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Influence of Family Upbringing Factors on the Development of Digital Skills of a Child with Mental Retardation

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Abstract

Introduction. The article is devoted to the problem of mediating the development of digital skills of a child with mental retardation in the conditions of family upbringing. Family upbringing factors have a significant impact on the process of developing these skills in children: material and technical equipment of the family, parents' media activity and their digital skills, digital parental mediation strategies, parents' attitudes towards the possibilities of the digital environment in the child's socialization. The relevance and novelty of this study lies in describing a number of factors of family upbringing and identifying their relationship with digital skills of a child with mental retardation. **Methods.** Two groups of parents participated in an online survey: those raising children and adolescents with mental retardation (N = 42 people) and parents of normally developing children and adolescents (N = 52 people). **Results**. The study showed that parents raising children with mental retardation are characterized by less media activity, predominance of communicative motive of Internet activity, and greater awareness of children's practices in the digital environment. At the same time, parents of children with intellectual disabilities use digital mediation strategies less often, and trust the Internet less as a source of development of cognitive sphere and formation of children's information processing skills. Parents of children with disabilities rate their digital skills higher than those of their children. The study proved the correlation of digital skills of a child with mental retardation with some factors of family upbringing. **Discussion.** The correlations found between the digital skills of children with mental retardation and the digital skills of parents, the number of digital devices in the family, and the availability and quality of

these digital tools indicate the need to develop and implement programs to educate parents, develop their digital skills, and master various digital mediation strategies in the process of raising a child with mental retardation.

Keywords

digital skills, digital divide, mental retardation, child with mental retardation, Internet space, media activism, digital parenting strategies, socialization

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Introduction

Digital environment is a space that provides conditions for compensating existing deficits, acquiring and expanding communicative experience, receiving education, and developing interests. The attention of researchers to the problem of digital skills of a child with mental retardation is determined, on the one hand, by the increased importance of the digital environment, and on the other hand, by the specific socio-psychological conditions of family upbringing and the reduced ability to develop cognitive skills in children of this group.

Digital skills

Digital skills reflect the ability to use skills and knowledge in analyzing, selecting and making sense of data (Trofimova, 2021). These are skills that allow "to *form and distribute digital content, ensure cooperation and collaboration and solve different kinds of problems in the framework of successful creative self-realization, education, work and social activity*" (Khablieva, 2022, p. 37).

Digital technologies and persons with disabilities

The significant role of digital skills and accessibility of digital technologies for persons with disabilities (hereinafter referred to as disabled persons) for their equality, achieving independence is emphasized in various foreign studies (Khanlou, Khan, Vazquez & Zangeneh, 2021; Sallafranque-St-Louis & Normand, 2017; Lussier-Desrochers et al., 2017).

Digital technology now offers individuals with developmental disabilities many more opportunities to compensate for their disabilities than ever before (Khanlou et al., 2021). The degree of digital skill development, interface sophistication, and accessibility of digital devices have been identified as critical factors for the social and economic inclusion of individuals with developmental disabilities (Khanlou et al., 2021). Social media has a powerful communicative resource and can greatly facilitate individuals with intellectual disabilities to develop relationships, thereby reducing their social isolation (Sallafranque-St-Louis & Normand, 2017). However, a 'digital divide' in the use of information and communication technologies can form between people with intellectual disabilities and others (Lussier-Desrochers et al., 2017).

Russian science also considers the advantages of using digital technologies in the correctional and educational process of persons with disabilities and, at the same time, emphasizes the difficulties and risks of their use (Volkova, Pisarenko, 2017; Volkova, Koroleva, Bogdanovskaya, Ikonnikova & Mashkova, 2019).

Virtual communication of persons with intellectual disabilities is "an adaptive and compensatory resource that helps to overcome communication difficulties" (Volkova et al., 2019, p. 100), and digital technologies for children and adolescents with disabilities can be "a significant factor in compensating for the consequences of their sensory, emotional, cognitive and social deprivation" (Volkova et al., 2019, p. 103), have a positive impact on education in general (Tokareva, Malyarchuk, 2021). At the same time, there are invariably difficulties associated with the organization of training of persons with disabilities with the use of digital technologies.

An obstacle to the full integration of a person into the digital society is the lack of digital skills, which, according to M.V. Tokareva and N.N. Malyarchuk, are not formed in the process of education in children with mental retardation. Children with mental retardation often "do not possess even a basic set of digital competencies" (Tokareva and Malyarchuk, 2021, p. 187). Despite this, adolescents and young men with mental retardation more often than representatives of other nosological groups visit dating sites, which indicates that, although poorly realized, there is a motivation to communicate in an online context (Kuzmina, 2020).

In addition, individuals with disabilities, compared to their normatively developing peers, are "more prone to problematic Internet use" (Volkova et al., 2019, p. 112). Unsupervised Internet use does contain many risks, especially for individuals with cognitive impairments, who are characterized by impulsivity, reduced ability to exercise self-control (Good & Fang, 2015).

Various aspects of the development of digital skills of a child with mental retardation are reflected in a number of works by domestic scientists and, as a rule, they are associated with the specifics of their psychophysical development (Tokareva and Malyarchuk, 2021), with the competencies of teachers and the quality or imperfection of applied computer technologies due to the lack of their adaptation to the needs and capabilities of persons with disabilities (Kovbasa, Popova, 2021; Sayfutdiyarova, Fatikhova, 2017), with the emergence of risks: online aggression, Internet addiction and victimization of the individual in the process of using digital tools (Volkova et al., 2019; Kuzmina, 2020; Kuzmina, 2021). The reason for the high level of riskiness is often low computer literacy and uncontrolled use of the Internet by children and adolescents with disabilities.

Digital parental mediation

The development of digital skills in a child with mental retardation is carried out in specific conditions and requires more active involvement of parents. The problem of Parental mediation or mediation, which is understood as a set of parental strategies to benefit and minimize the risks of using modern digital tools (Zaman, Nouwen, Vanattenhoven, Ferrerre & Looy, 2016) is widely presented in foreign studies (Wolfers, Kitzmann, Sauer & Sommer, 2020; Üstündağ-Alkan, Aslan, Turgut & Kurşun, 2021; Yuen, Park & Cheng, 2018; Caivano, Leduc, & Talwar, 2020) and in some domestic studies (Seck, Kakady, 2020; Pisarenko, Zaichenko, 2021; Soldatova, Nestik, Rasskazova, & Zotova, 2013).

Parental mediation of children's use of digital devices has come to be seen as a "new" and "specific" type of parenting at the present stage (Nikken, 2017). The traditional classification of parental mediation strategies includes three main types: restrictive mediation, which involves strict control and restrictions; active mediation, which is based on discussion and conversations about the content viewed; and collaborative use, in which parents shape the child's interest, participate together in playing games and exploring content (Zaman et al., 2016). A restrictive strategy can be a technical restriction, such as blocking websites, and a social restriction involving digital bans and time control.

However, there are not enough works in the scientific literature aimed at studying the relationship between the digital skills of a child with mental retardation and parental mediation, as well as other factors of family upbringing. Partially the problem of digital parental mediation is considered in the works of T. I. Kuzmina (2020; 2021), in which attention is paid to the function of parental control. The process of digital skills development in the family environment is not limited to the influence of parents' mediation strategies on it, so other factors should be considered as external (family) factors mediating the process of using digital devices by the younger generation and the development of their digital skills.

The digital development of a modern child is carried out so rapidly that very quickly they begin to surpass their parents in terms of digital competence, which forms a digital gap between generations (Soldatova et al., 2013; Deursen & Dijk, 2014), which

negatively affects the educational process and the system of interpersonal relations, as the universality of the parent is reduced (Seck & Kakady, 2020), and, therefore, the need to develop digital skills not only for adolescents, but also for their parents is formed (Soldatova & Rasskazova, 2014). An important factor that has a significant impact on the child's behavior in the digital environment is the parents' attitudes towards technology (Lauricella, 2015), as well as attitudes towards the possibilities of the digital environment to solve the child's socialization issues (Pisarenko and Zaichenko, 2021).

The material and technical support of the family can also be considered as an important factor that creates conditions for the child to interact with the digital environment and develop appropriate skills. Under logistical support we understand the number of digital devices (computer, tablet, laptop), their availability and quality. With a large number of electronic devices in the family, parental control over the use of these devices by children is weakened (Klimenko, Savenysheva, 2020).

The main family factors influencing a child's interaction with the digital environment and the development of digital skills are family logistics, general aspects of parents' media consumption (Internet activity, motives for media consumption) and their digital skills, as well as peculiarities of parental mediation and their attitudes towards the digital environment. The latter is also related to the peculiarities of parents' perception of their children's capabilities. Thus, parents often overestimate the capabilities of their children with disabilities, which leads to setting unattainable goals for them (Kiseleva, Rogunova, 2022) or unrealistic and distorted perception of their children's individual characteristics (Zhiginas, Grebennikova, Shelekhov, 2020).

The purpose of the empirical study is to identify the characteristics of different factors of family upbringing and to examine their relationship with the level of digital skills of a child with mental retardation.

Methods

Parents with children between the ages of 7 and 15 participated in the survey:

- The experimental group (EG) was parents (n = 42) raising children and adolescents with mild mental retardation, studying under the adapted basic general education program (variant 1);
- Control group (CG) - parents of students with normal development (n = 52).

The age of parents in both groups is represented by approximately the same distribution. The average age of parents in the experimental group was 39 years, standard deviation $\pm$11.7, and that of parents in the control group was 36 years, standard deviation $\pm$10.2. Among the families raising children and adolescents with normal development, complete families predominate (84.6%), while in the experimental group 45.2% of complete and 42.8% of incomplete families, 12% of children are raised by guardians.

The main method was an anonymous survey of parents via Google Forms. Survey structure: the questionnaire included 20 questions divided into the following blocks:

- *socio-demographic indicators of the family* (gender and education of the parent, age of the child, locality of their residence);
- *material and technical equipment* (number of information devices in the family, their quality and accessibility for parents and child);
- *Self-assessment of parents' digital skills and assessment of their children's skills;*
- *general aspects of parents' media consumption* (time spent in the digital space, number of subscribers/friends in the social network, motives for parents' activity in the Internet space);
- *features of parental mediation and their attitudes towards the potential of the digital environment to address issues of child socialization.*

The Fisher angular transformation test was used to compare samples by frequency of occurrence of the effect of interest, the Mann-Whitney test was used to compare samples, and correlation analysis was performed on the basis of the Spearman criterion.

Results

Among the parents of both groups the majority of respondents are female (EG – 85.7%, CG – 88.4%). The respondents live in the territory of the Orenburg Oblast, the Republic of Bashkortostan, Moscow and St. Petersburg.

Parents' educational backgrounds are presented in Table 1.

Table 1
Education of parents of experimental and control groups (in %)

Level of education	Parents of students with mental retardation	Parents of students with normal development
General secondary education	6	1,5
Secondary vocational education	50	13,6
Incomplete higher education	16,6	1,9
Higher education	28,6	82,6

Analysis of the results of the study of socio-demographic indicators of families has shown that the level of education of parents raising children with mental retardation is lower than the level of education of parents of children with normal development.

The results of the assessment of the logistical provision of the family with digital tools are presented in Table 2.

Table 2

Assessment of the material and technical provision of the family with digital means (in %)

Answer options	Parents of students with mental retardation	Parents of students with normal development
Indicate the number of digital devices in the household (computer, tablet, laptop, etc. - except phones)		
1	31,1	40,4
2	35,7	36,5
3	19	15,4
4	7,1	5,8
5	7,1	1,9
Evaluate the availability and quality of modern information devices you use (smartphone, PC, tablet, etc.) (on a 5-point scale, where 5 is a high level and 1 is a low level).		
5	52,4	38,5
4	16,7	34,1
3	14,3	21,2
2	7,4	1,9
1	9,5	3,8
Rate the availability and quality of modern information devices (smartphone, PC, tablet, etc.) used by your child (on a 5-point scale, where 5 is high and 1 is low).		
5	50	38,5
4	11,9	40,4
3	19	13,5
2	11,9	5,8
1	7,1	1,9

The number of digital devices (computer, tablet, laptop) in families raising children and adolescents with mental retardation is slightly higher (average number of devices per family – 2.2 devices) than in families raising children with normal development (average number – 1.9 devices).

Subjective assessment of parents' satisfaction with the indicator of accessibility and quality of modern information devices used shows that about 70% of parents of both groups are sufficiently satisfied. There are more parents of the experimental group, who evaluate this indicator for themselves and their children as high as possible (5 points), and on the contrary, very low (1 point) than parents of the control group (the reliability of differences is not confirmed). At the same time, 4.8% of parents note that their children do not have their own phone and/or device with Internet access.

The level of parents' activity in the Internet space was determined on the basis of the parameters proposed in the study by A. I. Luchinkina. I. Luchinkina's parameters for taking into account the time of stay (Luchinkina, 2014). The results are presented in Table 3.

Table 3

Results of the study of general aspects of media consumption of parents of the experimental and control groups (in %)

Activity level	Answeroptions	*How much time do you spend daily in the Internet space (messengers, social networks, websites, etc.)?*	
		Parents of students with mental retardation	Parents of students with normal development
very high	Practically all day long.	0	7,7
	8 hours or more	7,1	3,8
high	About five hours	16,7	15,4
average	2-3 hours	31	46,2
	About 1 hour	31	23,1
low	Not every day.	14,3	1,9

Activity level	Answeroptions	*How much time do you spend daily in the Internet space (messengers, social networks, websites, etc.)?*	
		What is the number of followers/friends you have on the social network you are most active on?	
	Up to 10	26,2	17,3
low	10 to 30	14,3	17,3
	30 to 50	16,7	15,4
	50 to 100	26,2	11,5
average	100 to 200	7,1	19,2
	200 to 500	4,8	9,6
high	500 to 1,000	2,4	5,8
	From 1,000 to 1,500	0	0
very high	1,500 to 2,000	0	0
	More than 2,000	2,4	1,9

Parents bringing up a child with mental retardation, in terms of time spent in the Internet space, insignificantly differ in their activity compared to parents with normally developing children (the reliability of differences is not confirmed). Thus, a low level of media activity is characteristic only for 14.3% of EG parents and for 1.9% of CG parents.

The results of the assessment of parents' motives for activities in the Internet space are presented in Table 4.

Table 4

Results of the study of parents' media consumption motives (in %)

Answer options	Parents of students with mental retardation	Parents of students with normal development	$\varphi^*_{эмп}$ (0,01)
What do you do most often on the Internet? *(the most popular motives for activity in the digital environment are presented)*			
Socializing with loved ones, friends	73,8	46,2	2,757
Looking for information about what I care about at the moment	66,7	55,8	–
I go in to buy something, to order something	50	63,5	–
I read the news, I watch the conversations	52,4	53,8	–
Looking for information for work or study	50	51,9	–
Looking for information that is needed for my child (help with learning, homework)	40,5	53,8	–
I watch movies, series, films, programs.	35,7	34,6	–

Answer options	Parents of students with mental retardation	Parents of students with normal development	$\varphi^*_{эмп}$ (0,01)
Seeking information needed for my child's education and development	31	19,2	–
I use e-mail	21,4	57,7	3,678
Self-development	16,7	44,2	2,955

There are no differences between the groups in the frequency of occurrence of educational and professional ("I look for information for work or study"), cognitive ("I read news, watch discussions"), situational ("I look for information about what concerns me at the moment") and entertainment ("I watch movies, serials, films, programs) motives of media consumption in parents' answers. The most expressed motive among parents of students with mental retardation is the communicative motive ("I communicate with relatives and friends"). Parents of the control group have the most expressed motive of self-development and use of e-mail, which is most likely due to the need to realize professional tasks.

Analysis of answers to the open-ended question: "What actions do you take to protect your child from harmful information on the Internet?" allowed us to identify the following groups of mediation strategies:

active positive strategy (conducting conversations, explanations, discussing the choice of material to view on the Internet) - 28.5% in EG and 42.3% in CG;

restrictive strategy (technical limitations): blocking sites, installing special programs – 30.9% in EG and 44.2% in CG;

restrictive strategy (social restrictions): prohibition of use - 9.5% in EG and 3.8% in CG, time restriction - 6.9% in EG and 9.6% in CG, control and viewing of information – 9.5% in EG.

9.5% of parents of students with mental retardation and 3.8% of parents of normatively developing children do not use any actions to protect their child from harmful information;

2.3% of EG parents claim that their child does not use the Internet; 7.6% of CG parents did not provide an answer to this question. 3.8% of CG parents use the strategy of active inclusion of the child in different activities (creativity, sports), and 2.3% of EG parents prefer sharing devices.

The results of the survey on other aspects of digital mediation for parents are presented in Table 5.

Table 5

Features of digital parental mediation (in %)

Answer options	Parents of students with mental retardation	Parents of students with normal development
Evaluate your awareness of the sites your child visits (on a 5-point scale, where 1 is low and 5 is high)		
5	42,9	23,1
4	23,8	30,8
3	21,4	30,8
2	2,4	13,5
1	9,5	1,9
Do you control what and how much time your child does on the Internet?		
Yeah, always.	45,2	13,5
Yes, but it's not always possible	50	82,7
No, there's no way to control that	0	3,8
The child doesn't use the Internet	2,4	0
The child is in control of himself	2,4	0

Answer options	Parents of students with mental retardation	Parents of students with normal development
Rate your digital skills (on a 5-point scale, where 1 is low and 5 is high)		
5	35,7	26,9
4	26,1	38,5
3	26,1	28,8
2	9,5	1,9
1	2,3	3,8

Both higher ratings of one's awareness of sites visited by the child and lower ratings are more common among parents raising a child with mental retardation, emphasizing the heterogeneity of the group.

Parents raising children and adolescents with mental retardation, compared to parents of the control group, are more often categorical about controlling their child's activities on the Internet and confident in the possibility of such control ($\varphi^*_{эмп}$ = 3.485; $U_{Эмп}$ = 722, p ≤0.01). The majority of parents raising children and adolescents with normal development are involved in controlling their child's activities in the digital environment, but realize that their abilities in this matter are limited.

Parents' self-assessment of their digital skills showed that a higher number of parents in the experimental group attributed a high level of their development compared to the control group.

Parents of the experimental group evaluate their digital skills higher than those of their children, which is quite natural and can be explained by underdevelopment of thinking operations, weakness of motivation, underdevelopment of self-control, and lack of initiative of children and adolescents with mental retardation. 33.3% of parents believe that their digital skills are higher than those of their children, and 16.6% of parents believe the opposite, thus emphasizing the idea of a digital generation gap. Among parents of normatively developing children, 19.2% of respondents confirm the digital divide.

The results of the study of parents' attitudes towards the Internet resource for solving child socialization issues showed that there are significant differences in attitudes between the groups of parents. Parents raising children and adolescents with mental retardation have more trust in the Internet as a platform to develop diligence (reliability of differences with the control group ($U_{Эмп}$ = 728, p ≤0.01). And parents raising children with normal development have more faith in the Internet as a source that creates conditions for the formation of information processing skills ($U_{Эмп}$ = 727, p ≤0.01).

The results of correlation analysis of the indicators are presented in Table 6.

Table 6

Results of correlation analysis of family upbringing factors and digital skills of children with mental retardation (p ≤0.05)

	Parents' digital skills	Accessibility and quality of modern information devices used by the child	Number of digital devices in the household
Digital skills of children with mental retardation	$r_{s=}$ 0.506	$r_{s=}$ 0.41	r_s = -0.58

The study confirmed the correlation between the level of digital skills of children with mental retardation and the factors of family upbringing (digital skills of parents themselves and logistical provision of digital tools).

Discussion

The results of the study showed significant variation in such factors of family upbringing as material and technical support and socio-demographic indicators of families raising children with mental retardation. Thus, there is a large number of single-parent and large families, and most parents have secondary vocational education. The low general educational and cultural level of families raising a child with mental retardation has long been known due to studies in this area (Shipitsyna, Sorokin, 2008; Koroleva, 2014), but a comparison of data obtained in different years with the results of this study shows significant changes in the status of modern families towards their improvement.

Analysis of the material and technical provision of families shows that parents raising a child with mental retardation are quite satisfied with the availability and quality of modern information devices. Moreover, the number of digital devices in these families

is somewhat higher than in families raising children with normal development. This can be explained by the number of children: thus, the number of large families (3 or more children) in the experimental group amounted to 40.3%, while in the control group – only 15.2%.

The absence of their own phone among children with mental retardation may be related to the material and technical level of family life, as well as to the system of parents' restrictions on the use of digital means by their children. In general, it is possible to note a high variability of material and technical provision of digital means for families raising children with mental retardation. In the study by I.N. Nurlygayanov and E.N. Solomina (2022) noted that the greatest difficulties in organizing distance learning with students with mental retardation are the difficulties of the material and technical plan: the absence or lack of technical means is emphasized by 48.8% of teachers-oligofrenopedagogues, the difficulties in using technical equipment by the students themselves are considered by 25.5% of teachers.

The specifics of the activity of parents of students with mental retardation in the sphere of media consumption is characterized by a slightly reduced activity compared to the activity of parents of the control group, as well as the presence of specific motivation. The prevalence of the communicative motive in the parents of the experimental group over the others may be the fact of manifestation of the rehabilitation activity of the family, aimed at finding moral and social support, expressing an active position in establishing and maintaining contacts with the surrounding people. Communication skills are the most important component of the rehabilitation culture of the family of a child with disabilities and allow to establish relationships, resolve conflicts, etc. (Starobina, 2018).

The motive of self-development is much less frequent in the experimental sample, which, together with parents' lower activity on the Internet, is a factor weakening the digital potential of the family. It is known that parents' behavior is a role model for their children. Parents' attitudes towards digital devices, time of use, and motives for their online activities can significantly determine not only the nature of their mediation, but also set the vector of their children's digital activities. Evidence for this is the correlation between the digital skills of children with mental retardation and those of their parents. "Parents' help and their digital competence" are significant factors in "the development of children's digital skills and cybersocialization" (Pisarenko, Zaichenko, 2021, p. 59). The work of G.F. Bedulina and S.A. Lazukov (2020) also proves the influence of parents' digital skills and the nature of their media activity on adolescents' socialization in the conditions of information society.

Parents of students with mental retardation tend to evaluate their digital skills highly, despite the fact that their level of education is rather low. Such a distorted view of their skills is most likely determined by not very high requirements to them. It is also possible that their high estimation arose against the background of comparison with the digital skills of their own child.

Despite the child's intellectual disabilities, 16.6% of parents noted a higher level of development of digital skills in their children, which seems to "fit" into the general idea of the digital divide between children and their parents (Soldatova, Rasskazova, 2014; Deursen & Dijk, 2014), but in this situation rather states the fact of overestimation or distortion in the perception of their child's abilities.

Parents of children with mental retardation monitor their children's Internet time to a much greater extent than parents of children with normal development. However, parents of normally developing children use a restrictive strategy and an active positive strategy to protect their child from harmful information more often. This illustrates the fact that parents of children with mental retardation underestimate their role as mediators in this issue and the difficulties in selecting adequate educational strategies, including in the sphere of digital socialization of a child with mental retardation.

As the results of our study show, a large number of electronic devices in the family negatively affects the level of digital skills of children themselves: a strong negative correlation between children's digital skills and the number of digital devices in the family was confirmed. At the same time, a positive correlation was found between the digital skills of children with mental retardation and the availability/quality of modern information devices used by the child.

The distrust of parents of students with mental retardation to the Internet space in solving such socialization tasks as the development of cognitive sphere and the formation of information processing skills is quite logical. However, this may indicate that parents underestimate the digital environment for solving the tasks of compensating for the existing deficits of a child with mental retardation and the ineffectiveness of digital parental mediation strategies. This is confirmed by the results of a study by T. I. Kuzmina (2020; 2021), who notes that only 18.4% of parents block "harmful" sites; 40.5% of parents of adolescents with mental retardation do not limit the time spent online.

Conclusion

The analysis of the study results reveals differences between the experimental and control groups of parents in terms of the degree of development of their own digital skills, the level of their activity in the digital environment and media consumption motives, the digital mediation strategies used and attitudes towards the possibilities of the digital environment in the process of the child's socialization. The leading factors of family upbringing that have a significant impact on the process of developing digital skills of children and adolescents with mental retardation are the digital skills of the parents themselves, the number of digital devices (computer, tablet, laptop) in the family, as well as their quality and accessibility for the child.

Research Perspectives

The present study does not exhaust the stated problem. Further work involves identifying other factors of family upbringing and expanding the research sample to include parents raising children of different nosological groups. The results of the study will make it possible to develop and implement programs to educate parents and train them in digital mediation strategies to improve the conditions of family upbringing and create the necessary basis for socialization of a child with disabilities in a digital society.

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Conflict of Interest Information

The author has no conflicts of interest to declare.