ISSN 2663-8169 Vol. 4, Issue 4: 46-50, DOI: 10.25236/IJNDE.2022.040409

Cognitive intelligence-driven learning disability education intervention for practical knowledge development of rural left-behind children

Yiquan Kong[1, 2, 3, a], Jiexuan Wang[2, b], Guiying Chen[2, c]

[1]*Guangdong Provincial Key Laboratory of Development and Education for Special Needs Children, Zhanjiang, Guangdong, 524048, China*
[2]*Institute of Rural Science and Technology Services, Lingnan Normal University, Zhanjiang, Guangdong, 524048, China*
[3]*Guangdong Coastal Economic Belt Development Research Center, Lingnan Normal University, Zhanjiang, Guangdong, 524048, China*
[a]*freemankyq@163.com*
**Corresponding author: Yiquan Kong*

Abstract: *The paper analyses the research status of children's learning disability education interventions, constructs a knowledge service framework for learning disability education interventions for rural left-behind children driven by cognitive intelligence, discusses the ideas and cases of practical knowledge development of learning disability education interventions for rural left-behind children driven by cognitive intelligence, and establishes a scientific knowledge service model. The practical knowledge development case of the learning disability education intervention for rural left-behind children takes the marine education game intervention as a case, and provides new opportunities for rural left-behind children's learning disability education interventions.*

Keywords: *learning disabilities, left-behind children, educational intervention*

1. Introduction

Artificial intelligence and special education are gradually integrating, and the use of artificial intelligence technology to solve the problem of learning disabilities has been further developed and breakthroughs. The development of artificial intelligence has gone through three stages: computational intelligence, perceptual intelligence, and cognitive intelligence, cognitive intelligence draws inspiration from cognitive psychology, brain science, and human social history, combines cross-field knowledge graph, causal reasoning, continuous learning, and other technologies to establish an effective mechanism for stable acquisition and expression of knowledge, achieve key breakthroughs from perceptual intelligence to cognitive intelligence, and provide new opportunities for rural left-behind children to intervene in learning disability education.

2. Research status of educational interventions for children with learning disabilities

At present, scholars at home and abroad have conducted research on the family resources and learning motivation of children with learning disabilities, and the attention, behavior, and sociality of children with learning disabilities have become research objects [1]. According to the DECA-P2 scale of the Psychological Resilience Assessment Tool for Children's Learning Behavior, children with learning disabilities were evaluated, and their learning initiative, learning self-regulation, and learning behavior adjustment ability were significantly different, which hid the disadvantages of learning ability development [2]. Early researchers' research on children's learning disabilities mainly focused on their cognitive processes, and research on educational interventions for children's learning disabilities focused on the psychoanalytic and psychological characteristics of children's learning disabilities [3]. Subsequent research, which was conducted only in terms of cognitive ability and learning skills, did not adequately illustrate the root causes of children with learning disabilities [4]. Therefore, instead, some other factors related to learning disabilities were studied in an attempt to find a breakthrough in the problem.

ISSN 2663-8169 Vol. 4, Issue 4: 46-50, DOI: 10.25236/IJNDE.2022.040409

In recent years, educational interventions have continuously integrated the research results of behaviorism and cognitive psychology, and different aspects of educational intervention techniques have been developed in the research of cognitive-behavioral interventions, including psychological counseling and counseling for learning disabilities academic interventions, perceptual interventions, and mediated interventions for parents and teachers[5]. With the deepening of research in this field, the relationship between the self-awareness development, achievement attribution mode, behavior pattern, and behavior pattern of learning disabilities and their social characteristics will continue to develop and deepen in future educational intervention research from the perspective of social cognition [6].

3. Knowledge service for education interventions for left-behind children with learning disabilities in rural areas driven by cognitive intelligence

With the rapid expansion of information technology development and social needs, knowledge services have become an emerging hot issue in social research. Knowledge services are personalized, specialized, and diversified information services developed based on traditional information services. Traditional information services emphasize the integration of information processing, focusing on providing information products and information-sharing services. Knowledge service originates from information service, which is the in-depth development and high-quality application of information service resources. Information services depend on the quantity of information development and are based on the construction of information service resources; while knowledge services mainly depend on the depth and quality of information services and knowledge applications, and are people as the core to promote the flow and transformation of knowledge.

Educational intervention knowledge service objectives to help users solve educational intervention-related problems. Its nature is the educational intervention information service process. The most important feature is for educational intervention knowledge resources and problem-solving services. The knowledge service framework of an educational intervention for rural left-behind children with learning disabilities constructs three modules of educational intervention data, educational intervention information and educational intervention knowledge, extracts and excavates the educational intervention data described by data, condenses the discipline information with time law, spatial law, correlation relationship, and meaningful subject information, and structures and correlates the educational intervention information, creates marine knowledge with causal mechanism, trend characteristics and systematic understanding, and provides knowledge perception, knowledge understanding and knowledge awareness for rural left-behind children in knowledge services.

4. Practical knowledge development ideas of learning disability education interventions for rural left-behind children driven by cognitive intelligence

There are multiple subjects of education intervention knowledge services, and this paper selects school-age children with learning disabilities as the knowledge service objects. Learning disability is a hidden disorder that refers to a set of heterogeneous disorders that show difficulties in obtaining and using listening, speaking, reading, writing, reasoning, and computing skills, and there are obvious differences between the learning initiative, learning self-regulation, and learning behavior regulation ability of school-age children with learning disabilities and children of the same age. Popular science education provides scientific popularization education for school-age children, which is a kind of public welfare education, which has a fundamental, leading, and overall role. Due to historical and practical reasons, special education has always been relatively weak in the popular science education system, and a variety of problems and contradictions are prominent, which is not conducive to the construction of a fair society and a harmonious society in China.

At present, interdisciplinary research is an important research direction, and this paper combines special education and information technology-related applied research to provide effective knowledge services for school-age children with learning disabilities. The main ideas of knowledge services are: to define the knowledge service of an education intervention for school-age children with learning disabilities from the perspective of artificial intelligence, to explore the knowledge service of new artificial intelligence technology and learning disability education intervention for school-age children, and then to divide the knowledge service dimension of new technology and school-age children's learning disabilities based on the process perspective, to construct the knowledge service model of new technologies and school-age children's learning disabilities from the perspective of artificial intelligence, and to establish a scientific knowledge service model.

ISSN 2663-8169 Vol. 4, Issue 4: 46-50, DOI: 10.25236/IJNDE.2022.040409

The educational intervention knowledge service model uses mathematical symbols and computer language to establish structural equations for the elements of the learning disability knowledge service system for school-age children, simulates the dynamic development process, verifies its effectiveness, establishes a scientific evaluation model, continuously tracks records, and evaluates the quality of sample data. Starting from the knowledge base of the knowledge service for school-age children with learning disabilities, the improvement of practical knowledge is grafted into the knowledge service system for school-age children with learning disabilities under artificial intelligence, to solve the difficulties and obstacles that arise in the process of learning disabilities acquiring relevant abilities in specific knowledge areas, and then improve their learning ability.

5. A case of practical knowledge development of educational interventions for left-behind children with learning disabilities in rural areas driven by cognitive intelligence

The practical knowledge development case of the learning disability education intervention for rural left-behind children takes the marine education game intervention as a case, and the selected content of the game needs to be consistent with the learning initiative, learning self-regulation, learning behavior problems, and learning behavior regulation in the DECA-P2 scale. The game explores and adventures the ocean world with engaging narrative elements, visualizing the marine environment through augmented reality. The gameplay of the game is highly free, children can see a variety of marine life in the marine system, etc., free to watch, in their way to observe, listen to and perceive the ocean, feel the sound of water currents, and marine life. Kids unlock all the elements related to marine ecology by completing quests, and then use those elements to build a unique marine ecosystem on their own. In the ocean education game, children play the protagonist of the game and can create their marine world according to their imagination. The game situational training system is carefully explored with narrative-driven, adjusting the training scene and difficulty in the intervention tutorial, edutainment, and more efficient intervention.

Marine education intervention games use VR technology to imitate the marine scene, the 3D modeling system is realistic, the use of machine learning algorithms to fictionalize the seabed environment, and the game screen is beautiful. Marine education intervention games overcome the limitations of natural conditions such as resources, time, and manpower, link the imagination space of the game with the practical experience of the real world, expand the understanding of the marine world by rural left-behind children, and increase the learning and cognitive experience of rural left-behind children.

In practice, the marine education intervention game has shown positive effects on the learning behavior and psychological resilience adjustment tasks of rural left-behind children. Play intervention can effectively enhance the development of psychological resilience of rural left-behind children, and improve the social emotions and learning behavior problems of rural left-behind children. Effective marine educational game interventions should include the following step. The marine education intervention game is shown in Figure 1.

Figure 1: The marine education intervention game

The world of ocean education games is free and happy, without a sense of rigidity and tension oppression. Play stimulates the interest and motivation of rural left-behind children and strives to

ISSN 2663-8169 Vol. 4, Issue 4: 46-50, DOI: 10.25236/IJNDE.2022.040409

master the knowledge and skills required for play. In the game activities, we encourage our team members to cooperate, compete and evaluate each other. Games create good spaces, resources, and atmospheres for rural left-behind children to discover their personal needs and points of interest. The sense of interest of left-behind children in rural areas is undoubtedly important at the outset of educational interventions. The education intervention game design interface is shown in Figure 2.

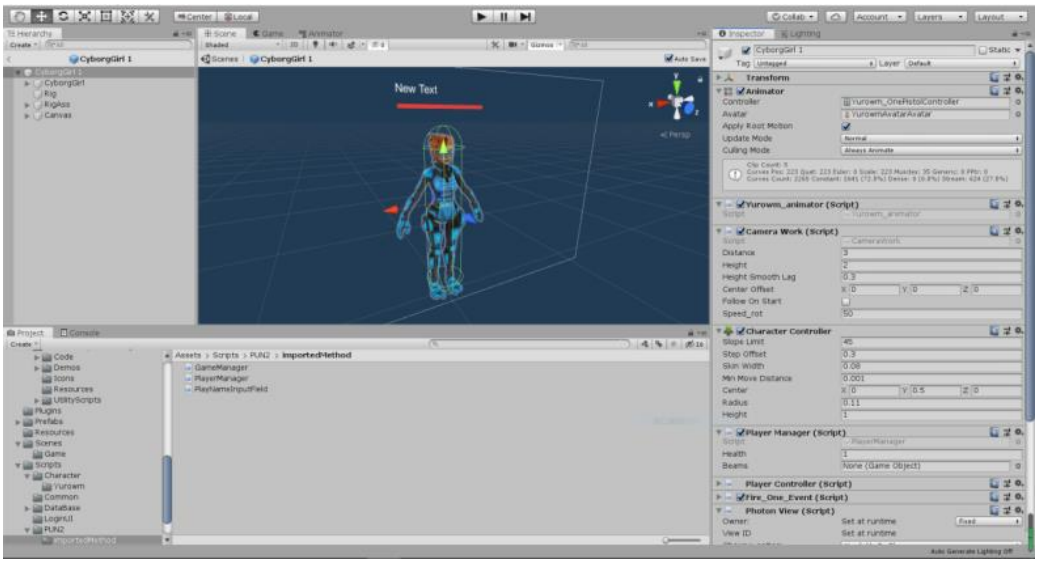

Figure 2: The education intervention game design interface

Feedback mechanisms in games are critical to developing rural left-behind children's abilities, as they inform children if they are moving towards a goal, and many factors may promote or hinder children's perceptual abilities, including task difficulty and game usability (such as user interface and navigation features). In a play environment, children need to believe that they are approaching the expected outcome of the game. While there is some uncertainty about the outcome of the game, the challenges children face should match the skills they develop so that they can experience achievable challenges. The education intervention game design rendering is shown in Figure 3.

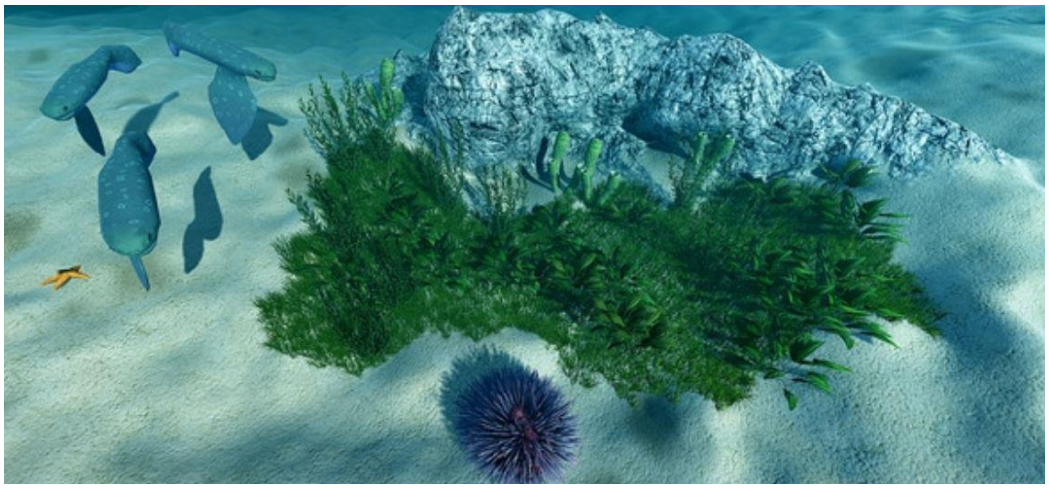

Figure 3: The education intervention game design rendering

Use the principles of the game, and even the game itself as a tool, let the children substitute for the role, fully experience the feelings of the protagonist, to strengthen learning, improve the children's motivation and participation. Putting children at the heart of their learning process, emphasizing the core messages in the game story, and effectively designing game features (interaction, decision-making, fun, challenges, competition, etc.) can stimulate more interest in the participants and thus facilitate the learning process. Play-based mechanics, aesthetics, and playful thinking engage people, inspire action, promote learning and problem-solving, and in addition to improving motivation, games are designed to support skills that encourage critical thinking, creativity, collaboration, and communication, transforming children's thinking and attitudes.

ISSN 2663-8169 Vol. 4, Issue 4: 46-50, DOI: 10.25236/IJNDE.2022.040409

6. Conclusions

Artificial intelligence and special education are gradually integrating, and the use of artificial intelligence technology to solve the problem of learning disabilities has been further developed and breakthroughs. The practical knowledge development of the learning disability education intervention for rural left-behind children emphasizes the learner's understanding and criticism of knowledge, and the connection and transfer of new and old knowledge. The data show that learners who perform deep learning have higher levels of learning motivation, academic commitment, self-efficacy, collaboration, and complex problem solving than learners who receive general instruction. Therefore, the knowledge space of educational intervention promotes learners to carry out deep learning and improves the efficiency of deep learning for learners.

The practical knowledge development case of the learning disability education intervention for rural left-behind children takes the marine education game intervention as a case, and provides new opportunities for rural left-behind children's learning disability education interventions. Rural left-behind children's learning disability education intervention practical knowledge development curriculum into the concept of game education, in doing middle school, play middle school, its curriculum design gives learners more freedom, help to cultivate learners' independent learning ability; in the educational intervention knowledge space, learners can independently search for information knowledge, organize, analyze and reorganize, integrate independent learning into the process of solving problems, carry out effective knowledge application and innovative services, and stimulate innovative thinking in the process of independent learning. Educational intervention knowledge space integrates all kinds of high-quality curriculum education resources for teaching and learning activities, and its resource architecture is reasonable, the resource navigation is clear, the resource search engine is intelligent, and it is supplemented by data mining, adaptability, scalability, and personalized knowledge recommendation and other technologies, acquiring resources more efficient and convenient.

Acknowledgments

This work was supported by Guangdong Philosophy and Social Sciences "13th Five-Year Plan" 2020 discipline co-construction project "An intervention study on the educational intervention of learning disabilities in rural left-behind children driven by cognitive intelligence"(Number: GD20XJY06), Lingnan Normal University created a national teacher education innovation experimental zone project “Research on the Optimization of Rural (Island) Education supported by Intelligent Technology: A case study of education intervention for left-behind children with learning disabilities", 2021 Guangdong Provincial College Students Innovation and Entrepreneurship Training Program Project "Left-behind Children Learning Disability Education Intervention System"(Number: 1250).

References

[1] Yujia Gao. Effective Interventions on Reading Fluency for Students with Learning Disability[J]. Learning & Education,2020,9(4).
[2] Varsha Vidyadharan,Harish M. Tharayil. Learning Disorder or Learning Disability: Time to Rethink[J]. Indian Journal of Psychological Medicine,2019,41(3).
[3] Akanksha Bisht,Anuraj Malav,Neelu Jyothi Ahuja. An Instructive Framework of Intelligent Tutoring System for Learning Disability[J]. International Journal of Recent Technology and Engineering (IJRTE),2019,7(6c).
[4] G.Rajivsureshkumar,K.Malarvizhi,G.Deebanchakkarawarthi. Mobile Application Development on Detection and Diagnose of Learning Disability for Children[J]. International Journal of Innovative Technology and Exploring Engineering (IJITEE),2019,8(6s).
[5] Dr. K. S. Sajan , Sunitha M S. Development of a Model for the TPACK for Children with Learning Disability[J]. Journal of Trend in Scientific Research and Development,2018,2(2).
[6] Lorna Montgomery,Gavin Davidson,Berni Kelly,Linda McKendry,Leslie Anne Newton,Paul Webb, Lisamarie Wood. Getting our voice heard: empowering people with a learning disability to influence adult safeguarding policy[J]. The Journal of Adult Protection, 2021,23(6).