

Research on the Utilization Status and Proposals of Information-based Educational Resources for Families of Children with Autism in China

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Abstract

With the development of science and technology, information-based educational resources play an important role in promoting educational fairness and improving educational quality. In this study, the families of children with autism in China were investigated by questionnaires and interviewed by individual case. The main findings of the study are as follows: (1) Families of children with autism have the basic conditions to use information-based educational resources. (2) Families of children with autism have less access to and use of high-quality information education resources. (3) The effect of applying information-based educational resources to family education of children with autism needs to be improved. (4) There is urgent need to develop and integrate the high-quality information-based educational resources to serve the family education of children with autism. On this basis, this paper puts forward some Proposal to promote the utilization of information-based educational resources for families of children with autism.

Keywords

Information-based educational resources; Children with autism; Family education.

1. Introduction

Autism spectrum disorder is a widespread neurological development disorder, the core of which is the persistent defect of social interaction and communication, and the repetition and limitation of behavior patterns and interest activities [1]. In recent years, the average prevalence of autism spectrum disorders is between 0.8% and 1.6%, the ratio of male to female is 4:1, and the number of patients is increasing at an annual rate of 10%-17%. According to the latest data from the American Centers for Disease Control and Prevention in 2020, the incidence of ASD among 8-year-old children in the United States was about 1.85%, that is, one out of every 54 children was diagnosed with ASD [1]. Studies have pointed out that there are more than 10 million autistic people in China, and 2 million children aged 0-14 are sick, and this number is increasing year by year [3]. The language, social and behavioral disorders of children with autism not only have a serious negative impact on their healthy growth but also bring great troubles to their families. Relevant research shows that families with children with autism in China often face many difficulties and challenges when raising autistic children, and bear tremendous pressure and burden, which leads to problems such as excessive anxiety of body and mind, financial difficulties of families, and breakdown of the marriage relationship [4] [5]. At the same time, many parents in China have pinned their hopes on the education and rehabilitation of children with autism in schools or institutions, but neglect the most critical and important family education, and fail to provide targeted and personalized family education services for autistic children [6]. Therefore, with the increasing number of autistic children, we

need to cultivate the educational ability of parents of children with autism in China through various channels, to improve the educational quality of autistic children.

Information-based educational resources refer to digital resources designed, formed, and stored to support educational and teaching activities based on computer technology [7]. Information-based educational resources have broken through the limitation of time and region, and have the characteristics of multi-terminal learning and resource sharing [8]. With the development and update of communication technology, information-based educational resources can help parents of children with autism learn and apply evidence-based teaching intervention methods, reduce psychological pressure and economic burden brought by blind learning, and improve the educational effect of autistic children [9]. In other words, parents of children with autism can not only allow children with autism to receive professional training in rehabilitation institutions but also make use of high-quality information-based educational resources at home to transform passive blood transfusion support into active hematopoiesis learning in family education, thus saving rehabilitation costs and improving family life quality satisfaction. However, the domestic research on the use of information-based educational resources by autistic children's families is still lacking, and their real feedback and actual needs are still unclear. Given this, this study focuses on the current utilization of information-based educational resources, and attempts to analyze the infrastructure conditions, resource utilization types, actual educational effects, and related influencing factors of Chinese autistic children's families, and puts forward some suggestions because of the existing problems, so as to promote the development of family education for children with autism in China.

2. Research Method

2.1. Research Participants

In this study, 158 autistic children's families in Wuhan, Hubei Province, China were selected as research objects. The selection criteria of autistic children's families are: (1) their children have been diagnosed as autistic by clinical medical evaluation; (2) children are between the ages of 0 and 18; (3) parents are willing to cooperate with the investigation. The basic situation of families of children with autism participating in this study is shown in Table 1.

Table 1. Demographic information of families of children with autism

Variable	Classification	Frequency	Percentage
Family residence	rural areas	22	13.9%
	urban areas	136	86.1%
Parents' education level	junior high school and below	23	14.6%
	high school / technical secondary school	36	22.9%
	college degree	39	24.6%
	bachelor degree or above	60	38.0%
Degree of children's disease	mild	63	39.8%
	moderate	43	26.6%
	serious	34	21.6%
	extremely severe	19	12.0%

2.2. Research Tools

This study formed a questionnaire based on reference to related research and suggestions from professionals. The questions covered by the questionnaire mainly cover three parts: basic information about families of children with autism, the status quo of the use of information-based educational resources, and family needs, with a total of 23 questions. Exploratory factor analysis and internal consistency test were performed on the questionnaire. The KMO test value was 0.876, the Bartlett sphere test reached the significance test level ($p < 0.001$), the

cumulative variance explanation rate after rotation was 78.46%, and the Cronbach's Alpha coefficient was 0.903. It shows that the questionnaire has good structural validity and reliability. At the same time, in this study, to protect the privacy of parents and ensure that the information filled in is true and effective, the questionnaire was filled out anonymously and set up polygraph items. In addition, based on the questionnaire survey, the researcher invited 6 parents of children with autism to participate in semi-structured interviews to understand more specific and detailed information, which is conducive to further analysis and interpretation of the quantitative results. The interview outline contains a total of 14 questions, mainly related to the actual effects and real needs of families with children with autism in using information-based educational resources

2.3. Data Collection and Process

With the support of parents' mutual aid organizations for children with autism, the researchers got the contact information of 181 families in Wuhan by snowballing. After a 15-day walk and investigation, on the basis of fully explaining the situation and obtaining the consent of the investigated families, the researcher distributed questionnaires to 166 families of children with autism. After reviewing and screened the questionnaire information one by one, the researchers obtained 158 valid questionnaires, and the effective rate was 95.2%. All the data obtained from the questionnaire were statistically processed by SPSS 23.0. At the same time, in order to dig deep into quantitative data, six parents of children with autism who have established good trust relationships with researchers participated in semi-structured interviews. By using qualitative analysis software Nvivo11.0, the researchers make theme analysis, evaluation analysis and construction analysis after carefully reading the text materials, to fully tap the deep structure and hidden information of the text.

3. Results and Analysis

3.1. The Basic Conditions for Families of Children with Autism to Use Information-based Educational Resources

This study evaluates whether autistic children's families have the basic conditions to use information-based educational resources from the aspects of hardware and information literacy of parents. According to the survey results, 96.2% of families have smart phones, 64.6% have laptops or desktop computers, 39.9% have smart TVs, and 41.8% have tablet computers. This shows that most families with children with autism have intelligent devices, and some families have various types of intelligent devices. These intelligent devices build a bridge for the parents of children with autism to communicate with the Internet world, which helps to speed up information exchange and dissemination, and is an important prerequisite for parents of children with autism to use information-based education resources. Parent 'information literacy refers to parents' ability to find related resources on the Internet by using intelligent devices. In this study, 61.4% of parents can use smart devices to browse the web and find information-based educational resources proficiently, 34.2% of parents have average information literacy, while 4.4% of parents have poor information literacy. In addition, the cross tabulation of information literacy and parents' educational background shows that parents' information literacy improves with the improvement of their education level, which is consistent with the actual situation learned during the interview. Therefore, families of children with autism have the equipment foundation and ability to use information-based educational resources.

Table 2. Cross tabulation of information literacy and educational background of parents of children with autism

Education level	Very bad	Bad	Average	Good	Excellent	Subtotal	$\chi^2(12)$
junior high school and below	2	2	14	4	1	23	62.90***
high school / technical secondary school	1	2	20	14	5	36	
college degree	0	0	13	14	12	39	
bachelor degree or above	0	0	7	13	40	60	
N	3	4	54	39	58	158	

3.2. The Actual Situation of Autistic Children's Families Using Information-Based Educational Resources

In this study, the actual situation of parents of children of autism using information-based educational resources includes the time when parents of children with autism surf the Internet, the degree of understanding and utilization of resources, the ways to obtain resources, and the effects of educational interventions. The survey results show that 52.5% of parents spend less than one hour browsing information and education resources online, 39.2% spend one to three hours browsing, and 8.3% spend more than three hours browsing. This shows that parents of children with autism will search and browse related information-based educational resources online, but most parents spend less time browsing the Internet, and only a small number of parents will spend a lot of time inquiring about the content of education for autistic children. In terms of the level of understanding of information-based educational resources, only 40.5% of parents said they knew well or very well, 45.6% of parents said they were fair, and 13.9% of parents said they did not know or very little. This shows that there is a phenomenon of information occlusion in the use of educational informational resources in autistic children's families. Combined with the cross tabulation of understanding degree and online browsing time (see Table 3), it shows that with the increase of online browsing time, parents' understanding of information-based educational resources is deepened. In terms of the frequency of use of information-based educational resources, 47.9% of parents often use information-based educational resources, 38.3% of parents use them at an average level, and 13.8% of parents occasionally use information-based educational resources, indicating that most parents of children with autism the knowledge and strategies obtained from the Internet will be applied to the family education of children with autism, with a view to improving the various abilities of children with autism. In addition, in terms of access to information-based educational resources, 96.2%, 64.6%, 39.9% and 41.8% of them use educational websites, online learning software, various search engines and social software respectively. This shows that the vast majority of parents prefer obtaining information-based educational resources about the education of children with autism through educational websites and online learning software, while a small number of parents choose to use various search engines and social communication software to obtain resources. Combined with the results of the interview, it can be seen that parents of children with autism pay attention to the source of the resources when using information-based educational resources, and they hope to obtain the latest and effective high-quality information-based educational resources from authoritative channels.

Table 3. Cross tabulation of surfing time and familiarity to resources of parents of children with autism

Surfing time	Very poor	Poor	General	Well	Very well	Subtotal	$\chi^2(12)$
Within an hour	3	14	48	15	three	83	52.11***
One hour to three hours	2	3	19	28	10	62	
Three to six hours	0	0	1	6	4	11	
More than six hours	0	0	0	0	2	2	
N	5	17	72	49	15	158	

In terms of information education resources that parents of children with autism have paid attention to, it can be seen from Table 4 that parents pay more attention to language and communication, social interaction, cognition and academic, and self-care. This shows that the degree of attention paid by the parents of children with autism to information-based educational resources is highly related to the three core characteristics of autistic children's language disorder, social disorder, and stereotyped behavior. In addition, as far as the information education resources are concerned, the top four users are the language and communication, cognition and academic, the self-care and the social interaction. This shows that parents of children with autism are eager to find educational strategies and methods to improve the typical symptoms of children with autism. According to the interview results, parents attach great importance to language training and social skills training for autistic children, hoping that they can smoothly enter ordinary schools and integrate into normal society. In the effects of educational intervention (see Table 5), 40.8% of parents reported that they had improved their child-rearing ability, 33% of parents thought that their children's development had improved, and 35.1% of parents reported that the quality of communication with people around them had improved to a greater extent. To sum up, due to various reasons, parents of children with autism spend less time browsing information-based educational resources on the Internet, and have little understanding of information-based educational resources. However, most parents will search for information-based educational resources about core symptoms of children with autism from authoritative websites and platforms, and apply them to their children's family education, which has achieved certain results in the use process.

Table 4. The usage and demand of resources by parents of children with autism

variable	Familiarity rate	Usage rate	Demand rate
Sensory perception	56.9%	56.4%	48.1%
Coarse movement	41.8%	42.6%	29.1%
Fine movements	52.9%	54.3%	41.8%
Language and communication	77.1%	75.5%	76.6%
Social interaction	63.8%	58.5%	74.7%
Self-care	58.6%	59.7%	58.2%
Emotion and behavior	57.5%	43.6%	67.7%
Cognition and academic	61.9%	69.2%	59.5%

Table 5. Practical effect of parents of children with autism using information-based educational resources

Practical effect	Very poor	Poor	General	Well	Very well
Parents' educational quality and ability	1.1%	12.8%	44.7%	32.3%	8.5%
Children's development and progress	0	14.9%	52.1%	27.7%	5.3%
Interpersonal communication quality	2.1%	20.2%	42.6%	33.0%	2.1%

3.3. The Demand and Feedback of Resources for Families of Children with Autism

This study analyzes the needs of parents of children with autism for information-based educational resources from the aspects of resource types, resource bearing forms, resource acquisition methods, resource application prospects, current problems and the help that parents hope to get. From the perspective of resource types, the information-based educational resources needed by parents are mainly concentrated in the fields of language and communication, social interaction, emotion and behavior, accounting for 76.6%, 74.7% and 67.7% respectively. Thus, the three core features of children with autism are the focus of parents' attention. In the form of resource bearing, the parents who choose text, audio and video are 54.4%, 44.3% and 94.3%, respectively. Therefore, most parents want to get vivid information-based educational resources in the form of video. In terms of resources acquisition, the proportion of parents participating in interactive live broadcasts, watching teaching videos, learning classes online and asking for help online was 60.1%, 81.1%, 58.2% and 44.9% respectively. Combined with parents' interviews, parents are more inclined to acquire the knowledge and strategies of educating their children by watching teaching videos and participating in interactive live broadcasts, to master scientific parenting methods. On the application prospect of information-based educational resources, 88.6% of parents think that information-based educational resources can help them find feasible educational methods and improve their children's intervention effect, 83.5% of parents think that information-based educational resources can save their children's educational expenditure and reduce their family's economic burden, and 61.4% of parents think that information-based educational resources can release personal psychological pressure and promote interaction with others. On the other hand, parents of children with autism also encounter many obstacles in the process of using information-based educational resources. There are some problems in the process of using the feedback from most parents, such as lack of practical guidance, disorder of network resources, expensive resources, scarcity of high-quality resources and so on. The survey results also show that parents need various help, among which the training and guidance of information-based educational resources are the most urgent. Besides, it also includes integrating existing resources to find and use them easily, reducing the use cost of information-based resources, and developing relevant information-based resources according to educational needs. In summary, parents of children with autism hope to obtain information-based educational resources by watching video analysis and interactive live broadcasts; parents urgently need information-based educational resources in the fields of language and communication, social interaction, and emotion and behavior of children with autism; parents hope to strengthen practical training and guidance on the use of resources, integrate and develop new resources, and reduce the cost of resource use in the process of utilization, thereby saving a lot of time and energy and improving the quality of family life.

4. Discussion

First, families of children with autism have the basic conditions to use information-based educational resources. The survey results show that most families of children with autism have

information-based intelligent devices, and some families even have a variety of intelligent devices, which lays a solid tool foundation for utilizing information-based educational resources. At the same time, parents of children with autism have certain information operation ability, which further lays the skill foundation for using information education resources. On the basis of the above conditions, parents can browse and learn information-based educational resources related to autism on the Internet with smart devices, communicate with parents or educators of other autistic children, and make it feasible to apply information-based educational resources to the education of children with autism, thus creating favorable conditions for the promotion and dissemination of information-based educational resources.

Second, although families of children with autism have the tool foundation and skill preparation for using information education resources, the survey results show that most parents of children with autism spend less time browsing information-based educational resources on autism, have limited understanding of information-based educational resources, and have problems such as blocked information and poor access to information. This study holds that the current situation is affected by the superposition of internal and external factors. The intrinsic factors come from parents of children with autism. Parents should not only bear the burden of raising their children but also bear the economic pressure of the whole family, which will inevitably lead to problems such as less time and lack of energy [10]. Therefore, parents of children with autism can't make an in-depth study on the information-based educational resources of autistic children. At the same time, parents of children with autism generally lack the ability to search and identify resources, and it is difficult to find effective information-based educational resources. External factors originate from the information-based educational resources themselves. The survey found that the current information education resources are scarce and mixed, parents of children with autism can not get effective screening and selection, and have problems learning scientific family education strategies for children with autism. In addition, some resources are too expensive, which makes it difficult for autistic children's families to obtain high-quality information-based educational resources. The combination of internal and external factors leads parents of children with autism to have a low understanding of information-based educational resources. Therefore, it is urgent to strengthen the training and guidance on the utilization of information-based educational resources, build a platform to integrate high-quality resources, and thus enhance parents' parenting ability for children with autism.

Thirdly, the effect of applying information-based educational resources to family education of children with autism needs to be improved. Children with autism, as a source of sudden family stress, has brought huge economic and spiritual burdens to the family [11]. At the same time, because it takes a lot of time and cost to take care of children with autism, some family members often quit their jobs to take full-time care of autistic children, which increases the burden of autistic children's families [12]. If parents of children with autism lack autism knowledge and rehabilitation intervention, they may miss the early diagnosis and identification of autistic children, and delay the best time for intervention and education [13]. The survey results show that the information-based educational resources can help parents learn the knowledge and skills of education and rehabilitation of children with autism to a certain extent, improve their parenting ability, promote children's education effect, save time and energy and save the high cost of institutional education. In other words, information-based educational resources can help parents with autism to reduce their mental and economic burden, so it has great development potential and application market in the future development process. However, due to the uneven network information resources, high fees, and lack of professional guidance for offline intervention, the educational effect of information-based educational resources needs to be further strengthened.

Fourth, there is urgent need to develop and integrate the high-quality information-based educational resources to serve the family education of children with autism. During the process of investigation, this study found that families of children with autism are eager to obtain high-quality information-based educational resources to educate their children. The demand of families of children with autism for high-quality information-based educational resources focuses on language and communication, social interaction, emotion and behavior, etc. Parents tend to get information-based educational resources by watching video analysis and interactive live broadcasts, which may be because video resources help parents imitate the intervention actions of professionals and teachers and help them improve ability anytime and anywhere. Therefore, when developing and integrating information-based educational resources, we should pay attention to the construction of information network classrooms and select high-quality teaching videos for parents' reference. In addition, in the process of utilizing information-based educational resources, parents strongly reflect that the cost of using resources should be reduced and new resources should be developed according to diversified needs. Therefore, relevant departments should adopt parents' opinions when making educational decisions, to provide various conveniences for families of children with autism.

5. Proposal

This study found that high-quality information-based educational resources can play an active and effective role in the education and rehabilitation of children with autism, and have great family needs and development potential in the education of children with autism. However, in the process of using information-based educational resources, there are some problems, such as parent pay insufficient attention, lack of standardization of resources, high platform fees and so on, which restrict the further application and development of information-based educational resources. Therefore, researchers put forward the following suggestions:

First, encourage the integration of existing resources, and develop high quality resources. Random placement of network resources, difficulty in distinguishing between true and false, and high fees are the key factors hindering families of children with autism from using information-based educational resources. Many educational websites and communication forums about autism update their information resources slowly. Most of them are out of date due to lack of financial support and personnel maintenance, which lag behind the latest development level of special education, and it is difficult to meet the diverse needs of families of children with autism. At the same time, the integration and development of information-based educational resources should be a long-term and systematic process, which requires the full participation of parents of children with autism, educational professionals, government administrators and the public. Communities, charitable organizations and public welfare organizations in which children with autism live should support and help children with autism to receive education and integrate into society on an equal footing. Relevant government departments should issue relevant policy documents, provide financial support, jointly develop information-based educational resources that meet the needs of parents and the times, and establish a unified search website and resource exchange platform with enthusiastic people from all walks of life. By screening and integrating high-quality information-based educational resources, maintaining websites and updating contents regularly, we can provide parents of children with autism with a more comprehensive and fast high-quality information service platform.

Second, support the development of educational software and the application of relevant emerging technologies. In recent years, due to the development of science and technology and the upgrade of wearable devices, smart devices have become a common things in our daily life. The educational software based on smart devices will be an important development direction

of family education of children with autism in the future. With the continuous development of artificial intelligence and 5g network technology, related educational software can realize many functions such as data monitoring, virtual interaction, real-time live broadcast, online learning, timely interaction and so on, creating favorable conditions for the development of family education for children with autism. Education departments, special education teachers, education experts, children's parents, technical personnel and other relevant people should make joint efforts to develop educational software according to actual needs, and gradually improve the family education guarantee system for children with autism. In the process of software development, content modules can be divided according to domain categories and intervention degrees, and online interaction and communication are supported. In addition, new technologies such as virtual reality and augmented reality can be combined to create an immersive educational environment and improve the intervention effect on children with autism.

Third, strengthen the social propaganda and the guidance of parents. Parents of children with autism don't have a deep understanding of information-based educational resources, which makes many families fail to give full play to their advantages of information-based educational resources. Therefore, community workers and parents' mutual aid organizations can print relevant parent 'instruction manuals and distribute them to parents of children with autism to help them use high-quality information-based educational resources. Relevant departments can emphasize the benefits of information-based educational resources to family education of children with autism in newspapers, periodicals and new media platforms, to arouse public attention. The education authorities can provide relevant resource links and operation demonstration instructions on the education websites, guide parents of children with autism to utilize these information-based educational resources, and expand the influence of high-quality information-based educational resources. In addition, in the process of using information-based educational resources, the biggest problem reflected by parents is the lack of professional practical guidance. The community can cooperate with professionals, invite experts and scholars to hold lectures and symposiums regularly, answer questions and doubts in time for parents of children with autism in the process of using information-based educational resources, improve the utilization effect of information-based educational resources, and effectively improve the quality of family education for autistic children.

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