



# YOUNG CHILDREN (0-8) AND DIGITAL TECHNOLOGY

*A qualitative exploratory study*  
*- National report -*  
**SPAIN**

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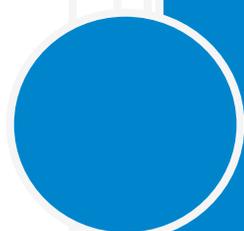
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Coordinated by the Joint Research Centre (JRC) - European Commission

3 February 2016



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## Executive Summary

The study is a part of a larger qualitative study carried out across 16 European countries aimed at exploring experiences with digital technologies, e.g. smart phones, tablets, computers, TVs, video-games, etc. of young children aged between 0 and 8 years and their families. The overall research question is: ***In what ways, if any, are children and/or their families empowered by the use of new (online) technologies?*** and was addressed through four areas (Use, Perceptions/Attitudes, Individual context, Family context).

This national report of Spain is written based on data generated interviewing 11 families who have at least one child between 6-7 years of age, and the fieldwork was conducted in the Autonomous Community of Madrid and of Catalonia between June and November 2015. Although literature regarding technology in the life of children 0-8 is emerging in the Spanish context as a key focus as such, it is still very scarce. We hope, therefore, that the presented results from the study will serve as a basis for larger EU studies on related topics and for policy recommendations in Spain and beyond.

### Key findings

- For most children the two **favourite digital devices are tablets and television (TV)**.
- They report **using the digital devices primarily for leisure**: to play game applications, watch videos and children's cartoons or shows and, to a lesser degree, to read digital storybooks. For the young children in our study who are entering or are in their first year of primary education, digital devices do not seem to be too tied to educational uses. Although families do report that their children's schools have and use some digital technologies, for the moment, they do not see any demands from schools to use digital technologies at home for educational purposes.
- **Tablets and TV are said to be used with autonomy by children** within the control and rules parents have arranged. Other digital devices such as laptop computers or smartphones are also used by some young children but in a more limited way and with more parental supervision. Very few of the target children in the study have their own mobile phone (but old mobile devices in the family are given to the child as a game (without the SIM Card). And none of the children report using social media - although some of the games they play might have involved creating profiles.
- Within families **digital devices are used by the family for leisure, and by parents also for work related purposes**. Family schedules are organized to include many other forms of activity, outdoor play and leisure, not only those that involve digital media and devices.
- **Most homes are equipped with multiple digital devices**, several of which are owned and used regularly by parents, and **the presence of digital technology in the home does not seem to be clearly tied to aspects such as family composition, geographical location or even family income**. However, **the uses of digital devices are more closely connected to parental occupation and parental ideologies**.

- **Children are described as having learnt "on their own" to use digital media.** However, this process includes practices such as close observations of how parents use and interact with digital devices and learning through interactions around digital technology with older siblings and extended family (especially cousins). **Nonetheless, young children report needing assistance to set up various digital devices, and most parents control very closely what is downloaded and installed in the digital devices their children use.**
- **Children perceive digital technologies in primarily positive terms,** as they are associated to leisure, play and as an opportunity for young children to explore and pursue their interests. When children mention risks or negative aspects it is clear (and often mentioned explicitly) that they are repeating parental views or explaining the reasons parents have given them to enforce particular rules or restrictions.
- **Parents see children's engagement with digital technologies as an unavoidable fact of their children's lives, which will only increase as children grow up.** This increased use will include more relevance in children's schooling, and all parents foresee digital technologies will be an integral part of their children's future work life.
- **Parents do express concerns in relation to risks associated with digital technologies such as accessing content that is inappropriate for their children (primarily violent content) and/or interacting with strangers through online platforms and games.** Parents do not seem to use, give credit or have had good experiences with content-controlled application and filters or the parental control features of the applications they use.
- **Parents also perceive digital technologies as in competition against traditional forms of play and outdoor and physical activity,** as well as other forms of leisure and socialization they want to promote in their children. Most families report organizing after-school schedules and routines that include multiple activities and commitments that limit the amount of time children can spend with digital devices. Parents admit using digital technologies as a way of keeping children "entertained" while they have to attend to other family demands, but this is not the primary way families report spending their after-school time.
- **Parents mediate and organize their children's digital experiences in two main ways: 1) Set up clear controls and restrictions to children's on-line access through digital devices** (by turning off the device's Wi-Fi connection, controlling what applications are installed, etc.). This allows children to use digital devices in a rather autonomous way, but this use is primarily individual and disconnected from the Internet or from online features of applications. **2) Allow on-line connectivity of the digital devices for children and then are more engaged with how children use digital technologies and might even use them alongside or with their children. There is a strong interplay between parent's fear or perceptions of risks and the controlling strategies they set up.**

## Key recommendations

Given the sample size and the design of the study our main interlocutors are families, so our suggestions speak more directly to parents and children's caretakers. However, from the practices and beliefs around digital technologies and young children we have identified, policy-makers and even media and technology designers might find relevant implications for their work.

- **Start to foster forms of self-regulation in young children**, as the shared expectation is that in the future children's engagement with these devices will increase (and parents foresee that it will reach a peak and dominate their interests when they enter adolescence). This goes contrary to the majority of parents' strategy to regulate for children their schedules or implement family rules that directly or indirectly regulate the time children spend with digital media and technologies. We have seen how some families have developed their own strategies to start to foster children's self-regulation, such as organizing activity schedules that tie digital technologies to completing other activities which children themselves can monitor. However, there are at least two observations that need to be made in relation to this.

(1) Our results show that Spanish young children tie digital technologies primarily to their leisure and play time. Thus, **the efforts to regulate children's use of digital technologies are in fact the efforts to regulate children's play - the domain that has been traditionally seen as the more autonomous domain of children's lives where adult intervention is often seen as interference.**

(2) **Digital technologies and media change rapidly** and, thus, it is more than probable that the young children we have studied will encounter and engage with new technologies during the course of their childhood and their future teenage years. Therefore, **parents should also acknowledge that any regulatory strategy (and the concerns that support it) should be seen as provisional and open to revision.**

- **Rethink and think through more carefully the experiences they are constraining in their children with the technical set-up they create for their children.** We have seen that a group of parents control the devices that children use in such a way that access to the Internet or the online features of the devices and applications are inhibited. While this arrangement facilitates children's autonomous use of digital devices and provides a sense of security to parents, **by inhibiting the online access or online features of applications, parents are sacrificing, perhaps, the quintessential feature of current digital media (online connectivity) and simply delay children's online experiences.** Yet, as parents' decision to limit access to the Internet is tied to perceived risks, alternative strategies must also respond effectively to these concerns.

- **Explore and promote ways in which children and adults can share activities around digital devices and applications expanding the scope of children's digital experiences in the home.** Our results indicate that in large part children's engagement with digital technologies in the family is an individual experience. Children interact on their own with their preferred devices (tablets and hand-held game players), mostly not involving interaction with other children/users through the devices. However, the use of digital devices does not necessarily mean solitary experience, as largely perceived among the families studied. The joint uses of digital devices should happen alongside, rather than instead, other forms of non-digital joint activity.

# 1. Introduction to the *0-8 Study* and the Spanish Report

## Background to the *0-8 Study* as an European study

In collaboration with a selected group of academic partners in different European countries, the present study is a qualitative investigation that explores young children (between 0-8 years old) and their families' experiences with digital technologies and the potential benefits and risks associated with their (online) interactions with new technologies. Research focusing on the benefits and challenges associated with children's use of the Internet has, so far, mainly targeted 9-16 years old (see, for example, the EU Kids Online research carried out since 2006, such as Love et al., 2011; Livingstone et al., 2011). Yet, research shows that children are going online at an increasingly younger age, and "*young children's lack of technical, critical and social skills may pose [a greater] risk*" (Livingstone et al., 2011, p.3). In spite of the substantial increase in usage by very young children, research in the area is still scarce. Therefore, it is considered imperative to conduct research that targets 0-8 years old children and explores the benefits and risks of their online engagement.

The aim of our research is to generate data to address the overall research question: ***in what ways, if any, are children and/or their families empowered by the use of new (online) technologies?*** In other words, it investigates the benefits or risks with regards young children's use of digital technologies at home. The study is conducted in the framework of the JRC's Project Empowering Citizens' Rights in emerging ICT (ECIT in short, Project n. 572). ECIT deals with "*Identification of new threats to children by ICT besides social networks. Development of recommendations to empower children's rights by preventing and mitigating these emerging issues through education, school and community co-vigilance, as well as reconciliation of digital and personal interactions.*"

This is the second year that the study has been conducted at a cross-national level in Europe although Spain participates in the study for the first time in 2015 and this report presents the first portrait of young children's engagement with digital technologies in Spain within the JRC project framework. In 2014, seven countries participated in the study, interviewing 10 families in each country that have at least a child aged between 6 and 7 (see also Chaudron, 2015). This first round of studies focused on four research questions:

- RQ 1: How do children under the age of 8 engage with new (online) technologies?
- RQ 2: How are new (online) technologies perceived by different family members?
- RQ 3: What role do these new (online) technologies (smartphones, tablets, computers, video games, apps, etc.) play in children's and parents' lives (separately and in relation to family life in general)?
- RQ 4: How do parents manage their younger children's use of (online) technologies (at home and/or elsewhere)? Are their strategies more constructive or restrictive?

In 2015, 16 countries conducted the study,<sup>1</sup> and we have done so under the modified framework, identifying four topics or dimensions to address the four research questions (Use, Perceptions/Attitudes, Individual context, and Family context) (See Tale 1 below).

**TABLE 1: Research questions for 2015 study**

|                           | INDIVIDUAL CONTEXT  | FAMILY CONTEXT  |
|---------------------------|---|---|
| USE                       | RQ 1:<br>Individual Use: children/parents   | RQ 3:<br>Family Use/Dynamics/Practices  |
| PERCEPTIONS/<br>ATTITUDES | RQ 2:<br>Awareness of risks/opportunities <ul style="list-style-type: none"> <li>● Of the children</li> <li>● Of the parents</li> </ul> | RQ 4: Parental Mediation <ul style="list-style-type: none"> <li>● Passive/active</li> <li>● Restrictive/permissive</li> <li>● Implicit/explicit</li> <li>● Reverse mediation</li> </ul> |

## Young children and digital technologies in Spain: Context and a brief review of the literature

The Spanish educational system is defined by the 2013 LOMCE Educational Law (*Ley Orgánica Mejora de la Calidad Educativa de Educación* - Organic Law for the Improvement of Education) and is framed in the Spanish Constitution of 1978 (article number 27). Education is free, secular and compulsory from 6 to 16 years old and is considered a constitutional right for all citizens. The central national government defines the general structure of the education system, which articulates five stages: early childhood education (0-6 years of age), primary education (6-12), compulsory secondary education (12-16), pre-university baccalaureate (16-18) or various tracks of technical and vocational training (+16) and University higher education (+18) alongside various specific educational programs (language, arts, sports, etc.). Spain has 17 autonomous communities, and these regional governments manage and oversee the educational system within their region and have responsibility over aspects of the curriculum and organization of educational related programs. In particular, regions with more than one official language (Basque Country, Galicia, Catalonia, Balearic Islands and Valencia) define the bilingual policies and practices of the school system they govern.

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<sup>1</sup> The countries that collected data in 2015 are Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Finland, Germany, Italy, Latvia, Portugal, Romania, Slovenia, Spain, The Netherlands, and United Kingdom. In addition to the 16 countries above, Malta, Norway and Russia have collaborated with the network without data collection in 2015.

For the age range of this national report the relevant educational tracks are: (a) the first cycle of early childhood education (0-3) which is primarily housed in specific early childhood education centres; (b) the second cycle of early childhood education (3-5), which is incorporated into primary schools, and; (c) the first cycle of primary education (6-8). This national report is based on fieldwork carried out in two Autonomous Communities, which are among the three most densely populated regions in Spain: the Community of Madrid, with close to 6.4 million inhabitants, and Catalonia with almost 7.4 million inhabitants. Furthermore, these two communities confront distinct linguistic realities. On one hand, the Community of Madrid has Spanish as an official language and has been implementing an extensive Spanish-English bilingual educational program in the pre-university school system. On the other hand, Catalonia has three co-official languages (Spanish, Catalan and Aranese, the last one since the reform of the *Estatut d'Autonomia* in 2006). It has a multilingual educational policy in which Catalan is the vehicular language of education in the regional education system, Spanish is taught as a second language and English has been fostered since 1999 through the CLIL (Content and Language Integrated Learning) approach.

Research on digital literacy in Spain is nowadays a major area of academic research, mainly driven by studies in the fields of Psychology, Education and Sociology. It has mainly focused on youth (13-18), under the assumption that young people are the population “at risk” that have become digital without the guidance of their families or teachers during the emergence and consolidation of the Digital Age at the beginning of 21st century. In other words, this work developed in response to the fears and needs of families and schools. Studies focused on families have covered issues such as family attitudes to technology (Ballesta & Cerezo, 2011), youth usage of social networks (García-Martín & García-Sánchez, 2013) and online security (e.g. Coan, 2010) or creativity and arts (García, Cruces, & Urteaga, 2012). However, studies on response to the school digital challenge have developed around the exploration of the pedagogical affordances of technologies, with work conducted in library studies (Area, 2010), literary education (Lluch, 2012) and on how to embed technology in the teaching/learning practice (Cabero, 2000; Jubany, 2012). Furthermore, literature on ICT in education has been largely concentrated on documenting and reflecting on the top-down process of classroom digitalization motivated by initiatives such as *Escuela 2.0* (School 2.0), through which all secondary school students received a voucher to buy a laptop (Aliagas & Castellà, 2014; Barba & Capella, 2010; Cassany, 2013; Vázquez & Cassany, in press). These studies draw on other studies, more descriptive in nature, that explore the complexities of youth literacy practices online (Aliagas, 2015; Cassany, 2012).

The initial focus on technology in secondary education has recently expanded to include primary education as well. Emerging empirical research has started by looking at particular spaces such as the ordinary classroom (Aliagas, 2011; Kucirkova, Messer, Sheehy & Fernández-Panadero, 2014, Ramada & Reyes 2015), the school library (Colomer & Fernández 2014), the family-school intersection (Correro & Real, in press; González-Patiño, Poveda, & Morgade, 2012) or urban space and home (Morgade, Poveda, & González-Patiño, 2014; Poveda, Morgade & González-Patiño, 2012). This emerging literature has focused on particular technologies,

mainly computers (Aliagas, 2011), iPads (Kurcirkova et al., 2014; Ramada & Reyes 2015; Real & Correro, in press) and videogames (Martínez-Borda & Lacasa, 2014). Moreover, research has recently shifted from a focus on the classroom to other settings beyond the classroom, usually using more qualitative or ethnographic-driven studies, such as the home, under the assumption that home is the main space where children have access to technology and thus come to master it (Aliagas & Margallo, in press; González-Patiño, 2011; González-Patiño & Esteban-Guitart, 2015; Morgade et al., 2014). González-Patiño (2011) describes the technology routines in urban childhood and González-Patiño and Esteban-Guitart (2015) examine how children develop digital 'funds' of knowledge through their daily interactions with digital devices. Aliagas and Margallo (in press) study the centrality that iPads are acquiring in the shared-reading practices of emergent readers. Since Spain has a long tradition studying literature for children, research on digital books for 0-8 is also a growing field of study (Correro & Real, in press; Ramada, in press; Turrión 2012).

In short, although literature regarding technology in the life of children 0-8 is emerging in the Spanish context as a key focus as such, it is still very scarce. We hope, therefore, that the presented results from the study will serve as a basis for larger EU studies on related topics and for policy recommendations in Spain and beyond.



took place, ES1b9 had just finished the 4th grade, ES1b7, the 2nd grade, and ES1b5 his last year of preschool. The focal child for the interview was ES1b7, although ES1b9 and ES1b5 joined actively in some parts of the interview.

The family owns a variety of digital devices at home. Both parents have their own laptops (the father has one and the mother has two), and they normally use them to work at home. They also have a laptop shared among the children and another old computer. ES1b7 is concerned about how their children can use the digital devices for educational purposes and he has tried to help them use the family laptop for reinforcing classroom content and for searching for information (especially with ES1b9), but so far the children have not found much interest in computers and the kind of educational applications he would like to promote. ES1b9 only goes online for academic searching purposes in his own tablet with the help of his father. Like his brothers, he prefers to use the tablet for playing games and watching videos on YouTube. ES1b7 and ES1b5 do not have their own tablet, but they can play sometimes on his brother's tablet and with their parent's iPad. Each parent has a smartphone, which the children are not allowed to use except in particular situations outside the house. ES1b7 used to have a mobile phone to take pictures and videos but now it has been substituted by a new camera that his parents gave him for his last birthday. The boys share a Wii, a Nintendo DS and three kids computers. The family also has two TVs (one is located in the living-room on the ground floor and one in the basement lounge, next to the Wii), a DVD player and there are several devices for listening to music, e.g., an iPod and a docking station with speakers, stereo set, CD players, etc.

In the afternoons, after school is finished, the three brothers go to the same after-school activities (music, athletics and swimming classes) and they come back home around 7.30 PM. They usually have to do some homework too. Consequently, there is little time to engage with digital devices on weekdays. This after-school schedule is a parental choice: they sought activities that entertained children but that also promoted family ties and socialisation with other children.

ES1b7's favourite digital activities include playing games with the PlayStation, Wii and Nintendo DS - yet, interestingly, the siblings do not own a PlayStation; they only use it when they go see their cousins. ES1b7 also loves playing games and watching videos on the tablet. During the interview, he showed us games such as Jelly Car 3, Angry Birds and Out of Water. His favourite game (*Clash of Clans*) was removed by his father because he saw that it generated anxiety and dependence on the part of their children. ES1b7 also plays videos on YouTube and plays games to learn English (e.g., Fun English). Alongside the TV, the tablet is the digital device most used by ES1b7, but he can go days without using it (as for TV, it is only watched during weekends). During the interviews, father and child disagreed on the frequency with which ES1b7 uses tablets: ES1b7 says that he does not play much with tablet but only "*sometimes*", and the reason for that is not always because his parents do not let him, but because sometimes he "*does not want to*". On the other hand, his father says - although he also mentions that children can go days without asking for the devices- his son "*grabs the tablet whenever it's free*".

Regardless of the contradictions, ES1b7's favourite activities also include non-digital devices, like cycling or playing ball. He likes to play with his brothers in the patio and around the house. He also likes to cook with his mother.

ES1f43 perceives that technology has both positive and negative aspects but it is generally positive. Regarding the positive aspects, he highlights its usefulness as a tool for his children to do school work. He mentions the educational potential of devices such as the TV, computer, tablet, and through the use of different activities and applications. For example, to learn English they practice tests on Internet, using a tablet application, after watching series and cartoons. Besides that, the eldest son - with the help of his father - uses Wikipedia and search engines to find information online for school homework. He also uses PowerPoint for presentations. ES1f43 also shared the importance of ICTs in relation to some of the children's extracurricular activities such as chess or athletics. He commented:

*"[ES1b9] has been participating in a Chess tournament, and they put up the results, statistics and all in a web page (...) So, he likes checking his position, seeing who he will play against in the next round (...) He likes it, likes using it. [My children] are aware that [the digital devices] can be used for these things too..."*

Despite the positive aspects mentioned above, ES1f43 also shared that the use of ICT can lead the children to isolate themselves from the rest of their peers, although this was not seen as a real threat. He also believes that their children can find inappropriate contents, mainly violent and sexual ones. However, in general, the father considers that their children have typical interests for their age, saying:

*"for now, we see that their interests correspond to their age... In fact, when they see a kiss, they are scandalised and say "¡Eww, disgusting!" (imitating his children), very typical for their age."*

Nevertheless, they avoid 'surprises' (that children find and watch inappropriate content), by monitoring the type of content that their children watch on TV or tablets and banning those they consider inappropriate. In the case of tablets, only parents can download applications and sometimes they have removed some applications already installed, as discussed above.

ES1f43 believes that his mediation has had a key influence on how the children's digital habits have been formed. His mediation involves three types of actions. First, through his mediation children came into contact and started to use applications related to classroom content (games and applications in English, search engines, etc.) and extracurricular activities (chess, athletics) discussed above. Furthermore, he is aware that his preference for extracurricular and family activities for his children affect the amount of time they can spend on digital devices. In other words, the more extracurricular or family activities they do, the less the children can play with digital devices. Third, he considers that it is important to be attentive to the contents (especially violent ones) to which they are exposed and limit them when necessary.

With regards to rules, parents do not use strict time periods or restrictions for using digital devices. The limits are centred around the ban of contents considered unsuitable or watching TV in general on weekdays, as ES1b7 also told us. ICTs are never used as a reward or punishment.

Rules are also established among siblings. For example, when they use the PlayStation with their cousins, ES1b9 and the older cousins usually capitalize the game and do not allow the youngest boys to play. There is also a rule that when a game only allows a player (e.g., Donkey Kong), only the owner of that game can play. The rest of the time, the siblings play together, although, according to the parents, they have not played game consoles for several months.

## Family ES2

Madrid Area, Spain

### Family members

- Mother, 49 (ES2m49), high user of digital media
- **Boy, 6 (ES2b6), about to enter the 1st grade of primary school**



### Narrative

"He likes the tablet the most, because that is what he first had... And so, the first thing he started to use was the tablet, and yes, that is why he likes it the most. Apart from that, I think it gives him a lot of freedom to see what he likes, which he doesn't feel with TV, it shows what it shows, but [with the tablet] he can choose what he wants to see" (Mother, 49, ES2b49).

ES2b6 lives with his mother ES2m49 in a two-bedroom apartment in a residential complex with common gardens in a town located in the southern area of Madrid. ES2m49 is a single-mother by choice and her home is composed of herself, her son and their dog. ES2m49 is the personal assistant of various high-level managers of an international digital technology corporation. ES2b6 at the time of the interview (early Summer 2015) has just completed his last year of preschool and will continue into his first year of Spanish primary education in the same school the following Fall.

ES2b6 and ES2m49 have multiple media and digital devices at home. ES2m49 owns a laptop computer and a smartphone. In their family living room they have a digital TV, a DVD player and a video-game console connected to the TV. In addition, ES2b6 has a TV and a DVD player in his own room. ES2m49 has an iPad that she shares with ES2b6 who also has a smaller non-branded tablet and a portable Nintendo DS game console.

ES2b6 has some form of access to all these digital devices and uses them all except the computer laptop. He is considered the owner of the generic-brand tablet and portable game console and of the DVD and TV in his room. The video-game console, TV and DVD player in the living room are primarily family belongings (although ES2b6 is the exclusive user of the video game console) and ES2m49 is the owner of the computer laptop, smartphone and iPad. ES2b6 can use the iPad under supervision and has very limited access to his mother's smartphone (except when they are away from home). When ES2b6 describes his use of free time he introduces multiple activities (playing Legos and construction pieces, his bicycle, playing with the dog and going down to the apartment complex garden) but digital devices always appear at the top of his list and he is able to describe and illustrate the uses he gives to each of the different digital devices he possesses and has access to.

ES2b6 uses autonomously the portable game console and the tablets (iPad and generic) he has access to, as well as the TV in his room. He needs help setting up the video game console in the living room but, once it is set up, he plays autonomously. However, by far his favourite devices are the iPad -which has been in the house and he has used for about three years now- and his portable game console, which he received as a gift in late Spring. He has several game applications installed in these devices, as well as a cartoon and children's TV network application, through which he watches "on demand" his favourite cartoons and TV shows. ES2b6 navigates confidently and fluently through the various screens, menus and options that are part of the devices and applications he uses. Nevertheless, ES2b6 needs to ask permission to use any of these devices and, as we will see below, his mother attempts to monitor the amount of time spent "on screens" in comparison to other activities and forms of play.

At the moment, ES2m49 is not concerned about risks and security in relation to her child going online. She has absolute control over what applications are installed in the devices ES2b6 uses and she monitors the suitability of the games the child requests to install before doing so. Once this monitoring takes place, the child can use the tablet devices at home through their domestic Wi-Fi connection. The main distinction ES2m49 seems to make in terms of how she supervises device use is related to their cost and care; ES2b6 has to use more delicate and expensive tablets (i.e. iPad) in the company of her mother and these cannot be taken out of the house, while the generic tablet and the portable game console can be used more freely and brought out of the house. As said, ES2b6 has restricted access to his mother's smartphone, does not use any social media application (nor does he know how) and, when he does use the phone, he uses it to play games or take photographs.

ES2m49 describes her use of digital technologies as constant. Her work obligations, even when she is at home, require her to have her computer activated on and she has to be available on her mobile phone. In addition, she uses social media (Facebook) and other Internet resources to organize her family and personal life - in fact, she connects various important life events to her involvement in digital media and Internet (such as her first marriage or later helping her decide being a single mother). For her, using digital media has required explicit learning and familiarization processes with these technologies. In contrast, she describes ES2b6's familiarization with digital devices as a natural process that is unfolding without much guidance on her side, apart from the control strategies described above. ES2m49 has flexible rules about the use of digital devices but does try to control the amount of time her son spends "on screens" and also wants him to engage in other forms of physical play and social activities outside the house. As said, ES2b6 uses digital media primarily for play and entertainment and enjoys playing on his own with digital devices. For the moment, ES2m49 has not introduced other "instructionally/educationally" oriented uses in her son's digital practices, nor are these required or fostered in the school ES2b6 attends. ES2m49 foresees that digital media will become relevant later in her son's schooling and clearly in his social and work-life but does not seem particularly concerned, at the moment, with the strategies she might have to put in motion to respond to these future demands.

## Family ES3

Madrid Area, Spain

### Family members

- Mother, 39 (ES3m39), medium user of digital media
- **Boy, 7 (ES3b7), completed the 1st grade**
- Girl, 5 (ES3g5), completed the last year of preschool



### Narrative

The family lives in a three-bedroom house in a historical city in the south of Madrid. Their uncle (ES3m39's brother) lives in an upper floor in the same building and has a lot of contact with the family - for example, he entered the house twice while the interview was going on and commented on the responses given by ES3b7 on various occasions. ES3m39 is a single mother. She has a university degree in History of Arts and also a diploma in restoration and conservation. She presently works in the commercial sector. Based on Eurostat's criteria, ES3 is classified as a low-income family. Family life seems to

“What his uncle listens to, the child listens to” (Mother, 39, ES3m39)

be organized around two locations in the house: their living room and patio. ES3b7 says that in the living room he plays with Legos, the Wii, watches TV, listens to music and does his homework. In the patio, while showing the researchers around, ES3b7 says:

*“I play football a lot and also play basketball, stick fighting and sword fighting with my uncle and [ES3g5] and we do barbeques”.*

The digital devices the family possesses are: TV, laptop, radio-cassette player, iPod, PlayStation, remote-controlled car, and a Wii. They also have a Nintendo DS but it is broken now. ES3b7 said he uses all the devices in the house (except Nintendo DS which he used to play but now that it is broken he does not use it anymore). However, it was not clear which devices ES3b7 feels he owns. ES3m39 says that practically her children do not have devices and if they have one it is a recent acquisition or something passed on from other family members. The laptop and the mobile phone are in the house only for about a year because of the mother's work. The small iPod of ES3b7 was given to him during the last Christmas. He does not have a tablet at home, but uses an iPad and a computer at school (which the school has as a prize to the school). ES3b7 says her sister ES3g5 does not use the iPod and uses the TV “*more or less*”. On the contrary, ES3g5 says she can use the TV (well). ES3m39 says her children do not play on the digital devices frequently. On one hand, she does not let ES3b7 use much the Wii (which he recently got as a gift) because she prefers that the children go out to a park. On the other hand, she said the children themselves prefer playing outside.

ES3m39 does not seem to use digital devices much. She says about herself that she has never been a kind of person to have computer, and that these devices entered her life very slowly and late. But her brother, who lives upstairs, uses the Mac computer a lot for music and images because he likes photography. He always put music on the computer and the family always has it on.

Among the devices ES3b7 has access to, he said the devices he uses the most are the TV, the computer (we do not know if this is the laptop in the house or uncle's Mac), and the Wii while his favourites are those plus the iPod. He watches TV and plays Wii in the living room, while he uses the computer in his uncle's house, and iPod in his own room. The TV is to see TV shows and movies, the iPod for listening to music (and dancing), the Wii for playing some games, and the laptop to listen to music on YouTube. He uses the mother's phone to send voice and text messages through WhatsApp and also to make calls. He showed how to do these to the researchers without difficulty.

ES3b7 uses the different devices in company of someone: Internet (YouTube) with his uncle, mobile with his mother, the Wii with his sister, TV with his sister and sometimes with his mother. They also have movie night on Fridays. While they eat pizza and potato chips, they watch children's movies that his uncle downloaded from Internet. ES3b7 chooses which movie to watch (ones that he has seen its trailer in some advertisement and so) but, in general, music and cartoons are chosen by the adults (mother or uncle). The iPod looks like something that he uses on his own (while doing homework and while cleaning). He also watches TV when his

mother is working at home, but they do not seem to use TV as a way to “babysit” much nor is an important part of family dynamics.

ES3b7 seems to have learned to use some devices alone (he learned by watching), while he is taught by his mother or uncle to use others (the mother says it is mostly taught by his uncle). For instance, ES3m39 does not know how to set up the Wii, so ES3b7 gets help from his uncle. He also goes to his mother or uncle when he gets stuck using some devices.

ES3m39 perceives that there are both risks and positive aspects in having children use digital devices. Risks include what they might see in music videos or cartoons or hear in conversations that are not appropriate for children. ES3b7 himself perceives some risks in using digital devices too. When asked why there are some rules and prohibitions, he says because there are contents that are violent, or not for his age, or so that he does not learn “*bad things*”. Positive things mentioned by ES3m39 are that devices are necessary and it seems to her that one can find many things if you know how to use them. Often they look for exercises for class or she shows them how to look for information on Internet. She also comments that there are many children that use a lot of technology and play when they feel like it, much more than ES3b7, or even have a TV in their own rooms.

ES3m39 seems to have quite a high control of ES3b7’s uses of technology. He does not play on digital devices during the week because she prefers that he does other things, indicating that he is very slow in doing things such as doing homework and he also had psychomotor activity difficulties (because he is a tall boy for his age and he is clumsy, says the mother, and so she wants him to do physical exercise to get better). She prefers that her children play “*traditional games*”, such as football or climbing walls. ES3m39 manages or controls what ES3b7 watches by changing the channel or the video if she does not like it (as she considers that it is not appropriate to the child). She always watches over what her children are watching. They only explore on Internet when she is around, saying “*they do not touch it alone*” even though she may be doing something else nearby and they are watching videos alone. She says ES3b7 never goes to his room to watch videos or while she is taking shower. At the same time, it seems ES3b7 is not too interested in using the digital devices alone either. ES3m39 commented that ES3b7 has not asked to have a TV in his own room, there are a lot of activities outside, and they are used to them and like them. What ES3b7 told us fits with what ES3m39 said regarding her management of his use of digital devices. He said that his mother does not let him use digital devices too much, only when he finishes his homework. About rules, however, ES3b7 does not seem to be wholly aware of the rules, only becoming aware in the course of dialogue with his mother in this research. He said, for TV, his mother establishes the rules while his uncle makes ones on the use of Wii. About the iPod, there are rules about the volume and time, and all these rules are the same both for him and his sister.

## Family ES4

Madrid Metropolitan area, Spain

### Family members

- Father, 46, ES4f46, high user of digital media
- Mother, 41, ES4m41, medium user of digital media
- Boy, 9, ES4b9, Completed 3rd grade of primary school
- **Boy, 6, ES4b6, Completed 1st grade of primary school**
- Boy, 2, ES4b2, Completed First Years of Early Childhood Education



### Narrative

ES4b6 lives with his mother ES4m41, his father ES4f46, his older brother ES4b9 and his younger brother ES4b2 in a four-bedroom apartment in a residential complex in a town located in the Northern area of Madrid. ES4f46 and ES4m41 are researchers in public institutions and both have PhDs. ES4b6 at the time of the interview (early Summer 2015) has just completed his first year of primary education and will continue into his second year of Spanish primary education in the same school in Fall.

“We are overwhelmed by his technological skills. Because I saw the little boy learn to handle the tablet before being able to speak. He does not speak because he is two years old and does not know how to talk, he doesn’t understand, and he manages the tablet, it’s just shocking! So I always doubt: am I doing the right thing? Or should I have waited a little longer? But, I have a 9 year-old boy, he comes with his friends who are playing this and that (...)” (Mother, 41, ES4m41)

This family has multiple media and digital devices in their house. Both parents have a laptop computer and a smartphone each, and another, a third laptop for family uses. In their family living room they have a TV, a DVD player and a video game console connected to the TV. In addition, they have a TV in the kitchen. ES4m41 and ES4f46 have 3 tablets and one iPad, and one of the tablets is shared with ES4b6. ES4b6 also has a smaller non-branded tablet and a portable Nintendo DS gaming console: this last digital device was an old instrument of his parents.

ES4b6 has some form of access and uses all these digital devices, except the computer laptop and smartphone: he can use them only under his mother's control and only during weekends. TV is considered the only device that he can access during the weekdays. He does not use the video game console at the moment because the mother says it becomes the source of argument between brothers. TV in the kitchen belongs to the family as a whole while ES4b6 and ES4b9 are the exclusive users of the video game console. ES4b6 can use the tablet under supervision and has very limited access (except when they are away from home). When ES4b6 describes his use of free time, he only introduces activities for play and entertainment (playing Clash of Clans, Minecraft, the Simpsons game, and other cuisine games), but digital devices do not appear at the top of his described list. His mother mentions how ES4b6 uses each of the different digital devices when he visits his aunt's or friends' homes - but these content of these uses were not described by the mother or by ES4b6.

ES4b6 uses autonomously the portable game console and TV during permitted hours. He has access to the TV in the kitchen. He needs help setting up the video game console and the DVD player in the living room but, once it is set up, he plays autonomously. However, by far his favourite device is the tablet, which has been in the house and he has used for about two years, although he can only use it when his mother permits it. His favourite is also his portable game console, which he and his brother received as a gift from their parents. He has several game applications installed in these devices; these applications are downloaded by his mother and are always free ones. ES4b6 navigates confidently and fluently through the various screens, menus and options that are part of the devices and applications that he is familiar with. Nevertheless, ES4b6 needs to ask permission to use any of these devices and, as we will see below, his mother does attempt to monitor the amount of time spent "on screens" in comparison to other activities and forms of play. At the moment, ES4m41 is very concerned about risks and security with regards to her children going online. She has absolute control over what applications are installed in the devices ES4b6 uses and she monitors the suitability of the games the child requests to install. After this monitoring takes place, the child can use the tablet devices at home but not with their domestic Wi-Fi connection, which his parents always switch off when he is using tablets.

ES4m41 seems very concerned with the sons' uses of digital devices in the aunt's (ES4m41's sister-in-law) and friends' homes. ES4m41 describes the house of ES2b6's aunt as a very free space for ICT uses for him, for instance, using aunt's smartphone. Therefore, ES4m41 has a strict control in order to avoid the kind of liberal uses (from her perspective) permitted in the aunt's house. As mentioned, ES2b6 has a restricted access to his mother's and father's smartphones and does not use any social media application (nor does he know how) and, when he does use the phone, he uses it only to make calls.

ES4m41 describes her use of digital technologies as constant. Even when she is at home, her work obligations require her to have her computer on and she has to be available on her mobile phone. She does not use social media (Facebook) but her husband uses it. She describes

ES4b6's familiarization with digital devices as a 'natural' process that is unfolding without much guidance on her side, apart from the control strategies described above. ES4m41 tries to control the amount of time her son spends on "screens" and wants him also to engage in other forms of physical play and social activities outside the house. As said, ES4b6 uses digital media primarily for entertainment and enjoys playing with digital devices on his own. For the moment, ES4m41 has not introduced other "instructionally/educationally" oriented uses in her son's digital practices, nor are these required or promoted in the school ES4b6 attends. However, his older brother ES4b9 has and uses tablet in school activities. ES4m41 and ES4f46 foresee that digital media will become relevant later in ES4b6's schooling and clearly in his social and work-life. She seems very concerned about how she should and can control those uses in the future.

## Family ES5

Toledo area, Spain

### Family members

- Father, 39, ES5f39, medium user of digital media
- Mother, 37, ES5m37, medium user of digital media
- **Boy, 6, ES5b6, completed the 1st grade of primary school**
- Girl, 2, ES5g2a
- Girl, 2, ES5g2b



### Narrative

ES5b6 and his family live in a townhouse in a village in the province of Toledo, located in central Spain. The family consists of five members: father (ES5f39), mother (ES5m37), ES5b6 and two younger twin sisters (ES5g2a and ES5g2b). The father works as a driver of public buses and the mother is currently looking for a job.

"If it were up to him [ES5b6], he would be playing video games the whole day." (Mother, 37, ES5m37)

They have many electronic devices at home: three TVs, a laptop, music players such as the iPod and a CD player, one tablet, Wii, PlayStation and two mobile phones. However, the parents think the children do not use technologies excessively partly because ES5b6 is not allowed to spend a lot of time with the technologies. The children usually do other types of activities, either individually or with the rest of the family, they go to park, go swimming or visit some places. The parents use social networks such as Facebook and LinkedIn and use Internet to find information and videos.

ES5b6, according to ES5m37, prefers video games to any other activity, saying that *“if it were up to him, he would be playing it the whole day.”* He is fascinated by video games, and he uses Internet only for searching videos on YouTube where other players play the games he likes. ES5b6 does not use Internet very much, and when he does so, he is supervised by his parents. He also uses the PlayStation and the Wii for play, and TV is always switched on in the house. On TV he can only watch some channels, as others are controlled by his parents because they think they have inappropriate content. He watches cartoons or films that he has seen in advertisements. ES5b6 does not have smartphone, and his parents do not let him use theirs.

ES5b6 is able to play and use autonomously the digital devices mentioned above. ES5m37 says he has learned it by observing and also by trial and error. His parents never let him play alone; they supervise and control him. For example, ES5b6 wanted to play with the PlayStation on the web with other players, but they removed this network access as they were afraid that he could meet strangers and only allowed ES5b6 to play in the offline mode of the video games. ES5b6 does not seem to play games with his sisters. With their parents, the only thing they do together with these devices is to listen to music.

The parents consider that technologies can have, on one hand, educational potential and generate an easy and diverse access to information, but on the other hand they could generate anxiety and addiction, and therefore they consider that its use should be controlled. ES5m37 does not consider that ES5b6 plays with digital devices above the average compared to other children, and she says that in his school, while children do also play video games, they generally have fun doing sports game or other type of physical games. She does not consider that the use of digital devices in school is achieving a great success either, but she likes the idea of using some videos to illustrate the content of the subjects.

Regarding how they manage children’s use of digital devices, ES5m37 says she resorted to use technologies as a negative or a positive reinforcement, for instance, for making ES5b6 do household chores which he never used to do before. However, ES5m37 says she prefers that ES5b6 uses technologies as little time as possible, and she must limit its use as she thinks it creates anxiety on part of ES5b6. For instance, she commented on that he had a bad time once at school, and the teachers found him more distracted as usual, and she believes that this was possibly related to the use of technologies. ES5m37 also tries to make ES5b6 play other games and does other activities, for example, playing with Legos, an activity he spends a long time playing. Apparently, he also likes constructions and his favourite PlayStation game is related to this topic (construction and Legos). ES5m37 says that this is because of his shy personality. ES5b6 prefers these types of games to exterior or physical games.

## Family ES6

Central Catalonia, Spain (Catalonia)

### Family members

- Father, 41, ES6f41, high user of digital media
- Mother, 41, ES6m41, high user of digital media
- Girl, 9, ES6g9, the 3<sup>rd</sup> grade in Primary School
- **Boy, 7, ES6b7, the 1<sup>st</sup> grade in Primary School**



### Narrative

ES6b7 is 7 years old and is the youngest in the family (his sister ES6g9 is 9 years old). His parents have recently divorced and share the custody of their children. All four participated in the interview, which was held in the father's flat, where they had all previously lived together. It is a three-bedroom apartment in a city located 70km from Barcelona. The mother lives in a shared apartment with her sister in the same city.

"I can't use this phone because the phone is my father's, for work, but I can use this other one (...) I use it to call my mother, and other people. (...) There's another phone, a Samsung, that my father will repair and give to me (*he smiles and then covers his face with the T-shirt, blushed*)" (Boy, 7, ES6b7)

In the father's house the presence of technology is huge. They have one large TV in the living room, with 3D glasses, three tablets (two devices are the same, educational ones for each child that they received as a gift in Christmas), one PlayStation, one "old" photographic camera, three smartphones (two are of the father one of which is for work), one iPod of the sister, and one brand new desktop Mac computer with a large

screen that is located in the father's bedroom. Children are allowed to use all the devices except the father's smartphone for work; they can use the Mac computer in the father's bedroom with permission, and they can use the PlayStation without excess. There are some rules to follow attached to those devices, such as: in the mornings, TV can be switched on after having breakfast and once they are prepared to go to school, just in case there is a bit of spare time; ES6b7 can only engage with the PlayStation in company of someone older (the sister does not count) and the time devoted to play "killing games" (e.g. GTA - Grand Theft Auto) and FIFA (International Federation of Association Football) is very controlled; the parent's smartphones

are banned with a password, and so they need to ask for permission to use them, usually for playing games. About the computer, the family had one in the living room but the father recently moved it to his bedroom when he began a new job and had to work from home; the consequence of this change was that the children intensified the use of the tablet against the computer.

Parents are high users of technology. The father works as a commercial worker in the food industry and the mother is an administrative assistant. They both have a good level of confidence with ICT, especially the father, who in the past had worked as a commercial worker in the computing sector. They both have brand new devices, and some of them are of the latest technology (e.g. 3D Google glasses, smartphone, Mac computer), and they usually buy them through monthly payment plans. In ES6b7's case, his technologically-driven leisure preferences (Play, TV, tablet, Wii) coexist with non-technological practices (e.g. basketball, bicycle, music, playing in a park, table games). Regarding the use of technology in ES6b7's case, the role of older persons should be highlighted, such as the father and the sister, the latter being the one who solves nearly all his doubts and problems. Older family members also have a role in ES6b7's development of interests; for instance, he discovered PlayStation games (e.g. "killing games" and FIFA) and breakdance through his older cousin. There are instances when interests are developed in an online/offline transmediation such as his main hobby, i.e. football (he plays with his friends in a park and with his cousin in FIFA game), and other pastimes like driving airplanes (his grandfather's passion is drone and modelling airplanes, and ES6b7 thinks his speciality in playing some games of PlayStation is in driving airplanes) and "killing games". ES6b7 explains the complexity involved in using the remote control with precision. During his explanation, he also brings a game gun to the table, an act through which he is implicitly relating those online and offline objects.

During the interview a diversity of points of views -even contradictions- emerged regarding the rules of use between parents and children. For instance, the rule about switching on TV just after being prepared for school or not watching TV during meals is clear for the parents but not for ES6b7, who insists that this is not a rule for every day. Another example involves playing "killing games" on PlayStation that the mother believes she controls by limiting the time of play and allowing the play only with a person older than 12 year-old. Bad behaviour is a cause for banning the PlayStation. However, ES6b7 said that he plays for a "*long time*". As the interview progresses, ES6b7 wants to make clear that rules are not as strict, until the father agrees with him that "*we are flexible with our rules*" and that sometimes they use technology to have the children calm down or entertained. There was a slight tension between the father and ES6b7 when the father stated that his son preferred his parents to read a storybook at bedtime than reading interactive e-books on his own. ES6b7 challenged this statement by saying that he actually preferred the tablet than a book because on tablet he can choose games or stories to be read by some storytellers. Regarding the downloading of applications (games, e-storybooks) on the tablet, the rule is that ES6b7 makes a proposal to the father and then the father checks the application and gives permission or not to download it ("*I act as the Spanish Inquisition*", says the father, joking). Payable applications are allowed exceptionally if they are cheap.

Parents perceive technology as something that has two intertwined sides: positive and negative ones. They understand the positive side in terms of opportunities (e.g. access to information, development of interests). The negative side is defined in terms of dangers: access to explicit images (sexual, violent, etc.), access to information that is not pertinent for their age. The mother summarises their points of view as follows:

*“On one side technology is good because children can develop their passions, search for relevant things. On the other side, my fear is that when they master how to use these devices... they will be able to find everything”.*

There were some divergences in points of view regarding the parental mediation preferences on the ‘safe’ use of technology and social networks. The mother shows her worries about “killing games” and access to information that does not correspond to their age, in particular searching tools like Google. Her philosophy focuses on setting rules and limiting access and time to technology. However, the father prefers to foster children’s self-regulation rather than parental controls:

*“I’ve worked in computing during some years. I’m not scared about setting firewalls or parental controlling but I prefer not to use them. I prefer that my children have the necessary responsibility for not forcing me to use these tools. I will be able to forbid technology in the house, but not outside the house. Therefore, I prefer them to be responsible to denying the access”.*

## Family ES7

Northern Catalonia, Spain (Catalonia)

### Family members

- Father, 43, ES7f43, high user of digital media
- Mother, 49, ES7m49, high user of digital media
- **Girl, 6, ES7g6, the 1st grade in primary school**
- Boy, 4, ES7b4, 4th year in Early Childhood Education



## Narrative

ES7g6 is 6 years old and is the eldest child in the family (she has one brother who is 4 years old, ES7b4). The family has moved one year ago to a small town in northern Catalonia. They live in a big house with three floors and five bedrooms close to the mountains and ski stations. They also have a garden where both children play with the neighbours (two girls). The family has a cat, and the neighbours, a dog. During the week the father, ES7f43, is away working in Barcelona and the mother is taking care of the children alone without any help. Three family members have participated in the interview: the mother (ES7m49), the brother (ES7b4) and the girl (ES7g6). The parents have a very good level of knowledge and confidence with ICT, especially the father (ES7f43).

“My favourite hobbies are watching videos on YouTube, especially watching dance videos or videos about how to make bracelets but I always have to ask my mum” (Girl, 6, ES7g6).

Many technological devices are present at home and are used on a daily basis. The family has one Apple TV, one iPad, three laptops, three smartphones, and one home stereo. Children are allowed to use all these digital devices on their own, especially the TV. However, to use the laptops, the iPad and the smartphones children have to ask their mother for permission. The mother is the one who set up the rules, as the father is not at home most of the time. These rules are: children are not allowed to watch TV during the meals or more than two hours. The mother also supervises the content (e.g. she has deleted computer games or applications when she has realised that they had violent content). However, time exposure changes during school period and holidays. During holidays and weekends the children can watch TV several times per day but each time not longer than two hours. None of them seem to have developed self-regulation strategies regarding the use of digital devices in the home setting. ES7g6 spends more time with digital devices than her brother who usually spends more time with non-digital games and devices.

When the father is at home ES7g6 and ES7b4 use their father’s smartphone as apparently it has more games and interesting applications than the ES7m49’s phone, such as *Angry birds*, *Toca Hair Salon* or *Thomas the locomotive* cartoons. There is another phone but ES7g6 recognises that: “We have two smartphones and a fake one because it does not have SIM card” and they do not use the ‘fake’ one. They need parents’ permission to play with their smartphones.

ES7g6 seems to recognise most of the logos and devices presented in the activity book (e.g. WhatsApp and Facebook), and so does her little brother, who is sometimes even faster than her. They also recognise all devices, and if they do not know the name or the function, they tried to describe it, for instance:

ES7g6: “An E-Reader is like a tablet with letters.”

ES7b4: “No, an E-Reader is like a tablet, like a book where you can read things. I saw

*that in a Shin Chan Episode.”*

This last quote also shows the influence of cartoons and TV in general as a reference for these children. It was through “Shin Chan” cartoons that the little brother could explain what an ebook is.

Nowadays her favourite digital device is a game console, perhaps because she does not have one. An older cousin has one, and both siblings hope to have one very soon. But the most used device is the TV: *“After dinner I like to watch TV, I always watch MasterChef”*. ES7g6 is so motivated with this TV program that she visits the website of MasterChef quite often. When the father is not at home, they use the Apple TV as a regular TV. However, ES7g6 knows that *“It is a thing in which we can watch movies and listen to songs on the TV”*, but only the father is using it. On the contrary, ES7g6 is able to use the computer for her own purposes (looking for video tutorials to make bracelets, YouTube video clips to learn how to dance “Late, late mi corazón” and to watch some cartoons such as “Espies de veritat”). ES7g6 asks for advice or help when required (e.g. when she does not know how to write a TV program or cartoon on a search engine). She becomes apparently disappointed when her parents do not allow her use a digital device. According to the mother, ES7f43 is usually more permissive than her as *“he wants to avoid conflicts with the children when he is at home”*.

At the public school in the town they attend, every classroom has a computer and a digital blackboard, and these are regularly used. Children have computer courses since the age of three. Every classroom has its own blog, and ES7g6 was proud to show it to the researcher and navigate through it.

Parents are high users of technology. The ES7f43 is a computer specialist, and the ES7m49 is an unemployed journalist who manages a blog. They use ICT for work and to watch TV (especially ES7m49, who also watches TV every day). Both parents prefer that their children play outside with friends to use digital devices. However, they recognise the ICT’s education values and potential, especially to learn English or to learn ‘how to’ such as to dance or to do some bracelets.

## Family ES8

Barcelona Metropolitan Area, Spain (Catalonia)

### Family members

- Father, 40, ES8f40, high user of digital media
- Mother, 38, ES8m38, medium user of digital media
- **Boy, 7, ES8b7, the 1st grade in primary school**
- Boy, ES8b3, P3 Early Childhood Education



## Narrative

ES8b7 is 7 years old and is the eldest child in the family (his brother ES8b3 is 3 years old). The parents are originally from Peru, although the children were born in Barcelona, and they travel to their country once a year. They live in a cosy three-bedroom house with a private garden in a residential area of a city in the metropolitan area of Barcelona. ES8b7 goes to a Jewish charter school that is open to the community, where English is the vehicular language of instruction, together with Spanish and Catalan. Hebrew is taught as a foreign language. In the family context, they speak Spanish and English. ES8b7 is particularly proud of speaking four languages (Spanish, English, Catalan and a bit of Hebrew) and of being a quick reader (according to the mother, he began to read when he was 3 years old). He is also proud of being able to play long songs with his piano, having family in Miami and possessing many games at home, as shown in the quote.

“He discovered how to play with the Wii on a trip to Peru. His cousins had a Wii. He had never been in contact with it before. He arrived in Peru and they had a Wii and he didn’t know how to play. His uncle and cousins taught him how to play. And then he wanted one for Christmas and the 'Three Kings' gave it to him (...) and his father taught him how to play” (Mother, 38, ES8m38).

At ES8b7’s home, the presence of technology is high. They have one large TV in the living room, one tablet (usually on the top shelf of the wardrobe in the parents’ bedroom), one desktop computer in the office, and two smartphones. These devices coexist with other leisure options promoted by the father on purpose, such as two pianos for children located in the living room (playing piano is the father’s hobby) and a range of table games and books, in this case promoted by the mother.

Children are allowed to use the devices with conscience and restraint. The mother has made up a self-regulatory tool seeking to embed technology in a broader leisure context including non-technology activities; in the morning of non-school days, ES8b7 writes down on a white paper the list of activities he wants to engage with during the day, and he crosses things out when he is done with them. This practice, called by the family “*the plan of your day*” (see the image below), is done since ES8b7 was 5 years old. Initially, when ES8b7 did not know how to write, the mother used to write the list down during a conversation with the child. At the beginning, the list was conceptualised as a tool to construct habits (e.g. taking shower, cleaning teeth, and clearing the table) and now it has evolved to regulate leisure activities. The list is a space of negotiation that the mother actively uses to locate technology in a broader context:

*“When we ‘arrive to screens’, we have previously done other things (...) I know that screens attract him a lot, but I also have to show him that many other options exist, [such as] lots of table games” (ES8m38).*

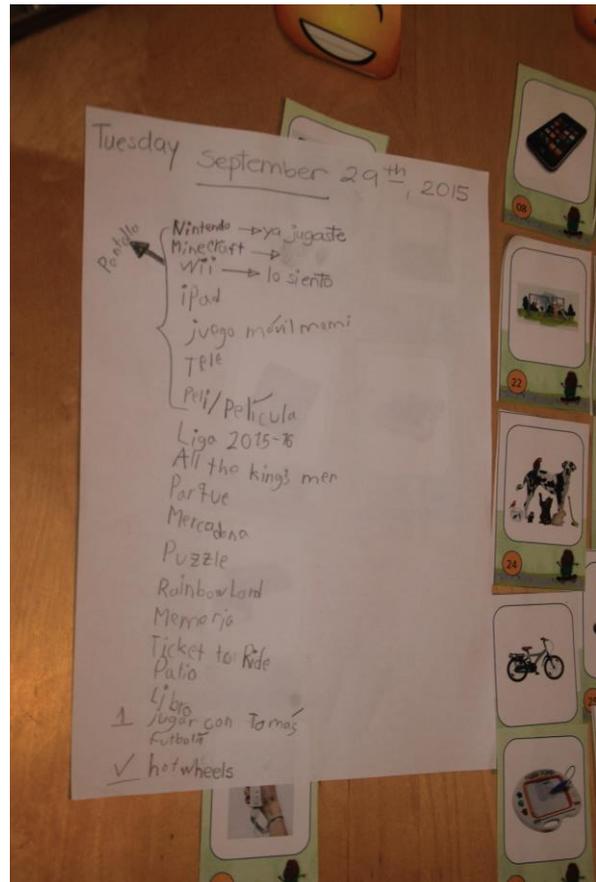
Moreover, when ES8b7 asks for a device, the parents’ answer is: *“tell me what time you will turn it off”*. The usage of technology increases during weekends, and during the week it is reserved to evenings, after doing the “basic” things (doing homework, taking bath, and changing to pyjamas). However, the parents allow the extensive use of technology (iPad, mobiles, and DVD player) in long trips such as the annual trip to Peru, for which they have to travel for more than 10 hours. Regardless of the strategy that is intended to promote self-regulation, all devices are allowed at home. Just very occasionally, parents have forbidden the use of a device, always as a result of misbehaviour (e.g. disobedience, or throwing the remote control in a fury). Some devices have some rules attached to them such as: TV is considered as a type of a ‘game’ instrument (like the Wii or the iPad) and so nobody can switch it on for breakfast or during the meals, as this is the time to be with the family.

The father works as a director of marketing and the mother is an English teacher in a charter school, the same school where their children go. The mother is a medium user of technology and during the interview she showed some resistance to digital reading (e.g. e-storybooks), whereas the father seems more involved with technology in general, above all digital games.

The mother does not know the technical dimension of some devices (e.g. Wii, Minecraft) but takes very seriously the time that the children invest in them, and so she rather promotes table games and socializing activities like going to park or playing ball in the park. Moreover, every time she reads stories to ES8b7 at bedtime she argues that the reason for not using e-literature for children is because *“as adults, we have not been attracted by it.”*

However, the father is keener on technology and playing with children, and he spends time with ES8b7 playing football or car game on the Wii or playing computer games like Minecraft.

ES8b7 loves the Wii and playing FIFA and, as shown in the photo, his brother ES8b3 imitates him playing with another remote control. For ES8b7, his technologically-driven leisure preferences (Wii, Nintendo, TV, Minecraft, tablet, games in mobile phones) coexist with non-



technological practices (e.g. music, table games). There are instances when interests are developed in an online/offline transmediation such as Minecraft, as he has the computer game, the table game and also a paper game created by the mother. ES8b7 discovered the Wii in Peru, as his cousins had one and learned quickly to play. He does not understand when a friend comes to his house and does not know how to play as well as him.

Moreover, technologies are also a source, seen by the parents, to learn English, and so ES8b7 watches Disney Channel in English and has some applications to develop English phonics (e.g. Star Falls, Letters and Sounds). Parents downloaded the applications after searching information about them in websites like “Internet for classrooms”. As a rule, they downloaded the application in its original language.

Parents perceive technology as something inevitable in their children’s life, and they think that their role is to provide them with technology from early age in order to create safe usage habits that will benefit them in the future. They believe that technology is good if it is combined with other non-technological activities but that it can also be very dangerous if it is dominant in the children’s lives. They aspire to teach their children how to self-regulate the function and time spent on technology in their lives. In particular, the mother is aware of some risks such as the relationship between technology and anger or that it can promote rivalry, an aspect that, although it is not a risk on its own, can lead to risks like frustration or envy. Furthermore, the mother expressed her worries about explicit language on some videos, since ES8b7 searches for YouTube videos to watch how other players play games, a practice that the mother finds “weird”.

During the interview a divergence of points of views between parents emerged. For instance, the mother does not see appropriate when the father occasionally decides to play digital games with the children at night. The mother did not know that Minecraft, a game that ES8b7 usually plays with his father, has guns and is about killing people.

## Family ES9

Barcelona Province, Spain (Catalonia)

### Family members

- Father, 41, ES9f41, high user of digital media
- Mother, 42, ES9m42
- Stepmother, 42, ES9sm42, low user of digital media
- **Girl, 7, ES9g7, the 1st grade in primary school**



- Brother, 13, ES9b13, the 2nd year in secondary school
- Half-brother, 20, ES9b20, the 4th year in Secondary Education
- Step-Sister, 16, ES9ss16, the 4th year in Secondary Education
- Step-Brother, 9, ES9sb9, the 4th grade in primary school

## Narrative

ES9g7 is 7 years old and is the youngest member of a blended family (she has one brother, ES9b13, and three other siblings). Her parents are divorced and the mother has custody of her. Father, ES9f41, stepmother, ES9sm42, and ES9g7 have participated in the interview and the siblings were around in the house. The interview was held in the ES9f41's house, where ES9g7 spends the weekend every two weeks. The father and his blended family live in a four-bedroom apartment located fifteen kilometres from Barcelona. The father is proud of his daughter and several times during the interview he was showing her love. He also seems very impressed about ES9g7's academic performance at school. He has repeated more than once that she is really good and hardworking at school. Adults of the family have a good level of knowledge and confidence with digital technologies.

“I don't want to be a technology addict” (Girl, 7, ES09g7).

In ES9f41's house technology has a huge presence. They have a large TV with plasma screen, two tablets, four desktop computers (one was located in the living room and was owned by the father), one PlayStation, one Nintendo DS, one Wii, and several smartphones (even ES9g7 has one). The children are allowed to use all the digital devices freely except the ES9f41's computer. However, on the contrary to her siblings, ES9g7 does not use digital devices on a regular basis. Among the devices she has access to, she said she uses the smartphone, the TV and the computer the most. She has her own smartphone and uses it to communicate, usually using WhatsApp application, with his father (or with the mother when she is in the father's house), and with some aunts. She uses the computer mostly in her mother's house. TV is to see some movies and series. The computer is to listen to music and watch dance videos. ES9g7 knows that there are a few existing rules with the use of ICT mostly settled by the mother. The time to be exposed to the ICT devices, for instance, should not be *“more than thirty minutes and once school homework is done”*. However, the father allows over *“one to two hours”*. Another rule is that ES9g7 and her siblings are allowed to download applications or games only if there are free products. According to the father, ES9g7 is the only one among her siblings who has a good self-regulation with regards to digital technologies and accepts the rules. Several times during the interview ES9g7 said *“I use the computer to entertain myself”* or *“only when I have some time left...”*. She has her own smartphone and she only uses it to communicate with her family members, especially via WhatsApp services, using written and audio messages. Nowadays the smartphone is her favourite digital device (it is also the newest one).

She learned to use the devices by observing her siblings. She is able to use the computer and get the information she needs. She asks for advice when required, for instance when she does not know how to write a name or get the best information about a subject. She does not get angry when she does not get the permission to use a device, and she rapidly looks for an alternative. She is aware that she does not want to be an addict *“like my brother”* of digital technologies. That is why she says she only loves dancing and studying. At school, computers are not used much and there is only one desktop computer in the classroom.

Parents are high users of technology. ES9f41 is currently unemployed but he is repairing hardware from time to time. He has good knowledge about digital technologies, and he likes to play computer games. The mother was presented in the interview as the one who has most control of digital technologies and she is a guide, a helper and a model of mediation for her daughter. ES9f41 seems to leave more freedom to his daughter but following the educational rules set by his former wife. However, he is aware that Internet should be more regulated. He knows about ES9g7's self-regulation capability. ES9g7 has repeated several times *“I use the computer or the TV only for a little while”*. The father identifies the daughter's preferences as: *“she prefers to play with a puzzle than playing with the console”*. However, he is pessimistic about her future digital technology usages, stating that ES9g7's self-regulation will decrease over time due to age and social influence as it happened with his other children. Moreover, there are some divergences in points of view between parents regarding time exposure, as ES9g7 said her mother only allows her to use digital devices less than half an hour, but the father considers that contact should not exceed 1-2 hours per day. He also believes that his children's contact with digital media must exist *“as technology represents the future”*. However, he admits that the use has to be controlled, especially the content because *“the border between an educational and a playful use is very thin.”*

## Family ES10

Barcelona area, Spain (Catalonia)

### Family members

- Father, 40, ES10f40, high user of digital media
- Mother, 39, ES10m39, medium user of digital media
- **Boy, 6, ES10b6, the 1<sup>st</sup> grade in primary school**
- Brother, 4, ES10b4, the 4th Year Early Childhood Education



## Narrative

ES10b6 is 6 years old and is the eldest in the family (his brother is 4 years old). They live in a three-bedroom flat in a residential area in the centre of Barcelona. At home, they have a large presence of technology but not all technology is visible or available to the children. They have one large TV in the living room, one iPad, two iPhones (one of the father, another of the mother), at least two other “*mobiles with a lot of years*” without sim card – one is a blackberry – the siblings use them to play (e.g. ‘making calls’, looking at photos), one Wii (they usually play two games: golf and tennis) and two laptops (a large one and a small one, the large one is for the father’s work). They also have a PlayStation, which is hidden from the children, and they do not know about it yet. They also do not know about the subscription TV packages they have, a DVD player and a computer plugged into the TV.

“If you watch TV a lot, you will end up with prescription glasses, and if you use the iPad a lot, the same thing will happen...[But] dancing is very good for you, you do sport... and [by doing it] you gain more energy” (Boy, 6, ES10b6).

Children are allowed to use all the devices with the parents’ permission. The parents’ mobiles have passwords and ES10b6 only knows the mother’s one. ES10b6 usually plays games with the parents’ mobiles, the iPad or the laptop when “*I can’t watch TV*” (i.e. during football matches or if the grandparents are watching the TV) or during weekends. The children cannot use these devices during the meals. They sometimes watch cartoons (Totally Spies!, Tom and Jerry) on the iPad and in case of disagreement they negotiate the turns among themselves. ES10b6 helps his little brother to find the videos he wants to watch, as he can write the title down. The brothers ask permission to play golf and tennis on the Wii with the father; it is usually the little brother who asks for it, since ES10b6 does not like to play on the Wii very much (this practice is promoted by the father who sometimes plays tennis). When ES10b6 has friends at home or he is invited to someone else’s house they usually play dressing dolls up, Lego, or Playmobil, he does not play online games or uses digital media in these visits.

The father is a high user of technology and has a good level of confidence with digital technologies. He works in marketing, selling products online. The mother’s engagement with technology in everyday life seems lower (she works in a secondary school). At home, some devices such as the Wii are under the father’s control.

Regarding the parental mediation on technology, the father states that it is important to set rules because their sons, especially ES10b4, would play and watch TV all day long. Rules are the way to control the “*ludic function*” that technology exerts in children’s lives, and he explains that this is important because technology will be the “*tools*” that they will use in the future for work. Although he feels that the technological world is very safe for his children at the moment,

he thinks that in the future *“we will need to be careful with Facebook, the computer and TV”*. Interestingly, although ES10b6 likes technology, he thinks that TV and iPad devices are harmful because *“it damages your eyes and you don’t work”*.

The interview made apparent some divergences in the points of view between parents. For instance, the mother thinks that the father is hooked all day long with the mobile but the father thinks he uses the mobile *“with today’s normal intensity”*. The mother’s fear is related to the fact that the children can perceive their excessive uses of technology. That is why she usually hides herself in the kitchen when she uses the mobile. The father argues that he was hooked to TV when he was a child but that he is now ‘normal’, and so he does not see technology as a negative influence in life.

## Family ES11

Barcelona area, Spain (Catalonia)<sup>5</sup>

### Family members

- Father, 40, ES11f40, medium user of digital media
- Mother, 39, ES11m39, medium user of digital media
- **Girl, 7, ES11g7, the 1st grade in primary school**

*(Looking at a card with the image of a computer toy) “Oh no, that’s ridiculous! That is for you, or for anyone else, but not for me” (Girl, 7, ES11g7).*

### Narrative

ES11g7 is 7 years old and is a single adopted child of the family. During the interview only the mother and the girl were present. They live in a four-bedroom flat in a city 30 kilometres from Barcelona. In terms of technology, at home they have an iPad, a laptop, a desktop, a TV, one children’s tablet, a Wii and two smartphones. They also have an iPod for the car.

The child is allowed to use digital technologies on her own, especially the iPad and the TV. However, the use of smartphones is restricted. Parents have set up time rules and access restrictions such as setting passwords to some devices, for instance, the smartphones. Between Mondays and Fridays, ES11g7 is only allowed to watch TV or to use the iPad during short periods of time (breakfast time, before having shower or before the dinner). During the

<sup>5</sup> No photographs were taken by parental request.

weekends or on holidays, parents are more flexible with time and access restrictions. Regarding the uses of smartphones they are usually limited to see pictures or send some WhatsApp messages to her school friends. ES11g7's favourite activities are dancing, singing and playing with Barbie dolls. Every morning and on evenings she watches some cartoons such as *Tom and Jerry* or *Jessy* at Disney Channel on TV. Only on Fridays she watches some movies. She also likes to listen to music on TV, especially *Los cuarenta principales [Top forty musical radio network]*. She uses the iPad to watch some video clips, listen to music or to dance. She is taking some music and dancing classes outside the school and during the whole interview she was singing and dancing. ES11g7 knows how to use the iPad to watch some dancing videos. The iPad has a password and only the parents know the access code. She uses Google search engine to search for songs, dance videos of dances and choreographies. Through these activities she is exposed to English language, a language that she funnily imitated several times during the interview. Usually she is able to use digital devices on her own and asks for some help when required, i.e. when she struggles with writing the name of a band or the title of a song. Her other favourite activities are to watch videos of a young boy who sings rap, going to park with friends and to play "Queens" in the playground at school. She also likes traditional activities like drawing, swimming or playing with pets. She does not like to play with Legos or reading alone (but she likes it when someone reads aloud to her).

Interestingly, ES11g7 showed initial rejection to some devices that she did not recognise in the cards, but changed her view when she discovered their affordances. This happened with the cards displaying an iPod and an iWatch; when she realised that they were tactile as her iPad, she started to like them. Her favourite devices are the TV and the iPad; "*With the iPad I can watch, I can sing and I can dance*". However, she prefers offline, non-digital activities (e.g. pets, Barbies and dancing) rather than the online ones. Her preferences are also confirmed by the mother. In summary, ES11g7 uses ICT mainly as a support to do what she likes: listening to music and dancing.

Regarding the parental mediation, parents do not control the ES11g7 technology-based use much as she is not spending a lot of time with ICT; ES11g7 mostly uses ICT alone, and she learned by directly observing her parents, specially how to use the iPad (how to access and navigate YouTube and Google), and by exploration and trial-error. At her school they have some computer lessons and several digital devices such as computers or digital blackboards, and she was able to do an inventory of school devices and explains how a digital blackboard works, for instance:

*"We use two blackboards, one with chalk and another one like a movie screen... It is like a computer but bigger".*

However, ES11g7 does not seem to be thrilled or enthusiastic by the fact that they have all these devices at school, an attitude reported by the mother as well.

The father is a computer draftsman and the mother is a nurse. The parent's engagement with technology in everyday life is medium. The mother has a smartphone, uses the computer to do some work and the iPad to entertain herself. The father uses digital technologies both at work and at home. At home, he has an office room and a desk-top that is forbidden to be used by ES11g7.

The mother agrees that contact with digital technologies is necessary, and she is not scared presently. She recognizes that technology is a great help to get information quickly or being connected to people all the time. She also recognises that ES11g7 is using digital devices properly and accepts all the norms and conditions. However, she points out that later this "safe world" might change, especially when ES11g7 starts using social networks such as Facebook, or when she participates in online games or chats. She believes that parents must be aware and monitor a child's uses of digital media from early stages. She says:

*"For the moment she is only watching some gym, dancing or singing videos and fortunately she is not interested in playing online games yet".*

### 3. Findings

#### 3.1 How do children under the age of 8 engage with new (online) technologies?

In this section we present the engagement of children under the age of 8 with online and offline technologies distinguishing between the individual uses of the focal child studied and the uses of the family as a unit. The two tables below summarize the results of the analysis taking into account: a) the type of devices used; b) the purposes with which devices are used; c) the performance; d) the ways or methods through which digital skills are learned, and; e) the level of autonomy and self-regulation. Table 2 summarizes how children under the age of 8 engage with technologies for their individual uses.

**TABLE 2: Children's individual use of digital technologies**

| USES            | INDIVIDUAL CONTEXT  |
|-----------------|---|
| Type of devices | Children mostly use TV and tablets on their own and on a daily basis. The use of other devices such as smartphones, game consoles and computers is more limited and it is usually regulated with parental permission. Moreover, devices that parents use in their professional life, such laptops and smartphones, are excluded from the devices that children have |

|                                       |  |
|---------------------------------------|--|
|                                       | access to at home (or access is exceptional).  |
| Purposes                              | It should be distinguished between voluntary and mediated purposes. On one hand, entertainment is the main purpose that shapes children's usage of digital technological devices. In some cases, entertainment is strongly associated to children's ruling passions, for instance, football, music, dancing, cooking or doing bracelets. On the other hand, purposes such as learning English or doing school-related tasks are somehow motivated or mediated by the parent's desires or the school. However, it should be highlighted that for the young children in this study there is a weak connection between the use of digital devices at home and education or schooling. An explanation could be that the children under 8 <i>we have worked with</i> <sup>6</sup> were rarely asked to do homework. |
| Performance                           | An average of seven activities per child using digital devices have been identified. The most frequent activities with digital devices are: watching cartoons and movies on the TV; playing games on tablets and/or computers (mostly boys); watching video clips and tutorials on YouTube on the iPad or laptops (mostly girls). Only two children in our study use instant messaging tools and only one child reads electronic interactive literature on a regular basis. In general, children prefer devices with access to Internet, and this constitutes a criterion that shapes their choices on devices, together with the type of available applications in each device.   |
| Digital skill learning methods        | Mostly by direct observation of siblings or other family members, or by trial-error. However, when a new device is introduced to the children parents spend some time showing how to use it and take care of it.   |
| Level of autonomy and self-regulation | Most of the children are autonomous in their use of the digital technologies that are available to them at home. However, they request permission or ask for help to parents, adults or older  |

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<sup>6</sup> We know that there are many children in Spain around the same age that do have quite an amount of homework, but the case children in the study and their families commented that they did not.

|  |   |
|--|---|
|  | siblings for downloading and installing applications or for searching for specific things on the Internet, generally using Google search tool. The awareness that they have to ask for permission to their parents for particular things are in a way limiting their level of autonomy. Only 30% of the children show self-regulation capabilities such as somehow controlling time exposure or being aware that they need to finish their duties before requesting permission to use technology. |
|--|---|

In summary, results in Table 2 show that young children in our study primarily use tablets and TV for their own entertainment and play. Educational uses of digital media play a secondary role in their purposes. They appear to have learned how to use these devices without much explicit mediation, mainly through observation of the behaviour of others, and exploring the devices by trial-error and the application's affordances in moments where they had autonomy. However, parents play the main role in controlling access and time spent on digital devices and media.

Table 3 below, in turn, describes the family uses of digital devices.

**TABLE 3: Family use of digital technologies**

| USES            | Family CONTEXT  |
|-----------------|---|
| Type of devices | Families use digital devices on a daily basis. The most common devices are smartphones, desktops, laptops and tablets. Video game consoles (e.g. PlayStation, the Wii) are also used but to a lesser extent.  |
| Purposes        | In general, all parents use digital technologies in their work life and to communicate with others. Some parents also use digital media in their leisure time and for daily socialization. Few families use the computer and the tablet to engage in distance learning. The most common devices used to communicate with others are smartphones, laptops and desktop computers. Types of devices used with leisure goals are mostly tablets and smartphones. On this regard, around 50% of parents admit playing digital video games (mostly fathers) on the PlayStation, computer or the Wii. Thus, tablets and smartphones are the devices typically used for a wide range of purposes. |

|             |   |
|-------------|---|
| Performance | Most of the families usually watch movies, listen to music and search information on the Internet together with their children. However, families leave children on their own when they play or watch cartoons or video clips (e.g. to dance, or to learn about things that matter to them). Most of the digital devices currently used at home were purchase, on average, a couple of years ago. Interestingly, the newest devices are in general the favourite ones. Only two of the families have set rules (in terms of daily priorities and time exposure to the devices) with regards to sharing of the devices with children.  |
| Dynamics    | Family dynamics around digital technologies are relatively homogeneous. Parents allow the uses of digital media mostly during the weekends and holidays. During school days they restrict use with time limitation and by organizing active after-school schedules. Most families are concerned with their children accessing inappropriate content (mainly violent or sexual content) and monitor very closely what applications children use and download or what sites they visit, if they do not restrict online accessibility of the device altogether. However, their largest concerns are related to psychological effects from the uses of the digital devices such as the overexcited reactions or isolation that using devices might produce in their children. |
| Preferences | Most of the parents prefer offline activities, although they admit that the uses of digital technologies (including online activities) can be and will be helpful for educational purposes (e.g. to learn English) and later on for work and social life of their children.   |

To summarise, Spanish families in our study use smartphones, tablets and computers as the main digital technologies for their work, communication and leisure life. In general, families have some norms to regulate the children's use of digital devices such as: limiting the amount of time spent with digital media, requiring children to ask for permission to use the devices, differentiating between daily use (e.g. only allowing them to watch TV) versus weekend use (e.g. they can use video-game consoles) or monitoring closely what is installed and used. Family as a unit has more diverse uses of digital media and technologies than children's individual uses, such as entertainment or communication with members of the extended family (especially if they are abroad). In general, parents prefer their children to engage in offline, non-digital activities (e.g. tangible toys, table games) and play outside the house. However,

most of them recognise that the contact with technologies is unavoidable, and they recognise the educational potential of digital technologies, as well.

### 3.2 How are (online) technologies perceived by different family members?

Perceptions regarding online technologies are expressed in distinctive ways by children and adults in the particular context of the interviews. The main contrast relates to how and to what extent points of view are made explicit in talk. Parents' perceptions are clearly verbalised and usually reasoned, whereas in the case of children perceptions tend to be implicit in their responses and more emotionally-driven, where verbal information is typically enhanced with non-verbal resources (e.g. emotions, facial and body expression, signalling, showing things through place and action). In our data, children's perceptions are usually embedded in their actions with technology (what they do) and emotional responses (how they react to particular devices or ideas on technology) rather than in the verbal reasoning that supports the parents' insights and views. In our analysis, children's perceptions have been interpreted considering both verbal accounts and non-verbal information, i.e. what they express verbally and what can be inferred from their facial faces, behaviour and emotional, spontaneous responses.

#### Children's perception of new digital technologies

The majority of children perceived technology devices as 'spaces' where they can pursue particular goals (e.g. playing games, listening to music, and accessing YouTube videos). All the children in our data see technology as a space to play, linked to their leisure time beyond school. However, for children play can be a "serious" activity rather than a simple pastime, according to the intensity they demonstrate in engaging with particular forms of play. In this sense, the majority of children in this study have referred to technology as a resource used to develop personal, serious interests (e.g. dancing, football, fabricating bracelets) or, in other words, to develop *ruling passions*, a concept coined by Barton & Hamilton (1998) to refer to how people's interests shape their engagement with literacy. Our data shows that children's ruling passions dictate children's preferences on devices and engagements with technology. Children's ruling passions also shape what they do with the devices and how they perceive them, as is the case of ES11g7, a girl who loves to dance and defines the iPad based on what she does with it: "*with the iPad you can watch, sing or dance*". As a result, children's usage of the device, driven by their deep interests, also shapes what they can learn through technology in everyday life.

A small group of children showed an awareness of the fact that devices can be used to achieve different goals beyond the leisure, and that technology is not "good" or "bad" per se but depends on the user's usage. For instance, ES9g7's discourse on the computer drew a line between using it for doing useful or rewarding activities (such as school-related activities or watching music videos) and using it for pastime or non-beneficial activities (e.g. meaning watching 'stupid videos' on YouTube):

*"I love to use the computer to study, I do not like to watch some stupid videos, but sometimes I also watch some [music] video clips to entertain myself."*

Children also have clear ideas about the devices they prefer and the ones they dislike and the reasons why. Their preferences and rankings of the devices are based on particular criteria such as what they can do with the device (the type and the number of applications it contains or the degree to which they can access it and use it with relative autonomy) or how the family interprets "ownership" of the device (as belonging to children, adults or particular members). For example, as preferences are based on what they can do with the device, quite frequently some children expressed clear preference for one of their parents' smartphone as they have more games they like and so (e.g. ES6, ES8, ES11). This choice is usually defined taking into account a balance between different elements such as the applications these devices have and/or the degree of access they are permitted, which can be very different from case to case. Further, children's criteria for device preferences, albeit being complex, tend to be coherent across the interview. For instance, in the following dialogue, ES8b7 distinguishes between mobile phones "without" or "with" games and gives a priority to the activity he likes (i.e. being able to play the games he likes), rather than to (the uses or the possession of) the device itself.

ES8b7: *A smartphone!*

Researcher: *How would you classify it [you like it a lot, you like it, you don't like it]?*

ES8b7: *If it hasn't any games, then here [I do not like it], but if it has games, then here [I love it].*

(...)

ES8b7: *Wow! Wow! I really love this one a lot! (...) a tablet!*

Researcher: *Do you have a tablet?*

ES8b7: *Yes, it is charging in the office.*

Researcher: *What do you prefer, a tablet or a smartphone? [he uses his finger to point out to the tablet]. And why do you prefer the tablet?*

ES8b7: *because probably it has plenty of games, much more games than in a smartphone (...) I have lots of games.*

Moreover, children also interpret devices in relation to the age and perception of the 'maturity' of the device. In this regard, we have come across spontaneous comments where children defined particular devices as something childish and others for grown-ups. ES11g7, in front of a card displaying a sort of LeapPad (i.e. a computer-tablet designed for toddlers) *"this is something ridiculous, for you, for everybody but me"*. ES8b7, in front of a card showing a tablet for children, argues more explicitly the following:

*"I don't like this one [a tablet for children]. I like these other ones [points at two cards, one with an iPad and the other one with a car] because it's for grown-ups. The iPad can be for youngsters, the car is for older people. I love it a lot!"*

Regarding tablet devices in particular, we have noticed that children with access to educational tablets nevertheless preferred "standard" one mainly because of its access to Internet. Children's preference for the standard tablets clashes with the desire of some parents, who believe that an educational one is more appropriate for them in terms of the resources that can be downloaded to it and more focus on games and applications that stimulate particular thinking abilities supposedly beneficial for schooling endeavour. Even some families such as ES4 limited the usage of the iPad by children to educational applications only. However, as we have pointed out, only a minority of parents think that educational uses of digital devices and applications should be a priority.

Moreover, children also establish associations between particular devices and family members such as siblings, parents or the extended family (e.g. cousins, uncle). For instance, playing with the PlayStation is an activity that boys to some extent associated with the father, the uncle or cousins. In other cases, such as the case of ES3b7, he associated Internet (YouTube) with his uncle, mobile with his mother, the Wii with his sister, TV with his sister and sometimes also with his mother. In cases when the child is not living with both parents, the children own a mobile that they use for being in contact with the parent they do not live with, and as such the children associated the mobile as a tool to contact their parents.

Summarising the positive aspects of technologies, children have complex views on digital technologies and devices. They have their own criteria for preference and choice of devices. Criteria are based on elements such as the resources that devices contain, the access they have, their leisure preferences or ruling passions. The nuances in their discourses challenge the socially extended discourse that children are 'absorbed' or 'alienated' by technology devices. On the contrary, children have clear ideas regarding for what purposes they want the devices and which devices can help them develop their own ruling passions.

On the other hand, children did not highlight risks or dangers using the devices; they usually talk about technology in a positive way, focusing their talk about technology on what they can do or like to do with the devices. This is a salient difference from their parents' discourse to be discussed below, where risks emerged spontaneously in all the conversations (although the type of risks and the intensity with which they talk about them are different). Children talk about the risks only when explicitly probed and they mainly reproduce adults' verbalizations on risks; children seem to internalize adult's discourse and the views on risks and dangers that they have heard from their parents or other adults. Across the interviews, children have occasionally mentioned three risks: a) publicity in games and online videos on tablet, b) 'silly' YouTube videos and c) eye damage when watching TV or using tablet in excess. 6-7 year old children on the whole recognise that pop-up advertisements interfere in their activities and know that they have to click on "no" or ask for help. Interestingly, ES8b7 argued that "*ads are not for me*". Regarding YouTube videos, children with teen siblings have more awareness of the existence of the primarily playful and humour videos that circulate online and the existence of YouTube "celebrities". For instance, ES9g7 positions herself against what she calls "*silly YouTube videos*", since she has seen her older brothers wasting time with them and has

listened to her parents talking negatively about them. Finally, the physical effect of the screens on the eyes is a risk occasionally mentioned by ES10b6: *“TV and iPad devices are bad because they damage your eyes and you can't work”*.

In short, in comparison to the parent's discourses on technologies where the awareness of risks and opportunities are explicit and central (see below), children's ways of talking about technology seem not to be structured in these terms. However, from the children's points of view, technology is a reality full of authentic choices; it is a space where they can do things that attract them. Obviously, the view of technology as an opportunity for growth or as a space where some dangers exist requires more perspective, knowledge and a complex interpretation of it.

## **Parents' perception of new digital technologies**

In general, parents in our corpus perceive technology as something that involves both negative and positive features, and there is wide agreement in the way these aspects are defined. The main difference among parents is their general attitudes towards technology: some parents positioned themselves as ardent supporters of technology whereas others displayed a moderate or resistant positioning towards technology. Interestingly, regardless of the stance they take, all parents agreed on the fact that it is impossible (and inadvisable) to avoid the use of technology in the life of their children, both at school and at home. Ferneding (2013) refers to this idea as the “discourse of inevitability”; the notion that technology is the future and is unavoidable for the children dominates parents' viewpoints concerning technology in the life of the children and their education.

As mentioned before, risks attached to technology or the digital world were more salient in parents' discourse than in the children's. The majority of parents in our study put forward, with similar intensity, the idea that technology is something in "competition" with traditional games (e.g. table games, Legos) or other activities involving physical play (e.g. park, ball). In this regard, they valued especially the types of play that involve human relationships (playing with peers or siblings, playing table games) or that involve contact with animals or nature (e.g. playing with dog, spending time in the garden or in a park). A possible interpretation is that fears expressed by parents may reflect a generational difference, since adults tend to value and idealise the objects and spaces that they used to play in their childhood. Behind this argument, there is the assumption that play that involves human relationships or nature is better, and that technology is something that isolates the child in terms of human socialisation, an idea that was stated by some of the parents. Interestingly, this consideration does not coincide totally with children's perceptions, whose narratives usually include peers and family members (e.g. siblings, cousins, uncles) as people they associate with particular devices. From this perspective, the mediating strategies of some parents could be promoting this isolation, in contrast to their intentions, for instance, by forbidding children to talk with other players (what parents refer to as “strangers”) in particular games in the PlayStation (e.g. FIFA, GTA) or by not engaging alongside their children with technologies.

Moreover, most of the parents refer to Internet as a place where they have lost (or could potentially lose) the control of the balance between age and content. In particular, they mentioned Google searching tool and YouTube videos as the spaces they mistrust the most. They fear for their children consuming inappropriate content, such as violent or sexual images or 'bad' language. They pointed out the difficulties in controlling their children in these spaces, the ease with which their children could access other videos or contents that they had not allowed (i.e. just scrolling the YouTube suggestions in the side-bar of the screen or clicking on an advertisement). In most of the cases, parents reported that inappropriate content is often identified "quickly" while the children were watching a video or listening to a song but parents state they cannot supervise in advance all the contents that children will interact with in a particular event. That is why some parents are very watchful or even check the tracked record of videos on a regular basis. In addition, the majority of parents also reported that they controlled the installation of applications, above all in tablet and mobile devices. In a few cases, parents have also reported that they had uninstalled some applications after discovering that they had violent content.

Another fear that was mentioned by some of parents relates to the development or reinforcement of attitudes that they considered undesirable (e.g. anxiety, addiction, anger, rivalry, frustration, envy) and engagement with "killing games". Also, the feature of online games that allow children to interact with "strangers" is an aspect that parents perceive as a danger (for example, parents in family ES5 blocked network access in the PlayStation in order to prevent their children from interacting with other unknown players). In the case of ES10, ES10m39 reported that she used to hide when texting with the mobile, since she did not want her children to perceive that excessive uses of technology are habitual at home. To a lesser extent, some families have shared their concern about how the socialization with other family members (e.g. the family of uncles/aunts or friends' families) have an impact on their own mediating strategies and sometimes they even need to confront them. This is due to the different devices, applications or games that are available in the homes of other families, where rules and values around technology can also be constructed in a slightly different (or even incompatible) way. Similarly, parents also reported that sometimes they used their children's experiences in other family contexts as a reason to incorporate new devices or change their own family rules. Only a small number of parents perceive incompatibilities between playful (i.e. unproductive) and educational (i.e. useful) uses of technologies, such as ES9f41 who argues that "*the border between an educational and a playful use is very thin*". Equally, only a couple of parents clearly stated that from their perspective there were no risks at the moment, but they predicted that these will emerge in the future when their children start to use social networks.

Regarding a view of technology as opportunities, parental' discourses are also quite homogenous and are articulated around three main points: education, work life and social life. Almost all parents talked about the educational potential of technology that is already to some extent being incorporated in children's digital experiences and will become a key tool for the

children's schooling. The difference among families regarding education was that only in some cases this concern translated into actual practices and actions with their young children. For instance, in family ES1, since parents wanted the usage of technology at home to reinforce classroom content, they decided to encourage the uses of applications that had an educational element. In family ES3 parents liked to search information for doing exercises for class as this was seen by them as a chance to show the child how to search for information on the Internet. In addition, a few parents argued that technology was useful as a tool for learning foreign language (English was the only language mentioned explicitly) or an important tool for accessing information.

Some parents also talked about technology as something relevant for work-life and reported their concern about how families can help building the proper technology skills. A minority of parents also mentioned that technology was relevant for social life or for developing interests. In any case, all parents assumed that technology was key and a requirement for their children's future and that they had to support to it at home. As ES9f41 puts it: *"technology represents the future"*.

To summarise, our analysis suggests that there is a strong interplay between parents' fears or perceptions of risks and the rules or controlling strategies they set up. For instance, family ES2 controls the time amount and exposure to technology by encouraging extracurricular activities during the week for their children, as a way to prevent isolation. Family ES8 provides another example of this, since the parents ask the child to do a list of the activities he expects to during a day in weekends or holidays, in order to frame technology-based activity in a broader set of activities. Moreover, the analysis also shows a strong difference in the nature of children's and parent's perceptions regarding online technologies: although in both children's and parent's cases technology devices are seen as artefacts/objects through which things can be done and goals pursued, children tend to talk about technology as "navigational spaces" where they can do things, whereas parents conceive it as "tools" to learn, to acquire something, or to spend time, under a more utilitarian and strategic assumption.

### **3.3 How do parents manage their younger children's use of (online) technologies?**

Parental mediation strategies regarding their children's use of digital media and technologies seems to be organized around two features. On one hand, there is a prevalent idealization (e.g. Lange, 2014) regarding how children have learnt how to use digital devices and media. On the other hand, this idealization of the process leads to a supervision-control-engagement strategy on the parts of parents that, in turn, leads to two broad parental styles across the sample of Spanish families.

In relation to the first issue, when parents are asked to reflect on how their children learned to use the digital devices they manipulate their initial answer is "on their own". They will explain

that they might have initially (or still do) help their child turn on the device, activate the screen or open the application / program but that from this point on children explored autonomously the device and progressively mastered the usage of the devices. For several devices, this learning began a few years ago and, thus 6-7 year olds children are described as knowing quite a few things about the digital devices they use. Yet, this statement about children's learning process, as indicated above, is partly an idealized representation -generated by parents- of how to account for children's learning, rather than accurate statement that captures the diversity and nuances in how children use and have used digital technologies that are also presented in the interviews. To begin, "learning on their own" seems to be how parents name a learning process in which, indeed, there was little "instruction". Parents do not report situations in which they explicitly "sat down" and explained verbally and step-by-step how to operate and/or navigate the various digital devices children use - nor do they report other adults doing this inside or outside the family settings (i.e. schools or day-care settings).

However, they do describe how their children have asked for help on various occasions or need their assistance to perform certain tasks related to the digital devices children use. On these occasions, parents perform the task/solve the problem "for" their children, and probably with the child closely observing how these steps are conducted. Also, most parents are active users of the digital devices their children use (except perhaps video games) so children are recurrently exposed to the daily operation of digital devices. In short, learning through direct observation of parents' use of digital devices is, in fact, an important mediation and management strategy for children's use of digital technologies. Further, these opportunities to learn through observation can be more or less structured, as they can occur through exposure to parents' digital own digital practices at home or as a request for help from children.

In addition, older siblings and children/young adults in the extended family (e.g. cousins, aunts/uncles) -when they are part of children's daily lives- are also reported by parents as having a very visible role in how children use and relate to digital technologies in the family. In the case of older siblings where the age differences are relatively small (i.e. 2-4 years), children seem to be incorporated into the preferences and uses of the older sibling. Since for children these uses are tied to leisure and play (playing game applications or video games, watching videos in YouTube or other streaming platforms, etc.), younger children either also participate in these games -or similar versions adapted to their age- or use the same applications and services, for example YouTube, but focusing on other contents. When the age difference with older partners in these interactions is wider (for example, when children have a close relationship to a young adult aunt/uncle or the focus child has a teenage sibling), children may have access to and learn particular digital skills tied to the personal or professional interests of the older child/young adult. For example, ES3b7 acquired certain skills in working with digital photographs through his uncle, who has an on-going interest in this area. However, to reiterate the finding mentioned above, this engagement with the digital practices of older family members does not extend to social media as none of the focus children of the study report having social media profiles or using social media applications with public profiles.

Turning to parental strategies, we have identified in the participating families two broad approaches regarding how they arrange their children's digital experiences in the family.

(1) For one group of parents, their more active control occurs in steps or actions that take place "before" children interact with digital technologies. These parents state that: (a) they restrict the capacity of the devices children use to openly connect to Internet and "be online": by switching off Wi-Fi connectivity in tablets; not giving access to data-plans in mobile devices outside the home or disconnecting online features of the video games and consoles children might use, and; activating access passwords on devices, etc. and/or (b) have almost complete control over the applications, programs or games children install, use or have available in the digital devices they use. From their perspective, as seen above, these steps minimize exposure to the various risks and concerns that parents enumerate in relation to the use of digital media and their children.

By putting these safeguards in place, parents facilitate that children use and interact with digital devices in a relatively autonomous (and even solitary) way. Children request and negotiate use of their favourite digital devices (often, tablets and portable video game consoles) and, when allowed, tend to use them to play on their own with them. This set-up allows parents to "step-back" from their immediate supervision of children's digital practices and only intervene when children ask for assistance.

(2) Another group of parents does not put in place these restrictions to the online/Internet connectivity of the digital devices that children use, stating that they "trust" the risk children might encounter are not critical at the moment or understand that this is an experience children will have to navigate through sooner or later. For example, ES6f41 states:

*"I've worked in computing during some years. I'm not scared about setting up firewalls or parental controls but I prefer not to use them. I prefer that my children have the necessary responsibility for not forcing me to use these tools. I may be able to forbid technology in the house, but not outside the house. Therefore, I prefer that they become responsible to denying access."*

Since children's access to the Internet and connected applications is open in these families, parents do describe being more "on top" and "monitor" their children's digital activities, which might include for these children conducting Internet/Google searches or instant messaging with family members - for example, in the latter case, ES9g7 who alternates between living with her mother and father (who are divorced) has her own smartphone and uses WhatsApp to communicate with her parents and family.

Interestingly, within the group of families who engage in this second strategy, we also find parents who report using digital devices for their own leisure activity - the use of digital devices for work-related or family matters seems to be present across all families - such as using game applications or enjoying playing with the video console. Consequently, they also report sharing

these leisure and play practices around digital media with their children, including the cases of children in the study, turning digital play into a family shared activity.

Finally, practically all parents report a concern regarding the amount of time children spend (or could spend if given the opportunity) with digital devices and on screens. This concern materializes in a general strategy where parents organize daily schedules that, in practice, limit children's time to use and access digital devices. The children we have studied attend full school-day sessions, might be involved in after-school activities (such as sports, scouts, art classes, etc.), have to run errands with their parents, have to spend some time on school tasks, and have to complete daily routines (dinner, baths, etc.). In addition, parents also attempt to promote outdoor play and family activities (in parks, their home gardens, etc.) and other games and activities in their homes that do not involve digital devices. Thus, in practice the combination of these two constraints organize and limit the amount of daily time that children spend with digital technologies at home. In relation to this, it should be noted that some parents do condition access to digital media to the completion of other chores or connect the use of digital media to their children's behaviour. However, for the group of young children we have studied it does not seem that digital devices are the major commodity in the reinforcement/punishment strategies that parents might have in place or try to enforce.

### **3.4 What role do these (online) technologies play in the children's and parents' lives?**

Digital technologies and devices are clearly incorporated in the lives of the families and of the children we have interviewed. They are a fundamental part of parents' professional, personal and social life, yet parents had to master these technologies through an explicit learning process over years of use. From adults' point of view, their children have been born into and are growing up with technologies, and they have learnt how to use them 'naturally', without much assistance or difficulty. Technologies are presented as a fact of life and especially for the future of the children they can be useful for many productive purposes (although they are also aware of the risks). For the moment, most of the families have created a series of conditions and rules, in the way children have access to and can use the devices in the home, through the way parents control what is installed in these devices and the connection to Internet, etc.; that respond effectively to parents' concerns and allow children to have some type of digital experience. We found that most of the families use some of the following strategies in order to control the uses of digital devices:

- (a) Promoting extracurricular activities outside school hours and family activities or activities with other children on weekends not related to digital technologies.
- (b) Restriction on the use of devices that are considered as the possession of parents (parents' smartphones and laptops, especially work related ones).

(c) Limits on the amount of time children can spend on specific activities, such as watching TV or playing certain games (e.g. Clash of Clans)

At the same time, in some ways parents allow children to use digital devices with certain autonomy. This fostering of autonomy, at the moment, seems to concentrate on children's own leisure activities: playing on game applications and watching cartoons. However, it should be highlighted that leisure activities sometimes conceal deep passions, and therefore children can use technologies to develop their own interests. Children do not use digital media for any school-related work yet, additionally some parents do not promote their children's use digital media for structured learning activities, while others do so, such as for second language learning or to develop literacy or numeracy skills.

These strategies are linked to the ideologies that parents have about digital technologies. Parents see these new technologies as something that can help the education of their children: facilitating access to all kinds of information, performing school tasks or learning about other cultural activities which are not usually much publicized or attended, such as poetry readings. Thus, the use of technology is perceived positively and is encouraged when it comes to activities that parents consider have a relation to the tasks and learning that occurs in school. The use of technology is also promoted when they are seen to enhance some extracurricular activities for children (e.g. athletics, chess, piano) and family relations (e.g. cooking, watching movies together, playing games on the PlayStation with the father).

However, parents also believe that there are potentially harmful activities for their children at this age, particularly in relation to digital games. Parents consider that this type of activity can isolate their children from the rest of peers or lead to dependence on technology. Therefore, they attempt to have constant control over children to ensure their children are using technology in the right way, and not to producing irritability and dependency that can be generated.

In addition to parents, other people are involved and shape children's digital practices, such as siblings, cousins, uncles/aunts, teachers or peers. Children's own tastes and interests also mediate participation in digital activities. During their free time children combine digital activities with non-digital activities such as playing ball, cycling, playing with the relatives, cooking, etc.

Interestingly, parents, based on their own experiences and what they observe in their relatives or older children, seem to take for granted that in several years (when they become teenagers), their children will own a smartphone with data-connectivity and will have much more varied uses of digital technologies and social media. Again, these future changes seem to be taken for granted as "facts of life" in the context where children are growing up, rather than something that is purposefully designed or planned by the families.

### 3.5. 'Surprising findings', further thoughts and future areas of exploration

The analysis of data has led to some unexpected or surprising findings. These are exploratory findings that deserve further research.

- *Differences between technology in rural and urban schools.* Although our data includes only one interview with a family living in a rural area, it was surprising to find out that the children in this family had an intense technology life associated to the school; for instance, they had a school blog addressed to the students - this is untypical in the Spanish literature, where the use of blogs managed by schools are usually addressed to families (González-Patiño, 2015) and blogs are typically used as a strategy for bridging between school and families and involving families in school life. Some children from urban families in our study showed researchers their school blog with the same enthusiasm with which they discussed other non-schooled activities such as watching YouTube videos or playing games. In the future, it would be interesting to diversify the sample of families and include a larger set of families living in rural areas, to be able to explore what may be characteristics of rural schools in relation to digital technologies, which perhaps operate under the assumption that digital technology can especially help rural children to be more connected with others and other settings. More generally, the way in which technology is embedded in school practices and how this may impact children's everyday engagements with technology at home is another interesting issue that deserves further research: What do children think about the digital technologies provided by their school and how is home technology used with school goals in the case of primary school students? How do they incorporate school uses of technology in their life? Are the devices used in each setting similar? Are the goals for digital technologies similar in the homes and schools of young children?
- *Social class.* In our sample, some of the more socioeconomically disadvantaged families possess as much technology at home as other wealthy families. This might involve buying the latest devices taking advantage of promotional offers or through credit payment plans. This raises important questions regarding material constraints: why are some families stressing their home finances to enjoy digital technologies? How are digital technologies tied to social status? How are the market and digital technology providers influencing this trend? However, although we might find similar degrees of technological equipment across homes and families, mediating strategies seem a bit different: the more socioeconomically advantaged families tend to be more restrictive with time exposure to digital technology and are more aware of the dangers, so they control the children's engagement with technology much more than families with fewer socioeconomic resources.
- *Ruling passions shape children's options, engagements and uses of technology.* Contrary to the extended view according to which children are passive consumers of technology, our results show that their passions (e.g. dancing, cooking) determine what children

chose to do with the devices. Technology is used by children to cultivate their passions. As an illustrative example, when we asked children what "*three devices or things they would take with them to a desert island*", in some cases the answer did not include digital technology devices but objects related to their passions. This shows that technology is not the first priority for children by defect.

- *Offline/online synergies.* Linked to the last point, children in our study have given examples of a continuity between offline and online leisure practices. These include games that they like and they have both offline and online versions (e.g. Minecraft), passions that they develop offline and online (e.g. cooking, chess, dancing in extracurricular classes and using the iPad to search for videos for dancing, or dancing games in the Wii) or abilities developed offline that then are meaningful in particular online contexts. Regarding the last idea, for example, ES6b7 learned about modelling airplanes with his grandfather, who also had a simulation program for piloting a plane. ES6b7 explained that piloting planes was his strength when playing video-console games since he had developed the ability with his grandfather.
- *Where is communication?* From the very beginning, digital technologies have been associated to communication practices (e.g. calling, mailing, texting) and during the last years it has extended to leisure (e.g. solitary games and games with other players). Interestingly, the focus/emphasis of the children and adults' discourse is on leisure or the academic potential or usage of digital devices. In contrast, the communication functions of digital technologies have been mentioned in the interviews to a lesser degree. This finding opens up new questions: Were these results a consequence of how the study was conducted? Will this pattern change as children grow up? Are these children "early adopters" of a way of using technology that will gain momentum in the future?

As stated above, this study has provided important insights on young children's and their parent's engagement with digital technology. Nevertheless, future research in this area could address more specific research questions. Based on the findings collected in Spain, some of the questions that need to be addressed more in depth are:

- How do children learn to use these devices? The main discourse held by parents on this point is that children learn on their own, exploring the affordances of the device through trial and error or making the best of moments where adults help (e.g. writing words on Google). However, ethnographic observation should be done to understand how children appropriate the devices' affordances and develop digital skills in practice and provide more accurate accounts of how young children "really" learn how to use digital devices and media.
- *Development of younger siblings' digital literacy.* Children usually have conversations about technology issues, they teach or help each other or share their discoveries or

achievements. Older children have a key role in the development of younger siblings, since the latter asks for help when he/she encounters a difficulty (e.g. writing on Google, managing publicity messages). Does this occur only in one direction? Or is development more complex and involves also younger siblings showing new things to older siblings? Another question that deserves further research is how families with more than a child establish the mediating strategies that support usage and digital literacy, if these are different across siblings and how differences are managed in the context of the family.

- *Siblings and their attitudes towards technology.* Technology, devices and applications constitute elements that bring siblings closer together (e.g. they play with each other) but they also constitute an element that differentiates siblings. Differentiation operates in the type of applications or games they prefer, something that is especially obvious in the case of gender differences. In this regard, it would be interesting to observe how technology games are incorporated in children's identities at home, at school and at the peer-sphere.
- *The role of the larger family and peers in access to newness and digital learning.* Aunts, uncles and older cousins play a role in children's digital development. They might introduce to the children their own digital practices and spend time with them teaching how to use devices, programs and applications. They also share their own leisure and play practices with children. Moreover, members of the extended family, above all cousins of the same age or slightly older, are for young children a source for learning about new games, applications and devices. These relationships within the extended family are important in the Spanish sample and should be explored further in the future.

## 4. DIGCOMP framework

### 4.1 Based on the interviews and observations, what are the digital skills of the interviewed children according to the DIGCOMP framework?

Upon the request from the JRC for all the national reports, we have evaluated the digital skills and competence of the focal child from each family based on the European Digital Competence Framework for Citizens, also known as DIGCOMP (see Table 4 below). The details of the DIGCOMP can be found in Ferrari (2013), and the grid against which we have evaluated each child can be seen in Annex A. It is important to note that we did not conduct the data collection in order to rate the digital skills of children based on the DIGCOMP framework; rather, we considered the possibility of evaluation *after* the data collection has completed. Therefore, there are some components we left empty when we did not know how to score, due to lack of related data. It is also important to note that this framework is designed to rate the level of digital skills and competence of *adults, not children*, as we critically review the use of this framework for children in the following section. When we have considered that the child is not

capable of the task even in the level of basic user, we have put "Not there yet" in the table below.

## 4.2 Discussion of the categorisation of young children's skills with DIGCOMP

We have faced many difficulties in evaluating each child's level of digital skills and competence following the DIGCOMP framework. This has arisen fundamentally because the framework is made for adults, and some assumptions on which it is built do not apply to children. Additionally, the instrument does not incorporate a developmental perspective, which would be a necessary element of any framework that attempts to assess children's skills. From these initial considerations we elaborate our critical review around three points.

First, the way progress is conceptualized within of digital competence framework often conflicts with what is currently known about children's cognitive development. For example, an assumption behind various items in the framework appears to be that *recognition/awareness* (of the availability of resources online, for instance) is an "inferior" or "earlier" achievement than *actual actions* (using the resources, etc.) (e.g. elements 2, 3, 6, 7, 15, 16, 22, 23). For example, component 22 specifies that a basic user (22BU) is someone who 'know[s] how to solve some routine problems' while an independent user (22IU) is someone who 'can use digital technologies to solve (non-technical) problems...'. In the case of adults this may be an appropriate way to rank digital competencies, however in the cases of children this raises problems. On one hand, developmentally, "awareness" (i.e. a metacognitive process) is usually a later achievement that comes after some practical mastery of a skill (Larkin, 2010; Karmiloff-Smith, 1992). On the other hand, certain digital skills might, in fact, be displayed and regularly put into action by children, but these have been learnt through trial and error as procedures that are not fully understood or cannot be verbalized. For example, component 15 distinguishes between a basic user (15BU) as someone who is 'aware that credentials (username and password) can be stolen (and) knows should not reveal private information online' and a more advanced independent user (15IU) as someone who can 'use different passwords to access equipment, devices and digital services and (...) modifies them on a periodic basis.' Our data shows that some children "know" the various passwords or unlock patterns of their parent's mobile phones or tablets and access these devices. However, we do not know how many of them could explain the rationale behind why a password exists (such as to protect the equipment from being stolen, etc.).

**TABLE 4: The interviewed children's evaluated levels of digital skills and competence according to the DIGCOMP framework**

| Interviewed Child  | Family 1                      | Family 2           | Family 3                     | Family 4           | Family 5         | Family 6         | Family 7         | Family 8         | Family 9         | Family 10        | Family 11        |
|--------------------|-------------------------------|--------------------|------------------------------|--------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| DGCOMP Skills      | ES1b6                         | ES2b6              | ES3b7                        | ES4b6              | ES5b6            | ES6b7            | ES7g6            | ES8b7            | ES9g7            | ES10b6           | ES11g7           |
| 1: 'Search skills' | BU** (with father's presence) | Not there yet***   | BU**(with mother's presence) | BU** (with mother) | BU**             | Not there yet*** |                  | 1BU**            | 1BU**            |                  | Not there yet*** |
| 2: 'Reliability'   |                               | Not there yet***   |                              | BU** (with mother) | BU**             | Not there yet*** |
| 3: 'Storage'       |                               | BU** (with mother) | BU*                          | BU***              | BU**             | Not there yet*** |
| 4: 'IMC'           | Not there yet***              | Not there yet***   | BU*                          | BU***              | BU**             | 4BU*             |                  | 4BU**            | 4BU**            |                  | 4BU**            |
| 5: 'File sharing'  |                               | Not there yet***   | BU*                          |                    | Not there yet*** |
| 6: 'Services'      |                               | Not there yet***   |                              | BU***              | Not there yet*** |
| 7: 'Networking'    |                               | Not there yet***   | BU** (Self-commentary)       | BU                 | BU**             |                  |                  |                  |                  |                  |                  |
| 8: 'Etiquette'     |                               | Not there yet***   |                              |                    | Not there yet*** | Not there yet*** |                  | Not there yet*** | 8BU**            | Not there yet*** | Not there yet*** |
| 9: 'Production'    | BU**                          | BU**               | BU*                          |                    | BU**             |                  |                  |                  | 9BU**            |                  |                  |
| 10: 'Edition'      |                               | Not there yet***   |                              |                    |                  |                  |                  |                  |                  |                  |                  |
| 11: 'Copyright'    |                               | Not there yet***   | Not there yet***             | BU***              | Not there yet*** |
| 12: 'Settings'     |                               | BU** (with mother) |                              |                    |                  |                  |                  |                  |                  |                  |                  |
| 13: 'Programing'   | Not there yet***              | Not there yet***   | Not there yet***             |                    |                  |                  |                  |                  |                  |                  |                  |
| 14: 'Protection'   |                               | Not there yet***   | Not there yet***             |                    | BU***            | 14BU**           |                  |                  | 14BU**           | Not there yet*** | Not there yet*** |
| 15: 'Credentials'  |                               | BU* (with mother)  | BU** (with mother)           |                    | BU**             | 15BU***          |                  |                  | 15BU***          |                  |                  |

|                        |                  |                   |                        |       |                  |                  |                  |                  |                  |                  |                  |
|------------------------|------------------|-------------------|------------------------|-------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| 16: 'Security'         | BU**             | Not there yet***  | BU** (self-commentary) |       |                  |                  |                  |                  |                  | 16BU**           |                  |
| 17: 'Energy'           |                  | Not there yet***  | Not there yet***       |       | Not there yet*** |
| 18: 'Overuse'          | Not there yet*** | Not there yet***  | Not there yet***       | IU**  |                  |                  |                  |                  |                  |                  |                  |
| 19: 'Environment'      | Not there yet*** | Not there yet***  | Not there yet***       |       | BU*              | Not there yet*** |
| 20: 'Impact'           | Not there yet*** | Not there yet***  | Not there yet***       |       | Not there yet*** |
| 21: 'Support'          |                  | BU* (with mother) | BU** (self-commentary) |       | BU**             | 21BU*            | 21BU**           | 21BU*            | 21BU**           | 21BU**           | 21BU*            |
| 22: 'Autonomy'         |                  | BU* (with mother) |                        |       | BU**             | 22BU**           | 22BU**           | 22BU**           | 22BU**           | 22BU**           | 22BU*            |
| 23: 'Problem solving'  | Not there yet*** | Not there yet***  | Not there yet***       | BU*** |                  |                  |                  |                  |                  |                  |                  |
| 24: 'Updating'         | Not there yet*** | Not there yet***  | Not there yet***       | BU*** |                  |                  |                  |                  |                  | 24BU**           |                  |
| 25: 'Awareness limits' | Not there yet*** | Not there yet***  |                        |       |                  |                  |                  |                  |                  |                  |                  |

(\*) observed

(\*\*)self-evaluation or reported by another member of the family

(\*\*\*) researcher evaluation]

Second, there is no distinction in the framework between the use of digital devices with someone's help and autonomous use. Children start using these devices with someone's help or by closely observing others (such as mother/father, elder siblings/cousins, or uncle/aunt) and learning occurs through these supported interactions as children advance into using the devices on their own. In later stages of learning, children even learn to use the Internet (e.g. YouTube videos, forums, websites) as a resource for learning how to use particular devices or applications. A competence framework focused on children would need to establish additional categories or levels to incorporate skills that can be displayed with support or without support (e.g. Moll, 2013). However, the current framework does not distinguish between the two and this distinction can only be signalled by writing it out, for example, "3BU (with mother)" when the child can store files or content only with a help of mother.

Third, the framework includes elements that are clearly not relevant to young children's lives and excludes others that are relevant and could be included. An obvious example is component 6, dealing with interaction through digital technologies with "services" such as governments, banks, hospitals and e-banking. More relevant services for children could be schools, cultural centres, or online shopping (especially buying some digital game applications or music). On a more general note, the framework has emphasis on access to services and information and communication. However, for smaller children we have investigated, the more essential reasons to engage with digital technologies are their play, entertainment and development of 'ruling passions', and yet these do not appear anywhere in the framework.

As a result of the framework being catered for adults, not for children, the children in our study at most reached being the basic user but in many cases we could only say as 'not there yet', or leave it blank due to the lack of relevance to the children's lives (or simply because we did not have a relevant data to evaluate), resulting in a skewed portrait of children's digital competencies that does not acknowledge what they are capable of doing with digital devices and media. Therefore, we recommend working on the creation of a DIGCOMP framework especially catered for children that is aligned with children's actual digital practices, approaches these from the child's point of view and incorporates a developmental perspective.

On a more practical point, we also recommend that each element (1, 2, 3, etc.) in the grid is summarized with a concept label or keyword to facilitate the reading of the data. For example, the component 1 could be called 'Search skills,' while the 2 could be 'Reliability'. The Table 4 above incorporates our proposals for the label for each component.

## 5. Methodology

### 5.1 Procedure

In this section, the implementation of the study in Spain is discussed. As a principle, we have - as much as possible - followed the protocol of observations and analysis that were shared across participating research groups (see JRC, 2015; Dreier et al; 2015). In the following, we discuss the procedure we have actually implemented in Spain, particularly noting the diversions from the protocol.

#### 5.1.1 The sampling procedure

As the Spanish research team consisted of a group based in Madrid and another in Barcelona, we have recruited five families in the Community of Madrid and six in Catalonia. For both samples, we have attempted to have a diversity in terms of family income, in addition to have at least one of the following categories both in the sample of Madrid and Catalonia, following the sampling directions shared among the participating countries (see JRC, 2015):

- One only-child family
- One single-parent family
- One family with siblings older than 7

To contact families in Madrid, an invitation for a participation in research was posted in various primary schools, preschools, NGOs, *scouts* associations, as well as electronic bulletin board of parental associations to recruit a diverse group of participants (the poster is attached as Annex B). We also contacted families through the friendship circle of one of the researchers. To access families in the Barcelona area, an invitation for participation in the study was e-mailed strategically to key contacts in the researcher's circle of acquaintances and to primary school teachers. The final sample is composed of the first eleven families who met the study criteria and accepted to participate in the study. With this procedure we have not had to select among volunteer families.

In the process of recruitment, we mentioned the general goals of the study, the tools for recording the visits to the families and how we planned to keep and analyse the visual and audio data, and publish the results. Moreover, we carefully explained how participants' confidentiality would be managed and how data would be anonymized. Involvement in the study did not imply any direct compensation, except some small gifts for children such as an activity book provided by the Safer Internet Network (Insafe, 2015) and some small goodies provided by the JRC, e.g. a pencil, a box with soil and some seeds to plant, candies, etc.). In the interviews held in Catalonia the researchers brought some pastries or cookies for each family.

### 5.1.2 The sample

Table 5 below provides the basic demographic information of the families. ES1<sup>7</sup> to ES5 are the families from the Autonomous Community of Madrid, while ES6 to ES11 are those recruited in the Autonomous Community of Catalonia.

**TABLE 5: Basic demographic information of the families that participated in the study**

| Family   | Code       | Family income <sup>8</sup> | Family member code <sup>9</sup> | Sex      | Age      | Highest level of education  | Ethnicity      |
|----------|------------|----------------------------|---------------------------------|----------|----------|---|----------------|
| 1        | ES1        | High income                | ES1f43                          | m        | 43       | At least a university degree <sup>10</sup>                            | Spanish        |
| 1        | ES1        | High income                | ES1m42                          | f        | 42       | At least a university degree  | Spanish        |
| 1        | ES1        | High income                | ES1b9                           | m        | 9        | 4th grade, Primary Education  | Spanish        |
| <b>1</b> | <b>ES1</b> | <b>High income</b>         | <b>ES1b7</b>                    | <b>m</b> | <b>7</b> | <b>2nd grade, Primary Education</b>                                   | <b>Spanish</b> |
| 1        | ES1        | High income                | ES1b5                           | m        | 5        | Preschool   | Spanish        |
| 2        | ES2        | High income                | ES2m49                          | f        | 49       | Spanish Baccalaureate   | Spanish        |
| <b>2</b> | <b>ES2</b> | <b>High income</b>         | <b>ES2b6</b>                    | <b>m</b> | <b>6</b> | <b>About to start the 1st grade of Primary Education<sup>11</sup></b> | <b>Spanish</b> |
| 3        | ES3        | Low income                 | ES3m39                          | f        | 39       | University Degree   | Spanish        |

<sup>7</sup> The family code consists of the country code (for Spain: ES) and a number code for each family (1-11). This coding was provided by JRC.

<sup>8</sup> Except for ES4, all the family income levels are measured according to the Eurostat's classification (2015). As mentioned below, we sent out a questionnaire in which each family could choose one of the four ranges of income, which were calculated based on the Eurostat's classification of the levels of family income, taking into account each family composition.

<sup>9</sup> The family member code consists of the country code, the family number, the code for family role, and age. The codes for family role are: f (father), m (mother), g (girl), b (boy), gf (grandfather), gm (grandmother), sm (step-mother), ss (step-sister), sb (step-brother) etc. In case of twins, after the age, alphabet a or b is added to distinguish between the two.

<sup>10</sup> We know from our interviews that they have a university degree, however, we are not sure if they have more than that as they did not return the questionnaire.

<sup>11</sup> Since most interviews in Madrid took over the Summer, we use the expressions such as "completed" and "about to enter" the relevant school grade/year.

|   |     |                           |        |   |    |  |         |
|---|-----|---------------------------|--------|---|----|--|---------|
| 3 | ES3 | Low income                | ES3b7  | m | 7  | Completed the 1st grade of Primary Education   | Spanish |
| 3 | ES3 | Low income                | ES3g5  | f | 5  | Completed the final year of preschool          | Spanish |
| 4 | ES4 | High income <sup>12</sup> | ES4f46 | m | 46 | PhD  | Spanish |
| 4 | ES4 | High income               | ES4m41 | f | 41 | PhD  | Spanish |
| 4 | ES4 | High income               | ES4b9  | m | 9  | Completed the 3rd grade of Primary Education   | Spanish |
| 4 | ES4 | High income               | ES4b6  | m | 6  | Completed the 1st grade of Primary Education   | Spanish |
| 4 | ES4 | High income               | ES4b2  | m | 2  | Completed the first cycle of nursery school    | Spanish |
| 5 | ES5 | Lower middle class        | ES5f39 | m | 39 | Compulsory Secondary Education                 | Spanish |
| 5 | ES5 | Lower middle class        | ES5m37 | f | 37 | Master Degree                                  | Spanish |
| 5 | ES5 | Lower middle class        | ES5b6  | m | 6  | Completed the first grade of Primary Education | Spanish |
| 5 | ES5 | Lower middle class        | ES5g2a | f | 2  | No schooling                                   | Spanish |
| 5 | ES5 | Lower middle class        | ES5g2b | f | 2  | No schooling                                   | Spanish |
| 6 | ES6 | Lower middle class        | ES6f41 | m | 41 | Compulsory Secondary Education                 | Spanish |
| 6 | ES6 | Lower middle class        | ES6m41 | f | 41 | Compulsory Secondary Education                 | Spanish |
| 6 | ES6 | Lower middle class        | ES6g9  | f | 9  | 3rd grade, Primary Education                   | Spanish |
| 6 | ES6 | Lower middle class        | ES6b7  | m | 7  | 1st grade, Primary Education                   | Spanish |

<sup>12</sup> The family income of ES4 is estimated by the Madrid research team.

|    |             |                           |               |   |          |   |                |
|----|-------------|---------------------------|---------------|---|----------|---|----------------|
| 7  | ES7         | Lower middle class        | ES7f43        | m | 43       | University Degree                                 | Spanish        |
| 7  | ES7         | Lower middle class        | ES7m49        | f | 49       | University Degree                                 | Spanish        |
| 7  | <b>ES7</b>  | <b>Lower middle class</b> | <b>ES7g6</b>  | f | <b>6</b> | <b>1st grade, Primary Education</b>               | <b>Spanish</b> |
| 7  | ES7         | Lower middle class        | ES7b4         | m | 4        | 4 <sup>th</sup> year in Early Childhood Education | Spanish        |
| 8  | ES8         | High income               | ES8f38        | m | 38       | University Degree                                 | Peruvian       |
| 8  | ES8         | High income               | ES8m40        | f | 40       | University Degree                                 | Peruvian       |
| 8  | <b>ES8</b>  | <b>High income</b>        | <b>ES8b7</b>  | m | <b>7</b> | <b>1st grade, Primary Education</b>               | <b>Spanish</b> |
| 8  | ES8         | High income               | ES8b3         | m | 3        | Early Childhood Education                         | Spanish        |
| 9  | ES9         | Lower middle class        | ES9f41        | m | 41       | Primary Education                                 | Spanish        |
| 9  | ES9         | No information            | ES9m42        | f | 42       | No information                                    | Spanish        |
| 9  | ES9         | Lower middle class        | ES9sm42       | f | 42       | Secondary Education                               | Spanish        |
| 9  | <b>ES9</b>  | <b>Lower middle class</b> | <b>ES9g7</b>  | f | <b>7</b> | <b>1st grade, Primary education</b>               | <b>Spanish</b> |
| 9  | ES9         | Lower middle class        | ES9b13        | m | 13       | 2nd year in Secondary Education                   | Spanish        |
| 9  | ES9         | Lower middle class        | ES9b20        | m | 20       | 4th year in Secondary Education                   | Spanish        |
| 9  | ES9         | Lower middle class        | ES9ss16       | m | 16       | 4th year in Secondary Education                   | Spanish        |
| 9  | ES9         | Lower middle class        | ES9sb9        | m | 9        | 4th grade of Primary Education                    | Spanish        |
| 10 | ES10        | High income               | ES10f40       | m | 40       | University Degree                                 | Spanish        |
| 10 | ES10        | High income               | ES10m39       | f | 39       | University Degree                                 | Spanish        |
| 10 | <b>ES10</b> | <b>High income</b>        | <b>ES10b6</b> | m | <b>6</b> | <b>1st grade, Primary Education</b>               | <b>Spanish</b> |

|    |      |                             |               |   |    |                                     |                |
|----|------|-----------------------------|---------------|---|----|-------------------------------------|----------------|
| 10 | ES10 | High income                 | ES10b4        | m | 4  | Early Childhood Education           | Spanish        |
| 11 | ES11 | Not specified <sup>13</sup> | ES11f40       | m | 40 | University Degree                   | Spanish        |
| 11 | ES11 | Not specified               | ES11m39       | f | 39 | University Degree                   | Spanish        |
| 11 | ES11 | <b>Not specified</b>        | <b>ES11g7</b> | f | 7  | <b>2nd grade, Primary Education</b> | <b>Spanish</b> |

### 5.1.3 Implementation of the protocol of observations

All the interviews were conducted at informants' homes. In the case of Madrid, two researchers were always present, one interviewing while the other took a secondary role (observing, asking complementary questions, and taking photos or recording videos). In the case of Catalonia the two researchers have been present only in two of the six interviews<sup>14</sup>.

Following the protocol of observations, all the family visits were structured in the following manner (timing is illustrative):

1. **Introduction and briefing about the study and the interview** (About 10 minutes): In addition to the brief description of the aims of the study, the ethics protocol and the interview to take place, the parents were asked to sign the informed consent forms. We also explained, usually with the help of the parents, to the participating child the same ethical issues in a language they could understand and decide about.
2. **Ice-breaker** (About 15 minutes): Using page 10 of the 'Play and Learn: Being Online' (Insafe, 2015) activity book that was provided, we asked the children and parents to determine the activities of the family on a typical day, choosing the appropriate stickers that represent the activities and pasting them in the appropriate times of the day (for instance, the sticker for "having breakfast" might get pasted on the space the image of "a clock showing 8am").
3. **Digital tour of the home** (About 10 minutes): We asked the focus child to give us a tour of their home, showing us the digital devices in each room and asking them how they use them. In some cases, we even ask them to briefly demonstrate the use of these

<sup>13</sup> Even though we sent a questionnaire, they did not respond to this question.

<sup>14</sup> The team in Catalonia appreciates Dr. Rafel Prohens and Dr. Elisabeth Aliagas for helping with the video recordings in the interviews where only one of the two researchers involved in the project was present (ES8, ES9 and ES11).

devices (for instance, if it was a radio cassette player, we asked them to turn it on and put the music they often listen to). All but one family (ES11) completed this video-tour.

4. **Interview with the focal child** (About 45 minutes): We interviewed the focal child, following the interview/observation protocol and using card games. Except for family ES11, we have video-recorded the whole interview, occasionally taking pictures of the cards placed on the table or the interactions that appeared to be important.
5. **Interview with a parent (or two)** (About 45 minutes): We interviewed a parent or two, following the interview/observation protocol and in some cases using the ICT charts. This part of the interview in some cases was conducted in the presence of children while in other cases it was not.
6. **Closing** (5 to 10 minutes): At the end of the family visit, parents, children and researchers got together again. They were asked if there was anything else anyone would like to add or if they had any questions and discussed next steps - such as sending the questionnaire (see Annex C) to be completed by e-mail - and thanked families for their collaboration once again.

On the whole, these home visits took between two and three hours. Depending on the availability of the time of the families, some portion of the visits have been affected (trying to rush through it), particularly the interviews with the parents, as we have done them at the end of the visit. All conversations about the study and interviews in Madrid were conducted in Spanish, while in Catalonia these conversations took place in Catalan (four of six) or in Spanish (two of six). The interviews were supported by some tools (listed below in Table 6), as well as the sets of questions that were in the observation/interview protocol (JRC, 2015):

**TABLE 6: Interview tools and the part of the interviews they were used in the visits**

| Interview tools/PARTS                          | Ice-breaker | Parents         | Children        |
|--|-------------|-----------------|-----------------|
| Activity book                                  | X           |                 |                 |
| Card game + 'Smiley' stickers                  |             |                 | X               |
| ICT use chart                                  |             | X <sup>15</sup> |                 |
| Home 'digital tour'                            |             |                 | X               |
| Pictures taken by children                     |             |                 | X <sup>16</sup> |
| Apps and Digital services logo and icons chart |             |                 | X               |

<sup>15</sup> It was only used with a few parents in Catalonia (ES8 and ES9) and was used to elicit verbal responses mainly, not a data source as such.

<sup>16</sup> In this study, only a child in Madrid (ES2b6) has taken some pictures of things in his room with a researcher's camera while the other researcher was interviewing the mother.

As a general principle of the visits, the researchers focused on the HOW, WHY and our own observations. To this end, all the questions listed in the observation/interview protocol were seen as a 'toolkit' provided to the researchers. From them, we freely picked in order to help gather data to approach the four research questions in the four dimensions that guide the present study (use, perceptions/attitudes, individual and family contexts) when they do not emerge spontaneously during the observation/interview. In the interviews with children, observation and the support of the tools (i.e. the card game and activity book) were particularly important considering that for some it was difficult to verbalise their own usages or perspectives on the digital devices they use. In addition, the researchers explored and took notes of interesting quotes/stories from the children and parents.

After the family visits have been concluded, we sent out a questionnaire to the families (most often via e-mail) requesting demographic information of the following items (see the questionnaire in Annex C):

- Annual family income: For each family we used Eurostat's classification criteria (2015), which accounts for family composition, and presented the income brackets for the particular family that would place it one of four levels of income (high, higher middle, lower middle, low).
- Age
- Ethnicity
- The level of education of the parents or legal guardians (the highest level or type of education for those who are not currently in and for those who are currently enrolled in formal education their present level of schooling)
- Employment situations of the parents or legal guardians.

The questionnaire was sent to all the families, but completing and returning it was voluntary and parents were also informed that they could leave particular questions unanswered if they preferred to do so.

#### **5.1.4. Recording**

In Madrid, interviews with parents have been digitally audio-recorded, and most interviews and home tours with children have been digitally video-recorded while in Catalonia all parts of the interviews were simultaneously audio and video-recorded. Photographs were taken with a smartphone or a camera, and the video was recorded with a small digital video camera. The use of video-recordings, in addition to audio-recordings and photo-taking, was explicitly mentioned in the information sheet and informed consent given to each participant. In addition, the full procedure and use of audio-visual recordings was supervised and approved by the Research Ethics Committees of the two participating universities in Spain (UAM and UAB).

The researchers have also taken ethnographic field notes regarding the setting, the use of devices, the interactions, etc. during the visit or typed them after each visit. The Barcelona team has also kept a research diary since the recruitment process started (taking notes of how they got in contact with the families, how they have responded, etc.). Also, it is where they have kept a copy of all the exchanges they have had with parents by telephone or in writing).

As soon as each interview was finished, all the raw data from the interview was stored in secure private folder that was shared only within the members of each research team (Madrid or Barcelona) in charge of the interviews. Only the coded data (detailed summaries) was shared among the two teams.

### 5.1.5 Implementation of the protocol of analysis

For each interview, a detailed summary - one that is closer to a full transcription- with time-codes was written out in the original language of the interview (i.e. Spanish or Catalan). Relevant photographs and quotes were also inserted in the summary. An example of the summary from the interview with ES1 (originally in Spanish) is illustrated in Table 7 below.

The researchers' notes, the summary of each interview, and videos have been thematically analysed, following the protocol of analysis (see Dreier, 2015). We have first attempted to create a narrative for each research question by family, and then we approached the research questions synthesising the data from all the families. Then, in order to produce family portraits in a consistent manner, we all attempted to touch on the following points provided in the template of the report designed by JRC:

1. Information about the child: age, family constitution, special family context...
2. Overview of technology at home
  1. What they possess
  2. What they use/ what children are allowed to use
  3. Which is the access/ ownership (difference)
3. Context of parental use (high, medium, low)
4. Parents' profession
5. Level of the parents' confidence with ICT.
6. Short answer to all three research themes:
  1. Use (individual and family contexts)
  2. Perception/attitudes (individual and family contexts)
  3. Parental Mediation preferences

Regarding the level of media use of parents (high, medium, or low), based on their findings, the Spanish team established the following classificatory criteria - acknowledging that decisions might have been taken differently in other contexts:

- All the families interviewed in Spain are basically at least medium level users, because 1) they have smartphones as their primary means of mobile communications; 2) they use some kind of technology at work (computer, etc.). In this way we evaluated that they use technology for basic communication and as tools for work.
- Some of them are high users if, in addition, they are active in social media or use digital technologies for leisure, or their hobbies or work are closely related to technology or computing.

**TABLE 7: An excerpt of detailed summary from the interview with ES1 (translated version)**

| Time        | SUMMARY  |
|-------------|--|
| 5.35 - 6.41 | <p>R1 [Researcher 1] asks - referring to the cards that are on the table - “tell me which ones of these you like the most, which ones are your favourites, which ones you like doing the most.” ES1b7 looks at all the cards and points out the followings: the tablet, the Nintendo DS, the PlayStation, the bicycle, and the Wii. R1 asks if there is anything more, and while ES1b7 looks at the cards, ES1b5 suggests to him in a low voice, choose the iPod. ES1b7 says that he [also had] an iPod but it broke. R1 asks again if there is something else he likes a lot and ES1b7 responds he likes a lot playing basketball. R1 places the 7 favourite activities in one line, on top of other activities and take a photo of it. While [s]he does that, ES1f43 comments on that ES1b7 has played a lot with Legos, although he does not do it that much. R1 asks ES1b7 if he likes Legos and he says a lot and [but] to a question if he does not use it anymore, he says no. [The intercom of the house rings and ES1f43 and ES1b5 go to open the door].</p>  |

## 5.2 Discussion of the methodology

### 5.2.1 Why might have the results turned out that way?

During the implementation of the observation and interview protocol several questions emerged related to the methodology. We highlight and discuss them in this section around four aspects that we consider are relevant to possible impacts on the collection/generation of data and the results presented here: (1) the structure of the interview/observation protocol; (2) the preference for having interviews carried out in a “single” visit (3) presence of parents during the interviews with children; and (4) the language used during the interview and in some materials.

First, the protocol is designed to find a balance between standardization and flexibility, and this was central to address the research questions adjusting to the characteristics and dynamics of the interviews with the families. Family context or interview dynamics vary from one family to another. Conducting interviews with young children and their parents at home during their daily activities unavoidably generates unexpected responses or situations that hinder the exact implementation of a tight interview schedule for all the families in the sample. In this regard, flexibility enabled us to adjust to the specific demands of each family during the course of the interviews. At the same time, it was also necessary to address a number of common issues for all families. In this respect, having the structure of the protocol of observations and trying to follow it as much as possible has proven to be an effective tool to systematically address the same research questions by two research teams located in geographically different contexts (in the case of Spain).

Second, the fact that all the interviews were carried out in a single visit has affected our data in several ways. On one hand, time available to each family for conducting the interviews was not always the same. It varied depending on when the interviews were carried out (during the week/weekends, during summer vacations or during the school year) and the families' schedules (e.g., work schedules of parents, school or after school activities for children). This meant that in some cases, the time available for conducting interviews with parents -normally conducted at the end of the visit- was shorter in relation to other parts of the interview. The available time of the families, especially of the children, was also different when they were visited during the Summer or during the school year; the children who were interviewed during the Summer seemed to be more relaxed regarding time than those who were interviewed during the school year as they had a tighter daily schedule. Furthermore, the fact that all the data was collected in a single visit may have affected the construction of the narrative of children, too. Most of the interviews in Madrid were conducted in Summer. For young children, this meant that they had to rebuild what they did during the school year, which was not an easy task, especially when we asked them to tell us their daily routines during the school year.

On the other hand, conducting interviews in a single session worked better with families who had other member(s) that could take care of the children while parents were being

interviewed. In this regard, the observation protocol could be adapted in future occasions to accommodate to each family situations when there is only a member who is in charge of children (for example, instead of one session, having two visits to these families or organizing care for children during the interviews).

This temporal dimension of the observation protocol also made it difficult to interview both parents in most two-parent families in the sample. We found it interesting to interview both parents because in some cases they could have different views on the issues discussed. In relation to this, it would be interesting also to explore the perceptions of other family members that influence largely the digital practices of young children in particular families, such as uncles/aunts and older/younger siblings, who were most often not present at the interviews. One way to overcome these limitations could be to add some activity or tool that allows access to the perceptions of these members or extend the protocol to include, when necessary and possible, key extended family members who play an important role in young children's digital experiences.

The third methodological aspect that could have affected the data is the presence of parents during the interviews conducted with children. In the case of Spain, some interviews with children were conducted in their presence; while in other cases they were not present (in the room). In some cases we could observe some reaction in children's behaviour or remarks the possible influences of their presents' presence. For example, a child who was seeking confirmation of the father (ES11b6), and another one who was looking for parental attention, saying things contrary to what the parents said (ES6b7). Perhaps in the cases of these children there would have been differences in their narratives if parents were not present during the interview.

Finally, we must also consider some questions about the language of the interview and of the materials used. This issue was more visible in Catalonia, a multilingual context that not only has three co-official languages (Spanish, Catalan and Aranese) but also incorporates multiple languages brought about from migrant populations, resulting in a complex, multilingual sociolinguistic landscape. Catalan is legally considered as Catalonia's 'own language' (llengua pròpia) and accordingly is used as the vehicular language of education and the main language of institutional domains. Within this context, some interviews naturally began in Catalan and others in Spanish. However, in a case of family, after doing the interview in Catalan, the researchers found out later on that among the family members they converse in Spanish. The choice of Catalan as the interview language might have influenced the results as the child was asked to talk about family routines and dynamics in 'non-regular' language in that specific context, a language that he associates with schooling and school tasks. The other language issue related to this study was that the activity book we used for the warming-up activity was in English, not in Spanish, as the Spanish version was out of stock, thus turning this warm-up activity in both a digital media and second language learning game. In short, working with representative samples of families across Spain necessarily involves taking into account the complex sociolinguistic dynamics that are part of life in Spain.

### 5.2.2 How could the study be improved?

There are several issues that emerged in the study that suggests areas which could be improved or reconsidered. First, gender issues need to be examined more systematically. Most importantly, the gender differentiation in the materials used for the card game could be reconsidered. In one case in our sample, we ended up imposing the set of cards designed for "boys" to a child who did not feel identified with this gender, and this made him feel uncomfortable during the interview. Similarly, gender stereotyping could present itself in a way in which we ask follow-up questions during interviews as well. This might even lead to a paradoxical situation in which researchers activate their own stereotypes to explore a topic of study (i.e. the digital experiences of young children) that has not been explored much and by doing so, in fact, create "new" stereotypes. For example, during interviews we took at face-value stereotypically "gender-matched" responses in boys and girls (e.g. girls reporting they like to see dance and music videos in YouTube and boys reporting they play action video-games) and did not explore in depth complementary practices that might complicate or contradict the stereotype (e.g. that girls also played action video-games or boys watched music videos). In short, gender issues should be critically taken into account in future studies, especially taking into account that gender identity is developing during early childhood and how digital media and gender intersect in these early years is something undetermined and in transformation.

A second more substantial change in the design of the observation protocol could be an introduction of tools to enable a greater participation of children as co-producers of data. In this line, we may consider the use of photographs as a tool to elicit responses from the children and family members: children could be given a camera and asked to photograph their engagement with digital technology at home prior to the researchers' visit in order to produce a visual record to be discussed with the researchers in the visit and interviews (see González-Patiño, 2011; González-Patiño & Esteban-Guitart, 2015; Morgade, Poveda & González-Patiño, 2014; Poveda, Morgade & González-Patiño, 2012). With this approach, children can take the lead in showing and discussing their media and digital technology uses. Additionally, this facilitates children to reflect with the materials that they collect from their daily lives and not through the imposition of a series of images that may be external to them (Allan, 2012), as may have been the case with the cards that have been used in the interview. In some cases, it may be possible that devices and activities depicted in the cards do not coincide with how they are represented in the daily lives of children or are perceived by them, thereby possibly restricting the opportunity for the child to tell his/her 'story' of her/his daily use of a device (e.g., a child can use the smartphone to listen to the radio but in the narration this activity may not appear because no card captures this meaning). Participatory approaches also facilitate incorporating new questions during the research process which are more adjusted to the particular realities and digital practices of children and families.

Additionally, more emphasis on the use of observation in the project around the children's engagement with digital technology in their daily routines may help generate richer data. These

observations could be gathered through participant observation and/or through video recordings made by family members (i.e. parents) or researchers. This would generate data regarding the research questions that did not rely so heavily on verbal responses of participants in interviews and thus require verbal skills more in line with children in the "older" end of the age range (i.e. 5-8 years of age). We know that the participants, especially small children, are "better" at *carrying out* their activities than *talking* about their activities (Lahire, 2008) and observations would help study the digital practices of even younger children (i.e. 0-4 years of age). In addition, available research drawing on observations has generated different types of questions and findings which could be relevant to the current project, such as ways in which young children's engagement with digital technology with the support of peers or parents facilitates their literacy learning (Wohlwend & Kargon, 2013; Wolfe & Flewitt, 2010), family interactions around digital games (Danby et al., 2013) or how participation in online worlds relates to issues of consumption practices and development of identity (Burke, 2013; Marsh, 2013). Our research experience with smaller children who have also followed the protocol of this study (between 3-5 years of age) also supports the importance of observations during verbal exchanges and more generally of children's spontaneous digital practices.<sup>17</sup>

Finally, efforts to diversify the sample of participating families and children should continue. The present study focused on sampling -and succeeded to some degree- a diversity of families in terms of income, family configuration (i.e. single parent, single child, or with siblings) and geographical location. However, it fell short of covering families from diverse cultural and ethnic backgrounds. Also, future studies should also explore children and families with more functional diversity (psychologically or physically) or intellectual diversity. Research with children with functional diversity is a field of research of particular relevance, since digital media and technologies have occupied a central place for some time in the daily lives of people with disabilities, such as with tools that assist communication, facilitate access to education, games, the general social environment, as well as in therapeutic intervention of the affected areas (Sánchez-Criado et al., 2014; Lopez and Sánchez-Criado, 2009; Poveda et al; 2012; RTVE, 2015). Also, practices with digital media, such as augmented communication, have been standardized through technological development, and these same practices have been extended to the general population with tools such as applications for smartphones and tablets. The study of these families and their practices could open new perspectives beyond the uses of digital devices for play or educational purposes.

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<sup>17</sup> Using the same observation/interview protocols, we have interviewed five children aged between three and five year olds in Madrid, which are not examined in this report.

### 5.2.3 What are the methodological recommendations for future research?

The three points we mentioned above to improve in the future research (change in the gender specificity of the material; inclusion of photography as an elicitation tool; and the more emphasis on observation) could also be considered as recommendations for future research. In addition to these, we recommend the use of video recordings during the visit to the family as a complementary tool to the observation/interview protocol. Our experience in this pilot study in Spain shows that the use of recordings of the interviews with children has brought a number of advantages in the production and analysis of data.

On one hand, this technique allowed to make a full transcript of the dynamics of the encounter and the important issues in addressing the research questions, such as the children's actual engagement with digital technology, role of gestures, movements in and around the house, the places where digital devices are located, etc. Taking notes of all these issues during the interview is sometimes too demanding and not practical for a single fieldworker on site. These difficulties are illustrated in one of the interviews in which we could only collect audio recordings (ES11). In this interview, the researcher had to verbally describe aloud everything the child did (e.g. pointing out a card that refers to a digital device, but he/she only expressed it as 'this') so that when we listened to the audio recording later we could make sense of what was happening during the interview and so that important details were not lost. In short, video recordings allowed the researchers to 'observe' again after the visit was done; it leaves a visual record of all the relevant details of the visit that the researcher can access afterwards. Also, having a detailed audio-visual record of the interviews allows the researchers to find data relevant to analytical questions not anticipated at the moment of the interview. Finally, as discussed in the previous section, we also have to add that the video recording of the interactions becomes an even more useful method and record when we research the smaller children (under five years olds) because of limitation in the verbal accounts (not for all but for some) and data from 'observation' weighs more.

We are aware that video-recording the interviews raises a number of ethical issues and in this pilot study we did take great care in this regard. For the purposes of the study, video recordings should be focussed on the children's actions and movements more than on their faces. It is also important to bear in mind that these are recordings of elicited conversations and actions within a research interview, rather than recordings of spontaneous daily interactions at home. It is also necessary to pay attention to what is being recorded at each moment. For example, while recording moments when the children are interacting with media and digital devices, personal information such as passwords, social networking profiles or email exchanges could appear on screen and be captured in the recording. Thus, additional steps such as covering the camera lens on site or masking/deleting this information from in raw recording have to be considered. From a different perspective, since recording interactions in video requires the researchers to be "extra" cautious ethically, this is simply another way of avoiding that ethical standards are

not relaxed because researchers chose to use less "ethically demanding" tools such as audio recording.

## 6. Conclusions

### 6.1. Key findings

For most children the two favourite digital devices are tablets and the TV. They report using these primarily for leisure, to play game applications, watch videos and children's cartoons or shows and, to a lesser degree, read digital storybooks.

Tablets and the TV are said to be used with autonomy by children - within the control and rules parents have arranged (see below). Several children also have portable game consoles or small tablets that they also use autonomously. Other digital devices such as laptop computers or smartphones are also used by some young children but in a more limited way and with more parental supervision. Very few of the target children in the study have their own mobile phone and none of the children report using public social media - although some of the games they play might have involved creating profiles.

Within families, digital devices are used by children and adults for leisure, and by parents also for work related purposes. Family schedules are organized to include many other forms of activity, outdoor play and leisure that do not involve digital media and devices. For the young children in our study who are entering or are in their first year of primary education, digital devices do not seem to be too tied to educational uses. Although families do report that their children's schools have and use some digital technologies, for the moment, they do not see any demands from schools to use digital technologies at home for educational purposes.

Most homes are equipped with multiple digital devices, several of which are owned and used regularly by parents, and the presence of digital technology in the house, within the sample of families we have studied, does not seem to be clearly tied to aspects such as family composition, geographical location or even family income. Variations may occur in relation to the uses of digital devices, which are more closely connected to parental occupation and parental ideologies.

Children are described as having learnt "on their own" to use digital media, but this process includes practices such as close observations of how parents use and interact with digital devices and learning through interactions around digital technology with older siblings and extended family (especially cousins). Nonetheless, young children report needing assistance to set up various digital devices, and most parents control very closely what is downloaded and installed in the digital devices their children use.

Children perceive digital technologies in primarily positive terms, as they are associated to leisure, play and as an opportunity for young children to explore and pursue their interests. When children mention risks or negative aspects it is clear (and often mentioned explicitly) that they are repeating parental views or explaining the reasons parents have given them to enforce particular rules or restrictions.

Parents see children's engagement with digital technologies as an unavoidable fact of their children's lives, which will only increase as children grow up. This increased use will include more relevance in children's schooling, and all parents foresee that digital technologies will be an integral part of their children's future work life. Parents do express concerns in relation to risks associated with digital technologies such as accessing content that is inappropriate for their children (primarily violent content) and/or interacting with strangers through online platforms and games. Parents do not seem to use, give credit or have had good experiences with content-control application and filters or the parental control features of the applications they use.

Parents also perceive digital technologies as in competition with traditional forms of play and outdoor and physical activity, as well as other forms of leisure and socialization they want to promote in their children. Most families report organizing after-school schedules and routines that include multiple activities and commitments that limit the amount of time children can spend with digital devices. Parents admit using digital technologies as a way of keeping children "entertained" while they have to attend to other family demands, but this is not the primary way families report spending their after-school time.

We have identified two main ways in which parents mediate and organize their children's digital experiences. The first group of parents sets up clear controls and restrictions to children's online access through digital devices (by turning of the device's Wi-Fi connection, controlling what applications are installed, etc.). This allows children to use digital devices in a rather autonomous way, but this use is primarily individual and disconnected from the Internet or online features of applications. The second set of parents allows online connectivity of the digital devices that children use and then are more engaged with how children use digital technologies and might even use them alongside and with their children.

## **6.2. Recommendations**

The findings of this study do suggest some practical recommendations for different participants. Given the sample size and the design of the study our main interlocutors are families, our suggestions speak more directly to parents and children's caretakers. However, we also believe that, from the practices and beliefs around digital technologies and young children we have identified, policy-makers and even media and technology designers might find relevant implications for their work.

A shared concern between parents relates to the amount of time young children spend or could spend with digital technologies - in detriment of other forms of leisure, play and socialization that parents also value. As we saw above the response to this concern is to regulate children's schedules or implement family rules that directly or indirectly regulate for children the time they spend with digital media and technologies. As the shared expectation is that in the future children's engagement with these devices will increase (and parents foresee that it will reach a peak and dominate their interests when they enter adolescence), one suggestion is to start to foster forms of self-regulation in young children. We have seen how some families have developed their own strategies to start to do this, such as organizing activity schedules that tie digital technologies to completing other activities which children themselves can monitor. Thus it would be interesting for families themselves to explore and share what strategies families are putting in place to facilitate children's self-regulation, how they work and under what conditions, in order to move forward children's self-regulation. Having said this, and acknowledging that "regulation" is a concern expressed by families themselves, there are at least two observations that need to be made in relation to this.

(1) Our results show that Spanish young children tie digital technologies primarily to their leisure and play time. Thus, during these early years efforts to regulate children's use of digital technologies are in fact efforts to regulate children's play - the domain that has been traditionally seen as the more autonomous domain of children's lives where adult intervention is often seen as interference. Probably, in later years, the need for regulation will be tied to increasing demands from school and other responsibilities (or perceived risks in digital technologies) but for the age-range of children it is primarily tied to the type of play and free time parents would like to promote in their children.

(2) Digital technologies and media change rapidly and, thus, it is more than probable that the young children we have studied will encounter and engage with new technologies during the course of their childhood and their future teenage years. With this in mind, the perceived risks and opportunities of digital media that parents have construed may be different or cease to be relevant as these young children grow up. Therefore, parents should also acknowledge that any regulatory strategy (and the concerns that support it) should be seen as provisional and open to revision. For example, many parents set up oppositions between sedentary digital play and physical activity, individual use of digital technologies versus other forms of childhood socialization, outdoor play and indoor use of digital devices and many of these descriptions are based on how their children use digital tablets. However, if digital "wearable" technologies continue to expand and grow and find their way into children's lives, for instance through leisure and play applications designed for "wearable" devices, many of these oppositions and concerns might break down (and be replaced by others).

Another issue that could be worked through with parents and families is tied to how several of the participating families organize children's connectivity/online experience. We have seen that a group of parents control the devices that children use in such a way that access to the Internet or the online features of the devices and applications are inhibited. While this

arrangement facilitates children's autonomous use of digital devices and provides a sense of security to parents it does so at the cost of sacrificing perhaps the quintessential feature of current digital media (online connectivity) and simply delays children's online experiences. From our perspective, this arrangement could be rethought and parents should be given opportunities to think through more carefully the experiences they are constraining in their children with the technical setup they create for their children. Yet, as parents' decision to limit access to the Internet is tied to perceived risks, alternative strategies must also respond effectively to these concerns.

Finally, given in part the above considerations, our results indicate that in large part children's engagement with digital technologies in the family is an individual experience. Children interact on their own with their preferred devices (tablets and portable game players) and mostly to use applications and games that do not involve interaction with other children/users through the devices. This does not mean that children primarily lead "solitary" lives; parents and children report many other activities in which they play together and interact with one another but these are construed as non-digital (outdoor play, playing with constructions, arts and crafts, etc.). For example, interestingly, most families report preferring sharing children's literature and books in the "traditional" way, rather than through e-books or digital storytelling applications. Therefore, there is much room to explore and promote ways in which children and adults can share activities around digital devices and applications expanding the scope of children's digital experiences at home. Here the logic should be additive: these joint uses should happen alongside, rather than instead of, other forms of non-digital joint activity. They should also acknowledge and value (as parents do) children's autonomous use of digital devices.

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## Annex A: DIGCOMP framework grid

| Basic user   |          | Independent user   |          | Proficient user  |          |
|--|----------|--|----------|--|----------|
| I can look for information online using a search engine.   | 1<br>BU  | I can use different search engines to find information. I use some filters when searching (e.g. searching only images, videos, maps).  | 1<br>IU  | I can use advanced search strategies (e.g. using search operators) to find reliable information on the Internet. I can use web feeds (like RSS) to be updated with content I am interested in. | 1<br>PU  |
| I know not all online information is reliable.   | 2<br>BU  | I compare different sources to assess the reliability of the information I find.   | 2<br>IU  | I can assess the validity and credibility of information using a range of criteria. I am aware of new advances in information search, storage and retrieval.                                   | 2<br>PU  |
| I can save or store files or content (e.g. text, pictures, music, videos, web pages) and retrieve them once saved or stored.   | 3<br>BU  | I classify the information in a methodical way using files and folders to locate these easier. I do backups of information or files I have stored.   | 3<br>IU  | I can save information found on the Internet in different formats. I can use cloud information storage services.   | 3<br>PU  |
| I can communicate with others using mobile phone, Voice over IP (e.g. Skype) e-mail or chat – using basic features (e.g. voice messaging, SMS, send and receive e-mails, text exchange). | 4<br>BU  | I can use advanced features of several communication tools (e.g. using Voice over IP and sharing files).   | 4<br>IU  | I actively use a wide range of communication tools (e-mail, chat, SMS, instant messaging, blogs, micro-blogs, social networks) for online communication.                                       | 4<br>PU  |
| I can share files and content using simple tools.  | 5<br>BU  | I can use collaboration tools and contribute to e.g. shared documents/files someone else has created.  | 5<br>IU  | I can create and manage content with collaboration tools (e.g. electronic calendars, project management systems, online proofing, online spreadsheets).  | 5<br>PU  |
| I know I can use digital technologies to interact with services (as governments, banks, hospitals, schools, libraries).  | 6<br>BU  | I can use some features of online services (e.g. public services, e-banking, online shopping).   | 6<br>IU  | I actively participate in online spaces and use several online services (e.g. public services, e-banking, online shopping).  | 6<br>PU  |
| I am aware of social networking sites and online collaboration tools.  | 7<br>BU  | I pass on or share knowledge with others online (e.g. through social networking tools or in online communities).   | 7<br>IU  | I can use advanced features of communication tools (e.g. video conferencing, data sharing, application sharing).   | 7<br>PU  |
| I am aware that when using digital tools, certain communication rules apply (e.g. when commenting, sharing personal information).  | 8<br>BU  | I am aware of and use the rules of online communication ("netiquette").  | 8<br>IU  |  | 8<br>PU  |
| I can produce simple digital content (e.g. text, tables, images, audio files) in at least one format using digital tools.  | 9<br>BU  | I can produce complex digital content in different formats (e.g. text, tables, images, audio files). I can use tools/editors for creating web page or blog using templates (e.g. WordPress). | 9<br>IU  | I can produce or modify complex, multimedia content in different formats, using a variety of digital platforms, tools and environments.  | 9<br>PU  |
| I can make basic editing to content produced by others.  | 10<br>BU | I can apply basic formatting (e.g. insert footnotes, charts, tables) to the content I or others have produced.   | 10<br>IU | I can create a website using a programming language.   | 10<br>PU |
| I know that content can be covered by copyright.   | 11<br>BU | I know how to reference and reuse content covered by copyright.  | 11<br>IU | I can use advanced formatting functions of different tools (e.g. mail merge, merging documents of different formats, using advanced formulas, macros).   | 11<br>PU |

|   |          |  |          |  |          |
|---|----------|--|----------|--|----------|
| I can apply and modify simple functions and settings of software and applications that I use (e.g. change default settings).              | 12<br>BU | I know the basics of one programming language.   | 12<br>IU | I know how to apply licences and copyrights.   | 12<br>PU |
|   | 13<br>BU |  | 13<br>IU | I can use several programming languages. I know how to design, create and modify databases with a computer tool.           | 13<br>PU |
| I can take basic steps to protect my devices (e.g. using anti-viruses and passwords). I know that not all online information is reliable. | 14<br>BU | I have installed security programmes on the device(s) that I use to access the Internet (e.g. antivirus, firewall). I run these programmes on a regular basis and I update them regularly. | 14<br>IU | I frequently check the security configuration and systems of my devices and/or of the applications I use.                  | 14<br>PU |
| I am aware that my credentials (username and password) can be stolen. I know I should not reveal private information online.              | 15<br>BU | I use different passwords to access equipment, devices and digital services and I modify them on a periodic basis.   | 15<br>IU | I know how to react if my computer is infected by a virus.   | 15<br>PU |
| I know that using digital technology too extensively can affect my health.  | 16<br>BU | I can identify the websites or e-mail messages which might be used to scam. I can identify a phishing e-mail.  | 16<br>IU | I can configure or modify the firewall and security settings of my digital devices.  | 16<br>PU |
| I take basic measures to save energy.   | 17<br>BU | I can shape my online digital identity and keep track of my digital footprint.   | 17<br>IU | I know how to encrypt e-mails or files.  | 17<br>PU |
|   | 18<br>BU | I understand the health risks associated with the use of digital technology (e.g. ergonomics, risk of addiction).  | 18<br>IU | I can apply filters to spam e-mails.   | 18<br>PU |
|   | 19<br>BU | I understand the positive and negative impact of technology on the environment.  | 19<br>IU | To avoid health problems (physical and psychological), I make reasonable use of information and communication technology.  | 19<br>PU |
|   | 20<br>BU |  | 20<br>IU | I have an informed stance on the impact of digital technologies on everyday life, online consumption, and the environment. | 20<br>PU |
| I can find support and assistance when a technical problem occurs or when using a new device, program or application.                     | 21<br>BU | I can solve most of the more frequent problems that arise when using digital technologies.   | 21<br>IU | I can solve almost all problems that arise when using digital technology.  | 21<br>PU |
| I know how to solve some routine problems (e.g. close program, re-start computer, re-install/update program, check Internet connection).  | 22<br>BU | I can use digital technologies to solve (non-technical) problems. I can select a digital tool that suits my needs and assess its effectiveness.  | 22<br>IU | I can choose the right tool, device, application, software or service to solve (non-technical) problems.                   | 22<br>PU |
| I know that digital tools can help me in solving problems. I am also aware that they have their limitations.                              | 23<br>BU | I can solve technological problems by exploring the settings and options of programmes or tools.   | 23<br>IU | I am aware of new technological developments. I understand how new tools work.   | 23<br>PU |
| When confronted with a technological or non-technological problem, I can use the digital tools I know to solve it.                        | 24<br>BU | I regularly update my digital skills. I am aware of my limits and try to fill my gaps.   | 24<br>IU | I frequently update my digital skills.   | 24<br>PU |
| I am aware that I need to update my digital skills regularly.   | 25<br>BU |  | 25<br>IU |  | 25<br>PU |

## Annex B: Flyer for the recruitment of families in Madrid



### **Infancia (0-8) y Tecnología Digital** **Young Children (0-8) and Digital Technology**

#### **INVITACIÓN A PARTICIPAR EN UNA INVESTIGACIÓN**

El centro de investigación *Joint Research Center* de la UE está coordinando una investigación sobre el uso e impacto de las tecnologías digitales en niños y niñas de menos de 8 años de edad. Se trata de una investigación comparativa entre varios países de Europa que persigue generar recomendaciones prácticas y de investigación en torno a la presencia y uso de medios digitales en la infancia dentro de la Unión Europea.

Buscamos familias interesadas en colaborar en esta investigación. El requisito es tener al menos un hijo/a entre 6-7 años dispuesto a participar en el estudio. El procedimiento de la investigación implica una o dos visitas al hogar y la realización de entrevistas individuales con padres/madres e hijos/as y algunas conversaciones conjuntas. La recogida de datos en una o dos visitas puede durar en total entre 1,5-2,5 horas.

Si estás interesado/a en colaborar en este estudio y/o necesitas más información para tomar una decisión por favor contacta con:

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## Annex C: Questionnaire

Cuestionario para las familias. Infancia (0-8) y Tecnología Digital.

Muchas gracias por participar en nuestro estudio. Para completar la entrevista, ¿podrías por favor facilitarnos la siguiente información?

### 1. Ingreso bruto anual de la familia<sup>18</sup>

- Por encima de € 18.000 al año
- Entre € 13.500 y € 18.000 al año
- Entre € 9600 y € 13.500 al año
- Debajo € 13.500 al año

### 2. Nivel de estudios más alto de los padres o tutores

|  |  |
|--|--|
| Padre/madre/tutor/tutora 1:<br>(relación con el niño entrevistado) | Padre/madre/tutor/tutora 2:<br>(relación con el niño entrevistado) |
| • Sin escolarización   | • Sin escolarización   |
| • Educación Primaria   | • Educación Primaria   |
| • ESO  | • ESO  |
| • Bachillerato   | • Bachillerato   |
| • Formación Profesional (Especifica FPB, FPM, o FPS)<br>_____      | • Formación Profesional (Especifica FPB, FPM, o FPS)<br>_____      |
| • Certificado universitario (Especifica:<br>_____)                 | • Certificado universitario (Especifica:<br>_____)                 |
| • Licenciatura (Especifica la carrera:<br>_____)                   | • Licenciatura (Especifica la carrera:<br>_____)                   |
| • Máster (Especifica : _____)                                      | • Máster (Especifica : _____)                                      |

<sup>18</sup> We have adapted the amount depending on the family composition of each family following the calculation of Eurostat (2015).

|                                  |                                  |
|----------------------------------|----------------------------------|
| • Doctorado (Especifica: _____ ) | • Doctorado (Especifica: _____ ) |
|----------------------------------|----------------------------------|

**3. Situaciones de empleo de los padres o tutores**

|  |  |
|--|--|
| Padre/madre/tutor/tutora 1: _____<br>(relación con el niño entrevistado) | Padre/madre/tutor/tutora 2: _____<br>(relación con el niño entrevistado) |
|  |  |

**4. Edad y origen étnico de todos los miembros de la familia entrevistados**

| Miembro de la familia | Edad | Origen étnico |
|-----------------------|------|---------------|
|                       |      |               |
|                       |      |               |
|                       |      |               |
|                       |      |               |
|                       |      |               |