What are the characteristics of "good" apps for young children? Perceptions of industry stakeholders

Patrícia Dias*

* CECC/CRC-W, Universidade Católica Portuguesa (pdias@ucp.pt)

Abstract

Young children have become keen users of mobile digital devices. The "hAPPy kids" project mapped the views of different stakeholders - parents, children and industry - on the characteristics of "good" apps - that is, safe and beneficial for the development of children - and on the criteria for selecting and developing them. This article presents the perceptions of industry stakeholders such as digital content developers and broadcasters, policy-makers, and experts from the fields of Education and Psychology, gathered from 17 interviews with a purposive sample. They are aware of the demands of parents - learning and safety - and of children - fun and entertainment. They try to address both, and also value technical aspects of user experience.

Keywords: Young children, digital media, mobile media, apps, practices, perceptions, development

Resumo

As crianças pequenas tornaram-se utilizadores hábeis dos dispositivos digitais. O projeto "hAPPy kids" mapeia as visões de diferentes stakeholders - pais, crianças e indústria - sobre as características de "boas" apps - ou seja, seguras e benéficas para o desenvolvimento das crianças - e sobre os critérios que usam para as selecionar e desenvolver. Este artigo apresenta as percepções dos stakeholders da indústria tais como criadores e difusores de conteúdos digitais, reguladores, e peritos nas áreas da Educação e da Psicologia, recolhidas através de 17 entrevistas a uma amostra intencional. Eles estão conscientes das exigências dos pais - aprendizagem e segurança - mas também das preferências das crianças - diversão e entretenimento. Tentam conciliar ambas, preocupando-se também com os aspetos técnicos da user experience.

Palavras-chave: Crianças pequenas, media digitais, dispositivos móveis, apps, práticas, percepções, desenvolvimento

Introduction

Currently, digital devices such as smartphones and tablets are widely used by children from a very early age (Cristia & Seidl, 2015; Marsh et al., 2015; OfCom, 2017; Rideout, 2017). They start experimenting with their parents' smartphones very early, and many children have their own personal tablet. Their favourite activities are playing games and watching videos on YouTube, and several children own personal mobile devices (Chaudron et al., 2015; Chaudron, di Gioia & Gemmo, 2018; Dias & Brito, 2018a, 2018b).

On the one hand, these practices are driven by a dynamic industry that is developing digital content for young children. On the other hand, parents are facing the challenge of mediating these practices, and often fear negative consequences such as addiction and exposure to online dangers. At this early stage of children's lives, parents play an important role as mediators of their access to the online world and of their digital practices (Livingstone, Mascheroni & Staksrud, 2017; Valcke, Bonte, Wener & Rots, 2010). Not only do they define the rules of access and use of digital media, they also set an example for children. This mediation raises doubts and dilemmas for parents, as they are confronted with choices about which digital content is best for their children, fuelled by mixed perceptions about opportunities and risks: parents acknowledge potential for learning and development but fear online risks and negative consequences in health and wellbeing, such as addiction, underdevelopment of social skills, sleep disorders and obesity (Livingstone, Haddon, Gorzig & Ólafsson, 2014; Livingstone, Blum-Ross, Pavlick & Ólafsson, 2018). Thus, they oscillate between restrictive and enabling parental mediation actions (Dias et al., 2016; Livingstone, Mascheroni & Staksrud, 2017; Livingstone, Ólafsson, Helsper, Lupiáñez-Villanueva, Veltri & Folkvord, 2017; Nikken & Schols, 2015; Zhao, Lyngs & Shadbolt, 2018), attempting, to the best of their ability, to manage the screen-time and digital practices of their children.

Young children are considered more vulnerable to online risks because they are still developing media literacy, particularly when it comes to recognizing the technical implications behind certain practices - such as data collection and privacy invasion - and also the persuasive nature of promotional content - such as advertising and influence marketing (Brito, 2017; Kumar, Naik, Devkar, Chetty, Clegg & Vitak, 2017; Minkus, Liu & Ross, 2015; Reyes et al, 2015). The United Nations Convention on the Rights of the Child (1989) states that children are to be protected from online risks, but at the same time they should be provided with skills to navigate the digital world and should participate in it, and this view is reiterated by recent research on the topic (Livingstone, 2008; Livingstone & Third, 2017; Third, Bellerose, Dawkins, Keltie & Phil, 2014). It is not just up to parents to find a balance between these rights, but also to the industry of digital hardware, software and content development and broadcasting, and also to marketing and advertising, and to experts and policy-makers (Broekman, Piotrowski, Beentjes & Valkenburg, 2018; Nesset & Large, 2004). Plus, young children themselves should also have a voice in this debate (Livingstone, 2008; Livingstone and Third, 2017), which is possible if the industry adopts a user-centred approach, incorporating children into the design and development processes, taking into account their needs and preferences (Broekman, Piotrowski, Benntjes & Valkenburg, 2018; Nesset & Large, 2004).

The hAPPy kids project

The project "hAPPy kids: Criteria for assessing and selecting beneficial and safe apps" was developed in Portugal between 2017 and 2019, and set out to explore the perspectives of parents, children and industry stakeholders on the characteristics of "good" apps and the criteria that each of these groups uses for selecting them. It encompassed three empirical stages, following a research design that aimed to include all stakeholders involved in the phenomenon under study, and also triangulate the results. The first stage was an online survey to 1955 parents of children under 8 years old, the second stage included visits to 81 families with children under 8 years old (including separate interviews to parents and children), and the third stage consisted of in-depth interviews to 17 industry stakeholders and experts connected to the development and production of digital content for young children.

In this paper, we report on the perspective of the industry stakeholders.

As main findings from the previous stages (Dias & Brito, 2018a; Dias & Brito, 2018b), we highlight that parents and children expressed contrasting perspectives about what a "good" app is. Parents value safety and they believe that the best apps are the ones that scaffold learning. However, they have quite a strict understanding of "learning", as they associate it mostly to topics of the school curricula, and often do not acknowledge learning about other topics or the development of other skills as valuable. Concerning dangers, they are most worried about addiction and negative effects of excessive use on health and behavior (e.g. sleep disorders, hyperactivity, obesity, underdevelopment of social skills), which they try to avoid or mitigate through restrictive parental mediation actions focused around limiting screen-time.

Children, on the other hand, are not very aware about the risks that digital media may pose, as they report that most parents have not addressed this topic with them yet. Concerning learning, they enjoy it a lot, as long as it is related to activities different from schoolwork. For them, digital media are a source of fun, entertainment and play. In addition, they enjoy co-using with their parents a lot, but complain that they often dislike the apps that are suggested by their parents, which are usually similar to schoolwork activities. Technical issues related to user experience are mentioned both by parents and children as important in a "good" app, but not fundamental.

Selecting "good apps" for young children

Different scientific fields have contributed to the discussion about to which extent digital devices and content can be beneficial or harmful for the safety, development and wellbeing of young children. In this section, we present a brief overview of established criteria on the subject.

Education studies contribute with the centrality of the development of the child - quality digital content should be adequate to the age and both cognitive and psychomotor development of children. Thus, the interface should be adequate to capabilities and skills, and the content and activities should address the interests of children in order to scaffold their development (Crescenzi-Lanna, 2010; Guernsey & Levine, 2015). But this is not always the case: Crescenzi-Lanna and Grané-Oró (2016) analysed over 100 educational apps for young children and found poor quality and adaptation to child development, complex design and user experience with unnecessary features, a hegemony of curricular content in detriment of

learning dimensions linked to socio-affective, artistic, creative and knowledge-building aspects, as well as stereotypes.

In Media Studies, based on the EU Kids Online project (Hasebrink, Livingstone & Haddon, 2008), Livingstone (2008) proposed a model for evaluating positive online content that considered two criteria: a) promoting the development of children in several dimensions such as learning, creativity, participation and identity; and b) promoting the participation of children, who could be receivers of content, interact with content or create content. Thus, for content to be classified as positive it should present development opportunities for children, encouraging them to go beyond their current skills and abilities. On the other hand, the criteria for classifying content as harmful are jeopardizing the safety of children, exploiting them, or being false or misleading. Livingstone (2008) also acknowledges that, even if it is possible to agree on abstract criteria for identifying positive content for young children, their application to specific cases is complex, and sometimes inconclusive.

Subsequently, an European Network for the Promotion of Positive Online Content (POSCON) was formed and carried out further research on the criteria for creating and selecting "good" content (de Reese, Pijpers, Behrens, Klahn & Tatsch, 2014), leading to a new systematization by Livingstone (2014), this time considering three main criteria: a) generating benefits from children (supporting imagination, self-expression, participation, development; not having harmful characteristics); b) attractiveness (quality, creative, enriching, representative of the children's perspective and experiences; not being boring, stereotypical of representative of the norms of adults); and c) usability (navigation, user experience, accessible, design, transparent, available in mother tongue of children).

Another contribution on this topic are the criteria proposed by Wartella and Jennings (2000): digital content for children should be guided by diversity, accessibility, interactivity, education, quality, creativity and safety. The National Literacy Trust has an Apps Literacy project, and in this scope proposes that the selection of apps should be based on the inclusion of at least two of a set of criteria - fun, cause, interactivity, activities, creativity and appropriation - and on the adequacy of the content to the children's age and the intended learning objectives (such as attention, comprehension, speaking, reading, and writing).

Guernsey and Levine (2015) give tips to parents, summarized in 4 Cs: 1) child - has to have fun and identify with the content; 2) content - has to be appropriate for the child and provide learning; 3) community - has to reflect the child's context; and 4) context - has to ensure that the child balances the time spent online and offline. The authors also add the top 3 elements to avoid online: 1) violence; 2) gender and ethnic stereotypes; and 3) pop-up advertising and sales promotion.

The diversity of criteria, perspectives and approaches involved in the discussion of this topic call for further research, and also for an integrated approach. In previous stages of the hAPPy kids project, we concluded that, when selecting apps for young children, parents value their educational potential and safety the most, while the children themselves seek fun and entertainment (Dias & Brito, 2018a, 2018b). In this article, we report on the industry stakeholders' varied perspectives.

Methodology

The hAPPy kids project included three data collection stages, and in this article we report exclusively on the third one, which was the stakeholders' auscultation, following a similar methodology to Livingstone (2008), when defining "positive" online content.

Our approach is exploratory and qualitative, and the data collection technique used on this stage was in-depth interviews to a purposive sample of 17 industry stakeholders (Courtney, 2017; Hill & Hill, 2008), selected based on their professional relationship with the industry of digital content for children production and dissemination, and on their expertise. The interviews followed a semi-structured script which had as theoretical grounding Livingstone's (2008, 2014) conceptualization of positive content (including the four dimensions of children's development and their level of interaction with the content) and POSCON's (de Reese, Pijpers, Behrens, Klahn & Tatsch, 2014) checklist for positive content, which establishes 12 criteria that digital content must meet in order to be considered positive for children. They were conducted between February and May 2018, lasting about 45 minutes to 1 hour each, and the audio was recorded.

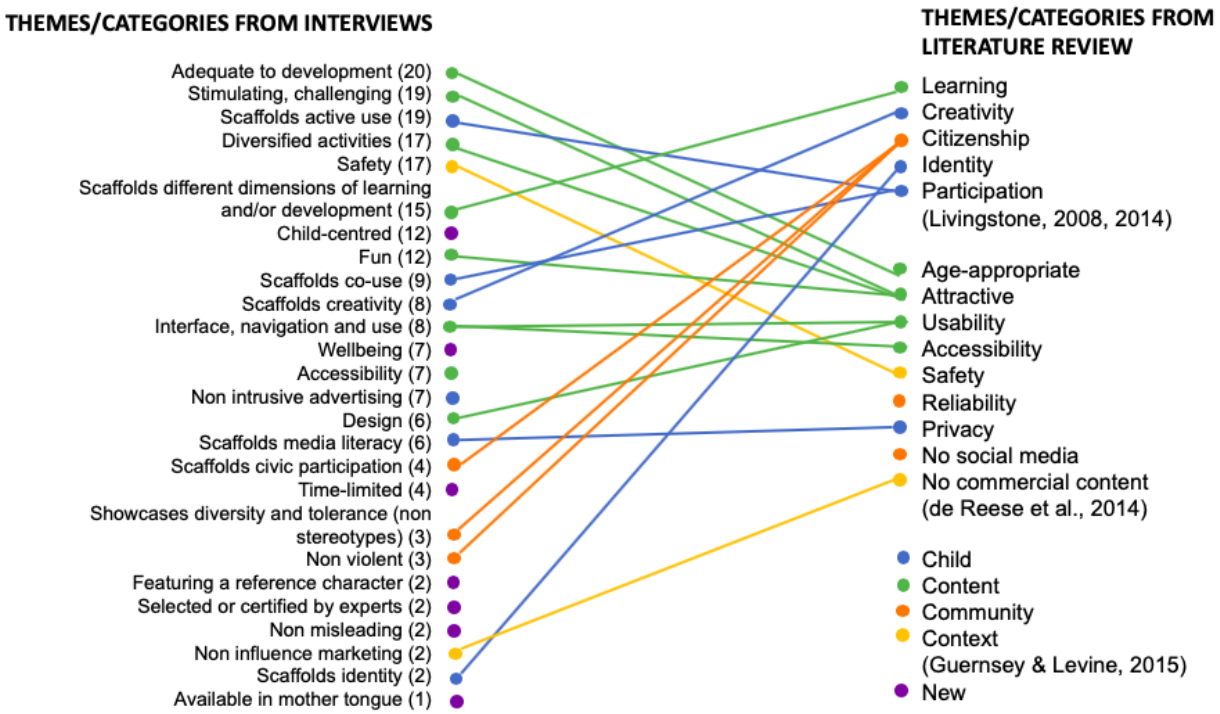
After informing the participants about the research goals and protocol, we asked them permission to collect some personal data, such as their name and job, as these were relevant for attesting their condition as relevant stakeholders and experts and for justifying their inclusion in our sample. We also asked permission to record audio during the interviews, ensuring them that the raw data would be deleted after transcription and coding and that this data would only be used for academic purposes. These permissions were registered in a signed consent form.

Concerning data analysis, the audios were transcribed and later deleted. As data analysis technique, we conducted a thematic analysis (Boyatzis, 1998; Creswell & Poth, 2017; Guest, McQueen & Namey, 2011; Miles, Huberman & Saldaña, 2013) with two phases: a) first we conducted a preliminary reading of the interviews and identified categories of analysis that emerged, mapping all the topics mentioned by the interviewees and isolating excerpts as units of analysis; b) then we compared our coding categories with the criteria for evaluating apps that are mentioned in the literature review (de Reese, Pijpers, Behrens, Klahn & Tatsch, 2014; Guernsey & Levine, 2015; Livingstone, 2008, 2014). and c) we "cleaned" our coding categories, eliminating duplicates and joining similar criteria, in order to produce a final set of coding categories. The identification, delimitation and classification of the units of analysis was based on the inclusion of keywords corresponding to the coding categories, but also on a more qualitative approach, which considered the meaning and context of the excerpts. For this analysis, we used NVivo Software, version 12.

After organizing the units of analysis according to the categories, we observed a correspondence between the topics mentioned by our interviewees and the criteria proposed by the literature, particularly by Livingstone (2008, 2014) and de Reese, Pijpers, Behrens, Klahn & Tatsch (2014). We concluded that the 4 Cs framework suggested by Guernsey & Levine (2015) is broader in its scope, and it was a valuable tool for organizing all the categories. In Figure 1, we present the topics that emerged from our initial coding and the number of units of analysis found for each category, and also the correspondence with the criteria

suggested by the theoretical models used, organized according to the 4 Cs framework by Guernsey and Levine (2015).

Figure 1: Categories for thematic analysis and number of units of analysis for each, organized according the 4 Cs model by Guernsey and Levine (2015)



Sample

For this stage of our study, we selected a purposive sample of industry stakeholders and experts (Emmel, 2013), aiming to obtain the greatest variety possible of narratives and perspectives on our topic. We focused on what we labelled as "internal" stakeholders, that is, developers of digital hardware, software and content, producers and broadcasters of digital content. In addition, we tried to complement their perspective with contributions from what we labelled "external" stakeholders, that is, experts from contiguous fields and activities, who play an important role in this phenomenon, namely governmental entities with regulatory role, other policymakers, children's rights activists, and experts from relevant academic fields such as paediatrics, psychology, education and media literacy. We describe our sample on Table 1.

Table 1: Description of our purposive sample

Internal Stakeholders		**External Stakeholders**	
Name	**Job and Expertise**	**Name**	**Job and Expertise**
Hugo Ribeiro	CEO of MagikBee; Expert in development of hardware and software for young children	Teresa Pombo	Ministry of Education; Expert in K12 Education
Rodrigo Carvalho	CEO of NutriVentures; Expert in digital content for young children	Guilhermina Miranda	Psychologist; Scientific researcher on child development
Inês Lourenço	Digital Marketing, Communication and PR Manager of Science4You; Expert in Children's Marketing	Tomás Lacerda	Police Officer of the programme Safe Schools; Expert in online safety
Lígia Azevedo	Division of Technological Educational Resources of the Ministry of Education; Expert in online safety	Paulo Dias	Police Officer of the programme Safe Schools; Expert in online safety
Susana Tavares	Division of Technological Educational Resources of the Ministry of Education; Expert in online safety	Sara Teixeira	Police Officer of the programme Safe Schools; Expert in online safety
Fernando Franco	Division of Technological Educational Resources of the Ministry of Education; Expert in digital educational resources	Pedro Teixeira	CEO of coding school Happy Code; Expert in teaching coding to young children
Tito de Morais	CEO and founder of an online safety promotion website; Expert in online safety and children's rights activist	Ivone Patrão	Psychologist; Expert in young children's addiction to digital media
Pedro Marques	Governmental agency Safe Internet Centre; Expert in digital resources for promoting online safety	Joana Batista	Coordinator of the 1st cycle of Basic Education at Park International School; Expert in using digital technologies in Education
Jorge Ruano	Programming Director of Children's TV Channel Panda; Expert in broadcasting and programming (TV and digital)		

Results and Discussion

All stakeholders share a common framework for addressing our questions about criteria for evaluating (and for developing) "good" digital content for young children - they conceptualize our society as a "digital age", where digital media are a part of the quotidian of families. Children are naturally predisposed to use and explore digital media and these are attractive for them because of the high-paced entertainment and stimulation they afford.

The stakeholders also acknowledge the important role of parents as mediators, and believe that, out of ignorance, fear or uncertainty, most parents enforce restrictive actions. However, they do not agree, arguing instead that co-use and monitoring are the best strategies for harvesting the potential benefits of digital media – as does academic research (Dias et al., 2016; Livingstone, Ólafsson, Helsper, Lupiáñez-Villanueva, Veltri & Folkvord, 2017; Ponte, Simões, Batista & Jorge, 2017). They aim to address the parents' preference for educational content, but agree that children are their primordial target, and they want to conquer them by offering attractive, fun and enriching content that generates engagement between children and their brands.

Concerning our thematic analysis, after the preliminary reading for identifying emerging coding categories and its comparison with the criteria featured in our literature review, we concluded that the 4 Cs suggested by Guernsey and Levine (2015) were a relevant framework for organizing our data.

Child

The stakeholders showcase a common child-centred mindset, claiming that the most important feature of "good" apps is promoting the wellbeing of children, which often translates as being fun, entertaining, challenging, stimulating and visually attractive, as Teresa Pombo from the Ministry of Education states, *"an application that contributes to make the children feel better about themselves, happier, whether studying, playing games, developing all kinds of skills, can be considered positive".*

A "good" app should also be enriching, and stakeholders display a broader understanding of "learning" and "development" than parents, who tend to focus on school curricula knowledge and competences (Dias & Brito, 2018a, 2018b). Guilhermina Miranda, psychologist expert on child development, is critical of this restrict association between learning and school curricula, acknowledging that young children spend long hours at school and need more free time to play and be creative, thus scaffolding learning of different skills and competences. Lígia Azevedo and Fernando Franco, from the Division of Technological Educational Resources of the Ministry of Education, argue that digital content can enhance learning by making it fun. Tito de Morais, expert in online safety and children's rights activist, adds that "*adults become boring because we stop playing!* (...) *apps that make the connection between ludicity and learning are the ideal, making learning playful*". The same view echoes in the digital content industry. Hugo Ribeiro, CEO of start-up MagikBee, claims that it is important to "*think from the perspective of children*" and "*create content and experiences which are familiar and meaningful to them*", adding that "*by teaching children from their own perspective, they will understand better what they are learning, instead of using boring content, non-adapted to children*". Rodrigo Carvalho, CEO of Nutriventures, presents his *motto* - "*if you want to educate,*

you have to engage" – and claims that playing with digital media is a positive experience for children, thus having the potential of, by connecting play to learning, turning learning into a positive experience too.

Industry stakeholders and other experts also share the view that children should have an active role in interacting with apps. For Inês Lourenço, expert in children's marketing, "*the participation of children is key for developing competences*", Pedro Marques states that "good" apps "*don't limit the child to being a receiver, they stimulate the creation of new content in a creative way*", Teresa Pombo stresses creating content is a "*pleasurable activity for children*", and Jorge Ruano, from Head of programming of Children's TV channel Panda adds that "*for a child, to realise that they created something, is the best that can happen on an app*". Pedro Marques states that "good" apps "*don't limit the child to being a receiver, they stimulate the creation of new content in a creative way*" and Teresa Pombo stresses that creating content is a "*pleasurable activity for children*". Pedro Teixeira, CEO of the coding school Happy Code, tells us how he observes "*their [the children's] eyes sparkle when they realise they were able to create something new in their Minecraft game, something exclusive, that other players don't have, and that the friends next to them also created cool stuff. They are proud to show their parents what they created*". For most stakeholders, scaffolding creativity and critical thinking is key in a "good" app.

However, Ivone Patrão, psychologist, highlights that content creation must be imbalanced with safety. Tito de Morais agrees, giving the example of creating a video and posting it on YouTube. It is an activity that stimulates competences in different developmental dimensions, but also exposes children. Thus, the right to participation must be paired with the provision of literacy and skills that enable an autonomous, conscious, critical and responsible use, thus ensuring safety. Tomás Lacerda, Police Officer of the programme Safe Schools, agrees that "*we shouldn't limit autonomy, and risk is also part of it. There has to be the ability to manage that risk so that children know what to do*".

Content

Industry stakeholders and psychologists agree and emphasize that "good" apps must be suitable for children's age and development. Rodrigo Carvalho highlighted the importance of not including written information in content for children who haven't learned how to read and write yet. Pedro Marques, from the governmental agency Safe Internet Centre, believes that creating modular solutions in which children can insert their age and access differentiated content are an interesting solution. However, Guilhermina Miranda warns that evaluating to which extent contents and interfaces are suitable according to age is complex and unreliable, as children of the same age may be in distinct development stages and rhythms.

Regarding content, all stakeholders agree that "good" apps promote the development of children in a holistic way. They are aware that parents associate "educational" to school curricula, but they believe that apps have the potential to scaffold a panoply of other aspects. Lígia Azevedo, Pedro Teixeira and Hugo Ribeiro mention the set of skills for the 21st century proposed by UNESCO (1996), among which social skills, critical thinking and creativity. Guilhermina Miranda adds that "*the richness of an app comes from the diversity of content and activities it holds, so that it can develop different skills*". Tito de Morais claims that a diversified app is "*more engaging, stimulating, challenging and motivating*" for children. However, both Lígia Azevedo and Susana Tavares, from the Ministry of Education, use the term "pollution" to refer to over-stimulation

that may distract children from the pedagogical goals of the app, and believe that this should be avoided.
Concerning technical issues such as design, interface and navigation, the stakeholders consider that accessibility is essential, not only for children with disabilities or learning difficulties, but to all children. An obvious aspect is not using written information for children who don't know how to read or write yet. Another aspect mentioned by Ivone Patrão is being available in the mother tongue of the users. Pedro Marques and Hugo Ribeiro emphasize the importance of simplicity in the design and the interface, so that children can be autonomous in their exploring, and refer the use of multimedia elements as a solution for enhancing accessibility (for example by adding voice descriptions, using sounds to indicate correct and incorrect actions). Susana Tavares believes that, if accessibility is considered from the start in the development of digital content, it has the potential to close gaps and afford opportunities to minorities, not only with disabilities but also of different ethnicities and socioeconomic status. Fernando Franco adds that all apps for children should be free to prevent gaps caused by socioeconomic status.
In order to enhance the attractiveness of an app, most stakeholders mention the use of multimedia stimuli (particularly video), simplicity of interface and quality of design. Jorge Ruano explains that "*if the mechanics of the game is too difficult, younger children tend to give up playing*", and adds that "*we need to remember that they are using smartphones or tablets to play, and in those devices, sliding and touching is the easiest*".
Concerning content, Tito de Morais adds that humour is important and Jorge Ruano considers that including "reference characters" that children already know and enjoy from TV or toys is very effective in attracting their attention, as children identify with the characters and have emotional and affective connections to them. Hugo Ribeiro believes that augmented reality and virtual reality hold great potential and will become standards of digital content for children in a near future, and Jorge Ruano declares that TV channel Panda already offers content with augmented reality and is working on widening such offer. For Pedro Marques, smart toys will enhance the digital practices of young children, particularly their exposure to the internet, and considers that smart toys have great potential for scaffolding several dimensions of the development of children.
Although most stakeholders work to enhance the attractiveness of their products and offers, the most connected to the industry reveal ethical concerns about excessive screen-time and its possible negative consequences. Hugo Ribeiro and Rodrigo de Carvalho include time-limit warnings in the digital content they created - in the case of MagikBee is set by parents, for Nutriventures it is 2 hours a day.

Community

When it comes to the connection between children and their close community, the stakeholders highlight the importance of promoting co-use between children and parents. Tito de Morais and Fernando Franco advocate co-use as an important preparation stage for children to become autonomous in the digital environment. Teresa Pombo claims that co-use strengthens affective bonds between family members, and helps them find common interests, "*the positive of apps can also come from the bonds they can establish or strengthen between generations, children, parents, grandparents. Wellbeing can come from this, from what the app provokes in terms of relationship and dialogue*".
Joana Batista, Coordinator of the 1st cycle of Basic Education at Park International School, tells us about

using digital media collaboratively in class, and believes that it "*strengthens the bond between each child and the teacher, and also among peers*". Thus, co-use and collaboration are beneficial for children, not only with the closest family, but also with a wider community.

The stakeholders outside the Education sphere believe that parents and teachers often don't know how to use apps correctly, or how to best harvest their potential. Tito de Morais and Pedro Marques advocate that apps should include an "information to parents" section. Susana Tavares agrees that there is no shortage of digital educational resources, so much so that teachers need a "guide" to help them "*choose the best app for each pedagogical goal, and for the profile of each student*".

The stakeholders also emphasize the importance of scaffolding citizenship and ethics that will help children become responsible and participative citizens. Pedro Marques and Ivone Patrão also mention diversity and tolerance, as many apps unfortunately perpetuate stereotypes, and argue that media literacy itself could be scaffolded by apps.

Finally, the stakeholders agree that "certifications" may help parents and children in their selection. Often, brands play a key role, as parents trust brands with good reputation and children trust characters that they know and like. Industry and marketing stakeholders agree that the classifications attributed by app stores are unreliable, as well as filters and parental control, and believe that human evaluation is indispensable. Joana Baptista believes that schools have a strategic role in this mediation, as parents usually trust digital content that is recommended by teachers. Guilhermina Miranda states that experts in different fields such as psychology, education, paediatrics and cognitive sciences should be involved in app development, as "*developing apps requires a diversified set of competences that cannot be found just in one person, only several and diversified people working together as a team can develop interesting digital content*", and Hugo Ribeiro reveals that MagikBee works with a panel of experts, mostly teachers.

Context

Finally, concerning the wider context, the stakeholders are unanimous in referring safety as a top priority. Ivone Patrão alerts to several dangers, underlining violent content, contact with strangers and exposure of privacy. Pedro Marques adds the commercial exploitation of data, and stresses that apps shouldn't be misleading, for instance featuring advertising that will drive children online, outside of the app, to environments where they can be exposed to more risks. Also, as children enjoy YouTube videos a lot, both Ivone Patrão and Pedro Marques highlight the pervasiveness of influence marketing that may not be perceptible to children. These types of undesirable features of apps can only be avoided if developers are committed to being ethical and not including such features, which Hugo Ribeiro and Rodrigo de Carvalho strive to do daily. Tito de Morais adds that parental consent should be required more often, for instance, for installing apps, even free, that are rated over 16 years old.

Conclusion

Our study emphasizes that stakeholders connected to the development and broadcasting of digital content for young children are informed about state of the art debates and concerns in their field, and strive to create "good" apps.

For an app to be "good", it must correspond to a set of requirements that are focused on children, but also consider their involvement in their community, and in a wider society (Guernsey & Levine, 2015). Although aware of the importance of parental mediation, the stakeholders disagree with the dominant view among parents, who restrict screen-time and activities more than engaging in co-use, and value school-related activities over play and fun. They believe that fun is essential for the wellbeing of children and has the potential to enhance their development holistically. Quality and simplicity are key in the user experience, and the development process should include children of the targeted age, as well as experts from different scientific fields. Above all, "good" apps are "born" out of an ethical commitment to rejecting practices that, although effective or profitable, may endanger children.

The "hAPPy kids" project aimed to reflect upon the criteria that are suitable for evaluating apps for young children, and the features that should be valued and avoided in order to help parents, children, education professionals, industry stakeholders and policy-makers make informed and ethical choices, thus promoting the application of ethical guidelines in the market in order to reinforce the production of safe and beneficial apps for young children. Although the internal and external industry stakeholders' perspectives portrayed in this study are generally positive, child-centred, committed to children's rights and ethical, researchers and readers must take into account that we are dealing with self-reported data. Although the interviewed stakeholders believe they have a positive agency in this process, they all reveal concern about negative industry and marketing practices, and lack of media literacy, both in parents and children. The promotion of media literacy on the side of users, and of ethical guidelines on the side of developers, broadcasters and policy-makers, is key for reaching the desired balance that affords young children the full protection of their rights, emphasizing protection, participation and provision in the digital environment (Livingstone & Third, 2017; Lupton & Williamson, 2017).

Bibliographical references

Boyatzis R (1998) *Transforming Qualitative Information: Thematic Analysis and Code Development*. Sage, London.

Brito R (2017) *FAMÍLIA.COM: Crianças (0-6) e Tecnologias Digitais* [E-book]. Labcom, Universidade da Beira Interior, Covilhã. ISBN: 978-989-654-384-6. Available from http://www.labcom-ifp.ubi.pt/livro/295

Broekman F, Piotrowski J, Beentjes H, Valkenburg P (2018) App features that fulfil parents' needs in apps for children. *Mobile Media & Communication* 6(3): 367–389.

Chaudron S, Beutel ME, Cernikova M, Donoso-Navarette V, Dreier M, Fletcher-Watson B, Heikilla AS, Kontrikova V, Korkeamaki RL, Livingstone S, Marsh J, Mascheroni G, Micheli M, Milesi D, Muller KW,

Myllyla-Nygard T, Niska M, Olkina O, Ottovordemgentschenfelde S, Plowman L, Ribbens W, Richardson J, Schaak C, Shlyapnikov V, Smahel D, Soldatova G, Wolfling K (2015) *Young children (0–8) and digital technology: A qualitative exploratory study across seven countries*. JRC 93239/EUR 27052, Publication Office of the European Union.

Chaudron S, Di Gioia R, Gemmo M (2018) *Young Children (0-8) and Digital Technology. A qualitative study across Europe*. EUR 29070. Publication Office of the European Union.

Crescenzi-Lanna L (2010) La comprensión del niño telespectador: posibilidades y límites asociados a la edad. *Comunicar* 15(29): 69-88.

Crescenzi-Lanna L, Grané-Oró M (2016) Análisis del diseño interactivo de las mejores apps educativas para niños de cero a ocho años. *Comunicar* 46(24): 77-85.

Creswell JW, Poth CH (2017) *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. Sage, London.

Cristia A, Seidl A (2015). Parental reports on touch screen use in early childhood. *PLoS One* 10(6).

Dias P, Brito R, Ribbens W, Daniela L, Rubene Z, Dreier M, Chaudron S (2016) The Role of Parents as 'Gatekeepers' of Digital Technologies: Exploring the tension between the rights of access and protection. In Coppock V, Gillett-Swan J (ed.), *Children's Rights in a 21st Century Digital World: Exploring Opportunities and Tensions. Global Studies of Childhood Special Issue* 4(6): 414-427, DOI https://doi.org/10.1177/2043610616676024

Dias P, Brito R (2018a). *Aplicações seguras e benéficas para crianças felizes. Perspetivas de famílias*. Centro de Estudos em Comunicação e Cultura, Universidade Católica Portuguesa, Lisboa. Available from https://goo.gl/8LfR4T

Dias P, Brito R (2018b) *Aplicações seguras e benéficas para crianças felizes. Perspetivas dos pais*. Centro de Estudos em Comunicação e Cultura, Universidade Católica Portuguesa, Lisboa. Available from https://goo.gl/PKdWU5.

Emmel N (2013) *Sampling and Choosing Cases in Qualitative Research: A Realist Approach*. Sage, London.

Guernsey L, Levine M (2015) *Tap, Click, Read: Growing readers in a world of screens*. Jossey-Bass, New York.

Guest G, McQueen KM, Namey EE (2011) *Applied Thematic Analysis*. Sage, London.

Kucirkova N, Littleton K, Cremin T (2017) Young children's reading for pleasure with digital books: six key facets of engagement. *Cambridge Journal of Education* 47(1): 67-84.

Kumar P, Naik SM, Devkar UR, Chetty M, Clegg TL, Vitak J (2017) No telling passcodes out because they're private?: Understanding children's mental models of privacy and security online. *Proceedings of ACM of Human-Computer Interaction* (CSCW '18 Online First), ACM. doi:10.1145/3134699

Livingstone S (2008) A rationale for positive online content for children. *Communication Research Trends 2008* 28(3): 12-16.

Livingstone S (2014) What does good content look like? Developing great online content for kids. In Whitaker L (ed.) *Children's Media Yearbook*: 66-71. Milton Keynes: The Children's Media Foundation.

Livingstone S, Haddon L, Görzig A, Ólafsson K (2014) *EU Kids Online II: A large scale quantitative approach to the study of European children's use of the internet and online risks and safety*. Sage, London.

Livingstone S, Mascheroni G, Staksrud E (2017) European research on children's internet use: Assessing the past, anticipating the future. *New Media & Society* 20(3): 1103-1122.

Livingstone S, Ólafsson K, Helsper J, Lupiáñez-Villanueva F, Veltri GA, Folkvord F (2017) Maximizing Opportunities and Minimizing Risks for Children Online: The Role of Digital Skills in Emerging Strategies of Parental Mediation, *Journal of Communication* 67 (1): 82-105. https://doi.org/10.1111/jcom.12277

Livingstone S, Third A (2017) Children and young people's rights in the digital age: An emerging agenda. *New Media & Society* 19(5): 657-670. https://doi.org/10.1177/1461444816686318

Livingstone S, Blum-Ross A, Pavlick J, Olafsson K (2018) In the digital home, how do parents support their children and who supports them? LSE, London. Available from http://blogs.lse.ac.uk/mediapolicyproject/2018/02/08/in-the-digital-home-how-do-parents-support-their-children-and-who-supports-them/

Lupton D, Williamson B (2017) The datafied child: The dataveillance of children and implications for their rights. *New Media & Society*, 19(5): 780–794. https://doi.org/10.1177/1461444816686328

Marsh J, Plowman L, Yamada-Rice D, Bishop J, Lahmar J, Scott F, Winter P (2015) Exploring play and creativity in pre-schoolers' use of apps. Available from http://techand-http://techand-play.org/reports/TAP_Final_Report.pdf

Miles MB, Huberman AM, Saldaña J (2013) *Qualitative Data Analysis: A Methods Sourcebook*. Sage, London.

Minkus T, Liu K, Ross KW (2015) Children seen but not heard: When parents compromise children's online privacy. *Proceedings of the 24th International Conference on World Wide Web*, International World Wide Web Conferences Steering Committee: 776–786.

Nesset V, Large A (2004) Children in the information technology design process: A review of theories and their applications. *Library & Information Science Research* 26: 140–161.

Nikken P, Schols M (2015) How and why parents guide the media use of young children. *Journal of Child and Family Studies* 24(11): 3423–3435.

OfCom (2016) Children and parents: media use and attitudes report. Available from https://www.ofcom.org.uk/__data/assets/pdf_file/0034/93976/Children-Parents-Media-Use-Attitudes-Report-2016.pdf

de Reese L, Pijpers R, Behrens U, Klahn S, Tatsch I (2014) POSCON Checklist and Concrete Criteria for Positive Content. POSCON Network. Available from https://goo.gl/pi82xQ

Reyes I, Wiesekera P, Razaghpanah A, Reardon J, Vallina-Rodriguez N, Egelman S, Kreibich C (2017) "Is our children's apps learning?" Automatically detecting COPPA violations. Workshop on Technology and Consumer Protection (ConPro 2017), in conjunction with the 38th IEEE Symposium on Security and Privacy.

Rideout V (2017) The Common Sense census: Media use by kids age zero to eight. Common Sense Media, San Francisco, CA. Available from https://www.commonsensemedia.org/sites/default/files/uploads/research/csm_zerotoeight_fullreport_release_2.pdf

Ritchie J, Lewis J, Nicholls CM, Ormston R (2013) *Qualitative Research Practice: A Guide for Social Science Students and Researchers*. Sage, London.

Third A, Bellerose D, Dawkins U, Keltie E, Pihl K (2014) Children's Rights in the Digital Age: A Download from Children Around the World. Available from http://www.uws.edu.au/__data/assets/pdf_file/0003/753447/Childrens-rights-in-the-digital-age.pdf

Valcke M, Bonte S, Wener B, Rots I (2010) Internet parenting styles and the impact on Internet use of primary school children. *Computers & Education* 55(2): 454-464. DOI:10.1016/j.compedu.2010.02.009.

Wartella EA, Jennings N (2000) Children and computers: new technology – old concerns. *The Future of Children* 10(2): 31-43.

Zhao J, Lyngs U, Shadbolt N (2018) What privacy concerns do parents have about children's mobile apps, and how can they stay SHARP? KOALA Project Report 1. Available from https://arxiv.org/pdf/1809.10841.pdf