





Evaluation and Improvement Methods of Preschool Children's Education Level based on Computer Technology

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Abstract. In the past two decades, the level of educational information technology in my country has developed rapidly. Information technology has played an increasingly important role in reforming and promoting education. In particular, the application of computer technology in children's education has been generally recognized by the academic circles. Information technology in preschool education has also attracted the attention of many academic experts. Some scholars have analyzed the problems of information technology construction in preschool education. Many scholars have made active and meaningful explorations and attempts, and put forward many targeted reform measures. However, judging from the current domestic implementation of information technology in preschool education, the academic world still lacks effective evaluation methods and evaluation index systems. The lack of computer technology makes it difficult for the information technology level of preschool education to reach the ideal state. Practical courses are the key content of the curriculum reform of deep pre-school education. Starting from the advantages and characteristics of computer technology practice courses, this research integrates theoretical cognition and integration situations in gamification teaching. This paper applies computer technology to the practical courses of preschool education. Based on the situation integration theory, this paper further constructs a computer practice curriculum system for preschool education majors. This paper constructs a practical curriculum system for preschool education from three levels: virtual practice preparation layer, practice layer, and psychological feedback layer.

Keywords: computer technology; preschool education; evaluation system; improvement method.

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1 INTRODUCTION

The application of these technologies in primary and secondary schools, higher education and vocational education is more mature. The theoretical and practical research on information technology in preschool education has always been marginalized and has not received due attention. This phenomenon occurs mainly because the research backgrounds and research interests of the research subjects are different. In addition, these situations also depend to a certain extent on the development of preschool education itself. Pre-school education is a weak link in all types of education at all levels. For a long time, there have been problems such as insufficient investment in education funds, Burchinal et al. [1] believed that serious shortage of educational resources, extremely unbalanced urban and rural development, and imperfect teaching staff. At present, computer technology has received more attention and research in the field of preschool education. However, Barnett and Jung [2] believed that academia still lacks a comprehensive understanding of the current situation of information technology construction and application in preschool education. If academia cannot grasp the development status and existing problems of preschool education information technology timely and accurately, it cannot guarantee the sustainable development of preschool education information technology. Therefore, we must fully understand the basic situation of information technology construction in preschool education. This paper expounds the current situation of information technology construction and application in preschool education from five aspects: policies and regulations, infrastructure construction, resource construction, kindergarten teachers' information literacy, and information technology application. Courtier et al. [3] believed that educational information technology is a hot research topic in the field of education in recent years. Information technologies such as computers and the Internet have been continuously applied in the field of education. Ben et al. [4] believed that these technologies can improve teaching efficiency, optimize the learning process, and build a rich teaching environment. Dockery et al. [5] believed that these technologies can also stimulate students' interest in learning and provide strong technical support for teachers' teaching work. With the development and popularization of science and technology, modern information technology has begun to move from cities to rural areas, from colleges and universities to primary and secondary schools and even pre-school education. Many researchers and practitioners in the field of preschool education have high expectations for modern information technology. These new technologies will play an important role in preschool education. However, the theoretical and practical research on the application of modern information technology in the field of preschool education is still immature. In response to this situation, schools need to build a scientific and reasonable preschool education information technology evaluation index system. Nathalie et al. [6] believed that the index system is of great significance to promoting the sound development of information technology in preschool education. With the help of computer technology, the school deepens the curriculum reform of semester education, which can make up for the lack of high-quality practical education resources. The setting of this type of courses can enable students to improve their professional literacy and ability in computer practice scenarios.

Information technology policies regulations and standards in preschool education are necessary. Shafi et al. [7] believed that the system can ensure the development of information technology in preschool education. In recent years, China has issued various education policies and documents. These documents all reflect the country's attention to information technology in preschool education. Since 2011, the Ministry of Education has officially promulgated the "Professional Standards for Kindergarten Teachers (Trial)", which is the country's basic requirement for the professional quality training of kindergarten teachers. This standard is also the basic norm for kindergarten teachers to carry out educational activities. He et al. [8] believed that the standard requires teachers to have a certain knowledge of modern information technology. Kindergarten teachers have information technology knowledge. Stokes et al. [9] believed that this knowledge plays a positive role in the management of information technology in kindergartens, Pei et al. [10] believed that the teaching activities of information technology and the improvement of

the level of scientific research in schools. This is also a must-have skill for kindergarten teachers in the age of information technology.

In 2012, the Ministry of Education released the Ten-Year Development Plan for Educational Information Technology. The plan believes that basic education should cultivate students' learning ability in an information technology environment. The plan encourages students to use information means to learn actively, independently and cooperatively. Schools need to cultivate students' good habits of using information technology to learn, develop students' interests and specialties, and improve students' learning quality. Schools need to enhance students' ability to ask, analyze and solve problems in the network environment. These abilities and habits of students need the support of kindergarten information technology environment. Kindergartens have appropriate information technology infrastructure and rich and appropriate information technology resources. Schools also need kindergarten teachers with high information literacy.

1.1 The Application Status of Computer Technology in the Field of Preschool Children's Education

Information technology infrastructure helps kindergartens achieve these goals. In 2012, my country launched the construction of preschool education management information system. The system is constructed to implement the "Several Opinions of the State Council on the Current Development of Preschool Education" and to strengthen the management of preschool education. The information system can monitor the implementation of major national preschool education projects. The information system can also capture the implementation of the three-year action plan for preschool education across the country. The development and operation of this system is the result of the construction of educational information technology, and it is also an important means to promote the scientific management of preschool education. The national government has given more preferential policy support to preschool education. Some provinces, cities and regions in my country also realized the importance of information technology development in preschool education earlier. Kindergartens have already started the practice of information technology in pre-school education. At the same time, kindergartens have also formulated corresponding regulations and standards to promote the construction of preschool education information technology systems. In 2009, the state released the Action Plan for Information Technology in Preschool Education.

The Action Plan considers pre-primary education an important part of basic education. Information technology work in preschool education has also become an important part of the development of information technology in basic education. The action plan aims to improve the quality of kindergarten education and improve teachers' information technology level. The plan uses information technology to improve educational ability and guide parents to master the knowledge of scientific parenting. The plan is to establish 60 preschool education demonstration bases in various districts and counties to promote the information technology construction of preschool education in the city. The plan requires the establishment of a high-quality, safe and stable information technology management platform for preschool education throughout the city. The system realizes various functions such as co-construction and sharing of preschool education resources, information transmission, and network communication. The system also clearly puts forward the construction method of the demonstration kindergarten network platform. The system has gradually promoted the construction of kindergarten network platforms of various natures. The system improves the level of information technology in the administrative management of kindergartens at all levels. The system also improves the IT level of IT managers. The evaluation path of children's preschool education effect based on computer CAD technology is shown in Figure 1. In addition, Tianjin, Liaoning, Jilin, Sichuan, Chongqing and other places have also successively issued guiding documents for the construction of information technology in preschool education. These documents put forward specific requirements in various aspects such as kindergarten educational technology equipment and digital network resource construction. These policies, regulations and related standards have promoted the rapid development of information technology in preschool education. For example, some regions have carried out the construction and selection

of information technology demonstration bases for preschool education, and actively promoted the construction of information technology in kindergartens. These works have constructed a distinct information technology construction model. Beijing Kindergarten started the information technology construction project in 2006, and gradually established a set of network operation mode integrating management, scientific research and teaching. This model aims at the management of information technology in kindergartens. Information technology work has promoted the all-round development of teachers' abilities and ensured the safe operation of kindergartens. Some kindergartens have built a computer information technology curriculum framework. The kindergarten has simultaneously built an information technology management platform, an information technology resource platform and an information technology communication platform. The information technology work in preschool education has gone through more than ten years of construction and development. Information technology has gradually expanded from the initial single information release work to comprehensive services covering management, teaching, training and support. In recent years, national policies have shown more attention to the work of information technology in preschool education, and various localities have also carried out active practice and exploration at the same time. However, the current construction of information technology in preschool education is still in its infancy. Judging from the current development status, the government should continue to increase policy support for information technology work in preschool education. The government should increase its support for the construction of information technology in preschool education, and provide a good policy atmosphere for the development of information technology in preschool education. All provinces, municipalities and regions should formulate regulations and standards for preschool education information technology according to their existing economic levels.

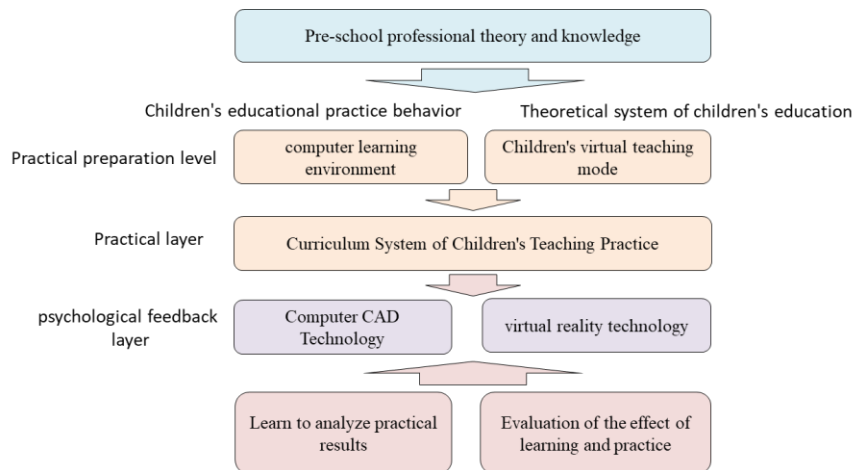


Figure 1: The evaluation path of children's preschool education effect based on computer CAD technology.

1.2 The Construction of Information Technology Infrastructure in Preschool Education

In the field of preschool education, financial investment is the key to the construction of information technology infrastructure. According to relevant statistics, China's preschool education expenditure accounts for only 1.3% of the total education expenditure, while the international average is 3.8%. Due to the low level of government guarantees for pre-school education, the proportion of privately-run pre-school education is relatively high. At the same time, the quality of private schools is uneven. The development of information technology in preschool education in

China is uneven in various regions, and the application within regions is not coordinated. The "digital divide" in preschool education has become a serious obstacle to achieving educational equity. The kindergarten's website, local area network and other settings will cost a lot of money to build. Therefore, some private kindergartens without strong economic strength are relatively weak in the development of information technology. At present, the construction of information technology infrastructure in kindergartens has become a bottleneck in promoting the development of information technology in preschool education. China's preschool education information technology infrastructure is relatively weak, with significant regional differences.

Kindergartens in developed areas can achieve almost complete network connectivity, and information technology equipment is constantly being upgraded. But for cities with a lower level of development, it is difficult for kindergartens to achieve such goals. However, for rural areas and remote mountainous areas, such goals are out of reach. The basic problem of children's school enrollment has not been solved, and the follow-up learning equipment is even more difficult to guarantee. The construction of information technology facilities for preschool education in the eastern region started early, with relatively sufficient funding and development. However, the basic construction and popularization of kindergartens in the central and western regions has not yet been solved, and the construction of information technology infrastructure in kindergartens has not received much attention. However, some provinces in China have made some achievements in the construction of pre-school information technology infrastructure. Kindergartens in most areas have applied modern information technology to the education and teaching management of kindergartens. Some institutions have established multimedia activity rooms, and kindergarten classes are also equipped with hardware facilities such as computers, electronic whiteboards, projectors, and DVDs.

2 THE MAIN CHARACTERISTICS OF THE DEVELOPMENT OF INFORMATION TECHNOLOGY IN THE FIELD OF PRESCHOOL EDUCATION

2.1 The Basic Situation of Preschool Education Website Construction

Information technology infrastructure is an important support to ensure the development of information technology, and it is the basis for supporting teachers to integrate information technology application and curriculum. The quantity and quality of resources determine the quality of information technology development in preschool education. Kindergartens need to integrate high-quality educational resources and promote the co-construction and sharing of resources. The construction of new information technology infrastructure is a top priority for preschool education. At present, the main resource types of preschool education information technology include early childhood education resource library (to meet the needs of kindergarten teaching), special learning websites, teacher blogs, courseware production material library, etc. The resource construction of information technology in preschool education mainly depends on the input and support of local governments. The construction of information infrastructure requires the joint efforts and cooperation of kindergartens, teachers, parents and some social forces. At present, the education departments of most provinces and cities in China have established preschool education websites. The kindergarten also has its own independent webpage, class blog, home interactive platform, preschool education theme forum and a series of network resource platforms. The computer technology-based children's teaching system and evaluation structure is shown in Figure 2.

The existing preschool education information technology resource websites are relatively mature. The information content on these websites is updated quickly and is rich in content. Most of these websites cover the latest information of preschool education at home and abroad, and advocate the latest ideas of preschool education. These websites provide information services for leadership decision-making and preschool education reform, as well as information services for early education in the whole society. However, there are relatively few learning resources specially provided for children on this website, and the software development technology suitable for children's learning and development is not mature enough in China. In some western regions of

China, the penetration rate of kindergarten websites is 36%, and the main use is concentrated in the publicity work of kindergartens. Teachers share teaching information with each other, and teachers and parents carry out interactive exchanges. The website provides relatively few independent learning resources for young children. Shanghai Preschool Education Network is one of the core achievements of Shanghai preschool education information technology. This website is a resource library of preschool education professional information at home and abroad, and a course material library that gathers Shanghai's excellent activity design, courseware, materials and other resources.

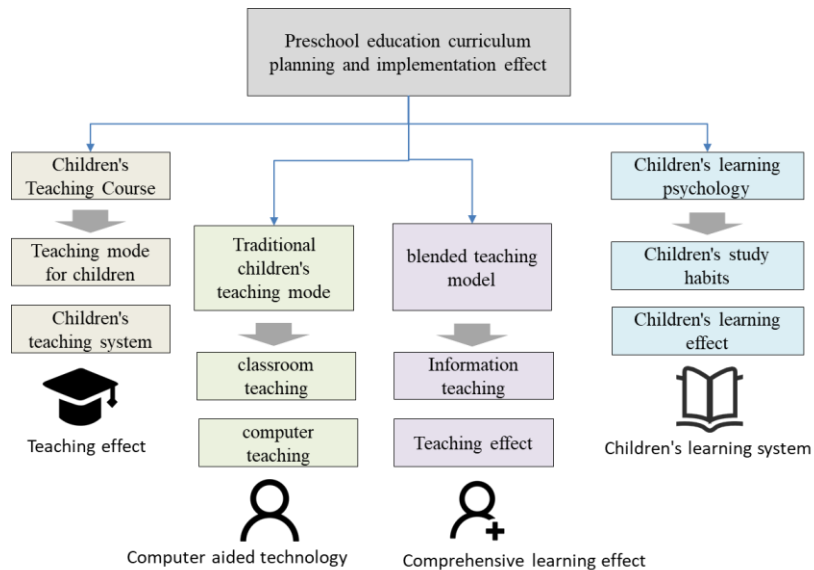


Figure 2: The computer technology-based children's teaching system and evaluation structure.

2.2 The Main Construction Content of the Preschool Education Website

The preschool education website integrates the important achievements of kindergarten curriculum reform through various channels. The website brings together experts and teachers from all walks of life, and carefully creates high-quality professional resources for preschool education. In contrast, foreign children's education and social networking sites have developed relatively mature. In 2012, the global media selected the 15 most popular children's websites. Among them, the number one Nick website has nearly 5 million monthly visitors. Foreign children's websites are highly professional and clearly classified. The content of the website generally includes three aspects: education, entertainment and adult human. Various educational websites for teachers and parents are further subdivided into seven sub-categories, including animals, art, mathematics, music, science, and space. The vast majority of content on these sites is primarily entertaining, in order to expose children to things they are less exposed to. These sites are not designed to make a child remember a certain area of expertise. The positioning of these websites is also relatively accurate. The websites are graded according to their own content, so that children can learn the appropriate knowledge content. Among them, the more critical point is that foreign children's education websites also focus on cultivating children's media literacy. They teach children how to protect their privacy while surfing the Internet. The comprehensive effects of computer technology supporting preschool children's teaching is shown in Figure 3.

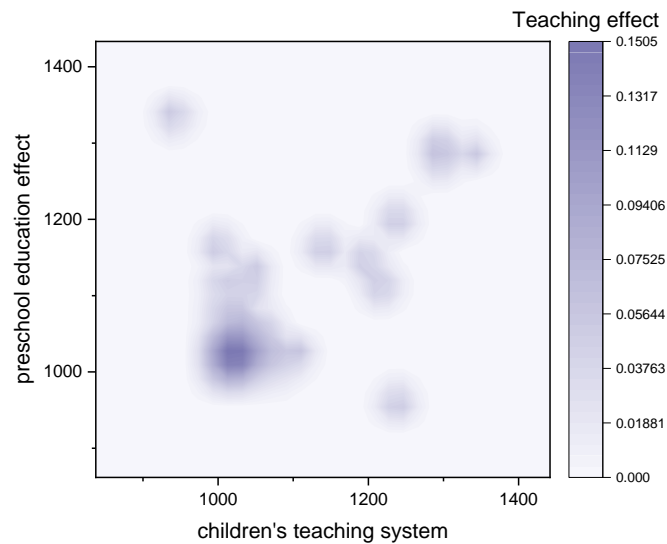


Figure 3: The comprehensive effects of computer technology supporting preschool children's teaching.

2.3 The Main Goal of Building a Preschool Education Website

Foreign websites have also specially set up monitoring pages for parents to guide children to use the network environment correctly. These practices are worthy of our study and reference. Information technology resources in preschool education are relatively scarce. This situation is an important factor hindering kindergarten teachers from carrying out modern information technology teaching. Even if kindergartens are well equipped with modern educational technology, they cannot play a role in actual teaching and management. In addition, there is still a lot of room for improvement in the level of specialization of information technology resources. The existing resources are difficult to meet the teaching and research needs of front-line teachers. Information technology resources for preschool education should be consistent with the goals, contents and characteristics of current preschool education. Preschool education requires the design of educational materials that conform to the learning habits of young children. The evaluation index system of preschool children's education based on computer technology is shown in Figure 4.

At the same time, preschool education websites also require the participation of specialized designers and developers. Such personnel will collect and sort out relevant information such as kindergarten one-day activities, teaching activities, and observation classes. Designers integrate and present materials in various forms such as pictures, text, audio, video, and animation. At the same time, designers transform these resources into professional information technology resources according to the physical and mental development characteristics and teaching needs of children at various ages. Website designers use the basic education information network platform to share resource content.

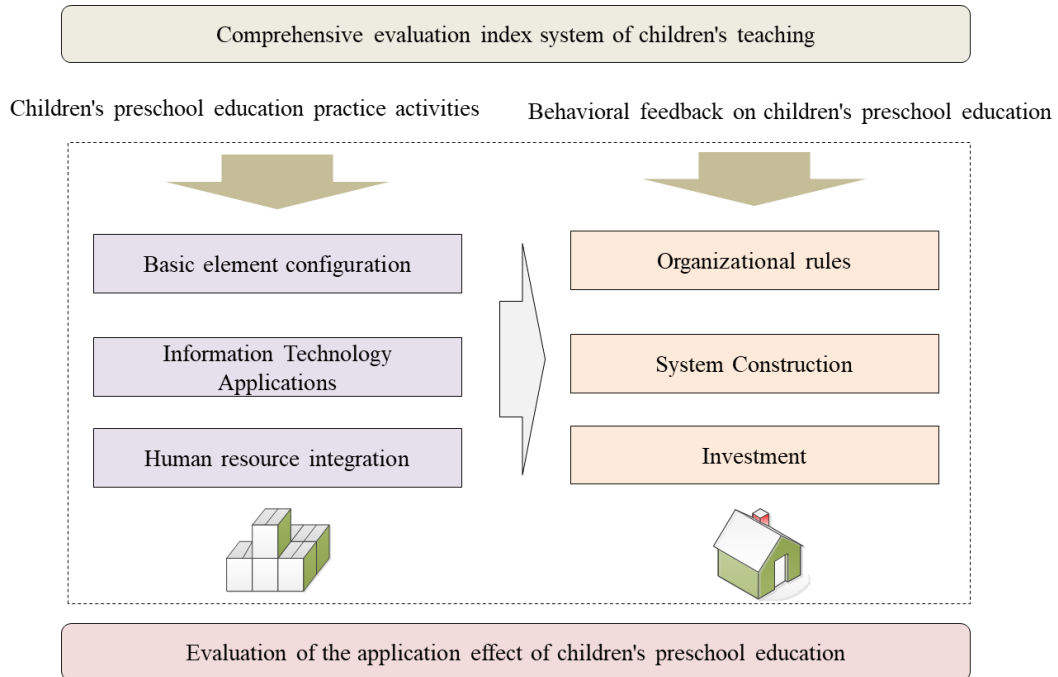


Figure 4: The evaluation index system of preschool children's education based on computer technology.

3 THE MAIN DIRECTION OF PRESCHOOL EDUCATION INFORMATION CONSTRUCTION

3.1 Curriculum System of Preschool Education Information Construction

Based on the relevant theories of computer practice courses in preschool education, schools should design a teaching application model of virtual reality technology. This study carried out researches related to preschool education information supported by virtual reality technology. This paper makes some optimizations on this basis, and proposes a virtual practice curriculum system for preschool education majors for different situational environments. In the whole preschool education major, the computer practice curriculum system is divided into three layers, namely practice preparation layer, practice layer and feedback layer. Overall, this is a top-down progressive system from behavioral activities to feedback. It is also a process from practical preparation activities to immersion experience to practical reflection. Among them, each process link involves the relevant knowledge of virtual reality technology, and involves all aspects of students' practical behavior. The comparison of different teaching modes in children's preschool education system is shown in Figure 5.

3.2 The Main Content of Preschool Education Information System Construction

The practice preparation layer is the most basic and important aspect. The construction of kindergarten information system is the first step to lead preschool students to carry out virtual practice. The system requires professional academics in preschool education and virtual reality technicians to develop design pages together. In view of the tasks and challenges faced by kindergartens, relevant scholars need to further improve the teaching practice system of preschool education professional knowledge.

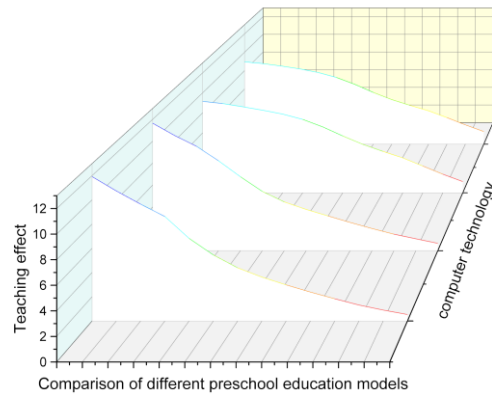


Figure 5: The comparison of different teaching modes in children's preschool education system.

The practice layer is the focus of the virtual kindergarten practice for students majoring in preschool education. At this stage, students need to complete a series of body and language behaviors, and cooperate with instructors to carry out systematic teaching work. The psychological feedback layer is the result of the whole virtual kindergarten practice system. The kindergarten realizes the practical work of virtual kindergarten through psychological immersion teaching. Through repeated body language operations, the school can further consolidate the practical achievements of the kindergarten and strengthen the training effect of the comprehensive ability of pre-school students. The analysis of the direct effect of CAD technology in preschool education is shown in Figure 6.

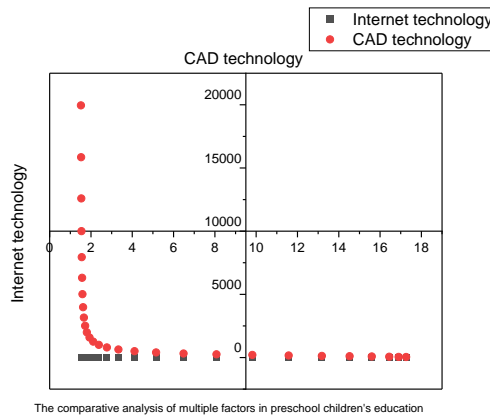


Figure 6: The analysis of the direct effect of CAD technology in preschool education.

3.3 The Construction Practice Mode of Preschool Education Information System

Kindergartens need to build a virtual practice curriculum system for preschool education based on practice preparation, practice and psychological feedback. Schools need to design the teaching mode of virtual courses based on the curriculum system. Throughout the preschool education profession, virtual practical courses are an important part of preschool education work. This course expresses the complete process of pre-professional curriculum feedback. Their interrelations and specific connotations are the core content of the preschool education professional practice model.

At the practical preparation level, schools need to set up virtual kindergartens with multiple contextual environments. Schools need to design preschool professional practice courses based on integrated contexts. These lessons are in the form of tasks with corresponding gamification elements. These gamification elements enable student groups to be attracted by realistic, complex, and vivid virtual situations. For example, virtual kindergarten situations include child interaction, classroom tasks, emergencies, etc. The course focuses on virtual perception technologies such as hearing, touch, force perception, and movement. Secondly, at the practical level, students majoring in preschool education carry out virtual practice activities of kindergarten gamification through the use of body movements and other behaviors. The whole process of practice is visible and controllable, and it includes the specific content of life, sports, games, learning, etc. The analysis of the differentiation effect of CAD technology in preschool education is shown in Figure 7.

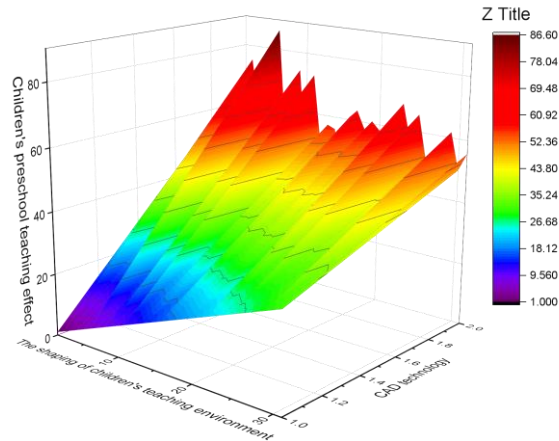


Figure 7: The analysis of the differentiation effect of CAD technology in preschool education.

4 CONCLUSION

At the current stage, there are still many problems in China's preschool education information technology. There is still a big gap between this technology and the achievements of information technology in primary and secondary education and information technology in higher education. However, we have also seen that from national to local, from experts and scholars to front-line kindergarten teachers, all begin to attach importance to and explore the theory and practice of information technology in preschool education. Some fields have formed a development model with distinctive features. Kindergartens need to carry out corresponding infrastructure construction with reference to the economic level and regional characteristics of each region. According to the different levels of kindergartens, the government provides classified guidance, step-by-step implementation, and layer-by-layer promotion, and develops information technology construction in preschool education step by step. This measure is conducive to improving the current deficiencies in the construction of information technology infrastructure in the field of preschool education. For example, in relatively developed regions and cities, the government has accelerated the construction of an information technology learning environment based on the existing information technology construction. It is necessary for the government to further improve the information technology teaching and management service functions in kindergartens. The government needs to explore a new model of combining information technology and curriculum in kindergartens. In economically underdeveloped areas, urban schools can strengthen the popularization and promotion of information technology, and further improve the construction of information technology infrastructure. In areas with weak conditions, the government should

increase the configuration of traditional information technology facilities, such as tape recorders, TV sets, video cameras, DVDs, etc.

Some developed areas are also equipped with two-way video conferencing systems and multimedia teaching courseware platforms. These infrastructure configurations allow kindergartens to basically achieve information interconnection. In the western region, the information technology infrastructure construction of kindergartens is still at a relatively low level. People's understanding of information technology teaching equipment is still relatively narrow. My country issued the "National Medium- and Long-Term Education Reform and Development Plan Outline". The document requires local governments to establish a kindergarten construction system that combines government leadership, social participation, and public and private management. In the field of preschool education, the construction of information technology infrastructure requires a lot of money. Kindergartens need to strengthen cooperation with all walks of life, and let more outstanding enterprises with a sense of social responsibility and historical mission participate in the construction of preschool education information technology.

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