How do parents select educational apps for young children?

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Abstract: Educational apps for mobile devices for young children have seen increasingly high rates of growth. As with other media, parents play a key role in young children's app selection and use. However, to date, we know very little about how parents select apps for their children. A survey was conducted with a sample of 51 parents with at least one child between 5-12 years old, who attended a science dissemination initiative called European Researcher's night in Cyprus and had their child interact with an educational app on emotion management. The survey documents parental perspectives on purchases of educational apps, including five factors that are important for parents to consider when purchasing educational apps. Findings offer important insight for the educational media production industry into how parents select educational apps for their children.

Introduction

The vast majority of children in developed countries worldwide use mobile devices today. For example, smart mobile devices have been widely adopted among parents of young children in the USA, and nearly three quarters (71%) of 2- to 10-year-olds in the USA live in a home with at least one smartphone (Rideout, 2014). Research also shows that children go online from an increasingly younger age. Over the last decade there has been a substantial increase in internet usage by children under nine years old (Holloway et al., 2013). Apps on mobile devices targeting children are therefore becoming increasingly more popular for the media production industry. Considering that parents play an influential role in young children's media selection and use (Chiong & Shuler, 2010), it is valuable for the media production industry to understand what parents are looking for in children's apps.

This study attempted to document a parental perspective focusing on educational apps based on a sample of 51 parents of children 5 to 12 years old, who attended a science dissemination initiative called European Researcher's Night in Cyprus, and had their children interact with an educational app on emotion management. The Researcher's Night is a Europe-wide public event dedicated to popular science and fun learning, that takes place each year on the last Friday in September, and in which around 30 countries and over 300 cities are involved.

The findings of the study, which include factors that are important for parents when purchasing educational apps offer important insight for the industry into how parents select apps for their children. Implications for the industry are therefore valuable for media production and educational software companies, app developers, programmers, graphic designers, instructional designers, educational technologists, media scholars, and practitioners in the field of digital media and the learning sciences, especially with respect to the development of children's educational apps that will be appealing for parents.

What we know from previous studies on parental perspectives on media

In the past decade, research attempts focused on how new forms of digital media are influencing very young children and their families and how we can deploy smart mobile devices and applications (apps) in particular, to help advance their learning. Research attempts examined the feasibility and effectiveness of using apps to promote learning among preschool- and early-elementary-aged children (Chiong & Shuler, 2010), but in general studies focusing on parents' selection of media for mobile devices are scarce.

One of the most recent studies that attempted to document a parental perspective on apps for young children was conducted by Broekman et al. (2016) and it was based on a sample of 600 Dutch parents who had at least one child between three and seven years old. Broekman et al. (2016) identified parents' most important needs that drive their selection of children's apps as well as the extent to which these needs differ by parenting style. Their results indicated five overarching parental needs when it comes to children's apps, namely the need for independent entertainment, co-education, familiarity, a tailored challenge, and to pass time.

Other studies examined frequency of use of apps by children as reported by parents (Rideout, 2014) and parental perceptions about educational apps (Chiong & Shuler, 2010), without focusing on factors that are important for parents. Rideout's (2014) study focused on media used at home by children of ages 2 to 10 in the USA, using a nationally representative survey of 1,577 parents. It attempted to quantify how much of children's media time is devoted to educational content and provided a measure of parents' experiences with the educational media their children use. They found that educational media use occurs most frequently among very young children (1 hour and 16 minutes a day among 2 to 4-year-olds), with a large drop-off in use as children get older (50 minutes a day among 5 to 7-year-olds, and 42 minutes a day among 8 to 10-year-olds). As children get older, the amount of time they spend with screen media goes up (from 1 hour and 37 minutes to 2 hours and 36 minutes a day), and the proportion that is educational goes down (from 78% to 27%). However, this study did not examine parents' reasons for selecting educational or other apps.

Another survey on parental perceptions about educational apps was conducted by HotSpex, a market research firm, by administering web-based surveys to 612 mothers and 198 fathers of at least one preschool or early-elementary-aged child in the USA (Chiong & Shuler, 2010). The survey asked parents questions regarding their practices around media and their interactions with their children around media. The study found that about three-quarters of parents do not believe that children under the age of 7 should regularly play with smart phones, and about a third of parents reported that they "rarely" or "never" interact with their child on a smart phone. When asked which media platform they believe is most educational for their child, only 1% of the parents chose "playing games on a mobile device or phone". However, researchers point out that parent perceptions may change with exposure to good educational apps.

Seven years ago, Chiong and Shuler (2010) have argued that "when it comes to smart mobile devices, many parents do not yet view them as potential learning tools-especially when compared to other technologies like computers and the Internet and thus restrict how their children use them" (p. 4). To what extent is this finding accurate today? Are parents favorable to the idea of having their young children use educational apps? Would they buy educational apps and how much would they be willing to spend? What are important factors for parents when selecting educational apps? The main aim of this study was to provide an answer to these questions, examine parents' acceptability of educational apps, specifically focusing on educational apps about emotion management, and identify factors that are important for parents when selecting educational apps.

Methodology

Research questions
1. Would parents use children's educational apps on emotion management?
2. What are important factors for parents when selecting educational apps for their children?

Participants
The participants of the study were 51 parents who attended a science dissemination initiative called European Researcher's night in Cyprus in September 2017. Their average age was 40.25 years old (SD=5.66) and 72% of parents were female. Participants reported having one to four children, with more than half of the participants reporting that they had two children (56.9%, 29/51). Almost all parents (98%, 50/51) were university graduates, while 64.7% (44/51) completed graduate studies (52.9% had a Master's degree and 11.8% had a PhD degree). Therefore the sample might not have been representative of the general population.

Data sources
The main data source of the study was a survey addressed to parents with at least one child between 5 and 12 years old, which consisted of 16 questions. These covered four areas: a) basic demographics of parents and children (5 questions), b) frequency of use of mobile devices by children (1 question), c) emotion management by children (4 questions), and d) acceptability of educational apps by parents (6 questions).

Specifically, basic demographic questions included parents' gender, age, highest educational level completed, number of children and ages of children. The frequency of use of mobile devices by children was measured using a Likert-type scale ranging from 1 (never) to 7 (daily).

Four questions focused on emotion management by children, as this aspect is relevant to the development of the educational app that was showcased (to children only) during the event. Two of these four questions examined the level and difficulty of emotion management by children and they were asked using a 5-point Likert scale ranging from completely disagree to completely agree. Another two of these four questions asked parents whether they read children's books that deal with managing emotions to their child and whether they ever consulted a child psychologist to help their child with managing emotions (worries, stress, anger, fears etc.), and they were both answered with a "Yes" or "No".

The parental perspective on the use of educational apps was measured using a total of six questions. Two of them examined whether parents have ever bought an app in general and whether parents have ever bought an *educational* app in particular. The third question focused on the acceptability of educational apps on emotion management and examined parents' intention to introduce their child to an educational app that empowers her/him to manage emotions. These three questions used a Yes/No response. The next question attempted to identify which are important factors that parents consider when deciding to purchase an educational app. Parents could select as many factors they considered as important from a total of five factors and they could also add factors they thought were important. The next question asked them to identify which one of the factors was the most important for them. Finally, an open-ended question asked parents to indicate how much they would be willing to pay for an educational app for their child.

Procedure of the study

The study was conducted in a science dissemination event, called European Researcher's night, in Cyprus. A multidisciplinary team from a SME company, Stremble Ventures Ltd., designed and developed an app for managing emotions, which was showcased to children. The app was designed to address a need identified from an exploratory review of eHealth interventions for anxiety management targeting young children and adolescents, which included the analysis of 19 technology-based treatments that demonstrated promising results in reducing anxiety (Tozzi et al., 2018). An interactive storytelling serious game app for mobile devices targeting children as young as 5 years old was designed as a prevention intervention for stress management to support children identify body signs of stress and manage stress through relaxation techniques.

The app Stremble Kids Stress Relief is a developmentally appropriate game for ages 6 to 9, but it can be used by children as young as 5 years old and as old as 12 years old. The game uses mindfulness techniques, behavioral change techniques and positive psychology principles. Its prototype currently includes five short stories (Figure 1) that help children identify emotions of happiness, sadness and anger, manage their anger, show empathy, identify body signs of stress (Figure 2) and overcome stress related to school tests, thunderstorms and meeting new friends. Children learn easy-to-perform methods to manage stress, such as a breathing exercise and a visualization exercise. They can practice performing these exercises through the app. The app also provides goals and incentives by using a superpower that children get, which is increasing, based on the number of times that children perform relaxation exercises. It is important to note that an iterative user-centered approach is used for the app development and in every step of its development, testing is performed and feedback from users, including parents and children, is solicited and used to build new features into the app. Preliminary usability evaluation results and acceptability results of a prototype of the game, which included three stories and a breathing exercise, with a small sample of 11 children were found to be promising (Nicolaidou et al., 2017). The game is offered as an Android app on Google-Play at www.kidsstressrelief.com in the greek language and it will soon be available on the Apple App Store in additional languages.
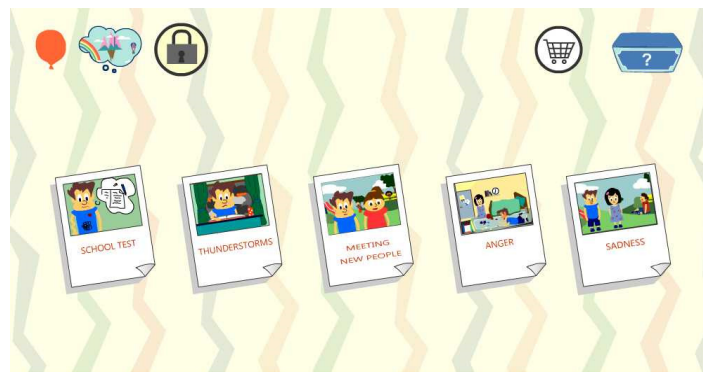
Figure 1: Screenshot of the prototype of the Stremble Kids Stress Relief app, showing five stories
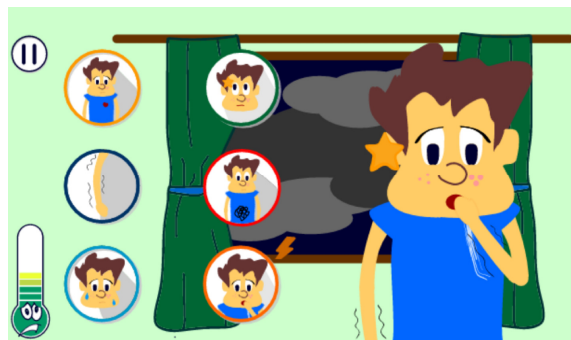

Figure 2: Screenshot of the prototype of the Stremble Kids Stress Relief app, showing body signs of stress

The app was offered for free to all children aged 5-12 who attended the Researcher's night science dissemination event in Cyprus. Children had the opportunity to interact with the app, which was installed on 8 tablets, individually, using headphones, for as long as they wanted. While their parents were waiting, they were asked if they could anonymously complete a parental questionnaire on their perspective on educational apps. If they answered positively, they were first informed about the purpose of the study and then signed a consent form to voluntarily participate to the study. Parents had no first-hand experience with the app before completing the survey.

Findings

The data analysis showed that about 1 out of 4 parents, specifically 28% (14/50) of parents ever bought an app in the past. Fewer parents (22%, 11/50) bought an educational app in the past. The majority of parents (70.6%, 36/51) reported that their child can manage her emotions easily and approximately one out of three parents (36%, 18/50) reported that their child often worries in her daily life. The majority of parents read children books about emotion management to their child (76.5%, 39/51) and most parents never visited a child psychologist to help their child with emotion management (84%, 42/50). However, the vast majority of parents (90.2%, 46/51) would use an educational app on managing emotions. This finding shows a potentially unmet need for parents and a potential market for educational apps focusing on emotion management.

With regard to the open-ended question of how much parents would be willing to pay for an educational app, 45% (23/51) chose not to provide an answer and left this question blanc. Out of the 55% (n=28 parents) who provided an answer, the amount of money that they would be willing to pay for an educational app varied from 0 to 100 euros, with an average of 21.85euros (SD=23.6). It is worth noting that 50% of parents would be willing to pay less than 15 euros for an educational app.

All five factors listed in the questionnaire were found to be important for parents when selecting an educational app. As shown in Figure 3, in order of significance, starting from the factor that was selected by the majority of parents, the most important factor seems to be that the child enjoys her interaction with the app, which was deemed as important by 78.9% (37/47) of parents. The second most important factor seems to be that the app is supported by peer reviewed scientific publications, which was deemed as important by 74.5% (35/47) of parents. The third most important factor, was that the app provides parents with data for the progress of their

child, which was deemed as important by 61.7% (29/47) of parents. The fourth most important factor was that the app is evolving, adding new features and ways of engaging the child over time, which was deemed as important by 56.5% (26/46) of parents. The factor that had the least importance out of the five, according to parents, was that the app should be recommended by a child psychologist, which was deemed as important by less than half of the parents (40.4%, 19/47).

Table 1: Factors that are important for parents when purchasing educational apps

When deciding to purchase an educational app what is important for you? Circle all that apply.	Percentage and frequency of parents who reported that the factor was important (n=51)
1. My child has fun playing it.	78.9% (37/47)
2. The app is supported by peer reviewed scientific publications.	74.5% (35/47)
3. The app provides me with data for the progress of my child.	61.7% (29/47)
4. The app is evolving, adding new features and ways of engaging the child over time.	56.5% (26/46)
5. The app is recommended by a child psychologist.	40.4% (19/47)

As shown in Table 2, when parents evaluated the significance of all factors, including any that were important for them but not listed in the questionnaire, the most important factor of all seems to be for the app to be supported by peer reviewed scientific publications, as this view supported by 31.8% (14/44) of the parents in the sample. Two factors, namely that the child has fun while interacting with the app and the capability of the app to provide parents with data for the progress of their child were the second most important factors for parents when selecting an app (18.2%, 8/44). The factor that referred to the continuous evolution of the app with the addition of new features and ways of engaging the child over time, was the third factor in importance, according to parents' preferences (15.9%, 7/44). The recommendation of the app by a child psychologist came fourth in parents' preferences (11.4%, 5/44).

Table 2: The most important factor for parents when purchasing educational apps

When deciding to purchase an educational app what is the MOST important factor for you?	Percentage and frequency of parents who selected each factor as the MOST important (n=51)
1. The app is supported by peer reviewed scientific publications.	31.8% (14/44)
2. My child has fun playing it.	18.2% (8/44)
3. The app provides me with data for the progress of my child.	18.2% (8/44)
4. The app is evolving, adding new features and ways of engaging the child over time.	15.9% (7/44)
5. The app is recommended by a child psychologist.	11.4% (5/44)
6. Other [Parents' answers included: "the app can be used for school lessons", "the child learns in an interactive way", "the app suggests solutions for everyday challenges", "the app does not contain ads"]	4.5% (2/44)

Discussion- Implications for the industry

This study attempted to answer to two main questions. The first one was whether parents would be positive with regard to using a children's educational app on emotion management. Parents in this study were very positive

with respect to their intention to have their children use educational apps on managing emotions (90.2%, 46/51 answered positively), which shows that there is a market for such apps, and that they may be satisfying a parental need that is currently unmet. This finding shows the potential acceptability of educational apps on emotion management, at least by highly educated parents. If such apps are designed as games this may potentially increase their popularity because games seem to be "the most popular type of app downloaded on smart mobile devices used by children, with the average device containing approximately 10 game-related apps" (Kids' Mobile Entertainment & Apps report, 2010). Parental acceptability of educational apps on emotion management comes in contrast with the argument by Chiong and Shuler (2010) that parents did not view smart mobile devices as potential learning tools in 2010, and provides an indication that this parental view might be changing, as more and more high-quality educational apps appear in the market.

In this study, parents reported that they would be willing to spend on average, approximately 20 euros for an educational app (M=21.85 euros, SD=23.6), while 50% of parents would be willing to pay less than 15 euros. This is in accordance with the findings of a previous study based on 1,043 surveys from parents who own an iPhone, iPod touch, iPad, BlackBerry, or other smart mobile device. That study found that the parents who report purchasing apps for their children, say they are willing to spend more money for these types of apps in contrast with the finding that in fact eighty-two percent of all apps downloaded for children were free (Kids' Mobile Entertainment & Apps report, 2010).

The second question this study focused on was the identification of factors that are important for parents when selecting educational apps. Parents indicated that it is important for them that their child has fun playing with the selected app, the app is supported by peer reviewed scientific publications, the app provides them with data for the progress of their child, the app is evolving, adding new features and ways of engaging the child over time, and the app is recommended by a child psychologist. When asked to indicate the most important factor out of these five, the most important factor was that the app should be supported by peer reviewed scientific publications. It is important to note however, that the high level of educational qualifications held by the participants probably had an impact on the findings, especially in relation to the importance of peer reviewed scientific publications.

Among the factors important for parents when deciding to purchase an education app is that the app provides them with data for the progress of their child. This factor was deemed as important by 61.7% (29/47) of parents and indicates that the involvement of parents is a feature that should be built into educational apps on emotion management, a finding that is in accordance with implications for the industry drawn by Rideout (2014) as well. The involvement of parents within an app also agrees with guidelines for parents provided by the Public Broadcasting Service (PBS) to take on an active, mediating role when they interact with their children and explore apps together with their children. It also agrees with research that has demonstrated that using educational media with adult guidance leads to greater learning than if used alone (Reiser, Tessmer, & Phelps, 1984 as cited in Rideout, 2014). Therefore, prompts and introductory tasks for parents embedded in apps would not only motivate kids to keep playing, but would help parents see firsthand that an app is beneficial for their child, as suggested by Chiong and Shuler (2010).

References

Broekman, F. L., Piotrowski, J. T., Beentjes, H. W., & Valkenburg, P. M. (2016). A parental perspective on apps for young children. *Computers in Human Behavior*, *63*, 142-151.

Chiong, C., & Shuler, C. (2010). Learning: Is there an app for that? Investigations of young children's usage and learning with mobile devices and apps. New York: The Joan Ganz Cooney Center at Sesame Workshop.

Holloway,D., Green, L. and Livingstone, S. (2013). Zero to eight. Young children and their internet use. LSE, London: EU Kids Online.

Nicolaidou, I., Tozzi, F., Kindynis, P., Panagiotou, M., & Antoniades, A. (2017, October). An Interactive Storytelling Game for Mobile Devices for Children's Stress Management. In European Conference on Games Based Learning (pp. 967-971). Academic Conferences International Limited.

Rideout, V. J. (2014). Learning at home: Families' educational media use in America. A report of the Families and Media Project. New York: The Joan Ganz Cooney Center at Sesame Workshop.

Tozzi, F., Nicolaidou, I., Galani, A., Antoniades, A. (2018). eHealth Interventions for Anxiety Management Targeting Young Children and Adolescents: Exploratory Review. Journal of Medical Internet Research, Journal of Pediatrics and Parenting 1(1):e5. URL: http://pediatrics.jmir.org/2018/1/e5 DOI: 10.2196/pediatrics.7248