

The Use of Cell Phones and Digital Screens in Two 2-Year-Old Infants: Intervention from a Historical-Cultural Perspective

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ABSTRACT

Background. Recent research shows the negative effects of cell phone and digital screen use on early development.

Objective. The objective of this article is to present two cases of communication problems caused by excessive screen use in 2-year-old children.

Design. Based on the assessment, an intervention program was developed based on a historical-cultural approach. This program offers positive modifications to communication processes between children and adults, working in twenty-four 50-minute sessions.

Results. As a result of the practical and playful object-based activity, under the external regulation of adults, it was possible to address the delay in children's psychological development, in addition to improving coexistence and avoiding frustrations.

Conclusion. The conclusion is that if children have a strong need for screens or cell phones, it is because parents or primary caregivers have created a codependency on them.

Keywords: Development; language; digital screens; intervention; Historical-Cultural approach

Highlights:

- The use of screens or cell phones by children strongly depends on codependency of caregivers
- The program for intervention, in cases of excessive use cell phone by young children, should be based on modification of the process of communication between children and adults
- During the intervention, verbal guidance should be consistent with support through bodily expression, mime, gestures, and objects

АННОТАЦИЯ

ИСПОЛЬЗОВАНИЕ СОТОВЫХ ТЕЛЕФОНОВ И ЭКРАНОВ ЦИФРОВЫХ УСТРОЙСТВ ДЕТЬМИ В ВОЗРАСТЕ ДВУХ ЛЕТ: КОРРЕКЦИОННАЯ ПРОГРАММА В ПАРАДИГМЕ КУЛЬТУРНО-ИСТОРИЧЕСКОЙ ПСИХОЛОГИИ

Введение. Результаты современных исследований свидетельствуют о негативном влиянии использования цифровых устройств (экранов) и сотовых телефонов на процессы раннего развития.

Цель. Целью настоящей статьи является описание двух случаев нарушения коммуникативной сферы, обусловленного чрезмерным использованием цифровых устройств детьми двухлетнего возраста.

Дизайн. На основании данных диагностики была разработана коррекционная программа, опирающаяся на принципы культурно-исторического подхода. Данная программа, реализованная в ходе двадцати четырех 50-минутных сессий, направлена на качественное преобразование процессов взаимодействия между ребенком и взрослым.

Результаты. В результате организации практической и игровой предметной деятельности, протекающей под внешним контролем и при регулирующем участии взрослого, удалось компенсировать задержку психологического развития детей, а также оптимизировать межличностное взаимодействие и снизить уровень фрустрации.

Заключение. Формирование устойчивой потребности в использовании цифровых устройств у детей является следствием созависимости, сформированной родителями или лицами, осуществляющими первичный уход.

Ключевые слова: Развитие; речь; цифровые устройства; коррекционное вмешательство; культурно-исторический подход

Ключевые положения:

- Интенсивность использования цифровых устройств детьми находится в прямой зависимости от сформированной опекунами модели созависимого поведения
- Коррекционная стратегия при чрезмерном использовании ребенком раннего возраста сотового телефона должна строиться на трансформации паттернов коммуникации в диаде «ребенок — взрослый»
- В процессе коррекционного воздействия вербальная инструкция должна быть неразрывно связана с опорой на телесную экспрессию, мимику, жестикуляцию и предметные действия

RESUMEN

EL USO DE TELÉFONOS MÓVILES Y PANTALLAS DIGITALES EN DOS INFANTES DE 2 AÑOS: INTERVENCIÓN DESDE UNA PERSPECTIVA HISTÓRICO-CULTURAL

Antecedentes. Investigaciones recientes muestran los efectos negativos del uso de teléfonos móviles y pantallas digitales en el desarrollo temprano.

Objetivo. El objetivo de este artículo es presentar dos casos de problemas de comunicación causados por el uso excesivo de pantallas en niños de 2 años.

Diseño. A partir de la evaluación, se desarrolló un programa de intervención basado en un enfoque histórico-cultural. Este programa ofrece modificaciones positivas en los

procesos de comunicación entre niños y adultos, trabajando en veinticuatro sesiones de 50 minutos.

Resultados. Como resultado de la actividad práctica y lúdica basada en objetos, bajo la regulación externa de los adultos, fue posible abordar el retraso en el desarrollo psicológico de los niños, además de mejorar la convivencia y evitar frustraciones.

Conclusión. La conclusión es que si los niños tienen una fuerte necesidad de pantallas o teléfonos móviles, es porque los padres o cuidadores principales han creado una codependencia hacia ellos.

Palabras clave: Desarrollo; lenguaje; pantallas digitales; intervención; enfoque histórico-cultural

Aspectos destacados:

- El uso de pantallas o teléfonos móviles por parte de los niños depende fuertemente de la codependencia de los cuidadores.
- El programa de intervención, en casos de uso excesivo del teléfono móvil por niños pequeños, debe basarse en la modificación del proceso de comunicación entre niños y adultos.
- Durante la intervención, la guía verbal debe ser coherente con el apoyo a través de la expresión corporal, la mímica, los gestos y los objetos.

RESUME

UTILISATION DES TÉLÉPHONES PORTABLES ET DES ÉCRANS NUMÉRIQUES PAR DES ENFANTS DE DEUX ANS: PROGRAMME D'INTERVENTION DANS LE CADRE DE LA PSYCHOLOGIE HISTORICO-CULTURELLE

Origines. Les résultats des recherches contemporaines indiquent un impact négatif de l'utilisation des dispositifs numériques (écrans) et des téléphones portables sur les processus du développement précoce.

Objectif. Cet article vise à décrire deux cas de troubles de la sphère communicative causés par l'utilisation excessive de dispositifs numériques chez des enfants âgés de deux ans.

Méthode. Sur la base des données diagnostiques, un programme d'intervention a été élaboré, fondé sur les principes de l'approche historique-culturelle. Ce programme, mis en œuvre au cours de vingt-quatre séances de 50 minutes, vise une transformation qualitative des processus d'interaction entre l'enfant et l'adulte.

Résultats. Grâce à l'organisation d'activités pratiques et ludiques avec des objets, se déroulant sous contrôle externe et avec la participation régulatrice de l'adulte, il a été possible de compenser le retard du développement psychologique des enfants, d'optimiser les interactions interpersonnelles et de réduire le niveau de frustration.

Conclusion. La formation d'un besoin stable d'utilisation des dispositifs numériques chez les enfants est une conséquence d'une codependance instaurée par les parents ou les principaux soignants.

Mots-clés: Développement; langage; dispositifs numériques; intervention corrective; approche historique-culturelle

Points principaux:

- L'intensité de l'utilisation des dispositifs numériques par les enfants dépend directement du modèle de comportement codependant instauré par les adultes référents.

- La stratégie corrective en cas d'utilisation excessive du téléphone portable par un jeune enfant doit reposer sur la transformation des schémas de communication dans la dyade «enfant — adulte».
- Dans le processus d'intervention corrective, l'instruction verbale doit être indissociablement liée à l'expression corporelle, aux mimiques, aux gestes et aux actions avec des objets.

Introduction

Currently, the excessive use of mobile media such as cell phones, iPads, and interactive displays is integrated inside and outside the home, becoming part of everyday life. While a few years ago, in different countries like the U.S., the use of this technology involved preschool children aged 4 and older, now all over the world we see infants as young as 4 months old or younger using these devices as true “digital natives” (García & Dias de Carvalho, 2022; Radesky & Christiakis, 2016). Therefore, it is considered that children born in the era of digital culture are prepared to face it, as if they had this ability “integrated” from birth or that evolution itself has changed the way of processing information, as well as interacting in society, which enables children’s manipulation of virtual media and their preference to use these instead of traditional toys and everyday objects. In this regard, researchers, such as Epstein et al. (2008), have found in young children a relationship of need with an overuse of computers and “smart” screens. This is worrying because when infants use these types of electronic devices for long periods of time, most of them present numerous problems including difficulties in relating to others, poor language development (Shakya & Christakis, 2017), less control of emotions, problems paying attention, sleep problems, motor skills, and problems with social and affective relationships (Teichert, 2020).

Asikainen et al. (2021), studied children aged 18 to 24 months who excessively used iPads, cell phones, and interactive screens, and found poor language development, as vocabulary had been reduced to 20 or fewer words. The children pointed to what they wanted instead of requesting it with words and, when they did, they showed problems articulating those words. In addition, they used isolated words instead of forming phrases and sentences. This led these researchers to deduce that children under 30 months could imitate movement or sign language, but could not learn new words. They also showed problems with tonality when speaking too loudly or too quietly because parent-child interactions were interrupted by phones, showing less sensitivity to the verbal and non-verbal needs of infants (Kildare & Middlemiss, 2017).

Skalická (2019) and McDaniel (2021), when working with children aged 4 and 6, observed the constant use of cell phones and iPads by caregivers who also offered these children the chance to use the caregivers own phones or iPad, noting that these infants had difficulties in controlling their emotions. Specifically, they threw tantrums more frequently, screamed or cried uncontrollably when caregivers tried to remove these devices, showing the impossibility of establishing positive emotional bonds.

Neira et al., (2022) reported that excessive use of screens causes a setback in the maturation of voluntary attention. They found that children's general field of vision and hearing is reduced as they focus only on light and sound in a reduced way on the screen of their digital device. Similarly, there is a suggestion that the use of the small screen gives an alternation in the focus of attention, with the child capturing much information only superficially. This in turn negatively affects retention, because the child gets used to perceiving many stimuli in a short period of time without reflection and without understanding it. Thus their attention cannot focus on a large space or in a certain time (Dadson et al., 2020; Mendieta, 2017; Suggate & Martzog, 2020). All of the above negatively influences the development of imagination and adequate motivation for social interaction (Reus & Mosley, 2019).

Some researchers report sleep problems in children who use virtual technologies. Children aged 4 months to 5 years who frequently or prolongedly use touchscreens have reported problems falling asleep or falling asleep, with fragmented sleep, nightmares, and decreased sleep quality and quantity. All researchers agree that bright light, and especially the blue light from screens, is the cause of this problem. This is because the brain classifies screen light as daylight, suppressing melatonin levels. This affects the circadian rhythm, elevating arousal levels, which in turn increase nocturnal alertness and reduce REM sleep time (Axelsson et al., 2022; Li et al., 2020; Paulich et al., 2021).

Regarding motor and social skills, Martzog (2022) found in a study conducted with 141 children that prolonged use of touchscreen devices can lead to problems with fine and gross motor skills, a fundamental prerequisite for learning and cognition. This can also be expressed in difficulties jumping, running, and properly grasping objects. Furthermore, there was poverty in their socio-affective relationships, because the minors did not ask for things but rather snatched them away. They did not appreciate the actions of adults, nor did they request attention in an affective way, which could be related to a lack of empathy that is not found in an artifact.

Obesity is another negative characteristic of children's development due to the use of technology. Sedentary lifestyles and increased body mass index have been found in a large majority of infants and preschoolers exposed to prolonged screen time on cell phones, iPads, and computers. Their lives lack an interactive or active physical component that favors walking and running skills. Another factor is that these types of devices offer excessive food advertising and decreased attention to satiety signals (Krynski et al., 2017; Madigan et al., 2019).

When reviewing various studies that reveal such prevalent problems with children, it is necessary to highlight the techniques used to address these types of issues and their possible resolutions or alternatives. Therefore, the objective of this article is to present the case of two 2-year-old children who attended a university clinic at UNAM in Mexico City. Both children did not speak correctly and did not pay attention to their families when they spoke. Furthermore, both children used cell phones to calm their frustration. This intervention is based on a historical-cultural approach, offering a perspective of positive modification of communication processes between children and adults from an early age.

Methods

Participants

The study participants are two 2-year-old boys from the urban sociocultural environment of Mexico City. The parents of both children reported significant delays in language acquisition and requested psychological support. Both children were born in 2019 and spent their first birthday under family confinement due to the global pandemic caused by COVID-19.

Case 1

K, a child, came to the psychological consultation at the age of 2.7 years. His parents requested the intervention because the child did not pronounce words correctly. He would interrupt words when hearing the others speaking and not use sentences such as: "I want water, can I have some milk?" He also took his mother's cell phone away to watch videos.

He was born in 2019. He had no problems during or after birth, with an Apgar score of 9/9. During the lockdown, the father worked, and the mother stayed home to care for the child. She said that her son was her life, that she lived only for him, and that he gave her direction in her life as a mother. For this reason, she entertained the child with anything he asked for, such as his cell phone. When we began working with K., the child didn't follow anyone's instructions; he did what he wanted, didn't speak, but understood what he was told, for example, "You can't go on the slide because it's wet." So, he approached the slide and touched it to feel the water. He then sat down on the bottom of the seesaw, and since he didn't move, and his mother didn't do anything to make him move, the boy stood up and went straight to hit her. He threw himself on the floor and began to cry. His angry mother immediately gave him the cell phone. The boy stopped crying, took the phone, and ignored any other stimulus or people. At mealtimes, his mother would sit him in front of the television, and if he didn't eat, she would feed him. At bedtime, the boy was given the cell phone so he could watch cartoons and programs where the actors went to bed.

Case 2

The child, L, came to the clinic at the age of 2.5 years. He was referred by a nursery teacher, whose opinion was that the child wasn't speaking enough for his age.

He was born in 2019. No problems were reported at birth, and he had an Apgar score of 9/9. During the lockdown, the parents worked from home for an online solution center, each separately. While working, they gave the child several toys and a cell phone for entertainment. The mother said she always had the child within sight. When work began with L, he was very eager to discover everything in the clinic. He didn't speak, only pointing. When he was given instructions or shown how to do things, he became upset and no longer wanted to be there. When he was upset or the mother was desperate with the child, she gave him her cell phone to calm him down. The child looked for videos and paid no attention to anyone around him. At mealtimes, he didn't want to sit at the table or eat with a spoon. He asked to be fed or

to eat things he could put in his mouth while continuing to look at his cell phone. At bedtime, the child would do so if he was given the cell phone to sleep with.

Procedure

Initial Assessment

After both mothers signed informed consent, the assessment of both children began in two 50-minute sessions, using the Portage Goals checklist, as it is based on normal growth and development patterns. This guide can be used with children from birth to 6 years of age, assessing self-help, motor development, language, socialization, and cognition. It established two observational assessment processes: a pretest to determine the Zone of Current Development (ZCD), and a posttest to demonstrate the children's progress.

The results of both children determined that their behaviors corresponded to the age of 1 year. This was because in socialization they could not play with another child because they were not allowed to be with them, they screamed if they saw another child or were running with their mother. They did not play with a doll and even when one was given to them they left it ignoring it. In language they could not say five different words. They did not obey two related commands such as "put the ball on the floor and kick it" They did not point to familiar objects such as a glass, a spoon, or a dog. They did not say their name. As to self-help, they could not eat alone with a spoon nor did they try to grab it. Neither could they lift a glass to drink water. They were unable to wet their face imitating an adult. Regarding cognition, they did not try to take objects out of a container one by one, nor could they point to parts of their body such as face, feet, or hands. As to motor development, they did not climb the stairs alone preferring to move away or shout for their mother to come to their help. They did not know how to roll a ball. They did not push each other around in ride-on carts, nor did they attempt to build a tower with three blocks.

Intervention

Based on the results obtained, an intervention program was implemented over three months, consisting of twenty-four 50-minute sessions, twice a week. The program was based on the concept of the zone of proximal development, which involves constant collaboration between the adult and the child in all the proposed tasks, showing them by example how to do them. In addition, the adults praised and showed affection to the child when they did the activity well. When one of the children did not do the activity well, the mother showed them how to do it while commenting on it. The program tasks were chosen based on Vygotsky and Elkonin's concept of the periodization of development, which involves the acquisition of practical actions with everyday objects and object play (Baltazar, 2019; Solovieva et al., 2018; Nikolaeva et al., 2023).

To teach them how to eat, drink water, wash their faces, and take off their sweaters, we told them the story of "Goldilocks and the Three Bears." We used puppets for each character, and a theatre made with a box and a curtain, which held their attention for three minutes. At the end of the story, we told them that we would be like one of the characters in the story, in this case Goldilocks. So, as our first activity, we went into

the bears' house, the bears having gone out for a walk. The corner of a living room was decorated, containing a preschool table and chairs, plates with cereal and milk, and a spoon by the side. The children were told that like the girl in the story we would eat the cereal, so all the adults took the spoon making slightly exaggerated movements so that the children could see them and try to imitate them, when they did so the mother gave them applause and a kiss telling them that they had done well. When they didn't do it, or couldn't, each mother showed her child, at the same time telling them how to do it. When the cereal was finished, or time was up (10 minutes), the children were told that they would drink a glass of water just like Goldilocks. Each child had to lift a small glass of water and take at least 3 sips by themselves. In the same way they were praised for doing it or they were shown by example, little by little how to do it.

For the next activity, they went to another corner of the room decorated as a bathroom, where there was a tray with water, a bar of soap and a towel. Here the children were told that just like Goldilocks, they would have to wash their face and hands and then dry them with the towel. However, in this part of the activity both children did not want to do the activity even though they were shown how to do it, so their mothers had to help them completely, showing them how their other classmates did it alone.

After 10 minutes, the program continued in another corner of the room — this time decorated like a bedroom. There was an imitation of a bed with a small blanket, the children were told that just like Goldilocks, they would now lie down in bed, but first, they had to take off their sweaters on their own. The mothers told them step by step what they had to do, and when they achieved it they hugged their children and told them that they were proud of them.

Next, in the center of the room, where there were tables and chairs for preschoolers, we asked them to sit down and talked with the children. We asked them what they had done with the spoon, if they had drunk the water, and if they could now put the sweater back on that they had taken off.

Afterwards, we gave them a sheet of paper and crayons and asked them to draw whatever they wanted using the crayons in front of them. Before drawing, the mothers asked the children, "What are you thinking of drawing?" This was done so that the children would generate a memory of what they did and capture it. Although at this age they only make lines that seem meaningless, when we ask them at the end of their drawing, "What did you draw?" the children even gave us some information about one or more lines.

Finally, to close the session, we all sang a farewell song. The mothers were given homework to do at home on the weekends. They were asked to play lottery, play memory games, put together puzzles, and teach the child to wash their hands or face. The purpose was to create family coexistence and teach the child at home to do some self-care activities.

Once a week, our sessions with our two case-study children were also held in conjunction with 20 other children who were also attending the clinic. The age range of these children was between 1 to 6 years old. Their parents also attended.

Two groups of 10 children and their parents were formed to carry out the activities in each group. The goal was for the older children to help the younger ones, for

the younger ones to ask for help, and for both to learn from each other. For example, the older children, encouraged by their parents, would ask the younger children for things, or babysit for them. The younger children would ask for help or ask the older children, and the older children would explain, for example, how to swing, climb a slide, or throw balls. The sessions were held throughout the clinic's spaces, including gardens and classrooms.

On another day of the week, we worked with just six children of the same psychological age, in this case between 1 and 2 years old, and their respective parents. The activities took place in a single space in the clinic.

In all sessions, the goal was to cover four novel actions. Each session began with a story to give the child and parent a general idea of what would be done throughout the session and to have the child begin by paying attention to the activity for three minutes. After the story, the child was told that we would pretend to be the protagonist of the story and, as such, would perform some action. His mother would show him how to do it if he couldn't, or congratulate him if he could. After 10 minutes, he was told that he was still pretending to be the protagonist of the story and would perform another action. Again, his mother was present to support or congratulate him.

After having performed four actions in total, feedback continued, where questions were asked to find out if the child had understood what they were supposed to learn. Following his answers, he was given a blank sheet of paper and his mother asked him what he was thinking of drawing. After two minutes, the mother asked him to explain the drawing. It's worth noting that during the first sessions, the children didn't say anything but gradually began to speak up. Finally, the session ended with a farewell song, so the child had a closing routine. Three weekend tasks were also assigned, so the children could spend time with the family, playing games, and teaching them some activities to help with self-care (see Appendix A).

Results

At the end of the 24 sessions and three months of care, the children were assessed again. The same tasks as in the initial assessment were administered during two 50-minute sessions.

The final evaluation data (see *Figure 1* and *Figure 2*) show significant progress in both children. They were now paying attention to stories for more than five minutes. They pointed to objects such as a sweater, a cup, and a backpack when adults asked them to. They made animal sounds such as dogs, cats, and cows. They were able to evoke some sounds such as rain and ambulances. They responded yes or no to questions such as "Do you want milk"? or "Have you finished your drawing"? They put on their own shoes, sweaters, and pants. They picked up a spoon to eat and could say sentences such as "I want milk" or "I don't want water", "Give me bread", or "Thank you". The children were able to build towers with wooden blocks. They drew vertical and horizontal lines and circles. They could hop on one foot in squares, walk in circles, and throw stones at triangles to play "airplane" In this game the child has to jump, either on one or both feet, on the cells drawn on the floor, according to verbal instructions and rules. They built a house for their teddy bears using boxes as blocks,

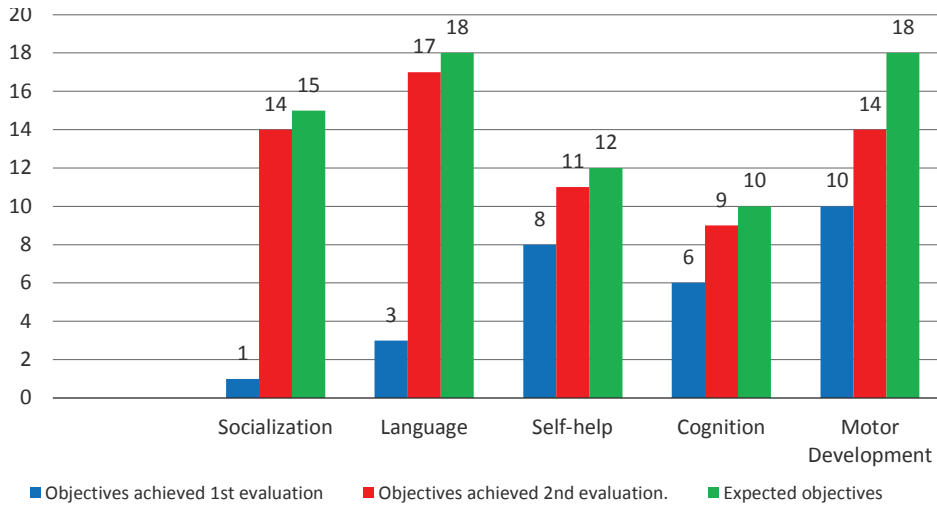


Figure 1. Results of child K. (2.7 years)

Note. The blue column shows the results of the child’s first assessment; socialisation is the least developed aspect of the child in this first phase. The gray column shows the expected milestones for ages 1 to 2, according to the Portage Guide. The third column, in orange, shows the child’s progress in the third month. We can see that Motor Development is the most impaired in this child’s development.

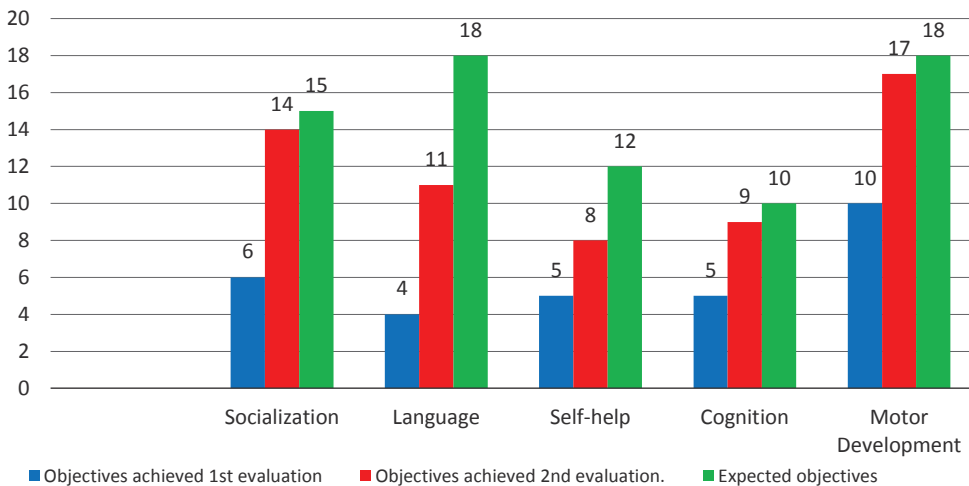


Figure 2. Results of child K. (2.5 years)

Note. The blue column shows the results of the child’s first assessment. The gray column shows the expected milestones for ages 1 to 2, according to the Portage Guide. The second orange column shows the child’s progress over the past month. This graph shows that language activity is the most impaired in this child’s development.

and they decided where their couch, stove, and bed would be. They could take a doll to a slide and push it down it.

L’s mother decided that her son had learned enough and spoke enough to enroll him in daycare, even though the child still didn’t speak enough for a one-year-old, according to the Portage Guide.

K’s mother decided to continue in the program because she saw that her son was having fun and enjoyed attending. She was also learning to get along better with her son, admitting that she played with him and read him stories at night.

Discussion

The results of the initial assessment, which allowed determining the degree of children's attention deficit disorder, are consistent with the literature, which indicates that children with prolonged use of virtual technologies show delays in their psychological development (Madigan et al., 2020; Varadarajan et al., 2021). What was observed in the children in this study was that they did not display the skills expected for 2-year-olds, despite being older than two years old. Their language displayed only a few isolated words with articulation problems, which is consistent with studies that found that young children addicted to digital screens consistently struggle to communicate adequately through language (Baltazar and Escotto, 2023; Yu et al., 2022; Kerai et al. 2022). This is because screens do not involve conversation, guttural movements are not observed, and they are not corrected. Aggressive behaviors were observed, such as hitting the mother to get her to pay attention to him instead of showing communicative initiative, because they had become accustomed to communicating in this way, that is, hitting the other to get her to pay attention to him.

Therefore, the data from the present study shows that these negative behaviors were always provoked by the same adults. For example, it was possible to observe that this behavior was reinforced by the same mothers who, instead of showing the child what to do, immediately handed the cell phone to their child.

Psychological development occurs as the historical-cultural experience provided and organized by the adults around children (Vygotsky, 1995). This is firstly, because the role of the adult is essential from birth, notably the inclusion of the child in positive and empathic emotional affective communication in the first year of life (Baltazar, 2024; Solovieva & Quinanar, 2021; Veraksa & Sheridan, 2018). Secondly the role of the adult in practical object-activity, for in cases of intense use of screens by children, there is always a similar use by their parents or primary caregivers (Campos-García & Solovieva, 2022; De Paula et al., 2023).

Conclusion

The results of the study showed the possibility of intervening in the development of young preschoolers with prolonged use of virtual technologies. Intervention programs should involve parents, addressing the needs of young preschoolers, such as the need for empathy during the implementation of practical and recreational activities under the guidance of their parents.

During the intervention, verbal guidance should be consistent with support through bodily expression, mime, gestures, and objects. The age of two is the appropriate period to ensure adequate intervention with positive results. Future studies should confirm the findings of this study and expand to a broader population of participants in different sociocultural settings. It is important to begin work on disseminating ways of organizing the coexistence of young preschoolers in families and institutions to ensure optimal psychological development of children and avoid the risk of language delays before the start of institutional preschool.

We found that the parents of the children in the cases did not demonstrate a positive initiative to communicate with their children. They did not know how to initiate

or maintain it, and they preferred their children to be entertained and cared for by the devices. When the children did not know what to do, they hit the parents, and the parents immediately gave them the cell phone instead of communicating with their child. It can be said that it is a vicious cycle, in which each family member chooses a simpler behavior that requires less communicative and empathetic effort. Similarly, if children have a strong need for screens or cell phones, it is because the parents or primary caregivers have created a codependency on them and use that time instead of giving it to their children.

Recommendations

The use of cell phones, iPads, and smart displays cannot be prohibited for minors, as they are part of our daily lives. What we need to do is teach children how to use them in the presence of an adult who communicates and guides them. The adults should establish the objectives for using the device and explain how to use it, without allowing it to become a device to soothe our loneliness or frustration.

Informed Consent from the Participants' Legal Guardians

Before participating, the mothers signed the informed consent form, which specified that their data will be always kept confidential and that their names will not be used.

Author Contributions

A. M. B. R. and Yu. S. designed and directed the project, developed the theoretical framework, performed the experiments, performed the analysis, drafted the manuscript and designed the figures. All authors discussed the results and contributed to the final manuscript.

Conflict of Interest

The authors declare no conflict of interest.

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Appendix A

Examples of activities with children

	Name	Goals	Materials	Activity	Time in minutes
1	Detectives (The children were dressed as detectives)	Pay attention	Storyteller dressed as a detective. Magnifying glass, binoculars, and paper lanterns.	A story was about a boy named Paco who became a detective. He used flashlights to search for marine animals. He also used magnifying glasses and binoculars to find them on farms because they hid very well, making it hard to see them. He went on tiptoe during his search so as not to make any noise. At the end of the story, the children were told that they would be Paco, like the boy in the story.	3
		Follow directions	Lamp, 6 plastic bags with drawings of sea animals, fruits, farm animals, and planet figures. A blue fish figure, a red apple, and a chicken glued onto a piece of cardboard. Star stickers	The children were told that, since they were now Paco, they would use their lamp to search for a blue fish, a red apple, and a chicken (similar to the ones shown on the wall). So, they had to put the lamp in each of the bags and move it very slowly. When they found one of the figures on the wall, they raised their hands and were given a star to stick on their shirts. If they had any problems, their mother showed them how to move the lamp.	10
		Walk on tiptoe	Magnifying glass made with yellow and blue cellophane paper, paper figures of sea animals, fruits, farm animals, planet figures	The paper figures were scattered around the playground, and the children were told that, since they were Paco, the boy in the story, they would use their magnifying glass to look for five different figures, but they had to tiptoe to avoid making noise. When they found one, they would put it in a bag provided for this purpose. Then they went into the classroom, took it out, and mentioned what they had found. If they had any problems, their mother showed them how to do a certain activity.	10
		Follow directions	Binoculars made of cardboard. Cardboard with figures of marine animals, fruits, farm animals, figures of planets.	The children were told that since they were still Paco, the boy from the story, they would now stand on the red line and, using binoculars, find a little red fish on the cardboard placed two meters away. When they found it, they would lower their binoculars and go to the shape and point to it. Then they had to find a cow, a star, or a bunch of grapes, using the same procedure.	

Name	Goals	Materials	Activity	Time in minutes
			If they had any problems, their mother would show them how to do a certain activity.	10
	Walk on tiptoe	Figures of marine animals, fruits, farm animals, planet figures	The different figures were scattered around the yard, telling the children that since they were still Paco, the boy from the story, they now had to choose the figures they liked best. They could look at them with their magnifying glass or binoculars, but to avoid stepping on them, they had to tiptoe. If they had any problems, their mother showed them how to do it.	10
	Feedback And know what goals he achieved on his own	Materials used in the session	The child was asked what he did to find the little blue fish, how he had to walk around the yard to avoid stepping on the figures.	3
	Feedback and memory	A white sheet of paper and crayons	With the sheet of paper on the table, Mom would ask the child what he was thinking of drawing. When he finished or after 2 minutes, she would ask him to tell her what he had drawn.	3
	Farewell	Farewell song	That the child had an end-of-session routine.	1
2 Circus (The children arrived dressed as clowns)	Pay attention for 3 minutes	Storyteller dressed as a clown, balls, hoops.	A story was told, showing how he played and placed balls that matched the colours of the hoops; he differentiated between large and small balls. At the end of the story, the child was told that he would be like the clown in the story.	3
	Identify colours	Hoops and balls of different colors.	The child was reminded that he was like the clown in the story and Dad or Mom showed the child where to place red, blue and yellow balls in red, blue or yellow hoops.	10
	Differentiate between big and small	Big and small balls on top of boats and chairs	The child was reminded that he was like the clown in the story and Dad or Mom showed the child where to throw big balls and put small balls in the chair.	10
	Identify colours	Colourful balls, clown face with mouth opening and red, blue, yellow hat	The child was reminded that he was like the clown in the story and Dad or Mom would show the child where to throw red balls into the mouth of the clown with the red hat, etc.	10

Name	Goals	Materials	Activity	Time in minutes
	Differentiate between big and small	Large and small inflated balloons, red, blue, and yellow Box, red, blue, and yellow	The child was reminded that he was like the clown in the story, and Mom or Dad showed him how to blow up the small red balloon and get it into a red box. Kick the big red balloon and get it into a red box, etc.	10
	Feedback And know what goals he achieved on his own	Materials used in the session	The child was shown two sizes of balls: Which one was big, and which one was small? Which one was red or yellow?	3
	Feedback and memory	A white sheet of paper and crayons	With the sheet of paper on the table, Mom would ask the child what he was thinking of drawing, when he finished or after 2 minutes, she would ask him to tell her what he had drawn.	3
	Farewell	Farewell song	That the child had an end-of-session routine.	1
3	Pay attention for 3 minutes	Plastic figures of a train, a boy, a donkey and a doctor.	A story was told about a boy named Juanito who listened to songs about a train and a donkey and did what the songs said. At the end of the story, he was told that he would be Juanito, like the boy in the story.	3
	Say 3 words	Horn. "Joy Train" song Train made of cardboard boxes	The child was told that he was like Juanito in the story, so he had to pull the train. Parents would show the child how to pull the train while the song was being sung.	10
	Putting objects into boxes Pulling or pushing boxes	Cardboard box train Ping pong balls, stuffed animals, small toys	The child was reminded that he was like Juanito in the story, so he had to put the train in. Parents would show the child how to put objects in each of the boxes so that he could pull or drag the train for approximately 2 meters.	10
	Say 3 words	Pictures of a donkey, a hat, cherry syrup, lemon juice, and a white scarf will be in a basket. Horn Song ¹ :	The child was reminded that he was like Johnny in the story, so he had to put what the doctor prescribed for the donkey on the train. The song paused where the donkey's prescription was mentioned. With Mom's help, he chose the relevant object, was asked what he had heard, and then was asked to pay it to the donkey perched on a wall. This continued until he finished with the objects in the basket.	10

¹ <https://www.youtube.com/watch?v=aBNtjSLaowA>

Name	Goals	Materials	Activity	Time in minutes
	Put objects in boxes	Pictures of a donkey, a hat, cherry syrup, lemon juice, and a white scarf will be in a basket. Horn Song ² :	The child was reminded that he was like Juanito, the boy in the story. He listened to the song again. He paused at each part that mentioned what the donkey was supposed to eat, but now with Mom's help, he detached each object from the donkey and put it in the basket. This continued until the song and the objects ended.	10
	Feedback And know what goals he achieved on his own	Materials used in the session	He was asked to name 3 objects he worked with during the session and asked to put them in a box.	3
	Feedback and memory	A white sheet of paper and crayons	With the sheet on the table, mom would ask the child what he was thinking of drawing, when he finished or after 2 minutes, she would ask him to tell her what he had drawn.	3
	Farewell	Farewell song	The same song was always sung with the child so that he had an end-of-session routine.	1
4 My Grandfather's Farm (The boy was dressed as a farmer)	Pay attention	Children's puppets, chickens, cows, sheep, pigs, rabbits, alfalfa, carrots, corn, milk, cheese, and a scarf.	A story was told: Don Juanito went to his grandfather's farm and made pairs of animals, identified their sounds, fed them and learned what each of them produced.	3
	Find the pair	Stuffed animals of 2 cows, 2 chickens, 2 sheep, 2 pigs, and 2 rabbits. Boxes that simulate the animals' pens.	In each box, only one different animal was placed, and in another place, the animals were placed together. The children were told that they were now like Juanito, the boy in the story, and that they had to find the pair of animals, just like in the story. If they had any problems, their Mom would show them which one it was and why.	10
	Identify sounds	A horn Stuffed animals Farm animal sounds	One animal was taken from each of the boxes; they were told that they were still like Juanito the boy in the story, and that they would now pick up the animal they heard and have to take it back to its animal companion. If they had a problem, their Mom would show them what it was and why.	10

² <https://www.youtube.com/watch?v=aBNtjSlAowA>

Name	Goals	Materials	Activity	Time in minutes
	To identify the sound of animals and imitate them	A horn Stuffed animals Farm animal sounds: corn, carrots, alfalfa	They were told they were still Juanito, the boy from the story, and it was time to feed the animals, but they had to make the sound of the animal they heard and say its name. If they had any problems, their Mom showed them what it was supposed to be and why.	10
	Identify the sound of animals	A horn Stuffed animals Farm animal sounds. Milk, cheese, eggs, scarves	They were told they were still Juanito, the boy in the story. They were shown a product derived from farm animals. At the same time, they heard the sound, and the animal was shown to them, and they had to name it. If they had any problems, their mother showed them what it was and why.	10
	Feedback know what goals he achieved on his own	Materials used in the session	They were shown to the three farm animals, asked to imitate the sound each one made and to tell us the name of the animal.	3
	Feedback and memory	A white sheet of paper and crayons	With the sheet on the table, Mom would ask the child what he was thinking of drawing, when he finished or after 2 minutes, she would ask him to tell her what he had drawn.	3
	Farewell	Farewell song	The same song was always sung with the child so that he had an end-of-session routine.	1

Note. Prepared by the authors. Four sessions conducted with the children are illustrated.