

Application Progress of Modern Information Technology in the Teaching of Emergency and Critical Nursing

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Abstract

As modern information technology is getting more mature nowadays and has been fully applied in various industries, it has also been gradually used in the teaching of emergency and critical nursing, achieving remarkable effects. There are various teaching methods using modern information technology. However, the current teaching of emergency and critical nursing based on modern information technology in colleges and universities is still in the primary stage, and the traditional teaching methods cannot break through the key and difficult points in the field. The article briefly describes the application progress of new education and teaching methods using modern information technology in emergency and critical nursing, intending to provide some references for the teaching innovation of the course.

Keywords

Modern Information Technology, Emergency and Critical Nursing, Teaching Innovation, Application Progress

1. Background

Emergency and critical nursing is a comprehensive and applied required course for nursing specialty in our school. However, teachers' practice of "what I say counts" and students' passive acceptance of knowledge under the traditional teaching mode result in low interest in learning; in addition, students born after 2000 have characteristics of value pluralism and insufficient recognition of medical spirit, so they tend to let their mind wander, lack concentration, and even be addicted to playing mobile phone in the class, greatly reducing learning efficiency. Such passive learning of students cannot improve the teaching quality well, and

teaching methods without innovation and novelty fail to mobilize the students' enthusiasm for learning and shift to "active learning", which affects the training quality of emergency nursing students to a greater extent. Therefore, it is necessary to integrate new teaching methods to improve the teaching quality and meet the needs of cultivating talents in emergency and critical nursing.

Nowadays, innovative courses with modern information technology as the core are being carried out in full swing. This teaching method can optimize the mode for keeping knowledge points of courses with a distinctive way of presentation, which can further enhance students' learning interest and improve teaching efficiency in the classroom. In view of this, it is a significant measure to carry out the reform of new education and teaching methods using modern information technology in emergency and critical nursing to improve the mastery of professional knowledge and clinical skills of nursing students.

2. Overview—Application of Modern Information Technology in the Teaching of Emergency and Critical Nursing

2.1. Combination of Moso Teach and Flipped Classroom

Mr. Zhang (2022) combined Moso Teach with flipped classroom and applied it to the standardized teaching of *Emergency and Critical Nursing*. Moso Teach is a learning app on mobile devices, which can integrate communication information technology, cloud storage technology, and visual management technology. Compared with the traditional teaching mode, the flipped classroom is an approach where students learn independently after class and become the main teaching body in the classroom and teachers assist in learning.

Before class, the teacher uploads the standardized teaching tasks, basic knowledge points, key and difficult points, and teaching materials of the course to the Moso Teach resource management database and assigns learning goals and tasks for nursing students. Students can complete the learning task of *Emergency and Critical Nursing* assigned by the teacher before class so that they can better participate in the course learning after mastering basic knowledge. In class, the teacher plays the teaching video of *Emergency and Critical Nursing* for students to learn with questions based on a certain stock of knowledge, which can better drive their learning enthusiasm. In addition, by utilizing the analysis of mistake data of Moso Teach, the teacher explains the mistake-prone problems and corresponding knowledge points to the students. In the classroom, the teacher strengthens students' mastery of knowledge points by interacting with and among students, answering questions, and making intellectual enquiries. After class, the teacher assigns online tasks in Moso Teach to keep track of students' understanding of knowledge in real time for subsequent teaching.

By using this method, the communication frequency between teachers and students can be increased, and students' autonomous learning abilities can be strengthened. However, there are also some problems, such as delayed completion,

poor quality, or incompleteness of online tasks for some students lacking independent learning capability.

2.2. Application of Virtual Simulation Experiment Teaching Mode in Emergency and Critical Nursing

2.2.1. Application of Virtual Reality (VR) in Emergency and Critical Nursing

By virtue of the visualization and interactive characteristics of virtual simulation technology, Zhao et al. (2022) introduced new elements into the teaching of emergency and critical nursing. Through the software of VR emergency and critical nursing training in the computer, the corresponding parameters can be set according to different diseases or changes in the condition to restore the real rescue scenarios as much as possible using VR simulation technology, allowing students to immerse themselves during learning and complete the rescue of patients with emergency and severe diseases. Simulation training can internalize knowledge from books into practical skills so that students can obtain corresponding scores based on step-by-step operations; in case of incorrect or inappropriate operations, students cannot proceed to the next step. This setting allows students to reflect on why they made mistakes, think about how to make progress, and then complete the entire rescue operation. Finally, the assessment scores and incorrect steps will be uploaded to the cloud and saved for teachers and students to watch, reflect on, and improve their operations after training. Students' operational abilities can be enhanced by applying VR simulation technology. In addition to VR simulation technology, 3D technology and animation are also introduced to simulate the real scenario, and human-computer interaction, menu, dialog box, and other forms are used to realize the teaching of knowledge and skills of emergency and critical nursing. Compared with the traditional teaching mode, VR simulation teaching allows students to have better performance in assessment scores, practical skills, and thinking and judgment abilities.

2.2.2. Application of High Simulation Technology + 3C Teaching Mode in Emergency and Critical Nursing

Based on high simulation technology, Wang et al. (2021) added the 3C guidance feedback teaching mode to the teaching of emergency and critical nursing in colleges and universities, opening up the novel mode of "intelligent + 3C teaching". By setting up a safe, confidential, and visual teaching environment and taking students as the learning subject, teachers' guidance is fully utilized to mobilize students' learning enthusiasm and help students improve their operational abilities. In the comparison of the experimental group and the control group, the former using the designed teaching mode achieved higher scores in theoretical assessment, practical operation, and critical thinking ability ($P < 0.05$, statistically significant), indicating that the high simulation teaching mode driven by 3C guidance feedback can promote students' mastery and internalization of knowledge about emergency and severe diseases and improve teaching quality and students' ability of critical thinking.

2.2.3. Application of VR Simulation + Case-Based Study (CBS) Mode in Emergency and Critical Nursing

The iLAB-X learning platform stands out among various online learning platforms due to its advantages and characteristics, such as a wide variety of courses, detailed explanations from renowned teachers, and the VR simulation experimental system. Mr. Luo (Qin et al., 2021) designed an intelligent VR simulation first-aid training course for chest injuries, which fully simulated the on-site and nosocomial standardized treatment process. The visualized operation is like overcoming barriers in a game, allowing students to learn in entertainment. Meanwhile, without being limited by time, space, or the condition of the injured, students can practice repeatedly, thus enhancing their clinical treatment for chest injuries and innovation ability and driving them to learn independently. CBS has been applied in practical teaching but has not been reported in emergency and critical nursing relying on VR simulation + CBS mode. Based on the CBS teaching approach, teachers can screen out classic cases relying on VR simulation technology on the iLAB-X learning platform and explain them, enhancing their discussion and communication with students, better stimulating students' interest in learning, cultivating students' ability of critical thinking, and ultimately improving their clinical thinking. Students use the iLAB-X for simulation training, allowing them to practice while listening to teachers' explanations, reflect on their practical operation, and build their capability during reflection, thereby improving their mastery level of theoretical knowledge as well as practical skills. This teaching method allows a learning mode of learning while practicing and thinking while learning.

2.2.4. Application of Augmented Reality (AR) + 5G Technology in Emergency and Critical Nursing

AR is a visual and real-time virtual image interaction technology, which is wearable and further enhances the face-to-face application experience (Chen, 2021). Under the development of the new era, 5G + AR technology has been applied to network security, marketing activities, and the teaching of immersive learning (Wang & Fan, 2023; Thakkar et al., 2023; Qian et al., 2022), but it is seldom used in emergency and critical nursing. Therefore, we can try to present cases of emergency and severe diseases with AR technology. Students can wear AR glasses to participate in case rescue and treatment more intuitively and authentically so that they can further understand different emergency and severe diseases and better learn the occurrence site, degree of severity, wound size, and other conditions. With the assistance of high-speed 5G, students' overall understanding of emergency and critical nursing can be deepened, and their ability of clinical thinking can be improved. Compared to 4G technology, 5G has the advantages of high speed, large bandwidth, low latency, and higher security.

2.3. Application of Problem-Based Learning (PBL) on WeChat Platform Combined with CBS Teaching Approach in Emergency and Critical Nursing

The PBL teaching method refers to a problem-based approach, with students as

the leading role and teachers as assistants, to cultivate students' ability to discover and solve problems and learn independently (Gan et al., 2018). In the exploration of teaching reform of emergency and critical nursing, Xiang et al. (2020) applied the PBL teaching approach only, while Meng et al. (2018) applied WeChat platform-based PBL combined with the CBS approach in teaching. Teaching materials, library resources, and Internet data are integrated, and basic knowledge points, disease pathogenesis principles, sites and scenarios, rescue measures, and other contents are stored on the WeChat learning platform for teachers and students to share and better teaching and learning effects. Teachers analyze the WeChat platform data, select the best cases for analysis in CBS teaching, and explain abstract theoretical concepts with simple and clear cases. In addition to utilizing the WeChat platform, Sun et al. (2022) applied the PBL teaching method and virtual simulation technology in the practical teaching of emergency and critical nursing. The result showed that the experimental group achieved higher theoretical scores and practical skill scores than the control group ($P < 0.05$, statistically significant), indicating that the method not only improved students' autonomous learning ability and skill level but also cultivated their ability of clinical thinking and teamwork. Compared with the single innovative teaching method, the combination of two teaching methods adopts diversified teaching approaches, changes the single education philosophy, and guides students to innovative learning while providing a reference for exploring teaching reform by combining multiple teaching modes.

2.4. Application of SimMan in Emergency and Critical Nursing

In addition to AR technology, VR technology, and virtual simulation technology (Dou et al., 2023), SimMan is widely used in medical teaching. SimMan can simulate the development process of human mechanisms and showcase human tissues and organs, providing medical students with a simulated clinical scenario (Wang et al., 2022). Students can set different parameters of the SimMan to observe various parts and understand the operation of the patient's body under different disease conditions. SimMan allows repeat practices. By analyzing the site and depth of wounds on the SimMan, students can better grasp the pathogenesis of emergency and severe diseases and sense the environment, thus implementing precise and efficient rescue under the first-aid concept of "always putting lives first".

3. Summary

The article summarizes the application of modern information technology in the teaching of emergency and critical nursing in recent years, which, especially the combined teaching mode, has achieved ideal results and improved students' theoretical knowledge while enhancing their operational ability. Although the application of modern information technology in the teaching of emergency and critical nursing has presented some beneficial effects, there are some shortcom-

ings. For example, Moso Teach can only judge students' learning status through their learning experience values and fail to reflect their actual mastery level of knowledge, virtual technology is limited in hardware, and SimMan is expensive and cannot be widely applied in all colleges and universities. To improve the teaching quality and meet the training requirements for nursing talents under the new medical context, it is necessary to introduce more, better, and easy-to-promote modern information technology into the teaching of emergency and critical nursing. Moreover, it is required to cultivate applied talents in advanced nursing with innovation and comprehensive abilities to meet the need of building a "Healthy China" of the times. The single teaching model has become more and more unsuitable for medical education in the new era, and traditional teaching cannot enable students to master more disease knowledge and skills. However, the teaching mode of combining multiple modern information technologies can improve students' mastery of disease theoretical knowledge while strengthening their operational abilities. Hence, the innovative teaching mode based on various information technologies is a new development trend for talent cultivation in medical colleges and universities.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- Chen, C. L. (2021). Exploration and Practice of 5G + AR Collaborative Emergency and Critical Care System. *Electronic Technology and Software Engineering*, 218, 99-101. (In Chinese)
- Dou, C., Ji, Y., Zhou, X. et al. (2023). Design and Application of Virtual Reality Simulation for Rehabilitation Nursing of Patients with Cervical Spondylosis under the Background of New Medical Science. *American Journal of Health Behavior*, 47, 297-305. <https://doi.org/10.5993/AJHB.47.2.10>
- Gan, J. H., Qiu, S. P., Fan, Q. M. et al. (2018). Application Research of PBL and LBL Teaching Method in Ophthalmology Nursing Course of Higher Vocational Nursing Specialty. *Journal of Nurses Training*, 33, 2197-2200. (In Chinese)
- Meng, J., Chen, H., Ning, Y. J. et al. (2018). Application of PBL Integrated CBS Teaching Method Based on WeChat Platform in the Teaching of Emergency and Critical Nursing. *Health Vocational Education*, 36, 85-87. (In Chinese)
- Qian, X. L., Song, Z. Y., & Cai, Q. (2022). Immersive Learning in the Metaverse: Characteristics, Paradigm, and Practice of Immersive Learning Based on 5G + AR. *Educational Review*, 276, 3-16. (In Chinese)
- Qin, Y., Yang, S. L., Deng, Z. Y. et al. (2021). Construction and Application of Virtual Simulative Training Platform of Thoracic Injuries First-Aid Thinking. *China Medical Education Technology*, 35, 583-587. (In Chinese)

- Sun, M. H., Di, X. W., Hao, C. Y. et al. (2022). Application of Virtual Simulation Technology Combined with PBL Teaching Method in the Practical Teaching of Emergency and Critical Nursing. *China Higher Medical Education*, 308, 121-122. (In Chinese)
- Thakkar, K., Joshi, B., & Kachhela, P. (2023). Consumer Engagement with Augmented Reality (AR) in Marketing: Exploring the Use of AR Technology in Marketing Campaigns and Its Impact on Consumer Engagement, Brand Experiences, and Purchase Decisions. *Journal of Management Research and Analysis*, 10, 99-105.
<https://doi.org/10.18231/j.jmra.2023.017>
- Wang, J. F., Li, N., Liu, J. F. et al. (2022). Application of SimMan3G in Comprehensive Training of Emergency and Critical Nursing. *Modern Nurse (Midmonth)*, 29, 162-165. (In Chinese)
- Wang, J. J., Jin, R. H., Huai, P. P. et al. (2021). Application of High Simulation Teaching under 3C Guided Feedback in Emergency and Critical Care Teaching. *Chinese Nursing Research*, 35, 2971-2974. (In Chinese)
- Wang, L., & Fan, B. (2023). Research on Advanced Auxiliary Maintenance of Substation Operation Based on AR and 5G Network. *Manufacturing Automation*, 45, 40-44, 76.
- Xiang, Y., Liu, J. Y., Yu, X. et al. (2020). Application of PBL Teaching Method in the Teaching of Emergency and Critical Nursing in Vocational Colleges. *Journal of Modern Medicine and Health*, 36, 2289-2290, 2304. (In Chinese)
- Zhang, B. (2022). Research on the Application of Flipped Classroom Based on Moso Teach in the Standardized Teaching of *Emergency and Critical Nursing*. *China Standardization*, 615, 194-196. (In Chinese)
- Zhao, H. M., Ma, D., & Liu, H. C. (2022). Application of Virtual Simulation Experiment Teaching Mode in the Teaching of *Emergency and Critical Nursing*. *Modern Hospital*, 22, 1608-1610. (In Chinese)