Education Reform and Development, 2024, Volume 6, Issue 12
https://ojs.bbwpublisher.com/index.php/ERD
Online ISSN: 2652-5372
Print ISSN: 2652-5364

The Application, Challenges, and Development of Artificial Intelligence in Nursing Education

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Abstract: With the rapid development of science and technology, artificial intelligence has penetrated every field, including the nursing education industry. This paper aims to discuss the application, challenges, and development trends of artificial intelligence in nursing education. The application of artificial intelligence technology such as virtual reality, augmented reality, mixed reality technology, ChatGPT, and knowledge graph in nursing education reveals its important role in improving the quality of nursing teaching, stimulating students' learning interest, and helping students build clinical practice ability. At the same time, this paper also points out the challenges existing in the application process of artificial intelligence, including privacy and security issues, over-dependence problems, lack of cognition of nursing staff, and difficulties in interdisciplinary integration. Finally, this paper puts forward countermeasures to the existing challenges, including teaching method innovation, curriculum content reform, curriculum module optimization, etc., in order to promote the development of nursing education and cultivate high-quality nursing talents who are more in line with the needs of the times.

Keywords: Artificial intelligence; Application of nursing education; Challenge; Development

Online publication: January 6, 2025

1. Introduction

As a key force in promoting industrial upgrading and a new round of scientific and technological revolution, artificial intelligence has brought new opportunities and challenges to the development of nursing education. Education should give full play to the value of relevant technical means, stimulate the vitality of education and teaching, and better serve all teachers and students. While applying intelligent technology, teachers must always keep in mind the original intention and mission of educating people, actively instill humanistic values in students, and cultivate their moral quality. This is of great significance for improving students' nursing professional quality and comprehensive accomplishment. Artificial intelligence enables nursing education, which is in line with the general trend of the medical field and social and economic development and is also an important technical support for nursing education reform.

2. Application analysis of artificial intelligence in nursing education

2.1. Virtual reality technology

The application of virtual reality (VR) technology in nursing education can effectively mobilize students' sensory systems and reduce their understanding of abstract nursing concepts, so as to stimulate their interest in nursing learning, improve the nursing knowledge system, further strengthen their clinical practice ability and clinical innovative thinking, and reduce the occurrence of medical accidents. At the same time, VR technology is not bound by time and space, and students can learn nursing knowledge and clinical practice anytime and anywhere with the help of simulation equipment, thus laying a solid foundation for the construction of efficient nursing education classrooms and the improvement of students' ability [1]. For example, students can use VR technology equipment to simulate the surgical process and reduce the error rate in clinical practice; build a virtual scene of cardiac arrest, and practice cardiopulmonary resuscitation with VR technology equipment.

However, while VR technology brings convenience to nursing education, it also brings some negative effects. For example, the equipment input cost of VR technology is high, which some schools cannot afford. Teachers' information literacy is limited, so they need to devote part of their energy to learning VR technology. In the process of using VR equipment, some staff will have uncomfortable symptoms, and so on. Therefore, nursing education teachers can properly apply VR technology and equipment in teaching, so as to reduce negative effects.

2.2. Augmented reality and mixed reality technologies

The application of augmented reality (AR) technology in nursing education and its interaction with the real-world environment can further enhance students' tactile sense of learning nursing knowledge in the information link [2-4]. With the help of AR technology, students can intuitively experience the nursing clinical details and processes in the scene where virtual nursing elements are integrated with actual clinical practice, thus deepening their understanding of complex nursing knowledge. This kind of interactivity, autonomy, diversity, and multi-perception can not only stimulate students' enthusiasm to learn nursing knowledge and participate in nursing practice but also provide strong support for them to adapt to the nursing work environment in the future, so as to improve the teaching quality and students' learning satisfaction.

Mixed reality (MR) technology is a technology that highly integrates virtual technology and real life. Users can see both the real environment and virtual objects. For example, in rehabilitation nursing practice, students can use MR technology to help with patient rehabilitation and other physical activities. In the practice of maternal and infant nursing, MR technology can present realistic scenes of mother and infant, such as the physiological characteristics of newborns, emergencies, etc. By interacting with the virtual mother and infant, students can master the skills of breastfeeding, neonatal nursing, and so on, which greatly improves students' nursing level [5]. However, MR technology is still in the initial stage of exploration, and its application in nursing education may bring a series of problems and ultimately affect the quality and progress of teaching.

2.3. ChatGPT

ChatGPT is an extremely advanced language model, which can effectively improve the interaction efficiency between students and teachers and help students quickly extract useful information. In this process, students' text ability, expression ability, and innovative thinking can be effectively exercised. At the same time, nursing students can interact with ChatGPT, such as discussing medical conditions and exploring innovative nursing methods, so as to enrich students' nursing knowledge reserve and help them keep up with teachers' teaching progress. In addition, this interaction can also help teachers find suitable teaching methods for medical students

and achieve the purpose of improving teaching quality.

ChatGPT also offers significant advantages in terms of finding learning materials and downloading learning resources [6]. It can help students quickly select the required content and answers from the complicated network information, greatly improve the efficiency of students' independent learning, reduce the difficulty factor of learning nursing knowledge alone, and pave the way for the improvement of students' medical literacy.

The application of ChatGPT in nursing education can not only encourage students to take the initiative and think deeply about social, legal, ethical, and moral issues, improve students' three views and professional views, but also reduce students' learning resistance, increase students' knowledge reserve, and exercise their critical thinking and decision-making ability.

For example, when teaching nursing-related content for diabetic patients, students can consult ChatGPT for various knowledge about diabetes, such as the characteristics of different types of diabetes, and the key points of diet management for diabetic patients.

In addition, teachers and students should not over-rely on ChatGPT during nursing education. Once dependent on ChatGPT, students' independent thinking and learning ability will gradually be weakened, which is not conducive to their future work and in-depth exploration of nursing topics. At the same time, there will be a "blind acceptance" phenomenon, causing students to lose the ability to question and awareness to explore, leading to mechanical application of knowledge. In the end, it will affect the development of teachers' and students' communication skills and the improvement of clinical skills [7]. Therefore, nursing education teachers can exercise students' thinking and learning abilities by assigning complex homework and projects. Teachers themselves can reduce their dependence on ChatGPT through regular on-duty exercise, so as to make ChatGPT reasonable, scientific, efficient, and practical.

2.4. Knowledge graph

The knowledge graph of thinking is simply a huge knowledge network or network library. Each node of the knowledge graph is a discipline or technology. Through its correlation and arrangement characteristics, users can explore a facet of knowledge content with the help of a knowledge node, so as to meet the needs of learning and application. At the same time, in the process of using the knowledge graph, users can also form a good knowledge context framework and improve their own knowledge system. The working principle of knowledge graph is a knowledge search tool that integrates the theoretical contents of graphics, applied mathematics, information science, and information visualization technology, and combines the methods of co-occurrence analysis and metrology citation analysis, etc., to display it through the visual graph.

For example, the application of a knowledge graph in the micro-course teaching of Child Nursing can help students start from the nodes of diseases such as pneumonia and diarrhea, and associate the peripheral knowledge such as symptoms, treatment methods, and nursing points of pneumonia and diarrhea in the form of a graph [8,9]. Through the combination of knowledge graph and nursing education, students can quickly complete the study of the important and difficult knowledge of nursing courses, as well as the sorting out of the fragmental knowledge points, so as to build a perfect disease knowledge framework in the brain, which greatly broadens the way for students to acquire knowledge.

3. Challenges faced by artificial intelligence in nursing education

The application of artificial intelligence in nursing education not only brings strong impetus to its reform but also

great challenges to the teaching work of nursing teachers in secondary vocational schools.

With the widespread popularization of artificial intelligence technology, most medical teachers have realized the significance and challenge of artificial intelligence technology to nursing education. After having a clear cognition and understanding of artificial intelligence, nursing teachers should try to integrate artificial intelligence content into nursing education and teaching. The combination of artificial intelligence and nursing education curriculum is not only the performance of nursing education conforming to the development trend of the times but also an effective means to accelerate the reform of nursing education. Through the organic integration of the two, nursing education teachers can cultivate more compound medical talents who meet the requirements of the new era, so as to meet the needs of modern medical talents in modern society.

However, the integration of artificial intelligence and nursing education is not achieved overnight. Artificial intelligence requires nursing education teachers to break away from the traditional teaching mode and change their roles in time. In the traditional education model, teachers usually play the role of disseminator, enlighten and guide theoretical knowledge, and pay more attention to students' grasp and application of theoretical knowledge of nursing. Under the influence of artificial intelligence technology, teachers should not only pay attention to the teaching of nursing education knowledge but also focus on students' grasp and application of multi-disciplinary knowledge such as artificial intelligence technology, biology, chemistry, anatomy, and physiology, which also greatly increases teachers' teaching pressure.

At the same time, the application of artificial intelligence technology is not a "1+1" model of simple technology and teaching, but requires teachers to change nursing education concepts in time, innovate teaching methods according to the requirements of artificial intelligence-related technologies and equipment, achieve the unity of knowledge and action and teach by word and example, adhere to professional ethics, in order to achieve the effect of "1+1>2." This can encourage nursing professional teachers to continuously improve their comprehensive quality to provide quality assurance for the training of nursing education professionals.

In terms of privacy and security, artificial intelligence technology is a new technology based on information technology. Therefore, there is also the possibility of information leakages, such as the use of artificial intelligence technology in collecting information about students and patients, which may be stolen by "people," thus causing serious damage to the lives and property of students and patients [10,11]. At the same time, it may also cause personal information disclosure due to system algorithm errors, hacker attacks, etc. Therefore, in the application of artificial intelligence technology, in addition to instilling artificial intelligence technology theory and application knowledge in students, teachers need to strengthen students' awareness of network security and professional ethics, so as to reduce the risk of personal information disclosure of students and patients.

The application of artificial intelligence technology in nursing education is not only a supplement to the existing teaching content and technology, but also the improvement of students' comprehensive knowledge system. Nursing teachers must accept or take the initiative to participate in relevant training, and actively participate in the design and development of artificial intelligence tools that meet the characteristics and goals of nursing education. The development of nursing-related artificial intelligence tools plays an important role in the transformation of nursing education and the development of students.

4. Effective strategies to cope with the challenges of artificial intelligence in nursing education

With the advent of the artificial intelligence era, it is urgent to reform the program and clinical practice

environment of the nursing education profession and related curriculum. By keeping up with the pace of the times, nursing education will not be eliminated and can cultivate a group of nursing talents with modern medical literacy and rich clinical practice experience.

In the process of teaching artificial intelligence-related knowledge in nursing majors, teachers need to utilize modern teaching methods and follow the principle of teaching students according to their aptitude, so as to meet the learning needs of students who are incapable and at different levels. At the same time, the improvement of medical students' information technology literacy can provide more comprehensive nursing services with humanistic care characteristics for patients in future work scenarios. For example, in teaching, teachers can use AIHTs technology (a clinical teaching method that integrates virtual or augmented reality technology) to build real clinical practice activities, so as to help students constantly improve their clinical reasoning skills and knowledge application ability.

In addition, the optimization of teaching methods in nursing education cannot be separated from the support of top-level logic, such as incentive systems. On the one hand, the formulation of the incentive system shows that the management of medical colleges and universities has a long-term vision and can realize the importance of artificial intelligence technology to nursing education. On the other hand, it shows that colleges and universities are equipped with relatively complete artificial intelligence hardware and software, which can support teachers to carry out artificial intelligence teaching in nursing education or apply modern teaching technology, such as virtual patient chatbots. Through this artificial intelligence technology, students can complete a large number of practical exercises, and continue to exercise their doctor-patient communication skills, enhance clinical practice information, and quickly improve the quality and effect of nursing education professional talent cultivation. However, teachers and students need to pay attention to the frequency of use of artificial intelligent robots to avoid dependence on them and affect the delivery of related academic research.

Reforms are also needed in the nursing curriculum. The reform of nursing curriculum can ensure the information technology level and ability of nursing students, so that they can easily use a variety of modern medical equipment after employment; it can also enrich the classroom content, mobilize the interest and initiative of students to participate in class activities, and improve their digital literacy and medical literacy. However, before the curriculum reform, nursing education teachers must undergo relevant training to ensure that they have sufficient artificial intelligence knowledge and skilled operation ability [12-14].

In terms of course content reform, in addition to retaining the existing nursing course content, teachers should base on the employment direction and employment skills of medical students, take artificial intelligence as the center, and add corresponding artificial intelligence course content, such as data management, biostatistical programming, predictive modeling, risk adjustment, cyber threats, machine learning, big data governance, etc.

In terms of curriculum module design, teachers can divide nursing courses and related artificial intelligence courses into topics such as critical thinking, data literacy, system thinking, technical literacy, artificial intelligence ethics, and artificial intelligence algorithms [15]. These thematic modules can effectively exercise students' thinking, analysis, data application, and reflection abilities, promote a better connection between the nursing profession and the nursing industry, and realize the steady development of nursing education profession.

In order to better improve the artificial intelligence literacy of nursing education teachers, medical colleges and universities can regularly require artificial intelligence experts or medical elites with good information literacy to give lectures on campus. With the help of lectures, nursing teachers can form a more comprehensive knowledge and understanding of artificial intelligence technology, timely understand the frontier information in the field of artificial intelligence, and draw a conclusion according to the case analysis and explanation of experts

and elites, and quickly apply artificial intelligence to nursing education and teaching work.

With the improvement of teachers' information literacy, students can be exposed to a large amount of artificial intelligence knowledge and skills during school, so as to better adapt to the future work environment and content. At the same time, explaining artificial intelligence knowledge in nursing education classes can also play a role in enriching classroom content, increasing classroom vitality, and exercising students' innovative and entrepreneurial thinking.

Under the background of artificial intelligence, teachers should adopt more scientific and objective evaluation methods, such as process evaluation, student mutual evaluation, final evaluation, etc., to dig deeply into students' learning behavior and career goals, so as to carry out individualized teaching.

5. Conclusion

To sum up, the application of artificial intelligence in nursing education brings both opportunities and challenges. Through the reasonable application of VR, AR, and MR technologies, ChatGPT, and knowledge graphs, it can inject new vitality into nursing education. At the same time, teachers must also actively cope with new challenges. By innovating teaching methods, upgrading medical equipment, reforming course content, optimizing course modules, holding lectures, and establishing scientific and objective evaluation methods, the deficiencies of artificial intelligence in nursing education can be effectively overcome, so as to continuously promote the development of nursing education, cultivate high-quality nursing talents more in line with the needs of the times, and make contributions to the progress of the medical cause.

Funding

University-Level Project of Shijiazhuang Medical College (SYGZY2023003)

Disclosure statement

The authors declare no conflict of interest.

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