

Enhancing Flexibility in Learning Processes: Simulation Training as an Alternative Mode to Substitute Clinical Practicum during COVID-19

Suet-lai Wong*, Ivy Sui-yu Yau, Crystal Hiu-wai Chan

The Open University of Hong Kong, Hong Kong, China

*Corresponding author: slwong@ouhk.edu.hk

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Abstract The pre-registration nursing training programmes were facing practical difficulties in arranging clinical practicum to students due to COVID-19 pandemic. In order to ensure clinical competencies of nursing students before their graduation, academics have been exploring strategies to overcome the challenges by enhancing flexibility in the learning processes. Simulation, as a kind of educational technology, with computerized software programmes can replicate real clinical situations in a non-threatening environment for training. It has been supported to enhance nursing students' clinical competencies. This paper illustrates the development of simulation training curriculum based on the ADDIE model. It was supported that the application of ADDIE model in the instruction development resulted in meeting the learning needs of students and allowed flexibility of learning processes during the pandemic.

Keywords: educational technology, simulation, ADDIE Model, clinical practicum, COVID-19

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1. Background

The pre-registration nursing training programmes were facing practical difficulties in arranging clinical practicum to students due to COVID-19 pandemic. In order to ensure clinical competencies of nursing students before their graduation, academics have been exploring strategies to overcome the challenges by enhancing flexibility in the learning processes. The use of educational technology such as simulation, student response system (SRS), flipped classroom, mobile apps has been suggested to enhance students' motivation, readiness, and engagement in learning [1,2,3,4,5]. Academics have been gaining evidence to inform decisions about what media or designs of technologies should be used in order to enhance knowledge and skill acquisition at the competent level in higher education [6]. The Association for Educational Communications and Technology (AECT), the leading organization on developing a wide range of instructional and educational technology, endorsed the current definition for the field of educational technology. The current description indicates:

Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources [7].

The term educational technology has evolved over the years to respond to society's changes, including technologies

for knowledge organisation, multiple domains of theories, and instructional technology practices [8]. The broadened definition requires the necessity of linking teaching and learning strategy (instructions) to plan and maximise the affordances of education technologies for learning, especially for training healthcare professionals' clinical competence. There is no single method that can work well under all learning environments in the learning processes. The scope of teaching practices should be made merely to guide the development and the use of educational technologies which impacts much on resources and the quality of professional competence [9,10]. Therefore, it prompts us to embrace alternative modes, such as simulation, to deliver clinical training to safeguard nursing graduates' standard by completing the minimum number of clinical training hours required by the governing registration body. The use of simulation as a learning activity has been gaining attention in the academic field [11]. The high-fidelity simulators with computerized software programmes can replicate real clinical situations in a non-threatening environment for training. The use of high-fidelity simulators has been successfully enhancing students' competence in caring for patients with severe or critical changes of vital signs in medical and surgical nursing [12,13].

The paper aims to describe how an alternative simulation training curriculum was developed based on the ADDIE Model in order to enhance flexibility in the learning processes to overcome the challenges of clinical practicum suspension. Such experiences can inform future

clinical teaching on the regular use of simulation training to ensure nursing students' clinical competencies.

2. The Application of ADDIE Model

The ADDIE model is an instructional design model that systematically direct the design of effective support tools [14,15,16]. It has been widely adopted to develop curriculum in fields such as library instruction, healthcare, and online education [16,17,18]. The ADDIE model comprises of five phases including analysis, design, development, implementation and evaluation. All the phases are iterative and cyclical in nature [16]. The ADDIE model ensures that the alternative modes adopted are more effective, efficient, and relevant to the registration governing body's requirement [19].

The details on how the ADDIE model was adopted for the design of simulation training curriculum are illustrated as follows.

2.1. Analysis

The analysis phase is the base of all other phases of the ADDIE model. This phase prompts to identify the instructional problems and objectives [16]. The questions such as learners characters, desired behavior, urgent needs (i.e. physical, psycho-social perspectives), and pedagogical consideration were analysed. The target learners of the simulation training were nursing students who were affected by the pandemic and considered one of the at risk groups for adverse physic-psycho-social impacts caused by several elements: perceived high-risk of exposure to COVID-19, inadequate personal protective equipment, fears of being infected or infecting their loves ones, uncontrollable exposure to social media on the rise of misinformation [20,21]. Thus, there was an urgent need to substitute the clinical practicum with a flexible learning processes. The development of the simulation training curriculum should ensure the students' clinical competencies

were met prior to their graduation. At the same time, all the training should meet the professional registration body's requirement.

2.2. Design

The design phase develops the blueprint of training based on the information collected in the analysis phase. The design step serves to choose the optimal instruction to be adopted and ensure the objectives were addressed [16]. In this phase, the plan, case scenarios, materials, or assessment methods were designed to assure that the curriculum aligned with the learning objectives. For instance, the clinical field coordinator listed the possible instructional approaches, materials and technological tools that best fit the objectives. The main output from the design phase was a prototype of a simulation training plan. It included descriptions of overall logistics, the group size of the learners, roles and responsibilities of learners and instructors, descriptions of activities, the time required to complete the activities, list of necessary technology such as simulation scenario-computerized-programming and evaluation of components.

2.3. Development

The development phase denotes creating the alternative modes of the plan generated from the design step. The clinical field coordinator assembled learning resources and technology tools and integrated these supporting resources and tools into instructional activities (i.e., scenario-based virtual and face-to-face training) aligning with learning objectives. Training materials such as instructor guides, student guides, pre-briefing clues, debriefing clues, contents of the training, observer checklist, checklist for documenting students' clinical performance were developed (refer to Table 1 and Table 2 for samples of pre-briefing clues and debriefing clues). All the training plan components were formulated in preparation with detailed supports for instructors to implement in the next phase.

Table 1. Briefing clues for simulation training

Process	Description	Examples of clues
Engagement	Convey the interest	- This experience has been developed with the understanding that you are intelligent, educated, and are trying to do your best on clinical competence. - You will participate in eight days of 5-hour via virtual and simulation training for emergency nursing, including prebriefing, participation/observation the unfolding scenario, and debriefing.
	Expect time investment	- You are expected to read the given information such as health assessment video before attending the training. - Your performance within a team will be evaluated as pass or fail. - It is impossible to mimic reality in this activity entirely, but here are some useful tips to make the experience worthwhile:
	Introduce usability	<ul style="list-style-type: none"> • The learning materials we can mimic, including <ul style="list-style-type: none"> ○ Patient's vital signs such as body temperature, pulses, respirations, breathing sounds, bowel sounds ○ The clinical environment, equipment, and documentation forms. • The patient may not be real to respond to your questions during the assessment. • The facilitators will use alternative methods to assist in getting what they want to know.
Engrossment	Ensure emotional attachment	- Here is a safe space, and making mistakes are acceptable as this helps us learn to know why. - Everyone needs to realise that what is observed and discussed is CONFIDENTIAL and remains between the group and is not shared with others not participating in this session.
	Focus of attention	- You should assess, ask relevant questions, communicate with teammates, plan, implement the care, and apply nursing process as same as for your usual clinical practice to the scenario. - You might be the leader acts as primary triage nurse to receive two cases from the instructor so that you can assign two cases to case nurse and arrange the runner and self to help two case nurses for further patient management.
Total immersion	Provide the presence	- The purpose of these activities is to understand why things went right or wrong in the first-day training so you can improve and perform in the next. - If the information is too overwhelming, please let us know, and we will assist you.
	Explain the flow	

Table 2. Debriefing clues for simulation training

Process	Description	Examples of clues
Reaction	Orient the overall debriefing process	- We do create an environment that is supportive of learning from each other. - You are encouraged to involve in the discussion actively. - It is important for everyone present to realise that what is observed and discussed is CONFIDENTIAL and remains between the group and is not be shared with others not participating in this session.
	Acknowledge emotional response	- How did you feel during the activity as a leader/case nurse/runner/observer? - What was done well on the task's allocation? (time management)
Analysis	Discuss the individual/team performance being congruent with the simulation training objectives	- What needs to improve on the task's allocation? - Were decisions made appropriately? And why? - Was the care practice safe? And why? - Was team-communication effective? And why?
	Conclude what had learnt to transfer knowledge in next training/clinical practice	- What have you learned from this activity? - How will you transform today's learning to your upcoming clinical placement?

2.4. Implementation

The implementation phase aims to deliver the instruction [16]. The simulation training as alternative mode for clinical practicum was implemented. Nursing students were assigned into groups and attended the simulation training in a face-to-face mode. An instructor's role is responsible for briefing (also known as pre-briefing) in order to promote learner's preparation and immersion in the simulation training to enhance clinical competencies. The instructors facilitated learners to solve the unfolding scenario in pre-briefing sessions before the simulation training. The next step would be the practice of simulation scenarios and then the debriefing sessions. After all, it proceeded to the final step of the ADDIE Model, the evaluation phase.

2.5. Evaluation

The evaluation phase aims to measure whether the simulation training has achieved its intended learning objectives. The evaluation included both formative and summative feedbacks. Formative feedback from instructors and students were collected throughout the simulation training as to allow incremental improvement and determine the direction of the training [16,17]. After the completion of the simulation, the instructors and students were surveyed to evaluate the effectiveness of the simulation training.

3. Discussion and Recommendation

The clinical practicum suspension is a universal issue affecting healthcare education during the pandemic. This paper adopted the ADDIE model to inform the development of simulation training curriculum as to immediately respond to the rapidly challenging situations. During the processes, several limiting factors in terms of resources (budgeting, venue, faculty training, and students' needs) were also identified. These limiting factors should be addressed when similar training is going to be conducted in the future.

Budgeting. In order to conduct high-fidelity simulation training for a large number of students during the pandemic, special approval on an extra budget is required for the additional ad hoc training sessions for purchasing related equipment. In the future, different budgeting should be prepared for any contingency purposes.

Venue. The available venue with adequate space is vital to provide safe training with adequate social

distancing measures. Due to the large number of students who were required to attend the simulation training, we had reserved the simulation laboratory across three weeks period for conducting the training. In the future, we should schedule designated weeks for simulation training by compromising the teaching schedules of theoretical courses in order to ensure adequate training venue is available.

Workforce and Faculty Training. It was anticipated that a workforce of 20 nursing faculties assembled in three weeks could deliver face-to-face simulation training to a group of 500 nursing students. Each student was entitled to attend two days training that contributed to ten hours of simulation training hours. It was fortunate to have available instructors to conduct the simulation training because they were free from clinical teaching during clinical practicum suspension in various healthcare facilities. A six-hour training workshop on simulation and educational technologies in teaching strategies has been provided to equip these 20 instructors. It is vital to include training workshops as part of the orientation programme for all newly joined faculties in order to equip all faculties to be ready for conducting simulation training.

Students' Needs. Nursing students were not ready to attend the face-to-face simulation training during the pandemic rather than the synchronous virtual training. Therefore, briefing sessions related to the alternative modes of training should be tailor-made to ease their stress and concerns. This allows enhancing students' motivation, readiness, and immersion in the training.

To conclude, the ADDIE Model provides a systematic means for the instructors to design the simulation training curriculum. With the use of educational technology, such as simulation, it can ensure nursing students' competencies by enhancing flexibility in the learning processes.

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