

Research on the Construction of Integrated Education Model of Kindergarten and Nursery Based on Artificial Intelligence

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Abstract: This article focuses on the integrated education model of child care based on AI (artificial intelligence). At present, the integrated kindergarten education is facing a series of severe challenges, and the vigorous development of AI technology has opened up a new opportunity for it. The main goal of this article is to build a scientific and effective integrated education model of child care based on AI, and comprehensively assess and continuously optimize its localized application effect. In the research process, the article deeply analyzes the application status and actual demand of AI in integrated kindergarten education, and finds a series of problems to be solved urgently, such as poor pertinence of teaching resources and insufficient application ability of teachers. Based on these findings, this article carefully constructs the framework of educational model from several key aspects such as curriculum system, teaching methods and learning support system. Furthermore, a comprehensive assessment index system is set up to ensure the scientificity and effectiveness of the education model. This AI-based integrated kindergarten education model is helpful to meet the actual needs of integrated kindergarten education. Through the assessment and optimization of the application effect, we can give full play to the positive role of AI technology in integrated kindergarten education.

1. Introduction

The field of education is undergoing unprecedented changes, and the rapid development of AI technology has brought new opportunities and challenges to the integrated kindergarten education [1]. In today's society, the importance of preschool education is increasingly prominent. As an advanced concept and practice mode of preschool education, the integration of child care and kindergarten aims to provide a continuous, systematic and suitable educational environment for children aged 0-6 to promote their all-round development [2-3]. With its powerful data processing, intelligent analysis and individualized service capabilities, AI is expected to be deeply integrated into the integrated kindergarten education, opening up a new path for optimizing the education process and improving the quality of education.

At present, the integrated kindergarten education has encountered a series of problems in the process of practice [4]. In actual teaching, due to limited energy, it is difficult for teachers to fully pay attention to the individual differences of each child, and it is difficult to effectively realize individualized education in the true sense. There is room for improvement in the integration and utilization efficiency of educational resources, and the unbalanced distribution of high-quality educational resources is still significant [5]. In this context, the application of AI technology is expected to be the key to solve these problems. With the in-depth analysis of children's learning data, AI can provide accurate teaching suggestions for teachers and effectively promote the achievement of individualized education. Furthermore, relying on the advantages of intelligent technology, we can break through geographical restrictions and integrate rich and diverse educational resources, thus promoting the realization of educational equity.

Although the application prospect of AI in the field of education is broad, the practice in integrated kindergarten education is still in the exploratory stage [6]. At present, there is no systematic and mature theory and method on how to organically integrate AI with integrated kindergarten education and build a scientific, reasonable and practical education model [7].

Therefore, it is of great significance to carry out in-depth research on the construction of integrated kindergarten education model based on AI. The purpose of this study is to explore the application status and demand of AI in integrated kindergarten education, build an integrated kindergarten education model based on AI, and assess and optimize the localization application effect of AI technology.

2. AI and related theories of integrated kindergarten education

As an important branch of computer science, AI is committed to developing theories, methods, technologies and application systems that can simulate, extend and expand human intelligence. It covers machine learning, natural language processing, computer vision and other key technologies, and realizes intelligent decision-making and behavior through learning and analyzing a large amount of data [8]. In the field of education, AI can provide individualized learning support for students according to their unique characteristics. Integrated kindergarten education emphasizes the provision of coherent and systematic education services for children aged 0-6. This educational model pays attention to the continuity and stages of children's physical and mental development, respects individual differences and aims at promoting children's all-round and harmonious development [9]. Whether it is curriculum, teaching methods, or environment creation, it is closely around the development needs of children.

The integration of AI and integrated kindergarten education has rich theoretical basis. The theory of educational informatization emphasizes the important role of information technology in promoting educational reform. As the frontier of information technology, AI provides technical support for integrated kindergarten education. The theory of children's development shows that children have unique cognitive characteristics at different stages, and AI can tailor educational programs for children to meet individual needs and help the integrated kindergarten education achieve the training goal.

3. Analysis of the current situation and demand of AI in the integration of kindergarten and child care

With the continuous progress of science and technology, the application of AI in integrated kindergarten education is gradually emerging. At present, some kindergartens have begun to try to introduce AI-related technologies, hoping to improve education quality and management efficiency with its advantages. From the teaching level, some kindergartens use intelligent education software to assist teaching. In terms of management, some institutions adopt intelligent attendance system, which can quickly and accurately record children's attendance and facilitate teachers and parents to grasp information in time. Intelligent monitoring equipment is also widely used, which can pay attention to children's activities in the park in real time and ensure their safety. Through the investigation and analysis of 10 child care institutions with a certain scale and applying AI technology (see Table 1), it is found that there are still many shortcomings in the current application. In terms of teaching resources, although there are abundant intelligent education software, there are relatively few targeted high-quality resources that meet the characteristics of integrated kindergarten education. Most resources are universal and fail to fully consider the continuity and stage differences of physical and mental development of children aged 0-6. In terms of teachers' application ability, nearly 60% teachers said that although they have been exposed to AI teaching tools, they can only perform basic operations and lack the ability to use AI for individualized teaching. In terms of technical adaptability, about 45% of the institutions report that the AI equipment or software adopted has compatibility problems with the existing educational environment and management system.

Starting from the practical needs of integrated kindergarten education, there is an urgent need for a large number of systematic and targeted AI teaching resources that conform to the laws of children's development to meet the learning needs of children of different ages. Teachers urgently need to improve their ability to use AI technology in teaching and management, so as to give full

play to the advantages of AI in education. Ensuring the seamless connection between AI technology and the existing environment and system of child care institutions is also the key to promote its wide application.

Table 1 Survey on the Current Status of AI Application in Childcare and Kindergarten Institutions

Survey Item	Specific Situation	Proportion
Relevance of High-Quality Teaching Resources	Scarcity of resources tailored to the characteristics of integrated childcare and kindergarten education	Approximately 70%
Teachers' Application Capabilities	Only capable of basic operations; lack of individualized teaching abilities	Nearly 60%
Technical Adaptability	Compatibility issues with existing educational environments and management systems	Approximately 45%

4. AI-based integrated kindergarten education model construction

The construction of integrated kindergarten education model based on AI aims to fully integrate AI technology and integrated kindergarten education concept, and create a more scientific, efficient and individualized education environment for children aged 0-6. Firstly, the construction goal is determined, that is, with the help of AI technology, to promote the all-round development of children in physical, cognitive, emotional and social interaction, and to cultivate their innovative thinking and ability to adapt to the future society. The construction process follows the principles of scientificity, adaptability, individuation and systematicness, ensuring that the educational model not only conforms to the law of children's physical and mental development, but also meets the needs of the times. The core structure of this educational model covers three key parts: curriculum system, teaching methods and learning support system (see Figure 1).

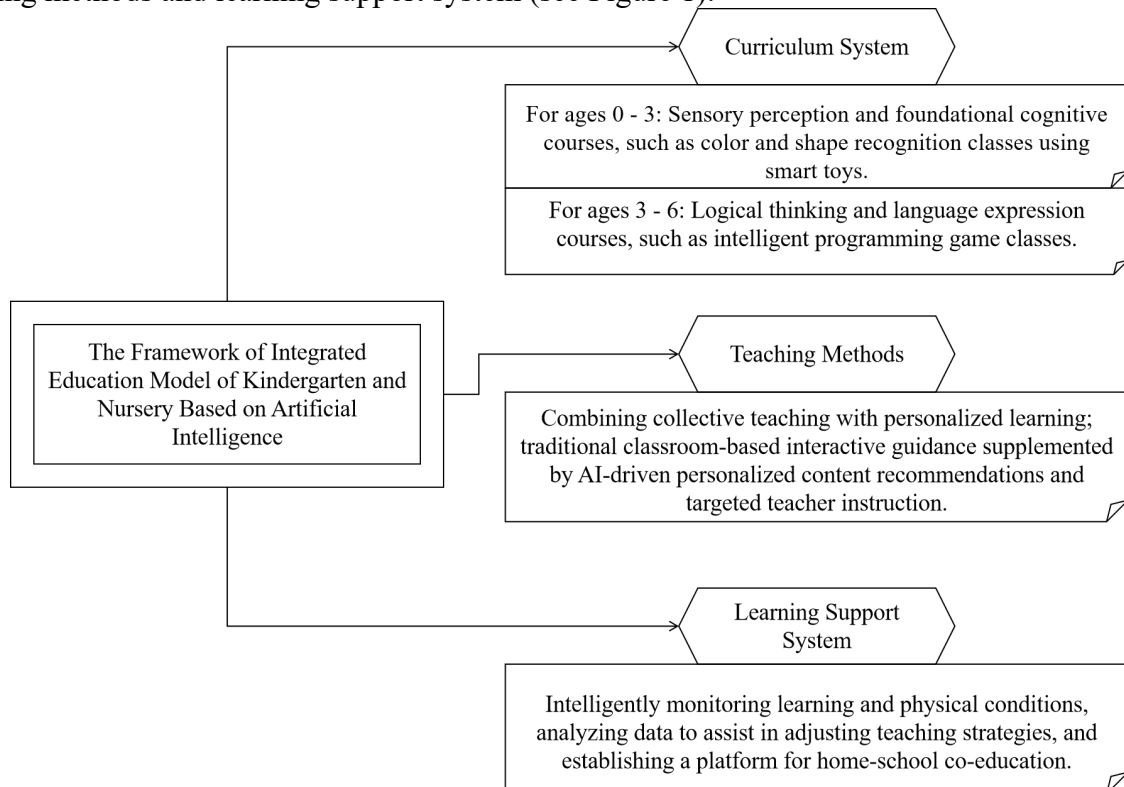


Figure 1 AI-based integrated education model framework for child care

In the aspect of curriculum system, according to the development characteristics of children at different ages, AI technology is used to develop customized courses. For children aged 0-3 years, courses focusing on sensory training and basic cognition are designed, such as color and shape cognition courses with the help of intelligent toys and interactive equipment. For children aged 3-6, courses such as logical thinking and language expression are added, such as using intelligent

programming games to cultivate children's logical thinking ability. On the teaching method, mixed teaching is adopted. On the one hand, teachers use the traditional classroom for collective teaching to guide children to interact and communicate; On the other hand, individualized learning is carried out with AI. For example, according to the children's learning data, push the exclusive learning content for them, and the teachers will give targeted guidance accordingly. Learning support system provides all-round protection for children. Real-time tracking of children's learning status and physical condition through intelligent monitoring equipment; Using AI to analyze learning data, and provide basis for teachers to adjust teaching strategies; By building a home-based co-education platform, parents can keep abreast of children's learning progress and communicate with teachers.

5. Assessment and optimization of localization application effect of AI technology in integrated kindergarten education

With the gradual deepening of the application of AI technology in integrated kindergarten education, it is particularly important to scientifically assess and continuously optimize its localization application effect. This is related to the improvement of education quality and the all-round development of children. First of all, a comprehensive and targeted assessment index system should be constructed for assessment. The system covers four main dimensions: early childhood development, education and teaching, technology application and parents' satisfaction (see Table 2).

Table 2 Assessment Index System for the Localized Application Effects of AI Technology in Integrated Childcare and Kindergarten Education

Assessment Dimension	Specific Indicators	Assessment Method
Child Development	Cognitive ability, language ability, emotional and social interaction skills	Regular testing, daily observation
Education and Teaching	Achievement of teaching objectives, effectiveness of teaching methods, improvement of teachers' teaching abilities	Analysis of teaching outcomes, self-assessment by teachers, and peer assessments
Technological Application	Technical stability, adaptability, and degree of support for education and teaching	Equipment failure statistics, system compatibility assessments, teacher feedback
Parent Satisfaction	Assessment and suggestions regarding the effects of AI applications in children's learning and daily life	Questionnaire surveys, interviews

In the dimension of children's development, it focuses on children's development in cognition, language, emotion and social interaction. Regular cognitive ability tests can help understand children's level of knowledge mastery and cognitive development; In daily activities, children's language expression and interaction can also be observed to evaluate the degree of improvement in their language and social communication abilities. The dimension of education and teaching focuses on the achievement of teaching objectives, the effectiveness of teaching methods, and the degree of improvement of teachers' teaching abilities. The dimension of technology application mainly considers the stability and adaptability of technology and the degree of support for education and teaching. Such as counting the failure rate of intelligent devices and evaluating the compatibility of AI software with existing educational resources and management systems. The dimension of parents' satisfaction collects parents' comments and suggestions on the effect of AI application in children's study and life in the park through questionnaires and interviews.

Based on the above assessment index system, diversified assessment methods are adopted. Comprehensive use of quantitative and qualitative analysis, combining objective data with subjective assessment. Statistical analysis of quantifiable data such as children's cognitive ability test scores and equipment failure times; The improvement of teachers' teaching methods and parents' suggestions are summarized by qualitative methods such as text analysis. According to the assessment results, the optimization strategy is put forward. If it is found that some children are not effective in cognitive improvement in the dimension of children's development, we can further

optimize the AI teaching content, adjust the learning difficulty and progress, and provide more individualized learning paths. If the dimension of education and teaching shows that the effectiveness of teaching methods is insufficient, we can strengthen teacher training, improve teachers' ability to use AI to innovate teaching, organize teaching seminars and share successful experiences. In terms of technical application, if there are problems with stability, communicate with technical suppliers in time to upgrade and maintain the system; If the adaptability is not good, the AI technology should be localized according to the actual needs of education. In response to the feedback from parents, timely respond and improve, strengthen home communication, and jointly promote the effective application of AI technology in integrated kindergarten education. Through scientific assessment and continuous optimization, it is ensured that AI technology can really play a positive role in improving the quality of education and promoting the all-round development of children in the localization process of integrated kindergarten education.

6. Conclusions

This study focuses on the construction of integrated kindergarten education model based on AI, and has achieved a series of results through multi-dimensional in-depth exploration. First of all, after comprehensively combing the theoretical basis of AI and integrated kindergarten education, it is clear that the integration of AI and integrated kindergarten education has solid theoretical support. Subsequently, the current situation and demand of AI in the field of child care integration are deeply analyzed, and it is found that although some child care institutions have introduced relevant technologies, there are still obvious deficiencies in key aspects such as teaching resources, teachers' ability and technical adaptability.

In view of the above problems, this study has carefully constructed a complete educational model, which covers curriculum system, teaching methods and learning support system. The curriculum system is customized strictly according to the age characteristics of children to ensure that it conforms to the cognitive development law of children; The teaching method adopts mixed teaching, organically combines the advantages of online and offline teaching to stimulate children's interest in learning; The learning support system provides a solid guarantee for children's learning and development from all directions. Furthermore, this study has set up a scientific assessment index system. The system includes many dimensions such as children's development, education and teaching, technology application and parents' satisfaction, and adopts diversified assessment methods to comprehensively and scientifically assess the localization application effect of AI technology in integrated kindergarten education.

Based on the assessment results, this study puts forward a series of targeted optimization strategies, covering many aspects such as adjusting teaching content, improving teachers' ability and improving technology application, in order to ensure that the education model can be continuously improved and optimized. The results of this study are of great significance to promote the development of integrated kindergarten education, and provide a theoretical framework and operational guidelines for follow-up practice.

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