Revista CEFAC

eISSN 1982-0216

DOI: 10.1590/1982-0216/20232541923 | Rev. CEFAC. 2023;25(4):e1923

Original articles

Use of handheld screens and language development - parents' perception and the construction of a guidance booklet

Carolina Felix Providello[1]
Maria Cecília de Freitas Ferreira[2]
Simone Rocha de Vasconcellos Hage[3]

[1] Universidade de São Paulo, Faculdade de Odontologia de Bauru - FOB-USP, Departamento de Fonoaudiologia, Programa de Pós-Graduação, Bauru, São Paulo, Brasil.

[2] Universidade de São Paulo, Faculdade de Odontologia de Bauru - FOB-USP, Bauru, São Paulo, Brasil.

[3] Universidade de São Paulo, Faculdade de Odontologia de Bauru - FOB-USP, Departamento de Fonoaudiologia, Bauru, São Paulo, Brasil.

ABSTRACT

Purpose: to describe the perception of parents about the use of handheld screens by children and to prepare a booklet for the healthy use of these devices.

Methods: 102 parents of children aged between 18 and 71 months answered a questionnaire on the use of screen. The analysis was a descriptive and non-parametric one. After assessing parents' responses and reviewing the literature, the booklet was prepared. The material was made available to three judges for analysis and suggestions.

Results: the use of portable screens by children was confirmed by most respondents, and some children spend two hours or more in front of them. Parents believe that screens are a source of stimuli for learning how to speak, but they are concerned about the reproduction of some characters' inappropriate behavior and consumerism. The judges answered the questionnaire assigning maximum scores to most questions. The text of the booklet gathered information about how children learn to speak, clarified about time and content of screen use, and presented language stimulation strategies.

Conclusion: parents' responses to the questionnaire, together with a review of studies on the subject and the judges' analyses, provided elements for the preparation of a booklet on the proper use of these devices.

Keywords: Language Development; Child Development; Science, Technology and Society; Child; Mobile Applications

A study conducted at the Speech-Language Pathology Department of the Bauru School of Dentistry, Bauru, São Paulo, Brazil.

Financial support: São Paulo Research Foundation (FAPESP) – Grant 2019/18800-0.

Conflicts of interests: Nonexistent.

Corresponding author:
Carolina Felix Providello
Silva Jardim Street Number 7-50 Block 3 Apartment 203, Jardim Bela Vista
Zip Code: 17060-240 – Bauru, São Paulo, Brasil
E-mail: carolinafelix@usp.br

Received on: March 3, 2023
Accepted on: July 6, 2023

INTRODUCTION

In recent decades there has been a great technological change, leading to the advance of the analogue signal to the digital one and, consequently, to the use of portable electronic equipment. The presence of screens, whether by computer or smartphone, connected to the internet in the homes of children and adolescents reveals that this technology advances significantly, as it becomes more accessible[1]. According to TIC Kids Online Brazil, a survey carried out by the Internet Management Committee in Brazil with a sample of Brazilian children and adolescents, 93% use their cell phones to watch videos or movies, share messages, use social networks and play games online[2].

Information and communication technologies have been transforming the world, people's behavior and relationships[3] and children have had access to the technological world at an earlier age using cell phones and tablets, as well as notebooks and computers that are also used by parents and other family members[4]. With the Covid-19 pandemic and the closure of schools in 2020 and part of 2021, even the teaching of early childhood education began to make systematic use of technology to develop children's skills, although this form of teaching was already contemplated in the document "Common National Curriculum Base"[5].

Regarding child development, more specifically language, the use of technologies has been seen with caution, as a solid brain architecture is formed through real interaction between adults and children, and it is essential to assure them caregivers involved in the game of action and reaction from the first months[6]. Based on this premise, it has been recommended that the use of electronic devices be avoided by children up to 24 months and, from this age up to 60 months, that the use be limited to a maximum of one hour a day[4], but not abolished, as it is recognized that the new means of communication and technologies have brought to society a different way of accessing information[7] and can be a source of stimulation for children, as long as they are used consciously[8].

Studies on language acquisition indicate that, before the age of two, children learn language through direct sources within the mutual relationship with adults and referenced by the context, while children older than three years can learn through indirect means such as television, videos or reading aloud[9]. The importance of interacting with people in the verb acquisition process was tested in a study in which 36 two-year-old children were selected to learn new verbs in three ways: with a mediator interacting with the child in person; through a real-time audio and video system (Skype); and through a video in which the facilitator is teaching another child. The result of the research pointed out that the children learned new words during the face-to-face training sessions and through the video conversation program (Skype), both cases in which interaction occurred in real time[10]. Thus, interactions that allow exchange, such as the relationship with parents and other caregivers, are essential for language acquisition, which may not occur when the child is passive in front of the screen.

It is known that digital media, when used based on a rational use in terms of age, time, schedule and content, are tools that can improve children's daily lives and motivate them by stimulating executive functions, learning and other positive behaviors[11] and, still, can promote an environment of communicative and social exchange of the language, extrapolating the traditional spaces of interaction and learning[12]. There are notes pointing out that the use of portable screens to watch movies and videos on YouTube, listen to music, play games and read books can be considered a supporting factor in learning, creativity, communication, concentration and even in children's physical and social skills[13].

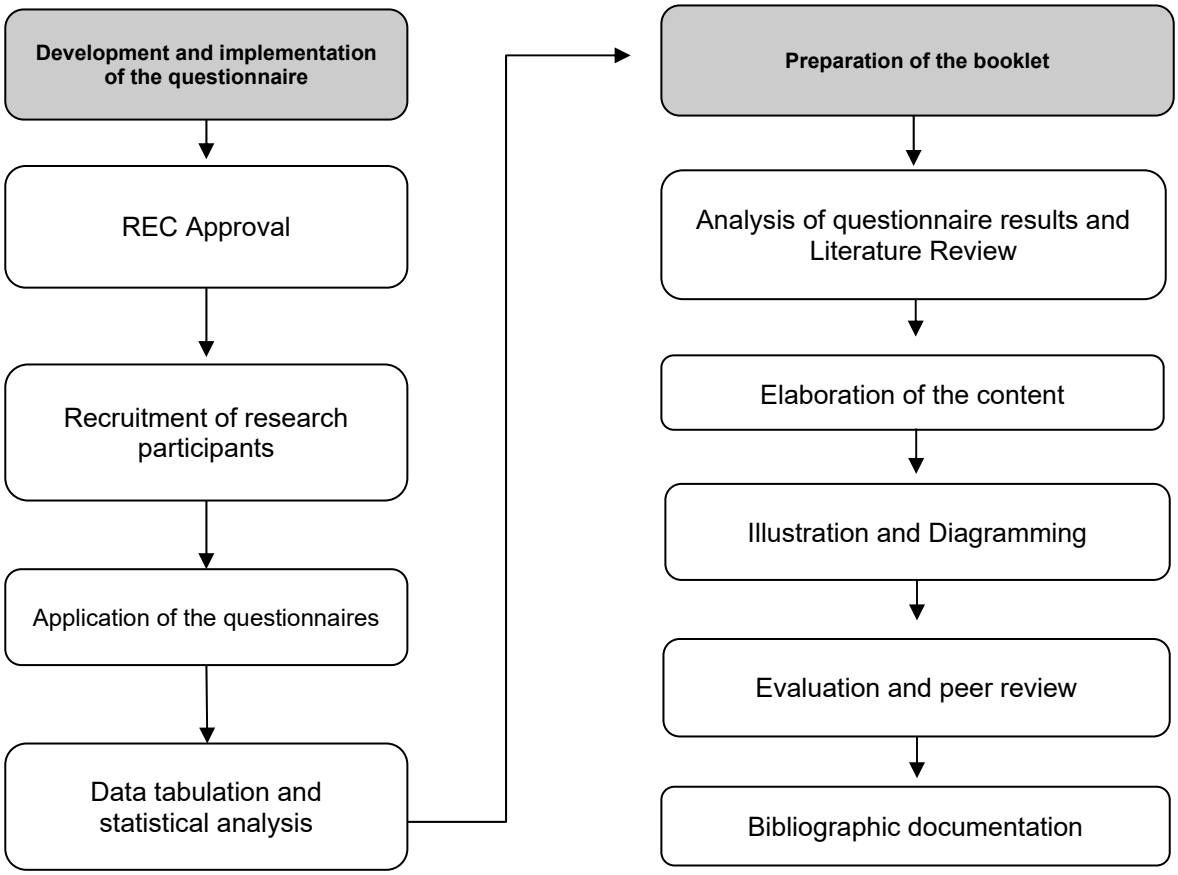
However, when children are in front of screens, they can miss out on important opportunities to practice interpersonal and communication skills[14]. According to the Convention on the Rights of the Child[15], delay in speech and language development is frequent in babies who are passively exposed to screens for prolonged periods or when accessing inappropriate content. Increased screen time by young children can contribute to sedentary lifestyle, reduced cognitive development, intellectual and behavioral passivity, weakening of critical, creative, independence and language skills in the expressive aspect, and may, in the long run and without mediation, bring about skill reduction in dynamic brain microstructures in early childhood[16].

Parents' attitudes, some of whom are digital natives, are important predictors of the effects of media on children, and even with all the ease in using and handling that a child can present with the media, caregivers must still preserve the role of interaction, as any deprivation of communicative opportunity may lead to delays[17,18]. A meta-analysis study found that while increased screen time was associated with lower language skills, quality screen time (educational programs) associated with caregiver support was associated with more developed language skills in children under the age of 12 years old[19].

Therefore, research and parenting guidance on the relationship between language development and the use of portable screens need to be developed. In this context, the objective of this study was to describe the perception of parents about the use of handheld screens by preschool children and the understanding they have about language acquisition and stimulation and, based on this perception and review of the literature on the subject, elaborate a booklet on the fruitful use of these devices. The hypothesis is that, although there is information available on recommendations for screen use by preschool children, caregivers have a limited view of how children acquire language and the role of healthy screen use in this process.

METHODS

The study was approved by the Research Ethics Committee (REC) of the School of Dentistry of Bauru, University of São Paulo, Brazil (protocol number: 5.587.196, CAAE: 13852919.7.0000.5417). Participants received information about all study procedures and signed the Free and Informed Consent Form (FICF) in accordance with the guidelines and regulatory standards for research with human beings. The methodological stages were divided into a questionnaire and a booklet and are presented in the flowchart (Figure 1).



Captions: → indication of continuity of the steps described.; REC = Research Ethics Committee

Figure 1. Flowchart of the methodological steps of the study

Questionnaire Application

A total of 102 parents or guardians of children between 1 year and 6 months and 5 years and 11 months were included in this study, with age outside this range being the only exclusion factor. They were invited to answer a questionnaire with multiple choice questions ranging from three to seven alternatives and two open questions. The questionnaire was exploratory, not inferential, therefore, there was no indication of validation. The multiple-choice questions addressed the following aspects: 1. The occurrence of handheld screen use by children; 2. Use of equipment other than handheld screens (computer, TV); 3. Time of use of the handheld screens and other screens. 4. Content accessed by children; 5. Use of cell phones and tablets by parents in the presence of children; 6. How children learn language; 7. Which materials help to stimulate children's communication. Two open questions were asked about what children learn most from handheld screens and what they most reproduce from the virtual world.

Data were obtained in person and virtually. Before the pandemic, collection took place in person at four municipal schools in the state of São Paulo. Parents or guardians who had children in the collection age range were invited to participate in the study through an invitation letter sent by the educational institutions and authorized by the city's Department of Education. Parents who agreed to participate answered the questionnaire in a room made available by the school, individually, together with the researcher to clarify the proposal and possible doubts. The application of the instrument, from instructions to completion, took around 60 minutes. After schools suspended classes due to the social isolation imposed by Covid-19, the questionnaire was made available on the "Google Forms" platform for completion, with instructions given via "audio call" or "video call" by the researchers on the mechanism for inserting responses and the content of the questions. The invitations were made through social networks and, therefore, included parents with children who attended school or not.

Table 1 shows the characterization of the sample of children in terms of age group, type of school and gender, whose parents answered the questionnaire. Because some participants answered the questionnaire in the online format, with free access, it was not possible to equally distribute the number of children by age group.

Table 1. Characterization of the sample of children whose parents answered the questionnaire

Variables	n	(%)
Age range		
18 to 23 m	5	(4.9)
24 to 35 m	16	(15.7)
36 to 47 m	29	(28.4)
48 to 60 m	33	(32.4)
60 to 71 m	19	(18.6)
Type of school		
Public	90	(88.2)
Private	6	(5.9)
Does not attend	6	(5.9)
Sex		
Females	51	(50.0)
Males	51	(50.0)

Captions: n= number of children in the sample (absolute frequency)
(%) = percentage of children considering the total sample (relative frequency)

This was an observational, cross-sectional and prospective study. Data were tabulated in a spreadsheet using Excel® software and organized according to the needs of the study. The analysis was descriptive performed using total and relative values. For the analysis of the relationship between variables, the Spearman test was used, as these are ordinal qualitative variables, namely: children's age and time of use of handheld screens. A significance level of 5% ($p<0.05$) was adopted. For the analysis, the statistical software Jamovi® version 2.3 was used[20-22].

Elaboration of the Booklet

After assessing the responses of the parents, the construction of the booklet began, based on, in addition to the analysis of the responses, selection of descriptors on the "DeCS/MeSH" platform, a literature review on the platform in the "VHL" (Virtual Health Library - Advanced Search) with the descriptors "Children's Language", "Children's Development", "Language Development", "Screen Time" and "Handheld Computers". Considering the articles researched in the last 10 years in the "Medline", "LILACS" and "Index Psychology – Periodicals" databases, 40 studies were selected for the literature review, which supported the text of the booklet's themes. A designer was hired for the illustration and layout of the material.

Once elaborated, the booklet was made available to three judges - two specialists in language and child development, and one of the mothers who answered the questionnaire, to evaluate the material. The judges agreed to participate in the research by filling out a Free and Informed Consent Form (FICF) and received a questionnaire prepared by the researchers with eight questions. The questions addressed the clarity and understanding of the content, the relevance of the information exposed, quantity and layout of the texts per page, whether the design matched the content exposed and the ethnic diversity of the country, and the quality of the physical and digital material. The judges indicated for each of the questions whether the booklet fully met (2 points), partially met (1 point) or did not meet (0 point). In addition to answering the questions, the judges were asked to provide suggestions about the material.

RESULTS

Questionnaire application

Considering the 102 questionnaires, 65 were answered in person by parents or guardians at municipal schools, and the other 37 via video call. The use of portable screens by children was confirmed by 87 of the respondents (85.3%) and the use of other screens such as TV, desktop computer for various tasks and video games by 98 of the participants (96%). A specific question about increased time in front of screens was asked to participants who answered the questionnaire during the pandemic period (37), with 24 of them (64.8%) stating that there was an increase. The percentage distribution of daily time using handheld screens and other types of screens is described in Table 2. The older the children, the longer the time spent using screens, according to the Spearman test (p value – $0.025 < 0.05$).

Table 2. Percentage distribution of time of daily use of handheld screens and other types of screens (TV, notebooks, desktop computers).

Time of use	n	(%)
Handheld screens		
30 minutes or less	26	(29.9)
1 hour	30	(34.4)
2 hours or more	31	(35.7)
Total	87	(100.0)
Other types of equipment		
30 minutes or less	17	(17.4)
1 hour	20	(20.4)
2 hours or more	61	(62.2)
Total	98	(100.0)

Captions: n = number of respondents who confirmed the use of handheld and/or other screens
(%) = percentage of children, considering the total sample, who use them

Regarding the contents accessed by the children, the most frequent were cartoons and children's games (participants could choose more than one alternative), as shown in Table 3. The item 'others' includes access to applications and social media for videochats and 'Google' to explore the meaning of words.

Table 3. Percentage distribution of content accessed through handheld screens.

Content accessed	n	(%)
Children's drawings	93	(91.1)
Games or play	64	(62.7)
Music	44	(43.1)
Other	10	(09.8)
Total	211	(-)

Captions: n = number of participants' answers considering more than one answer each
(%) = percentage of the answers considering the total sample that makes use of it
(-) = the percentage was not indicated because the answer had more than one permitted alternative, not totaling 100% of the answers.

To verify the image that children have of their parents regarding the use of handheld screens, parents and/or guardians were asked if they themselves used this type of equipment in front of their children, to which 95.1% of the total sample answered yes, 56.9% often, and 38.2% rarely.

One of the objectives of the questionnaire was to investigate the knowledge that caregivers have about how children acquire language and which instruments help to stimulate the development of this skill. Tables 4 and 5 show the percentage distribution of responses.

Table 4. Percentage distribution of responses on how children learn language.

Language and speech	n	(%)
Listening to other people speak	83	(81.4)
By participating in conversations with other people	61	(59.8)
By watching children's drawings and games	25	(24.5)
Learning by themselves	08	(7.8)
Total	177	(-)

Captions: n = number of participants' answers considering more than one answer each
(%) = percentage of responses considering the total sample that makes use of it
(-) = the percentage was not indicated because the answer had more than one permitted alternative, not totaling 100% of the answers.

Table 5. Percentage distribution of materials for the stimulation of child communication.

Materials/Instruments	n	(%)
Books	73	(71.6)
Traditional toys	61	(59.8)
Electronic toys	47	(44.1)
TV	35	(34.8)
Cell phones	17	(16.7)
Tablets	12	(11.8)
Other	16	(15.7)
Total	261	(-)

Captions: n = number of participants' answers considering more than one answer each
(%) = percentage of responses considering the total sample that uses it
(-) = the percentage was not indicated because the answer had more than one permitted alternative, not totaling 100% of the answers.

Open questions were asked about handheld screens as to what children learn and reproduce from the virtual world. The responses were grouped into two blocks: positive and negative aspects. Most respondents (66.7%) indicated positive aspects, such as cell phones being a source of stimulation, enabling the learning of words, songs, games, keeping the child's attention, and promoting creativity and curiosity. The negative points mentioned were the possibility of children reproducing inappropriate behavior of characters and increasing consumption due to exposure to advertising of products of children's interest. Among the negative aspects, excessive screen time was mentioned by 4.9% and lack of mediation by adults in the use of equipment by 3.9%.

Elaboration of the Booklet

Based on the profile of the participants' responses to the questionnaire and on texts selected about child development, language, handheld computers and time of use, the booklet explained how children learn how to speak, the difference between communication, speech and language, presented risk factors related to language delay, clarified the content and time of use of handheld screens, and presented strategies to stimulate children's communication.

For the illustration and layout, the "flat design" style was selected, that is, without gradients and realistic effects in which each chapter corresponds to a predominant color to facilitate the recognition of the content of each chapter and association (e.g.: lime green – how children acquire language). The elements of the booklet, that is, background, texts and illustrations, followed a predetermined color palette for standardization.

Although the target audience is adults, the theme is child-oriented and, therefore, the illustrations were made in such a way that adults could show them to children, stimulating the exchange between them. The themes of the images were based on the content, and the greatest possible number of ethnicities and interactions between parents, siblings, grandparents and friends were presented.

The judges answered the questionnaire assigning 2 points to most of the questions in the questionnaire (Table 6), indicating that the booklet met the objectives proposed. For those issues that were not fully addressed, they proposed suggestions that were accepted, such as reformulating the distribution of content per page to optimize visualization, replacing words and/or grammar that could contribute to accessible language and inserting images. At the end of the process, all participants received the booklet - parents, schools and judges.

Table 6. Percentage of answers given by judges to questions about the content of the booklet

Judges	Score		
Judges' description	Fully meets (2)	Meets partially (1)	Does not meet (0)
Judge 1	12	2	0
Judge 2	12	2	0
Judge 3	16	0	0
Total	44 (91.6%)	4 (50.0%)	0
Maximum	48 (100.0%)	8 (100.0%)	0

Notes: Total = total score given by the sum of the three judges.
Maximum = maximum score that could result from the sum of the three judges

DISCUSSION

Children are growing up in an increasingly technological environment and there is no way to get away from it, on the contrary, technology can offer opportunities for learning and connecting with the world that will influence adult life. However, for the use of cell phones, tablets and computers to be prosperous for preschool children, having information about how parents offer these devices to them and how they understand the role of screens in stimulating language can contribute to a healthy use of technology. In addition, understanding parents' perception of the use of technological devices can help in the construction of guidance materials on the subject.

The present study pointed out that the use of handheld screens is part of the routine of 85.3% (87) of the children and, although the sample is not population-based, it indicates that the use of cell phones and tablets occurs on a large scale by infants. In a questionnaire collected from 412 Portuguese parents, 90% (368) of children and adolescents use technologies, with 67% of this group aged between 0 and 3 years old and 89% between 4 and 6 years old, the majority through handheld screens[23]. The 8th edition of the TIC *Kids Online* Brasil[2] survey found that 93% of the 2,651 children and adolescents between 9 and 17 years old interviewed are internet users, with cell phones being the main means of connection in different social strata. Even though the research does not present preschool children's data, it is unlikely that this use does not also have high percentages in ages younger than 9 years.

Screen use is associated with worse health outcomes for children, such as higher risk of obesity, worse motor, cognitive and psychosocial development, as well as reduced critical, creative, independence and language skills[8,9,24]. However, it is not specifically the use that brings harm, but when it is offered, the excessive time of use and the lack of adult mediation. The time of use of handheld screens for 2 hours or more was pointed out by 35.7% of participants, and three out of the five children aged between 1 and a half and 2 years use screens between 60 and 30 minutes a day. When considering the time of use of other equipment, such as TVs and desktop computers for video games, 62.20% of the 98 respondents indicated that their children spend 2 hours or more in front of these devices. Adding up the time spent on tablets/smartphones and other equipment, many children spent much more time in front of a screen than recommended by the Brazilian Society of Pediatrics[4].

Based on the data described and on the literature review, one of the topics addressed in the booklet was the time of offering and the time of use of the screens, with emphasis on language acquisition based on principles of sociointeractionism[25]. It was explained that there is no scientific evidence showing benefits of handheld screens for children under 2 years old. In this age group, language acquisition depends substantially on interacting with people who understand their gestures, interpret their intentions, expand their utterances and reformulate their speech. The videos and games displayed on the screens do not do this, although they speak, they are not human. Between 2 and 5 years old, screens can be an ally in language development[26], as they help expand vocabulary, play songs that develop rhythm and rhyme, and encourage understanding of the intentions of cartoon characters. However, mediation by caregivers is essential and with a time limit of 1 hour per day[4]. When children are passively watching screens, they miss communication opportunities, as they have less possibility of verbal and non-verbal exchanges, which are essential factors for language development.

A total of 93 out of the 102 respondents use screens in front of the children and the majority (56.9%)

admitted that the use is frequent. The use of media by parents during their children's usual routine was negatively associated with language development[9]. The ease of staying connected with work, friends and the distractions of social media has led many parents to overuse their cell phones. Human learning is the result of a complex network that ranges from genetic endowment to the ability to observe and imitate the actions of others. This special ability is given to us, in part, through brain cells called mirror neurons, which link the actions we see others do to our patterns of actions[27]. Much of what children learn comes from observing their parents, siblings, colleagues, family members, people in their daily lives. If parents want their children not to manifest digital dependence or any other disorder related to excessive use of screens, such as language delay, it is up to them to balance their use and make use of parenting educational practices that encourage the occurrence of desired behaviors.

Regarding the contents accessed by children, the most mentioned were cartoons and children's games. Although there was no formal question about how they are selected, during the face-to-face or online interviews, parents explained that the options for what the children watched were based on internet searches. Thus, the booklet addressed the issue of content and listed selection criteria. In addition to taking care to avoid violent content, it was recommended to observe the rhythm of the characters' speech and scene changes. Fast scenes and dialogues with many characters confuse the child and do not provide models of balanced dialogue with well-articulated statements. The model of speech a child receives, whether from the virtual or real world, is critical for language development. Not only the quantity, but the quality of language input a child receives is significantly and strongly associated with subsequent language acquisition and cognitive development[28].

Caregivers' understanding of how children acquire language contributes to the type of stimulation they adopt. Regarding the investigation of parents' knowledge about how children learn to speak, most understand that 'listening to other people speak' and 'participating in conversations with other people' are valid strategies to acquire language, which signals a positive understanding of the process, even if the questionnaire alternatives were pre-established and may have favored the profile of the answers. In any case, some respondents understand language acquisition as an individual process ('they learn by themselves'). In this sense, one of the topics covered by the booklet was how children learn to communicate verbally. Language as a skill of the human brain was reinforced in the text of the booklet, as well as the communicative experiences lived by the child and how much they impact the architecture of the developing brain in the first years of life. Every child is a social being who, since babyhood, needs to have communicative partners who interpret and give meaning to their productions, whether words or gestures. It is important to remember that excessive use of screens can reduce the time a child engages in conversations with adults, which may compromise language development. Not to mention that the accumulation of visual stimuli and brain exposure to images can lead to damage to the frontopolar region of the brain, one of the areas responsible for language processing[29].

When parents were asked about which materials or instruments are important in stimulating communication, cell phones and tablets were less mentioned compared to traditional and electronic books and toys. Although screens are recognized as a source for learning words, phrases and songs, traditional playing with the use of miniatures of the real world and books was pointed out as the main source of stimuli by the sample studied. The type of toy used during play influences the quantity and quality of communicative interactions between children and caregivers. In an analysis of 10 dyads - child and adult -, traditional toys provided greater possibility of intentional communicative acts when compared to electronic toys[30]. In the booklet, one of the recommendations pointed out that the screens should gain the same function as a toy with the possibility of favoring the imagination and auditory, visual and narrative skills, and never as a "reinforcement" to eat or stop having a tantrum.

Most respondents see positive aspects in handheld screens, as a source of sensory stimuli, enabling the learning of skills such as speaking, singing, imitating, playing or paying attention. In responses after the start of the pandemic, parents highlighted the importance of screens for various activities, including school ones. The screens, when used properly, can be allies of children development. Some applications and games are specifically designed for children and can stimulate positive aspects related to cognitive development, imagination and vocabulary[26]. A questionnaire that resulted in a multicriteria index to measure the quality of interactive media used by children in early childhood pointed out that the higher the index score

(higher quality of interactive media use, such as, for example, use of educational applications, monitoring of a mediator and time within the range recommended by Pediatric Associations) the higher the score of children aged between 2 and 3 and a half years in the 'language' field of the Bayley Scales of Infant and Toddler Development[31]. Interactive media, when used properly, can be one of the tools to promote language development.

The negative points pointed out by the interviewees were the possibility of children reproducing characters' inappropriate behavior and consumerism. Much of a child's behavior results from their parent's parenting style and what they see and hear around them. In this context, the contents observed on the screens are models for perceiving the world. For example, many cartoons refer to the idea that the important thing is to win, even if it means cheating, mocking the different or the weakest, with scenes of aggression and violence. Thus, the characteristics of some cartoons can negatively influence the child, because, depending on their maturity, they will not be able to discern the content presented on their own, requiring adult mediation[32].

Both positive and negative points served as a basis for the construction of guidelines regarding language stimulation in the presence or absence of screens. Excessive screen time and lack of mediation by adults in the use of equipment was rarely mentioned by parents (4.9% and 3.9%, respectively) and, therefore, were emphasized in the booklet. The motivation for creating the booklet was precisely the need for clear and concise guidance on the relationship between language development and the use of handheld screens by children. Booklets with this objective are an educational material that can develop the self-efficacy of parents and/or caregivers, providing awareness and information on the subject[33].

This research had limitations that can be overcome with new studies on the subject. One of them was the lack of data on socioeconomic status and parental education. Such aspects can influence the way parents conduct the upbringing of their children[34,35]. Parents with higher income tend to be more educated and, consequently, have more access to information[36]. Another point was the fact that parents were not asked directly about their mediation while the children use screens, although some caregivers during the interview spontaneously verbalized both the absence and the presence of this mediation. Parental mediation in the use of screens is a crucial factor in defining the quality of interactive media use[4,11,31] and should be emphasized in the guidelines on the use of electronic devices.

CONCLUSION

The analysis of caregivers' perception showed the frequency, time, and content of children's use of screens, as well as their understanding of how children learn language. This information, added to the reading of studies on the subject and the judges' suggestions, allowed the elaboration of an orientation booklet[37] on the use of screens by children to make them allies in the language development of preschool children. Mobile electronic devices, such as tablets and cell phones, can be positive and establish a new environment for communication, depending on the moment, time, content and way of offering the screens.

REFERENCES

1. Passarelli B, Junqueira AH, Angeluci ACB. Digital natives in Brazil and their behavior in front of the screens. MATRIZes. 2014;8(1):159. http://dx.doi.org/10.11606/issn.1982-8160.v8i1p159-178.
2. Comitê Gestor da Internet no Brasil. TIC Kids Online Brasil crianças e adolescentes. São Paulo: Núcleo de Informação e Coordenação do Ponto BR; 2021 [accessed 2022 nov 20]. Available at: https://cetic.br/pt/tics/kidsonline/2021/criancas/.
3. Ramos DK. The information and communication technologies in education: reproduction or transformation? Educ Tem. Dig. 2011;13(1):44-62. ISSN 1676-2592.
4. Sociedade Brasileira de Pediatria. Manual de Orientação: #MenosTelas #Mais Saúde. Brasil: Grupo de trabalho de saúde na era digital; 2019 [accessed 2022 nov 20]. Available at: https://www.sbp.com.br/fileadmin/user_upload/_22246c-ManOrient_-__MenosTelas__MaisSaude.pdf.
5. Ministério da Educação do Conselho Nacional de Educação. Base Nacional Comum Curricular (BNCC). Prorrogação do prazo do artigo 60 do Decreto nº 9.235, de 15 de dezembro de 2017, para implantação de instituições credenciadas e de cursos autorizados, em razão das circunstâncias restritivas decorrentes da pandemia da COVID-19; 2020 [accessed 2022 nov 16]. Available at: https://normativasconselhos.mec.gov.br/normativa/pdf/CNE_PAR_CNECPN102020.pdf.
6. Center on Developing of Child. Harvard University [homepage na Internet]. Three core concepts in early development. Cambridge: Harvard University; 2023 [accessed 2023 fev 12]. Available at: https://developingchild.harvard.edu/resources/three-core-concepts-in-early-development/.
7. Modelski D, Giraffa LMM, Casartelli AO. Digital technologies, teacher training and teaching practices. Educ Pesq. 2019;45:e180201. http://dx.doi.org/10.1590/S1678-4634201945180201.
8. Santos TAS, Rezende KTA, Santos IF, Tonhom SFR. The influence of technology on preschool and school child development. New Trends in Qualitative Research. 2020;3(1):592-608. https://doi.org/10.36367/ntqr.3.2020.592-608.

9. Sundqvist A, Koch FS, Thornberg UB, Barr R, Heimann M. Growing up in a digital world – Digital media and the association with the child's language development at two years of age. Pully, Front. Psychol. 2021;12:569920. https://doi.org/10.3389/fpsyg.2021.569920. PMID: 33815187.
10. Roseberry S, Pasel KH, Golinkoff RM. Skype me! Socially contingent interactions help toddlers learn language. Child Dev Res. 2014;85(3):956-70. https://doi.org/10.1111/cdev.12166. PMID: 24112079.
11. Alroqi H, Serratrice L, Cameron-Faulkner T. The association between screen media quantity, content, and context and language development. London, J Child Lang. 2022;27(6):1-29. https://doi.org/10.1017/S0305000922000265. PMID: 35758141.
12. Melo EA, Santana FP. A influência da linguagem da internet na escrita formal: uma pesquisa com alunos do 9º ano na cidade de Tobias Barreto-Se. Rev Cad Est Pesq Ed Bas. 2017;3(1):275-86.
13. Rideout V. The Common Sense Census: Media use by kids age zero to eight. São Francisco: Common Sense Media; 2017 [accessed 2022 nov 18]. Available at: https://www.commonsensemedia.org/sites/default/files/research/report/csm_zerotoeight_fullreport_release_2.pdf.
14. Rocha HAL, Correia LL, Leite AJM, Machado MMT, Lindsay AC, Rocha SGMO et al. Screen time and early childhood development in Ceará. Brazil: a population based study. London, BMC Public Health. 2021;21(2072):1-8. https://doi.org/10.1186/s12889-021-12136-2. PMID: 34763693.
15. Brasil. Artigo 8 de 29 de setembro de 2017. Evitam atrasos desnecessários na decisão das causas e execução de sentenças ou despachos que concedam indenização às crianças vítimas. Convenção sobre os direitos da criança [accessed 2017 set 29]. Available at: https://www.unicef.org/brazil/convencao-sobre-os-direitos-da-crianca.
16. Hutton JSMS, Jonathan Dudley MD, Horowitz-Kraus T, DeWitt MD, Holland SK. Associations between screen-based media use and brain white matter integrity in preschool-aged children. JAMA Pediatr. 2020;174(1):e193869. https://doi.org/10.1001/jamapediatrics.2019.3869. PMID: 31682712.
17. Assathiany R, Guery E, Caron FM, Cheymol J, Picherot G, Foucaud P et al. Children and screens: a survey by French pediatricians. Arch Pediatr. 2018;25(2):84-8. https://doi.org/10.1016/j.arcped.2017.11.001. PMID: 29246522.
18. Byeon H, Hong S. Relationship between television viewing and language delay in toddlers: evidence from a Korea national cross-sectional survey. PlosOne. 2015;10(3):1-12. https://doi.org/10.1371/journal.pone.0120663. PMID: 25785449.
19. Madigan S, Browne D, Racine N. Association between screen time and children's performance on a developmental screening test. JAMA Pediatr. 2019;173(3):244-50. https://doi.org/10.1001/jamapediatrics.2018.5056. PMID: 30688984.
20. The Jamovi Project. Jamovi. (Version 2.3) [Computer Software]. Retrieved from https://www.jamovi.org. 2022.
21. R Core Team. R: A language and environment for statistical computing. (Version 4.1) [Computer software]. Retrieved from https://cran.r-project.org. (R packages retrieved from MRAN snapshot 2022-01-01). 2021.
22. Costa P, Forni E, Amato I, Sassaki RL. Risk and protective factors to early childhood development during the COVID-19 pandemic. Rev Esc Enferm USP. 2022;56(e20220196):1-6. https://doi.org/10.1590/1980-220X-REEUSP-2022-0196en. PMID: 36197030.
23. Faria HC, Costa IP, Neto AS. Hábitos de utilização das novas tecnologias em crianças e jovens. Gaz Med Port. 2018;5(4):270-6. https://doi.org/10.29315/gm.v5i4.214.
24. Lin J, Magiati I, Chiong SHR, Singhal S, Riard N, Ng IH et al. The relationship among screen use, sleep, and emotional/behavioral difficulties in preschool children with neurodevelopmental disorders. J Dev Behav Pediatr. 2019;40(7):519-29. https://doi.org/10.1097/DBP.0000000000000683. PMID: 31107771.
25. Silva HML, Silva DCL, Almeida EP, Uchôa SAO, Cabral SAAO. Socio-Interactional Theory and language acquisition: contributions to human development. Id on line Rev.Mult.Psic. 2020;14(51):327-42. https://doi.org/10.14295/idonline.v14i51.2587.
26. Yadav S, Chakraborty P. Using smartphones with suitable apps can be safe and even useful if they are not misused or overused. Acta Paediatr. 2018;107(3):384-7. https://doi.org/10.1111/apa.14042. PMID: 28833547.
27. Lameira AP, Gawryszewski LG, Pereira A. Neurônios espelho. Psicol USP. 2006;17(4):123-33. https://doi.org/10.1590/S0103-65642006000400007.
28. Zimmerman FJ, Gilkerson J, Richards JA, Christakis DA, Xu D, Gray S et al. Teaching by listening: the importance of adult-child conversations to language development. Pediatrics. 2009;124(1):342-9. https://doi.org/10.1542/peds.2008-2267. PMID: 19564318.
29. Takeuchi H, Taki Y, Hashizume H, Asano K, Asano M, Sassa Y et al. The impact of television viewing on brain structures: cross-sectional and longitudinal analyses. New York, Cereb Cortex. 2015;25(5):1188-97. https://doi.org/10.1093/cercor/bht315. PMID: 24256892.
30. Afonso FR, Ferreira MCF, Hage SRV. Análise das habilidades comunicativas de crianças expostas a brinquedos eletrônicos e tradicionais. In: Castro LHAC, Pereira TT, Moreto FVC, organizers. Propostas, Recursos e Resultados nas Ciências da Saúde 6. Ponta Grossa (PR): Atena Editora; 2020. p.30-8.
31. Nobre JN, Vinolas PB, Santos JN, Santos LR, Pereira L, Guedes SC et al. Quality of interactive media use in early childhood and child development: a multicriteria analysis. J Pediatr. 2020;96(3):310-7. https://doi.org/10.1016/j.jped.2018.11.015. PMID: 30822392.
32. Santana AM, Ferreira LG. TV and education: a study on the influence of cartoons on children's moral values. Cad de Psicologia. 2015;9(17):2-18. ISSN: 1982-4440.
33. Alexandre D de S, Alpes MF, Reis ACMB, Mandrá PP. Validation of a booklet on language developmental milestones in childhood. Rev. CEFAC. 2020;22(2):e16219. https://doi.org/10.1590/1982-0216/202022216219.
34. Costa CH, Molini-Avejonas DR. Development of a speech therapy app for parents. CoDAS. 2020;32(5):e20190123. https://doi.org/10.1590/2317-1782/20202019123. PMID: 33053087.
35. Silva NCB, Nunes CC, Betti MCM, Rios KSA. Variáveis da família e seu impacto sobre o desenvolvimento infantil. Temas psicol. 2008;16(2):215-29. ISSN 1413-389X.
36. Maia JMD, Williams LCA. Fatores de risco e fatores de proteção ao desenvolvimento infantil: uma revisão da área. Temas psicol. 2005;13(2):91-103. ISSN 1413-389X.
37. Providello CF, Hage SRV. Como tornar as telas de mão aliadas do desenvolvimento de linguagem de crianças pequenas. Bauru: Faculdade de Odontologia de Bauru, Universidade de São Paulo, 2021. 28 p. Available at: https://posgraduacao.fob.usp.br/wp-content/uploads/sites/731/2021/12/Cartilha.pdf.

Authors' Contributions:

CFP: substantial contributions to conception and design, data collection, analysis and interpretation of data, writing, critical revision of the article for intellectually important content;

MCFF: analysis and interpretation of data, article drafting, critical revision of the article for intellectually important content;

SRVH: substantial contributions to conception and design, analysis and interpretation of data, critical revision of the article for intellectually important content, final approval of the version to be submitted for publication.