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Research on the Practice of Digital Innovation Technology Enabling Family Education—Taking the Cultivation of Psychological Literacy of Primary School Students as an Example

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Abstract: This paper takes the cultivation of psychological literacy of primary school students as an example to explore the practice of digital innovation technology in family education. With the rapid development of science and technology, digital innovation technology has penetrated into various fields, and family education is no exception. By analyzing the characteristics of digital innovation technology and the needs of family education, this paper proposes a method of cultivating the psychological literacy of primary school students based on digital innovation technology. First, this paper introduces the digital innovation technology, the concept of family education and related theories, including the Internet, mobile applications, virtual reality, etc. Then, the advantages of digital innovation technology in family education include convenience, interactivity, and personalization.Taking the psychological literacy cultivation of primary school students as an example, the application method and practical effect of digital innovation technology in family education are elaborated in detail. The practice shows that the method of cultivating students' psychological literacy of primary school students based on digital innovation technology has remarkable effect. On this basis, this study puts forward corresponding measures in the aspects of online emotion diary, virtual reality interactive experience, personalized psychological counseling software, digital storytelling, online game therapy, cloud home-school cooperation platform, emotion recognition training courses, big data-driven growth assessment and so on. In short, this paper proposed a method of cultivating psychological literacy of primary school students based on digital innovation technology, and achieved good results in practice. In the future, with the continuous development and popularization of digital innovation technology, it is believed that its application in family education will be more extensive and in-depth, and provide new opportunities and challenges for the development of family education.

1. Introduction

With the rapid development of information technology, digitization has become an important force to promote social progress. In the field of education, the application of digital innovation technology not only greatly enriches the teaching means and methods, but also provides students with a more personalized learning experience. Especially in the important education field of family, the application of digital technology is gradually changing the traditional family education mode, providing a new way to cultivate students' psychological literacy [1].

In recent years, the mental health problem of primary school students has been increasingly concerned by all walks of life. Faced with the rapidly changing social environment and complex learning tasks, primary school students have increasing psychological pressure. How to effectively improve the psychological quality of primary school students, help them to form a healthy personality and good social adaptability, has become an important subject facing family education [2]. In this context, it is of great theoretical value and practical significance to explore how to use digital innovation technology to empower family education, especially the application and practice in the cultivation of psychological literacy of primary school students.

Digital innovative technologies such as big data, artificial intelligence, virtual reality, etc., show great potential in improving the effect of family education [3]. For example, big data analysis can understand children's interests and development needs; artificial intelligence technology can provide customized learning resources and methods according to individual differences; and virtual reality technology can create an immersive learning environment to improve learning interesting and interactive [4]. The application of these technologies makes family education more accurate and efficient, and also provides strong support for the mental health of primary school students[5].

However, there is still a lack of systematic and in-depth research on how to effectively apply these advanced technologies in the field of family education, especially for the cultivation of the psychological literacy of primary school students. The purpose of this study is to explore the specific application path of digital innovation technology in improving the psychological literacy of primary school students, in order to provide scientific guidance for family education practice, and promote the development of family education towards higher quality.

2. Research literature review

2.1 Digital innovation technology

Virtual reality technology can provide students with an immersive learning experience. Educational games can help children to better understand abstract concepts, while enhancing their practical operational ability [6].

In psychological education, VR technology can be used to simulate various situations in real life, help children learn how to deal with complex interpersonal relationships, and improve their ability to solve problems [7].

The intelligent tutoring system developed by using artificial intelligence technology can provide personalized guidance to each student according to their learning characteristics and progress. This not only helps to improve learning efficiency, but also makes students feel concerned and supported, thus enhancing self-confidence [8]. In addition, AI can also analyze students' behavioral data to find out potential psychological problems in time and provide early warning information for parents and teachers.

The Internet-based online interactive platform makes the home-school communication more convenient and efficient. Parents can learn more about their children's performance at school through these platforms, and communicate and discuss with teachers [9]. At the same time, such a

platform also builds a good bridge for parents to share their parenting experience.

2.2 Family education-taking

In today's society, with the improvement of people's living standards and the deepening of attention to children's education, the role of family education has attracted more and more attention. Family is the first school where children grow up, and parents are the first teachers of children. In the process of children's growth, parents pass on their own recognized values and moral concepts to the next generation of [10] through words and deeds. A good family environment can help children establish a positive and healthy emotional attitude, and learn how to control and express their emotions, which plays a crucial role in their future interpersonal skills [11]. The formation of early reading habits and mathematical logic thinking training are conducive to the exploration and utilization of children's brain potential.

Regular equal and open dialogue and communication with children, understand their ideas and needs, give necessary guidance and advice, but also to listen to the child's opinion [12]. Through their own words and deeds to show children the right way of behavior, such as integrity, respect for others and other qualities [13]. Parents should set clear and specific rules for children to let them understand what can be done and what cannot be done [14]. This helps cultivate children's ability to think independently and stimulates their curiosity and interest in exploring the unknown things.

2.3 Information acquisition and dissemination

With the rapid development of information technology, digital innovation technology is gradually changing the way we live and work. In the field of education, especially in family education, the application of these technologies provides parents with more convenient and efficient access to and disseminate information [15].The online education resource platform enables the high-quality education resources to break through the geographical restrictions and provide rich learning materials for the majority of families. Parents can easily access various curriculum resources through the Internet to help their children broaden their knowledge [16].With the development of artificial intelligence technology, many intelligent learning tools designed for children of different ages have emerged. These tools can not only provide personalized tutoring programs according to the children's learning situation, but also provide timely feedback on the learning effect, so that parents can grasp the children's learning progress. Digital technology makes information transmission more fast and accurate, saving a lot of time and energy. Internet-based communication tools make the communication between parents and children more frequent and deeper. By collecting and analyzing user data, the system is able to customize a learning plan for each child. Diversified forms of digital content (such as videos, games, etc.) make the learning process no longer boring [17].

2.4 Personalized teaching support

The traditional education model often adopts a "one-size-fits-all" approach, that is, all students receive the same teaching content and schedule[18]. Although this way can ensure the equal distribution of educational resources, but it ignores the problem of individual differences of students, and it is difficult to meet the personalized needs of each student [19]. The application of digital innovation technologies, such as artificial intelligence (AI) and big data analysis, can realize the accurate tracking of students' learning behavior and effects, so as to provide each student with tailored learning plans, and effectively improve the learning efficiency [20].

2.5 Emotional communication tools

With the rapid development of information technology, digital innovation technology is increasingly widely used in various fields. Virtual reality (VR) and augmented reality (AR) Virtual reality and augmented reality technology can create an immersive learning environment to help parents and children to participate in it, thus enhancing the interaction between parents and children experience [21]. For example, through AR technology, parents can explore the mysteries of the universe with their children, while VR allows their children to experience historical events or literary scenes personally. The AI chatbot can have natural conversations with the user based on a pre-set question library. In home education, such tools can be designed to answer questions and give positive feedback, to help develop confidence and curiosity. Many online collaboration platforms today support features such as multi-person document editing in real time. Such platforms not only facilitate information sharing among family members, but also encourage children to actively participate in discussions and express their views. In addition, some platforms even have video conferencing functions, making it easy for remote families to communicate "face-to-face". The personalized learning system based on big data analysis can customize the exclusive course content for each child according to his / her interests and learning progress[22]. This can not only improve the learning efficiency of the children, but also make them feel the attention and support from their parents.

3. Existing problems

3.1 Problems in information acquisition and dissemination

Although digital innovation brings convenience to family education, there are still some challenges in practical application. Personal information leakage may bring safety risks for children. There is a large amount of unaudited information on the network, which is difficult to ensure its scientific nature and effectiveness. The difference in digital resources between urban and rural areas and between families leads to some groups cannot enjoy high-quality educational resources. Long-term use of electronic products may affect the child's visual health and interpersonal skills.

3.2 Problems in personalized teaching support

Digital technology can provide a lot of learning resources, but whether these resources are suitable for children's learning needs needs to be carefully screened. Parents and teachers often lack enough time and professional knowledge to screen out the learning materials that are most suitable for children's characteristics. In addition, although some technology platforms provide rich and diverse resources, they may have uneven quality problems, and even contain content that is not suitable for children to contact with.

Each family has different financial conditions, and different ownership of digital devices. Rich families may have easier access to the latest and state-of-the-art electronics, while children from poor families may face poor equipment or simply be unable to use the tools. This gap can lead to unfairness in children receiving digital educational resources.

Although many parents are willing to try to use new technologies to help their children learn, but because they are not deep enough about the new technologies, so they often feel difficult in practical operation. In cyberspace, children are easily exposed to bad information or suffer from problems such as cyberbullying. At present, there is no complete and effective evaluation mechanism for how to measure the personalized teaching effect implemented through digital means.

3.3 Problems in the emotional communication tool

While many emotional communication tools claim as "easy to use," learning how to use new software is still a challenge for some older or less familiar with digital devices. This not only limits the effective coverage of these tools, but also may make some parents feel rejected, thus affecting their use effect. With the enhancement of people's awareness of personal privacy protection, how to ensure the security of children and family information has become a problem that must be taken seriously. On the one hand, the risk of data leakage always exists; on the other hand, excessive collection of personal information may also concern parents.

There are a large number of apps and platforms developed for children in the market, some of which lack scientific basis or even contain bad information. Parents need to spend a lot of time and energy screening out the quality resources that really help their children's growth and development, which is a big challenge for busy modern families.

Although the parent-child relationship can be enhanced through emotional communication tools, in some cases, over-reliance on these tools for communication may lead to less face-to-face communication opportunities in real life, thus affecting the deep emotional communication between both sides.

4. Effective measures for the practical research of digital innovation technology enabling family education-taking the cultivation of psychological literacy of primary school students as an example

4.1 Online mood diary

Primary school students are encouraged to record their mood changes and important events every day by designing friendly online platforms. This diary can help children learn to recognize and express emotions and develop a positive attitude towards difficulties in life.

4.2 Virtual reality interactive experience

VR technology is used to simulate various social situations, so that students can learn how to deal with conflicts and conduct effective communication skills in a safe virtual environment, so as to improve their practical ability to solve problems.

4.3 Personalized psychological counseling software

We should develop mental health applications that can provide customized recommendations according to each child's specific circumstances.

These applications can use data analysis to identify potential problems and give targeted guidance and support.

4.4 Digital story telling

We need to tell the children the stories of positive effects through e-books or animations, so that they can learn the correct values and morals.

This way can not only stimulate children's interest in reading, but also guide them to make more appropriate behavioral choices in their daily life.

4.5 Online game therapy

For some specific psychological problems (such as anxiety disorder, attention deficit disorder,

hyperactivity disorder, etc.), special games can be designed to intervene. Gamified treatments can not only reduce children's resistance to traditional counseling methods, but also enable them to gradually overcome barriers in games.

4.6 Cloud home-school cooperation platform

We should build a child's growth file system with the participation of parents and teachers.

On this platform, both sides can timely understand the child's performance of children in school and the existing psychological problems, so as to facilitate the two sides to cooperate to solve related problems.

4.7 Emotion recognition training course

AI technology to help students identify others and their own emotional performance, and teach appropriate coping strategies. Such training helps children improve empathy and social skills.

4.8 Big data-driven growth assessment

Big data analysis technology is used to regularly comprehensively evaluate students' learning outcomes and behavior habits, so as to timely detect and correct the adverse tendencies that may affect their mental health.

5. Conclusion

The application of digital innovation technology in the cultivation of primary school students has achieved initial success. But there are also a lot of problems. For example, problems in information acquisition and communication, problems in personalized teaching support, problems in emotional communication tools, etc.

Faced with these problems, we should take corresponding measures. These include designing user-friendly online platforms to encourage pupils to record their daily mood changes and important events. We can use VR technology to simulate various social situations, allowing students to learn how to handle conflicts and develop effective communication skills in a safe virtual environment, thereby improving their practical problem-solving abilities. Additionally, we can develop mental health applications that provide customized recommendations tailored to each child's unique circumstances. Through e-books or animations, we can tell stories with positive effects, teaching children the correct values and morals. For specific psychological issues, such as anxiety disorders and attention-deficit hyperactivity disorder, we can design specialized games to intervene. We should also build a growth file system where parents and teachers can participate in children's development. By utilizing AI technology, we can create intelligent coaches to help students recognize their own and others' emotional responses and teach appropriate coping strategies. Finally, employing big data analysis technology, we can regularly conduct comprehensive evaluations of students' learning outcomes and behavior habits to timely detect and correct adverse tendencies that may affect their mental health.

In the future, with the continuous progress and improvement of technology, it is believed that more and more innovative methods will be introduced into family education to further promote the development of basic education in China. At the same time, we also look forward to more attention and support from all sectors of society, and make joint efforts to create a good environment conducive to the healthy growth of young people.

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Family Education Service Guidance Research Center: A Countermeasures Research on the Effect of Family Education on the Mental Health of Primary school Students (JTJY2024015).

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