analyse our data by using the proposed model. Specifically, in section 4.2 we present a general picture of the positive and negative discourses and their frequencies ascribed to each belief to answer the second research question, which are subsequently categorised and discussed in depth in section 4.3. This section will lead us towards answers to the third and fourth research questions. The informants' comments included in this paper are the authors' translations from the Spanish language.

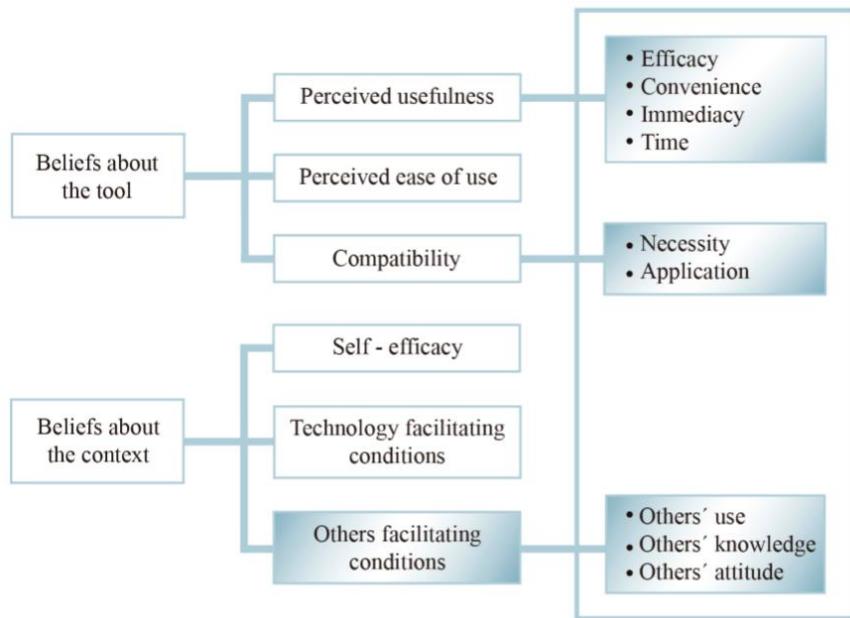
4.1. The proposed model for the communicative context in education (RQ1)

In this section, we present our proposed theoretical model to address the issue of digital family-school communication. This model emerged from the participants' discourses on and concerns about the use of digital media for pedagogical communication. As explained in section 2.2, the DTPB model (Taylor & Todd, 1995) was used as the analytical framework to analyse the data. Thus, we grouped beliefs into two main categories: *beliefs about the medium* and *beliefs about the context*. The first category refers to beliefs about the system design factors. That is what Taylor and Todd (1995) called *behavioural beliefs*. The second category, drawing attention to the context, only refers to the *control beliefs* concept in the DTPB model. The *normative beliefs* category included in the DTPB model is not reported in our analysis because participants' references to these beliefs were scarce (less than five participants referred to peers' influence and superiors' influence, and the researchers considered that this limited amount of records was not representative enough to take the category into consideration). However, it is worth noting that our model is based on a specific data set and that further research is needed to test whether normative beliefs have no influence on the use of digital media for family-school communication (as we propose) or whether such beliefs should indeed be included in the model that we have attempted to design.

It should also be noted that the labels we use to describe each category of beliefs differ from those used in previous literature. This has been done for the sake of simplicity and applicability. We consider that the new labels help the reader to better understand the beliefs to which such labels refer. Further, we believe that the proposed labels are more appropriate when it comes to designing a framework that is applicable from the perspective of a wide variety of domains other than psychology, which aligns with the nature of the educational and communicational issue that concerns us. Figure 2 shows the model that emerged from our data; the categories and sub-themes that do not align with the DTPB model are highlighted with a coloured background, so they are specifically tailored to address digital media for family-school communication.

FIGURE 2

The proposed model to analyse two-way digital media in family-school communication



Focusing on the first category of beliefs, *beliefs about the medium*, we distinguish between perceived usefulness, perceived ease of use, and compatibility. The beliefs that emerged from the data were therefore aligned with the specific beliefs reported by the DTPB model with regard to the intrinsic characteristics of technology (Taylor & Todd, 1995). However, since our aim was to tailor the DTPB model to study a specific context, we decomposed some of these beliefs into more detailed sub-themes. Specifically, perceived usefulness comprises efficacy, convenience, immediacy and time. Compatibility includes necessity and application. Perceived ease of use is the only belief that does not require this specification. Table 3 shows the specific sub-themes for each belief and their definitions.

TABLE 3
Definitions of the sub-themes included in the proposed model

Beliefs	Specific sub-themes	Definitions
Perceived usefulness	Efficacy	The degree to which a person believes that digital media achieve greater communication.
	Convenience	The degree to which a person believes that digital media are more convenient than using traditional channels.
	Immediacy	The degree to which a person believes that digital media make the communication process quicker.
	Time	The degree to which a person believes that digital media save him or her time.
Compatibility	Necessity	The degree to which a person believes that digital media suit his or her current needs.

	Application	The degree to which a person believes that digital media suit his or her existing values.
Others' facilitating conditions	Others' use	The degree to which a person believes that others' use of digital media facilitates or constrains successful ICT integration.
	Others' knowledge	The degree to which a person believes that others' knowledge of managing digital media facilitates or constrains successful ICT integration.
	Others' attitudes	The degree to which a person believes that others' attitudes towards digital media facilitate or constrain successful ICT integration.

The second category of beliefs, *beliefs about the context*, comprises three components: self-efficacy, technology facilitating conditions (both remaining the same as in the DTPB model) and others' facilitating conditions. Others' facilitating conditions is a new belief that emerged from the data, and it refers to the degree to which a person believes that others' actions and preparation will facilitate the successful integration of ICT. We also decomposed this belief into more specific sub-themes in order to better define the concept and guide further research. Specifically, the others' facilitating conditions belief is composed of others' use, others' knowledge and others' attitudes (see the definitions in Table 3). In contrast, we removed the item concerning beliefs about resource facilitating conditions (used in the DTPB model) from our framework as participants' discourses rarely mentioned this aspect. Nevertheless, as pointed out when referring to normative beliefs, this is an exploratory study and we encourage researchers to bear this belief in mind when analysing other contexts.

Evidence from our data suggests that, by including the modifications specified above, the DTPB model could be used when analysing family-school communication. However, the most significant outcome is the decomposition of the specific beliefs included in the DTPB model into more detailed sub-themes. As the model proposed by Taylor and Todd (1995) was designed to report technology acceptance in a wide variety of domains, the definitions of usefulness, ease of use, and compatibility are quite general and may include many different interpretations. Indeed, different approaches to the concepts are evident in the literature (Chien et al., 2014; Ho et al., 2013). Thus, the specific sub-categories that we suggest in this paper may help to ensure category consistency in future studies on family-school communication.

4.2. Discourses on each specific belief: supporting or constraining the use of digital media (RQ2)

This section summarizes the discourses ascribed to each belief in accordance with the proposed model (see Figure 2). For each defined belief and sub-theme, we show the specific statements made by parents and teachers. We have divided the discourses into positive and negative, since the participants expressed considerably different views on a given technology characteristic or context situation. Table 4 includes an overview of the participants' main discourses and their quantities.

TABLE 4

Positive and negative discourses ascribed to each belief and their quantities

	Q.	Positive discourses	Q.	Negative discourses	Q.
Perceived usefulness	32				
Efficacy	11	<ul style="list-style-type: none"> ▪ In permanent contact. ▪ More effective: ensures that the information is received. 	5	<ul style="list-style-type: none"> ▪ Problems with e-mail addresses. ▪ Information is limited. ▪ Communication cannot reach all families or it is lost. ▪ Other means are more convenient. 	6
Convenience	9	<ul style="list-style-type: none"> ▪ Useful for families who cannot get to school easily/need constant contact. ▪ You can send a message whenever possible. 	7		2
Immediacy	8	<ul style="list-style-type: none"> ▪ Digital media make communication quicker, more immediate and more agile. 	6	<ul style="list-style-type: none"> ▪ The calendar is more immediate/quicker to use. 	2
Time	4	<ul style="list-style-type: none"> ▪ Teachers do not waste time at pick-up times. 	1	<ul style="list-style-type: none"> ▪ Requires time. 	3
Ease of use	7	<ul style="list-style-type: none"> ▪ Easy to access. ▪ You can access communication using a mobile phone. 	3	<ul style="list-style-type: none"> ▪ Not easy to access. ▪ Using portable devices might be difficult. 	4
Compatibility	21				
Necessity	7	-----	0	<ul style="list-style-type: none"> ▪ Not necessary in primary schools. ▪ Not necessary as you can see the teacher. 	7
Application	14	<ul style="list-style-type: none"> ▪ Only for academic/simple/specific topics. ▪ Problems/important issues discussed face-to-face. 	6	<ul style="list-style-type: none"> ▪ It can lead to misinterpretations. ▪ Face-to-face communication improves personal relationships. 	8
Self-efficacy	6	-----	0	<ul style="list-style-type: none"> ▪ People do not know how to use it. 	6
Technology facilitating conditions	26	<ul style="list-style-type: none"> ▪ Some families do not have Internet access or devices, so both methods (traditional and digital) are used. ▪ In general, people do have Internet access and devices. 	8	<ul style="list-style-type: none"> ▪ Internet at school does not work properly. ▪ People do not have Internet access or devices. 	18
Others' facilitating conditions	22				

Others' use	12	■ In general, people use digital media.	4	■ People do not use digital media. ■ People do not know how to use them.	8
Others' knowledge	4	-----	0	■ People prefer traditional channels/are not interested in ICT.	4
Others' attitudes	6	-----	0	■ People prefer traditional channels/are not interested in ICT.	6

The overview presented in this section makes a two-fold contribution. First, it provides a guide for future studies as it shows the specific statements on which researchers should focus when analysing digital family-school communication. Second, referring to the application of this model to our specific data, we found that most of the beliefs could be considered both positive and negative depending on each individual's values and experiences. This is not surprising because we are dealing with people's subjective appraisals, which do not necessarily reflect objective reality. Indeed, the opposite is the case, as individuals tend to build causal explanations around their beliefs, whether these arguments are accurate or merely invention (Davis et al., 1989; Pajares, 1992).

However, of particular interest in this instance is the knowledge of which beliefs mainly support the use of digital media and which beliefs can be considered barriers to digital communication in schools. There are only two beliefs that can be considered factors that enhance ICT implementation because the majority of the discourses expressed by the participants were positive. These beliefs are *convenience* and *immediacy*, both related to the characteristics of digital media. Thus, as evidenced in this data, the convenience and immediacy afforded by e-mails and online platforms are two key advantages perceived by parents and teachers. This perception is consistent with other studies (Thompson et al., 2015), which revealed that convenience is the primary reason why parents and teachers choose e-mails to communicate certain issues, highlighting the non-necessity to coordinate their busy work schedules. Further, our study reinforces the idea supported by many authors (Blau & Hameiri, 2017; Ho et al., 2013; Olmstead, 2013) that digital communication is perceived as more convenient and more immediate than traditional outreach models, so in some instances it could be a suitable option.

In contrast, the results showed that all the specific *beliefs about the context* were basically supported by negative discourses. Specifically, *self-efficacy*, *others' knowledge* and *others' attitudes* are beliefs with a negative view only (see Table 4), while *technology facilitating conditions* and *others' use*, albeit registering positive and negative perceptions, are beliefs that could be considered constrainters of the use of digital media since the majority of the participants' comments reflected negative views. Thus, it is clear that *beliefs about the context* can be considered key barriers to successful ICT integration. Further, this set of beliefs appeared constantly in the interviews, which shows that they are an important concern for families and teachers. As a result of this double conjecture, we argue that future interventions in two-way digital communication should take into special consideration the beliefs that parents and teachers hold towards themselves and others, and that future studies need to focus on first-order barriers to check whether computer literacy is still a core problem that needs to be addressed (or, conversely,

whether it is a perceived weakness misaligned with what really happens within the educational and familial context).

Finally, we found some *beliefs about the medium* that had an equal mixture of positive and negative comments, so they could be considered as strengths or barriers depending on the agents' views. These beliefs are related to *efficacy*, *perceived ease of use* and *application*. Regarding *perceived ease of use*, it is worth noting that regardless of the participants' views on this belief (positive or negative), the arguments that parents and teachers used to support their thoughts can be placed within two key ideas. The first one is the degree of difficulty in accessing the medium, with passwords and log-in sessions as important features. The second argument is linked to the ubiquity enabled by current devices, specifically smartphones. Unlike much prior research (Davis et al., 1989; Hu et al., 2003) that states that perceived ease of use is a significant secondary determinant of usage, we support the idea that perceived ease of use is an essential issue when studying ICT integration due to its strong alignment with computer literacy. Consequently, although recent studies have suggested that the large majority of parents and teachers are digitally competent (Hu et al., 2009; Özdamli & Yıldız, 2014), perceived ease of use has to be seen as a belief that might constrain the use of digital media in those parents and teachers whose level of digital competency remains low (Lewin & Luckin, 2010; Ozcinar & Ekizoglu, 2013). Concerning *application*, a lack of visual and auditory cues, which are key elements in verbal communication, was at the heart of the participants' discourses. On the positive side, it is suggested that digital communication should be reserved for academic issues and concrete information, whereas sensitive, serious or complex topics should be dealt with through personal contact. Previous studies have also shown that parents and teachers share this conviction (Bouffard, 2008; Hu et al., 2009; Thompson et al., 2015), leading us to the conclusion that schools must combine both methods – traditional and digital – in order to take advantage of the strengths of each one (Goodall, 2016; Heath et al., 2015). As Hu et al. (2009) asserted, the role of ICT is just to redistribute the channels for messages to be communicated according to the nature and purpose of such messages. On the negative side, the data showed that some participants believed that the lack of non-verbal cues could lead to misinterpretations, a concern also found in Thompson's (2009) study.

4.3. Who said what? Comparing the participants' discourses (RQ3; RQ4)

In this section, we compare the participants' discourses, taking into consideration two variables: the participants' group (parents and teachers) and the participants' setting (*ICT schools* and *non-ICT schools*). First, we shall focus on the participants' positive discourses on the whole set of beliefs included in the model. Secondly, we shall analyse the participants' negative comments on the set of beliefs included in the model. The discussion expands on each group of comments.

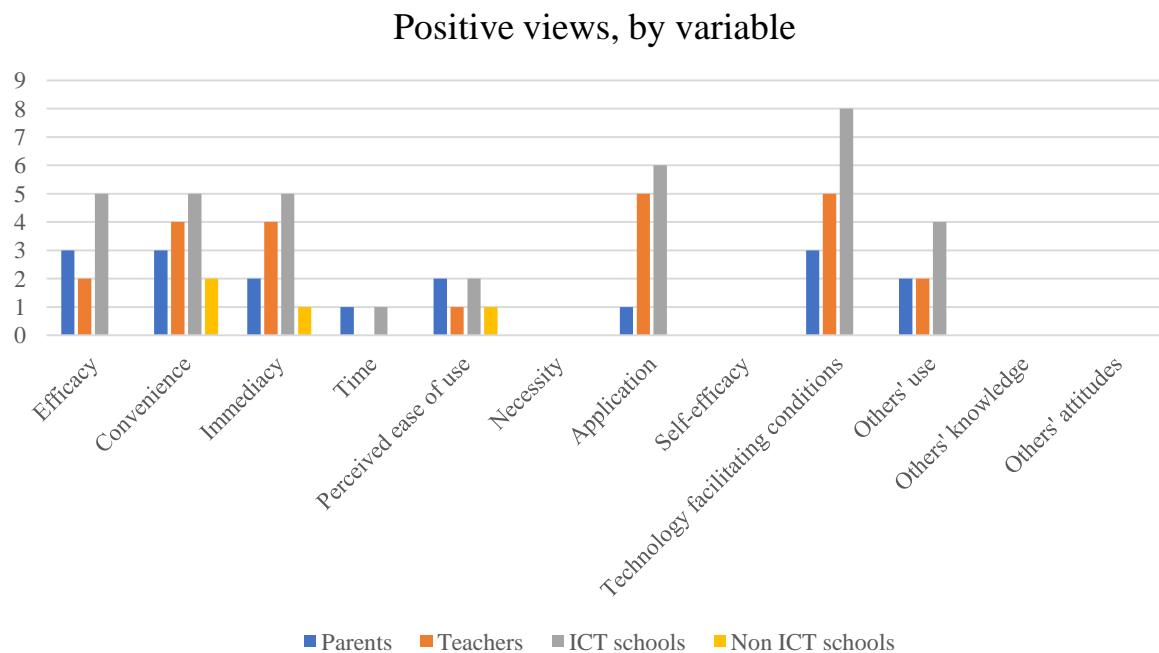
4.3.1. Positive discourses

For the purposes of this study, we defined positive discourses as «utterances that expressed advantages of and/or supporters of the use of digital media». Figure 3 shows

the number of positive discourses, by groups of agents (parents and teachers) and by participants' setting (*ICT schools* and *non-ICT schools*), on the beliefs included in the proposed model.

FIGURE 3

Frequency of positive statements about every belief, by participants' group (parents/teachers) and participants' setting (ICT schools/non-ICT schools)



It is clear from Figure 3 that the participants in the *ICT schools* setting expressed most of the positive comments on digital media. Only *convenience*, *immediacy* and *perceived ease of use* were characteristics of digital media also viewed as strengths for some participants in the *non-ICT schools* setting. In this regard, when looking at *convenience*, the most frequently mentioned idea by both the parents and the teachers, was that digital media are perfectly suited to daily family-school communication or to those families who cannot get to school because of their work schedules. The following excerpt exemplifies this idea:

«The online platform is a really useful communication medium for all families, but even more so for those who do not have flexibility because of their work schedules or because their workplace is a long way from the school.»

Many participants, primarily teachers in this instance, perceived *immediacy* as a positive attribute of digital media as they make communication quicker, more immediate and more agile. As one teacher stated:

«Digital media have greatly facilitated quicker communication. You can send a message like ‘tomorrow, please remember to bring this material to school’, and the following day the majority of parents respond because they have the information there in an instant.»

Regarding *perceived ease of use*, some parents were keen on using digital media as they require no effort. The teachers' discourses, however, focused on the ubiquity of mobile phones, explaining that smartphones provided ready access to the Internet, thereby making digital communication even more convenient (Thompson et al., 2015). The positive standpoints on the rest of the beliefs were all mentioned by the participants from *ICT schools*. However, some differences were found between the parents' and the teachers' discourses. Focusing on *efficacy*, while the parents held the view that using digital media meant that they were in permanent communication with the school, highlighting the frequency of contact, the teachers referred to the creation and maintenance of high-quality school-family communication, pointing to the quality of contact. One teacher noted that:

«I frequently use the online platform because, although they [the pupils] often have the calendar [a two-way traditional communication channel used by Spanish schools] on them, they don't show it to their parents.»

Concerning *application*, it is a belief primarily referenced in the teachers' interviews. In this regard, they suggested that digital communication should be reserved for academic issues and concrete information, such as informing the teachers of a child's absence from school due to a doctor's visit, whereas more sensitive and serious problems should be dealt through personal contact. As one teacher noted:

«We communicate concrete and specific issues via digital media; we do not go into the same level detail as we would in face-to-face communication.»

Moving on to *beliefs about the context*, only *technology facilitating conditions* and *others' use* had some positive comments. Regarding *technology facilitating conditions*, the teachers adopted a positive attitude towards the existence of parents unwilling to use digital media and highlighted the solution that they had adopted: using a combination of methods to ensure effective communication with all families. One teacher explained that:

«Not all families have Internet access. In our school, some don't have it, so you have to be sure to reach all families by using the calendar. Although you give some information via the online platform, such as the pupils' homework, this information will never be sent using that medium alone. It is also written down on the calendar so that those who can't access the Internet or have a broken-down computer at that time can receive it.»

Another important discourse, in this case shared by both the parents and the teachers, was that while some families lacked digital resources, the vast majority of parents did not. The parents and the teachers also shared the view that many families already used digital devices in their daily lives, so the *others' use* of digital media is not a barrier to ICT implementation for two-way communication between families and schools.

It is clear from this section that the arguments behind the parents' and the teachers' positive views on the use of digital media are similar in some beliefs, whilst in others,

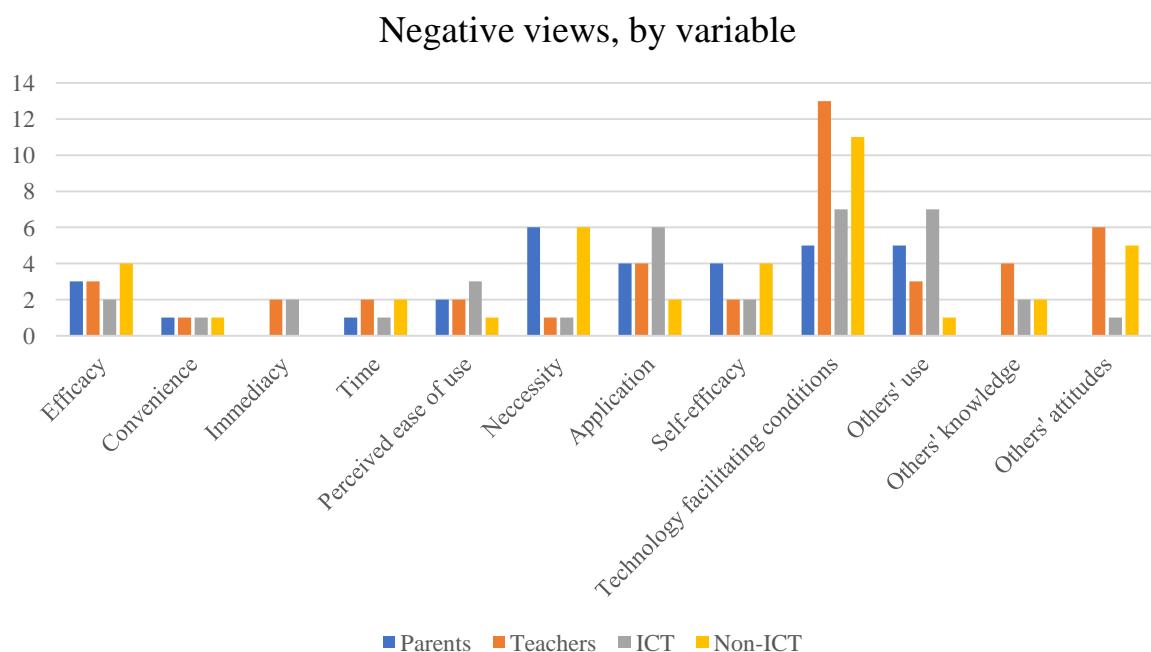
each group constructs its own reasoning based on different premises. However, the most important finding is the importance of the context, where leadership dynamics, change management or ICT implementation time impact on the kind of approach that the participants' take towards the set of beliefs studied, with the parents' and the teachers' in an *ICT schools* setting expressing the most positive views on the use of digital media. These results are, to some extent, consistent with previous research (Drossel et al., 2017; Ertmer et al., 2012; Gil et al., 2017), which suggests the importance of the social system and especially of leadership action (Pelgrum & Voogt, 2009) in ICT integration in schools. In our study, the influence of this social system might be reflected through the change in the participants' attitudes towards the use of digital media for pedagogical purposes, although, as pointed out by others researchers (Kim et al., 2013), it is possible to assert that while the participants' beliefs may be related to ICT integration, a correlation does not imply causation (and this study does not provide empirical evidence to prove that causality), so it is simply a hypothesis that further studies will need to test.

4.3.2. Negative discourses

This section expands on the negative statements made by the participants, defined as «utterances that expressed disadvantages of and/or concerns about the use of digital media». Figure 4 shows the number of negative discourses, by groups of agents (parents and teachers) and by the participants' setting (*ICT schools* and *non-ICT schools*).

FIGURE 4

Frequency of negative statements about every belief, by participants' group (parents/teachers) and participants' setting (ICT schools/non-ICT schools)



Contrary to what we had expected, the participants from *ICT schools* also held a negative stance on the use of digital media, and was actually the main group expressing such negative comments for certain kinds of belief, e.g., *immediacy, perceived ease of use, application* and *others' use*. *Immediacy* was a characteristic of digital media that only the teachers viewed negatively, who suggested that the calendar –a two-way traditional communication channel used by Spanish schools– was quicker to use and more immediate than digital media were.

Regarding *perceived ease of use*, some parents perceived the action of logging in to a session as a burden, whereas in the teachers' discourses, as found in the positive comments on the same belief, the idea of the ubiquity of smartphones also emerged, but on this occasion they felt that it might be difficult to access the online platform using mobile phones, probably because of the existence of passwords and log-in sessions. Moving on to *application*, differences between the parents' and the teachers' discourses were also found. Both the parents and the teachers still took a dim view of e-mails and online platforms, mainly because the lack of non-verbal cues. For families, this fact could lead to misinterpretations. As one parent stated:

«I like direct communication, face-to-face channels, because it seems to me that they can better understand my point, and I can better express what I'm thinking and what I want to communicate.»

Thompson (2009) also found that misinterpretations were the most significant problem expressed by parents and teachers when communicating via e-mail. However, unlike Thompson's results, in this study the problem was expressed mainly in the parents' discourses. In contrast, the teachers underlined the difficulty in developing interpersonal impressions through digital media, a concern that was also noted in previous research (Thompson et al., 2015). *Others' use*, a belief on which negative views were held by the participants in *ICT schools*, was primarily cited by the parents. In this regard, the most common view was that parents, and in some cases teachers, did not tend to use e-mails and online platforms on a regular basis. The following statement shows this position:

«When we talk about the lack of use of digital media, generally we're referring to immigrants, but, on the whole, national people don't check their e-mails on a daily basis either. That seems odd to me because I check mine many times a day.»

The results showed the primacy of the parents' group when talking about *necessity* and *self-efficacy* too, albeit in this case for families from *non-ICT schools*. Looking at themselves, some parents noted that they did not know exactly how to manage new technologies and, consequently, were not keen on using digital media to enhance parent-teacher communication. The teachers that held the same belief related their lack of confidence and the non-use of digital devices to age. Referring to *necessity*, the comments on this were based on two salient ideas. First, it is thought that in primary schools there is no necessity to use digital media for parent-teacher communication because traditional channels already suit the agents' communicative needs. Second, as Thompson et al. (2015) found in their study, some parents stated that they frequently visit their child's

school, making direct communication with teachers possible, especially at drop-off and pick-up times, so the use of ICT is unnecessary. In this regard, one parent stated:

«I'm familiar with these digital media but don't use them, I prefer traditional channels. I understand that they could work in secondary schools, but in primary schools face-to-face communication is easier because you can see the teacher every day and you have daily contact with the professional staff.»

Regarding the teachers, they were above all concerned about the context (the downsides of *technology facilitating conditions*, *others' knowledge* and *others' attitudes* were mainly cited by this group of participants). In this respect, the teachers stated that other families and teachers, i.e., the *others*, did not know how to use digital media due to their scarce knowledge of and training in new technologies. Nevertheless, statistical evidence and empirical studies show that nowadays the large majority of parents and teachers are digitally competent (Hu et al., 2009; Özdamli & Yıldız, 2014). Consequently, the low levels of technical know-how mentioned by teachers when talking about their peers may be out of alignment with reality and simply be a biased image that they have created to justify the fact that they do not use e-mails and online platforms. Similarly, the teachers (mainly in a *non-ICT schools* setting) justified their non-use of digital media by stating simply that it was the families' fault. The general statement referring to this belief of others' attitudes was that many families did not go to school to get their password, or that when they did, they lost it afterwards. As one teacher explained:

«You might have to give the password to a family many times because they're constantly losing it, and I don't know if they eventually manage to log in.»

In a similar manner, many teachers expressed a negative stance on *technology facilitating conditions*. It is clear that there will always be some families who do not have devices or Internet access. In fact, some of the parents interviewed pointed out their lack of access to the Internet, a concern also expressed by some teachers about their schools' Internet service. However, given this situation, the emphasis must be placed on how this weakness is viewed and addressed by families and schools. Many teachers, primarily in a *non-ICT schools* setting held the belief that, by using digital media, schools might make the existing social gap wider and, consequently, that it was better to simply retain traditional channels, a statement also mentioned by a few parents. Surprisingly, this was a negative belief equally held by teachers from both low and high socioeconomic-status schools, which suggests that it might sometimes be a discourse used to justify the non-use of digital media. Consequently, as stated earlier, future studies should focus on first-order barriers to check whether access –such as computer literacy– remains a challenge. Finally, it should be acknowledged that the profile of the participants who held negative views on the *efficacy* and *convenience* of digital media, as well as the *time* required to use them, was mixed when looking at both variables.

To sum up, this section has provided evidence to assert that the parents and the teachers from *ICT schools* also had concerns about some of the characteristics of digital media and the contextual conditions, especially about *immediacy*, *perceived ease of use*,

application and *others' use*. Differences between the parents' and the teachers' views were also notable, with the parents' focusing on the non-necessity of digital media and the teachers highlighting negative feelings towards contextual factors, especially the belief that there was still a lack of optimal technological conditions to enable an effective implementation of e-communication with families. Thus, the digital divide could be a major issue for family-school communication, a first-order barrier commonly cited in previous research (Heath et al., 2015; Rogers & Wright, 2008; Selwyn et al., 2011) and on which we consider further research is needed.

5. CONCLUSION

Why is it that digital media are not frequently used for pedagogical communication despite their potential benefits in bridging the communication gap between families and teachers? To answer this question, we first developed a theoretical model to explicitly analyse two-way communication within an educational field. Thus, this study provides not only a contextualised answer to the question, but also a general framework to guide future studies, which will extend its usability and relevance beyond those involved in our research. The results obtained from this study point to the usability of the DTPB model (Taylor & Todd, 1995) –as the theoretical underpinning– for analysing family-school communication. However, in the same way as the DTPB model tailors previous acceptance models (focusing on general behaviours) by including more detailed beliefs, the major outcome of our framework is the inclusion of even more decomposed sub-themes to adapt the DTPB model to the family-school context. Thus, it can be said that the more specific the context, the more specific the model.

We also applied the proposed model to our specific data in order to perform the analysis, which led us to suggest salient beliefs constraining or supporting the use of two-way digital media. This study showed that families and, above all, teachers perceived *beliefs about the context* as important barriers to the implementation of e-mails and online platforms, especially beliefs related to technology facilitating conditions and others' facilitating conditions (low levels of self-competency were only expressed by few participants). Consequently, the results indicate that *beliefs about the context* are mainly focused on the social and external components rather than internal factors (self-efficacy), which is consistent with previous literature (Chien et al, 2014). This may be primarily attributed to the fact that the communicative process involves two agents, parents and families; the predisposition and action of one of those two is therefore not enough to bring about successful communication. Thus, an alignment between the parents' and the teachers' behaviours is required. As noted by Ajzen (1991), the significance of control beliefs varies across situations and behaviours, becoming more useful when people's control over the behaviour declines, which is the case of family-school communication. However, it is worth noting that, while in some schools those *beliefs about the context* might reflect an objective reality, e.g. in low-socioeconomic status schools, such perceptions within many educational communities might simply be based on non-reasoned judgments, as some teachers from medium-socioeconomic status schools also

held this belief. In light of this, practical interventions should endeavour to ensure that teachers and parents have a better understanding of the social environment in order to minimise assumptions not based on fact. This study therefore highlights the need for teachers to see parents as *partners* and not as barriers to the implementation of any kind of innovation (in this case, the use of digital media to improve parent-teacher communication). Thus, in order to enhance the use of digital media, teacher training must focus on getting teachers to foster positive attitudes among parents rather than on the advantages of digital technologies (as many of the beliefs about such media are already positive). In short, new attitudes, old needs.

Another notable finding of this study in terms of the educational implications is the relationship between the degree of a school's ICT implementation for family-school communication and the participants' perception of the use of digital media for that purpose. In *ICT schools*, the parents and teachers held more positive and optimistic views on the beliefs included in our model, highlighting the strengths of digital media and seeing the context as a factor that strengthened their use. While the study does not enable us to establish the directionality of this relationship, it is possible to hypothesize that, when a management team promotes and strengthens the use of digital media for family-school communication, with the subsequent actions arising from doing so, a gradual change in beliefs and attitudes occurs among the educational community as a whole towards such digital innovation. Thus, given the importance of beliefs in the successful integration of ICT in schools (Drossel et al., 2017; Hew & Brush, 2007; Inan & Lowther, 2010; Prestridge, 2012), it is possible to foster a greater use of e-mails and online platforms by all the educational agents. These findings therefore suggest that, if there is a desire to improve family-school communication, educational institutions and, above all, school management teams should take the first step to introduce digital media because their actions are considered determinants of ICT integration (Pelgrum & Voogt, 2009). Indeed, another implication for the field of practical application of digital media is the need for schools to combine both methods –traditional and digital– in order to take advantage of the strengths of each one (Goodall, 2016). We highly support this idea. It is crucial for parents and teachers to use diverse means in order to achieve the best results, and future interventions must emphasise this point. Nevertheless, we would like to point out that the introduction of digital media is not a panacea for all the latent challenges of family-school communication, since there are cultural and attitudinal factors that play a very important role in this regard. In short, new modes, old needs.

These findings are also relevant in the academic field, since previous literature has only pointed out the advantages of and concerns about the characteristics of technology, what we refer to as *beliefs about the medium*. However, *beliefs about the context* are a new path of analysis that has emerged from our data, on which future studies should focus. Indeed, our findings suggest the need to study the trilogy of digital media/communication/family-school from a more systemic perspective (Blau & Hameiri, 2012; 2017). Thus, future studies should approach this object of study from the perspective of the Diffusion of Innovation Theory (Rogers, 2003), a theoretical framework that tries to understand the acceptance of a certain technology within a social system.

To sum up, the outcomes of this study are three-fold. First, it sheds light on the issue of family-school communication, focusing on a dimension that has been relatively unexplored in previous studies (two-way digital media). Second, it makes a contribution to the theoretical field by developing a framework to guide future research. Lastly, it goes beyond scientific knowledge and makes several suggestions for practical interventions, in this case in schools, which must be the ultimate goal of all research.

6. LIMITATIONS AND FUTURE RESEARCH

Our study has some limitations that need to be mentioned. Lack of access, lack of skills and lack of will among parents and teachers are several potential generic reasons explaining the slow incorporation of digital media for pedagogical communication into home-school communication. However, this research intentionally focused on the *will* factor, as beliefs are considered important barriers to general ICT implementation in schools (Hew & Brush, 2007; Inan & Lowther, 2010). Future research is required to analyse other variables. Second, we performed a general analysis of beliefs to explain the widely unsuccessful integration of two-way digital media for pedagogical communication in many schools, but the study does not tie beliefs to actual behaviour. Thus, an interesting venue for future research would be an analysis of the correlation between the proposed model and the actual use of e-mails and online platforms by parents and teachers in specific schools (including the analysis of constructs resulting from every belief, from the behavioural intention to use and from the direct antecedents to actual use). However, the sharp focus on beliefs provided more specific data on the range of beliefs influencing ICT use within the communicative context, which led us to design a model that could be applied in future studies. Further research is needed to validate, refute or improve the model proposed in this paper. This means that future studies might use this data to design a survey instrument to collect larger quantities of data to test an empirical model. Finally, we were aware of the limitation of the interview used as the questions included did not provide information from all the participants in the study, with a consequent reduction in the size of the sample. However, rather than a weakness, we consider it a strength as the information analysed in this paper comes from parents' and teachers' real concerns and judgments, which brings added value to the data. Furthermore, this filter enabled us to observe that two-way digital media were not an important matter for most participants, as traditional means of communication continued to predominate in the educational context (Garreta, 2015).

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Appendix 1

Interview with the families and teachers (adapt the questions to the interviewee's profile)

8. General and introductory questions.

- Description of the environment. Sociodemographic characteristics of the neighbourhood/village. How would you describe the sociodemographic context that the school is located in?
- Profile of the families that the school serves. How would you describe the families that the school serves?
- General assessment of the relationship between families and teachers. How do the families relate to the school, and the school to the families? How would you rate this relationship?
- Concept of involvement (in general). What do you understand by the families' involvement in their children's education?
- Is parental involvement important? Does it help pupils become more successful? In what way? What other benefits does it bring?
- Introduction to real involvement. What are the families involved in in this school?

9. Upbringing.

C) The families' actions.

- Do the families show an interest in their children's education?
- How would you rate the families' rules or habits within their homes?
Adequate, could be improved...?

D) The school's actions.

- What does the school do to help the families create this favourable atmosphere?
- What role do the external professionals play?

10. Learning at home.

C) The families' actions.

- Do the families get involved in their children's education at home? How?
In what activities?
- How would you rate the families' involvement within their homes?
Adequate, could be improved...?

D) The school's actions.

- What does the school do to help the families improve their parental involvement at home?
- What role do the external professionals and the teachers play?

11. Communication.

D) Traditional communication channels: use and rating.

- What traditional communication channels do the teachers use to relate to the families, and the families to the teachers?
- On what occasions?
- How would you rate them?
- If he/she cannot think of anything, nudge the interviewee by suggesting the following channels: circulars, informal communication, calendars, group meetings and tutorials.

E) One-way digital media for communication: use and rating.

- When the school needs to communicate some information to every family, does it use a digital medium?
- On what occasions?
- How would you rate it?
- If he/she cannot think of anything, nudge the interviewee by suggesting the following media: websites, blogs, e-mails and online platforms.

F) Two-way digital media for communication: use and rating.

- Are e-mails also used to have conversations with the families/teachers?
- On what occasions?
- How would you rate it?
- And what about online platforms, are they also used to have conversations with the families/teachers?
- On what occasions?
- How would you rate it?

12. Volunteering.

D) Festive activities and events.

- What activities do the families get involved in?
- How much do they get involved? Who gets involved?
- How would you rate this involvement?

E) In the classroom.

- What activities do the families get involved in?
- How much do they get involved? Who gets involved?
- How would you rate this involvement?

F) Other forms of involvement in the school.

- Are there any other ways that the families get involved in the school that we haven't mentioned?
- How much do they get involved? Who gets involved?
- How would you rate this involvement?

13. Decision-making.

C) The School Council.

- How would you rate the School Council? Is it useful?
- How much do the families get involved in it?
- What types of family get involved?

D) The Parents' Association

- What activities does the Parent's Association organise?
- In your view, what are the strengths and weaknesses of the Parents' Association and of the actions it carries out?
- How would you rate the families' involvement in the Parents' Association?

14. Collaboration with the community.

C) With the local area.

- What relationship is there with the local area?
- Are any activities organised with the village/neighbourhood?
- Is there any collaboration with local institutions? How?
- What benefits does it bring?

D) With the schools' other professionals.

- What role do the external professionals play (Psychopedagogical Advice Teams, social workers...) within the family-school relationship?
- How would you rate their actions and help in this respect?