

Research on the Application of Scenario-based Simulation Teaching Combined with Pre-hospital Emergency Scenarios in Higher Vocational Nursing Training

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Abstract: In light of the teaching reform for pre-hospital emergency training in higher vocational nursing, this paper examines the problems of rigid traditional teaching methods, distorted clinical scenarios, and weak emergency response ability among students, and proposes a system for applying scenario-simulation teaching. Based on constructivism, situated learning, and skill transfer theory, this paper presents multiple scenario constructions, a three-stage closed-loop process design, and an optimized process management scheme. Based on the above analysis, it can be seen that the new system will help students learn better in practice. At the same time, there are also practical deficiencies, such as too much dependence on teachers and a narrow scope of assessment. Therefore, the following optimization strategies are proposed: build a dynamic resource bank, introduce a group rotation mechanism, and adopt multi-dimensional process-oriented evaluation; provide systematic empirical support for the reform of higher vocational nursing practical teaching.

Keywords: Scenariosimulation teaching; Prehospital emergency care; Higher vocational nursing; Practical training reform; Skill transfer

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1. Introduction

The first link in the public health emergency response system is pre-hospital emergency care. The time and accuracy of this decision will directly affect whether a seriously ill patient can live, so the nursing staff's clinical judgment, operating ability, and mental health need to be very good. High-quality vocational nursing education aims to train excellent technically skilled personnel for the front line, and the quality of practical training will directly affect their post-graduation employment prospects. However, most of the pre-hospital emergency training in higher vocational colleges still follows the traditional model of "teacher demonstration of technical procedures followed by passive imitation practice by students," and thus fails to help students

gain a deep understanding of the complexity and urgency of real-life emergency situations. Build a high-fidelity clinical environment and use scenario-simulation teaching to have students actively construct clinical thinking through role-playing and dynamic interaction, thereby connecting classroom learning with actual medical practice. Systematically sort out the relevant theoretical basis and current teaching conditions, identify structural deficiencies in practical training, design and implement targeted simulation-teaching schemes, and summarize improvement measures through effect verification and reflection; thus, provide evidence-based operational frameworks for teaching reform in peer institutions.

2. Overview of the research

2.1. Connotation and characteristics of scenario-simulation teaching

Based on the idea of constructivism, scenario-simulation teaching is employed. In short, it builds a real-life work environment by setting up a physical space, assigning roles, and organizing events based on the desired teaching goals. Learners take part in the entire process of problem-solving from their own experiences and build knowledge and skills through repeated practice and reflection. It has three basic attributes: situation authenticity, task completeness, and generative interaction; therefore, it goes beyond mere case studies or role-playing^[1].

First, it offers a good experience. Learners are placed in a simulated emergency environment and receive simultaneous visual, auditory, tactile, and time-pressure stimuli for deep immersion. Second, it is highly integrative; thus, it can connect knowledge from different fields such as anatomy-physiology, pharmacology, communication skills, and ethics of care in emergency situations. Third, it will inspire thought. Organized debriefing after the simulation can help students move away from their initial emotional reactions and engage in rational thinking and strategy planning based on the actual situation.

2.2. Core contents and requirements for pre-hospital emergency practical training

The pre-hospital emergency training system includes off-site risk assessment, first aid for injuries, basic life support, airway management and ventilation, hemorrhage control and bandaging, fracture immobilization and safe transport, as well as psychological support for patients and their families. Finally, educators want to help students learn how to respond promptly, reasonably, and effectively during the golden hour of rescue.

Training requirements should include standardized individual operations, such as sufficient compression depth and full-chest recoil during CPR, correct bag-valve-mask technique, and coordinated emergency work and effective teamwork. Pre-hospital environments in reality are highly uncertain; there may be a lack of information, supply shortages, and bystander interference. In addition, practical training should enhance adaptive communication skills; students need to give clear instructions, regulate multiple-party emotions, and organize off-site orders in a disorderly and noisy environment. Therefore, the content of pre-hospital emergency training should go beyond technical drills and promote all-around abilities such as clinical thinking, risk assessment, and professional responsibility.

2.3. Current situation of higher vocational nursing practical teaching

Under the impetus of national vocational education reform and the Healthy China initiative, significant progress has been made in the hardware facilities for higher vocational nursing education. Many colleges have established multi-functional simulation wards and virtual-reality interactive systems. Pedagogy and

teaching methods have not been updated in line with new hardware developments. Classroom practice is still mainly in the form of checklist-driven mechanical drills, and students are considered proficient after completing these procedures. There is no good adaptive training for changes in the course of illness, equipment failure, or problems with doctor-patient communication.

There is a serious lack of “dual-qualified” teachers who have strong theoretical foundations and rich front-line clinical emergency experience; thus, high-quality simulation cases cannot develop normally. Although a few colleges have introduced standardized patients or simple situation skits, these are still superficial additions rather than an organized, regular part of the curriculum. In short, most high-level vocational nursing practical training is at a critical stage of change from “skill rehearsal” to “clinical competency-oriented education.”

3. Theoretical foundations of the research

3.1. Constructivist learning theory

Constructivist Learning Theory does not believe in the transmission of knowledge. Knowledge is not a passive reflection of the external world; rather, it is a subjective meaning system that people construct actively through their interactions with the environment, cooperation among peers, and self-exploration based on previous experiences in a particular social-cultural context.

In pre-hospital emergency training, students face dynamic clinical situations and need to identify the main problems, use available resources effectively, make urgent decisions, and bear the consequences; this is in line with the idea of “authentic task-based learning” proposed by constructivists. Scenario-simulation teaching offers a safe, scaffolded environment. Learners can test the intervention strategy without harming actual patients, correct errors, and learn how to apply abstract textbook knowledge flexibly ^[2].

3.2. Situated learning theory

According to the theory of situated learning, learning is “legitimate peripheral participation.” To gain both explicit professional knowledge and tacit practical skills, learners need to participate in real or high-fidelity simulated communities of practice through progressive observation, hands-on experience, and the formation of a professional identity.

Pre-hospital emergency care is very situation-specific. Learners will not have developed a good sense of place and adaptability in a multiple-choice environment. Scenario-simulation teaching can create various situations, such as street accidents, sudden illnesses at home, and construction-site injuries. Add time pressure, background noise, and upset family members to increase ecological validity intentionally. Learning by doing helps students learn about their roles and operating rules better, reduces the difference between what they learn in class and what they need to know for their jobs, and promotes the application of knowledge.

3.3. Skill transfer theory

The general idea of skill transfer theory is to apply the abilities learned in one place to other places. To improve transfer efficiency, expand the range of training, introduce various tasks, and enable learners to learn general problem-solving skills.

The cases of pre-hospital emergency scenarios are diverse. If only the standard procedures are repeated in training, students will have rigid procedural memories. Their performance drops significantly when there

is a change in the real-world environment. Scenario-simulation teaching can build multiple versions of case libraries for various causes, age groups, and off-site constraints to expand task diversity. Debriefing sessions help students learn general rules for decision-making, convert surface-level motor skill memory into high-level strategic ability, and enhance their adaptability to new and difficult situations.

4. Existing problems in pre-hospital emergency training for higher vocational nursing

4.1. Rigid and monotonous practical-teaching modes

The current dominant model for pre-hospital emergency training is still a traditional linear process: teacher lecture, procedural demonstration, repeated group practice by students, and final skill assessment at the end of the term. The entire teaching rhythm is teacher-led, and students complete the checklist to take the test. Monotonous practice fails to train dynamic clinical assessment and prioritization skills, so many students can perform individual operations well but are unable to make timely decisions in the event of sudden changes in health status.

At present, the standards for assessment also focus on process. Quality of clinical thinking, team communication efficiency, and emotion regulation ability are not primary evaluation indices. The above bias in assessment will encourage teachers to lead students to learn by rote and fail to promote all-around development of their clinical skills ^[3].

4.2. Discrepancy between practical training scenarios and real-world clinical conditions

Training laboratories are generally clean, well-lit, well-equipped, and quiet; they are far from the actual pre-hospital environment of dim light, small spaces, slippery floors, loud surroundings, and emotional or obstructive family members. Students have been trained in these protected laboratory environments and thus lack real-life perception of hazards, limited resource allocation, and interpersonal conflict management.

Most of the current scenarios are static initial-state simulations and do not show how diseases change over time, such as vomiting or ventricular fibrillation during CPR. Students have rarely been exposed to consecutive unforeseen difficulties and thus face significant “reality shock syndrome” upon their first clinical internship; consequently, their professional self-confidence is weakened.

4.3. Deficiencies in students’ all-round emergency practical ability

Due to a fixed teaching mode and de-contextualized scenarios, higher vocational nursing students show clear deficiencies in pre-hospital emergency response in terms of cognition-decision-making, technical operation, and emotional regulation. Students have difficulty quickly assessing all the injured people and prioritizing their care; they focus too much on minor injuries and fail to help others. Operationally, the technical performance declines under high-pressure conditions; typical errors include inadequate compression depth and improper placement of a tourniquet, as well as unclear command delivery and role overlap among team members. Most students feel anxious, mentally blank, or avoidant in the presence of actual patients psychologically. The reasons for these shortcomings are not only a lack of technical knowledge but also an overall failure to provide training on emergency decision-making and psychological adjustment mechanisms.

5. Design and implementation of scenario-simulation teaching

5.1. Construction of pre-hospital emergency simulation scenarios

Based on the campus emergency simulation teaching center, mobile partition walls, high-fidelity projection screens, professional audio equipment, and other simulation props have been installed. The four representative cases are as follows: sudden illness at home, urban road traffic accident, construction-site fall injury, and sports-field injury. All the scenarios had a standard first-aid kit and a configurable equipment failure simulation device.

Based on the three-level progressive system, the scenario construction was divided into three parts: physical reality restoration, psychological atmosphere rendering, and authentic task embedding. Space arrangement, light color temperature, and background noise are all examples of context. Teachers and standardized patients performed spontaneous performances under time pressure. Conflicting clues, such as obstructive family members, communication breakdowns, and low-powered rescue equipment, were present, and students had to choose among them due to resource limitations ^[4].

5.2. Design of scenario-simulation teaching procedures

The three stages of the closed-loop system were: Pre-simulation Orientation, Immersive Simulation Execution, and Guided Debriefing, to ensure consistent learning and deep thinking. In the pre-simulation orientation, teachers provided short case materials and role assignments, and students completed mental preparation and off-site risk assessment in five minutes. The immersion simulation period was 15–20 minutes long, and it generally followed the same process as on-site assessment, emergency response, and safe transfer. Teachers triggered pre-set clinical deterioration scenarios via central control for off-site testing. Guided debriefing used a non-punitive evaluation method and had students first share their own emotions and thoughts, then have peers observe. Then, the teacher posed some heuristic questions at the critical points of decision-making to guide the students' clinical reasoning.

5.3. Teaching implementation and process control

Two natural parallel classes of Grade-2024 nursing majors from a higher vocational college were selected as the research subjects. The experimental group used scenario-simulation teaching, and the control group was taught conventionally. The total number of teaching hours, curriculum content, and teachers were the same for both groups.

Six-person training groups were formed in the experimental class, and two other observers recorded the group's interaction data. Role rotation was used to give all the students a chance to be the on-site commander, technical operator, information recorder, and patient counselor. Critical control measures: Clarify the boundary between simulation and actual clinical practice to avoid excessive psychological pressure; set up a "safe-word" mechanism for voluntary emergency interruption; schedule a 10-minute rest period after each simulation. Multi-dimensional process archives have been created to store operation records, decision-making paths, and communication logs.

6. Application effects and teaching optimization strategies

6.1. Analysis of teaching outcomes

Objective structured clinical examination and self-developed emergency-decision-making scales were used

for evaluation. Based on the statistics, the experimental group performed better than the control group in all three areas: completeness of emergency response, rationality of clinical decision-making, and efficiency of team communication. According to the qualitative data in the reflective journals, scenario-simulation provided a realistic emergency situation and strengthened students' sense of purpose and emotional strength. Classroom observations found that the experimental class students had more high-level questions and logical analyses during debriefing. In addition, clinical preceptors gave the experimental-class students more than 10 percentage points higher scores for off-site adaptation in the early stages of clinical internship and confirmed favorable long-term skill transfer effects.

6.2. Practical deficiencies of the teaching model

Although the results were good, there were serious problems in practice. First, high-quality scenario design requires teachers' clinical emergency experience and script-writing skills. Inconsistent plot logic or too many conflicting clues in some simulation cases led to cognitive dissonance among students. Second, full-cycle simulations are time-consuming. Only three or four groups can finish the drills in a normal class period. Many students were in the observer role and did not participate actively or focus well. Third, assessments have focused on final exams; process-oriented behavioral data, such as changes in emotion and reaction speed during decision-making, have been neglected and cannot reflect the gradual progress of learning^[5].

6.3. Optimization countermeasures for higher vocational nursing practical training

Based on the above deficiencies, four feasible remediation measures are put forward. First, establish a dynamic teaching resource library with core basic cases and adjustable-parameter modules. Teachers can adjust the difficulty level and context to reduce the workload of independent case development. Second, set up an organizational system for simulated-drill rotation and parallel small-group operation. Large classes are divided into mini-units that run different cases simultaneously, and then joint debriefing sessions are held to increase the frequency of participation and immersion within a limited number of class hours. Third, develop behavior-anchored process-evaluation scales, decompose non-technical skills into observable behavioral indicators, and integrate peer-assessment and self-assessment weights to build multi-source evaluation closed loops. Fourth, organize regular emergency-center-on-the-job training courses for teachers. Senior outstanding students are selected to act as auxiliary simulated participants and help build a stable faculty and personnel support system.

7. Conclusion

Scenario-simulation teaching offers a new model for transforming pre-hospital emergency training at higher vocational nursing schools by moving away from "skill-drill-centered" education towards "clinical-situation-centered" learning. Through the entire research chain of theoretical review, problem diagnosis, scheme design, and effect verification, this study has found that scenario-simulation teaching can effectively motivate deep-level student participation, reduce the gap between classroom training and actual clinical practice, and enhance all-around emergency skills. However, it will also have relatively higher demands for faculty qualifications and optimized teaching organization and evaluation systems. In the future, extend the duration of longitudinal follow-up studies to investigate how different intensities and frequencies of simulation affect the long-term career development of nursing talents. Virtual reality, artificial intelligence, and simulation

teaching can also be integrated in depth to build adaptive-diagnosis intelligent training systems, and thus provide strong support for high-quality emergency care personnel cultivation under the Healthy China Initiative.

Disclosure statement

The authors declare no conflict of interest.

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