

# Concept Mapping for Students' Objective Structured Clinical Examinations and Simulation Training-An Experience from Nursing Students

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## ABSTRACT

**Background:** Objective Structured Clinical Examinations (OSCE) and situational simulation are useful strategies to increase nursing students' clinical competency and have been comprehensive employed in Taiwan, especially in nursing education [1]. Taiwanese students are accustomed to rote learning and following textbooks. OSCE is difficult for them and establishing an appropriate scenario for evaluation is also challenging for educators [2]. During the scenario or task, students often have the feeling of struggling in the tasks and do not know where main problem lies [2]. This study sought to establish a teaching strategy by using concept maps to help students' learning and to develop critical thinking skills.

**Method:** Apply concept map to clinical situation training to establish students' critical thinking and face clinical situation.

**Result:** Students participating in the program also recognize the value and practicality of concept maps and perform better by using them. The design of concept map is a suitable strategy for clinical practice teaching and training.

**Keywords:** Concept Map; OCSE; Situational Simulation; Critical Thinking

## Introduction

OSCE and situational simulation scenarios have been adopted for improving students' clinical skills and communication skills since 1970s and offer students various clinical scenarios to adapt clinical conditions. It is now widely utilized in the other disciplines of medical sciences including nurses training in Taiwan [1]. The scenarios and tasks help students to enhance their familiarity with clinical practice and their ability of analytical think. Educators must help students to integrate their acquisition of nursing

expertise, to use critical thinking for appropriate judgments, to make care decisions that finally solve the patient's problems, and to implement nursing practices in the correct manner [1]. However, during the training processes, students have problem of figuring out patients' problem and usually struggling in the story of scenarios [2]. Therefore, establish a suitable training technique for those difficulties is necessary. This paper attempted to establish a training method by using concept map to help students to figure out patient's problem.

Concept maps were developed by Novak and Gowin [3] for teaching, learning, evaluation, and knowledge reorganization. It has been used in various contexts. Novak outlines the main features of concept maps in 1995 [3], including

- 1) A tool for organizing learners' knowledge representation, including concepts, connecting lines, and some prevalent problems.
- 2) Concepts are presented hierarchically.
- 3) Horizontal and vertical connections that help students to conceptualize the relationships between various thoughts; and
- 4) Clarification of conceptual meanings. The connection word must define the relationship between the two concepts and provide a valid statement or conjunction [4].

### Applying Concept Maps in OSCE and Situational Simulation Training

This study attempts to use the idea of conceptual maps in the teaching of OSCE and situational simulation scenarios or tasks by using them to help students reflect comprehensively on scenarios or tasks and then provide case-centered care based on the needs of individuals. Through literature discussion, the authors establish this OSCE or scenario simulation learning strategy guides students in using the concept map into students' OSCE or scenario simulation learning under the concept of patients centered learning mode.

- 1) Provide learner lesson-related information and ask learners to preview relevant information such as disease, diagnosis, and related pathology and care.
- 2) Provide relevant lesson plans to learners, assist them in use of patient-centered models to identify patients' complaints, draft a concept map (patient complaints), and extend secondary concept data (related assessment or clinical examination).
- 3) Add relevant information regarding connectivity to the link.
- 4) Organize the relevant information into a preconcept map of information relating to a case.
- 5) Write the main health issues related to a case on the linked concept map.
- 6) Re-examine relevant nursing measures or nursing guidance based on the linked health problems.

### The Training Technique / Method

In concept map training, the conceptual structure of the teaching content is depicted mainly with illustrations. Students present the basic structure of the case requirements within the program design through the drawing and use of conceptual diagrams, while

clarifying and representing the relevance of each concept to the topic and the relationship between the various concept branches [3]. During the learning process, students were given an OSCE and situational simulation scenario or task. Then concept mapping was used to construct the learning process. In the first stage of conceptual mapping, students clarified the main complaints or issues for major concepts, that is, scenarios or tasks. This stage was challenging for students because they had to construct the concept maps according to the scenarios or tasks.

Therefore, students used their knowledge for thinking analysis and used critical thinking without being able to directly recite the content of textbooks. This also developed students' self-study, data collection, and integration capabilities. Through this learning process, students could re-examine their relevant knowledge.

In this case, concept maps had several functions:

- 1) Representing key issues relating to a scenario or task.
- 2) Overcoming the inertia of ready-made materials and mechanical memorization, in clinical situations, students can use the problem of learning case-by-case.
- 3) Using productive learning strategies to achieve self-realization to enhance learning interest and reduce confusion associated with clinical situations; and
- 4) Improving the effectiveness of conceptual learning.

For example, in a task for a clinical condition (Text box).

#### Effective Concept Selection

This involves consideration of the meaningfulness and effectiveness of concepts chosen from the problems. According to the patient's complaints, students must establish patients' problems from the scenario, the respective timeline, and the symptoms of patients' complaints (Figure1).

#### Conceptual Hierarchy

A conceptual hierarchy is constructed according to the previous arrangement, and students are asked to help with choosing suitable connectives that form the proposition. Concepts are arranged from the general concepts to the bottom or outward. The concepts represent patients' conditions. Also the maps' connections are based on students' prior experience and knowledge (Figure 2).

#### The Link Between Concepts

The meaningful interconnections between different concepts (cross-links) are defined. Continuing previous thinking processes allows connection of concepts. This step also requires students to comprehensively utilize their knowledge to reflect on clinical condition and treatments (Figure 3).

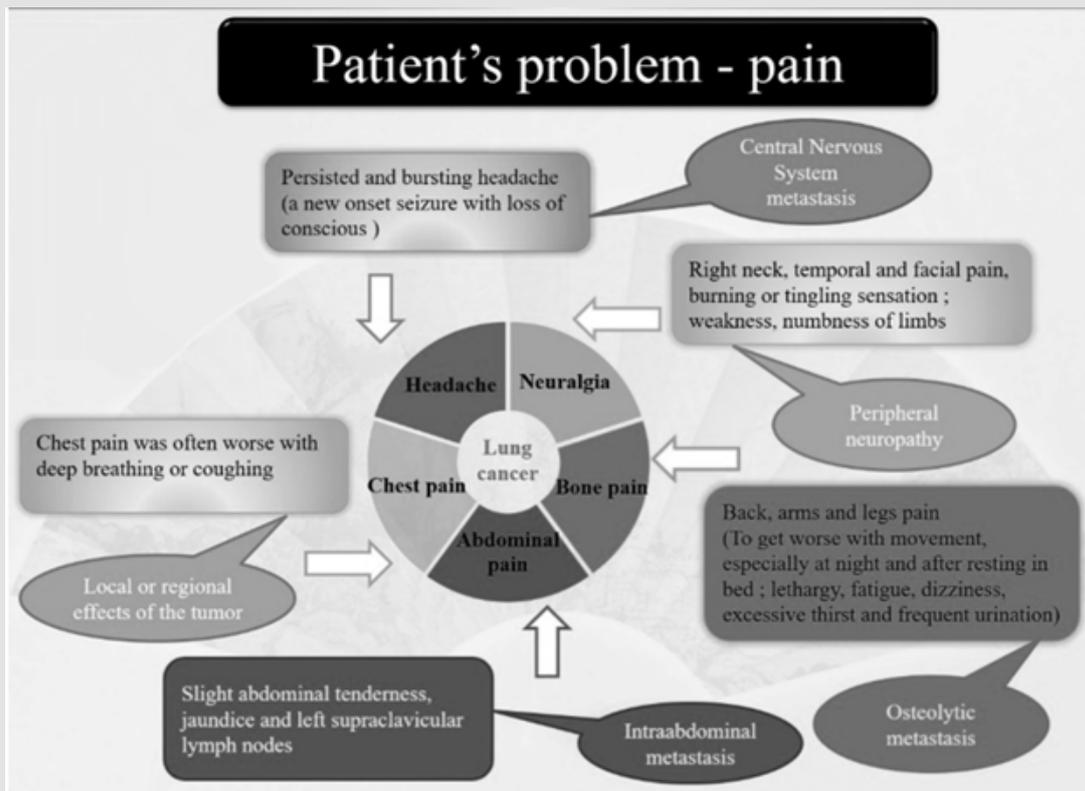


Figure 1: Effective concept selection: According to the patient’s complaints, students must establish patients’ problems from the scenario, the respective time line, and the symptoms of patients’ complaints.

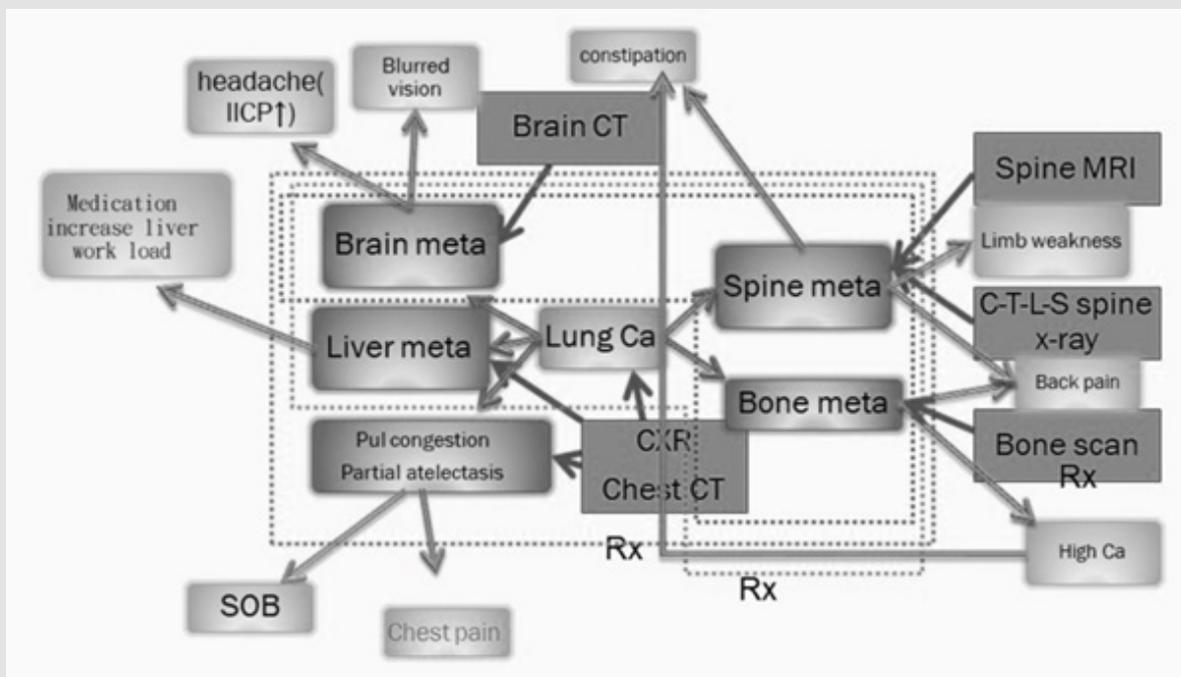


Figure 2: Conceptual hierarchy: Construct a conceptual hierarchy according to the previous arrangement, and ask students to help choose the good connectives that form the proposition.

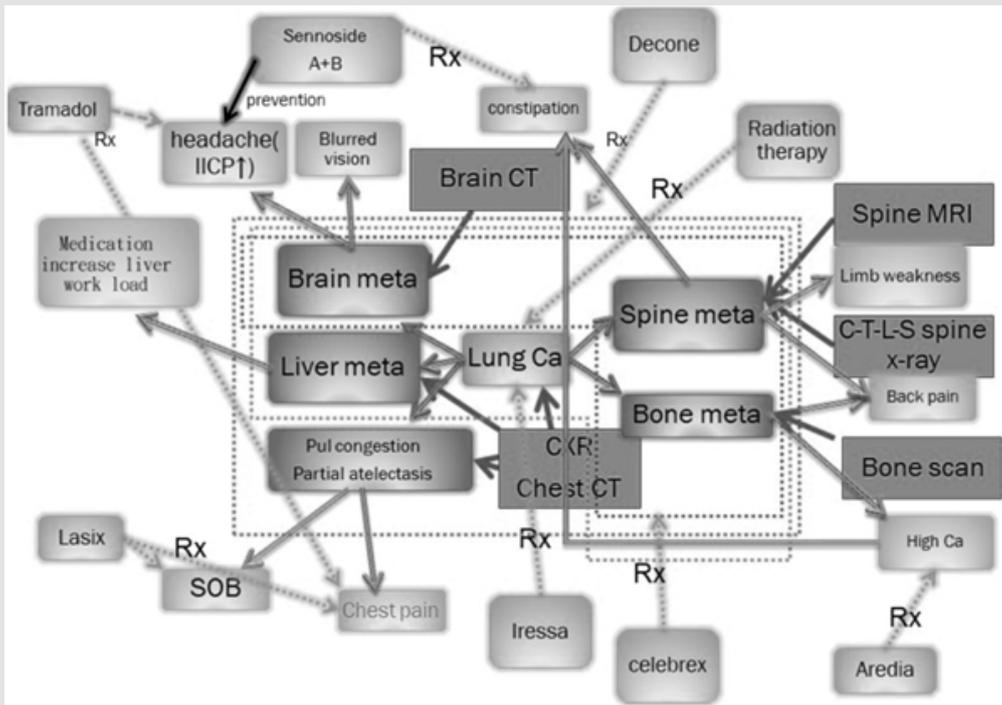


Figure 3: The link between concepts: The degree of meaningful interconnection between different concepts (cross-link).

**Relationship to the Context of a Scenario or Task**

The extent to which a concept is directly related to or associated with the context of the problem. Student must continue comprehensive utilizing their knowledge to reflect on

clinical conditions and treatments. For this step, students must use their knowledge of disease in relation to patients' conditions and to correlations between diseases. This step requires critical thinking and reflection on patients' conditions (Figure

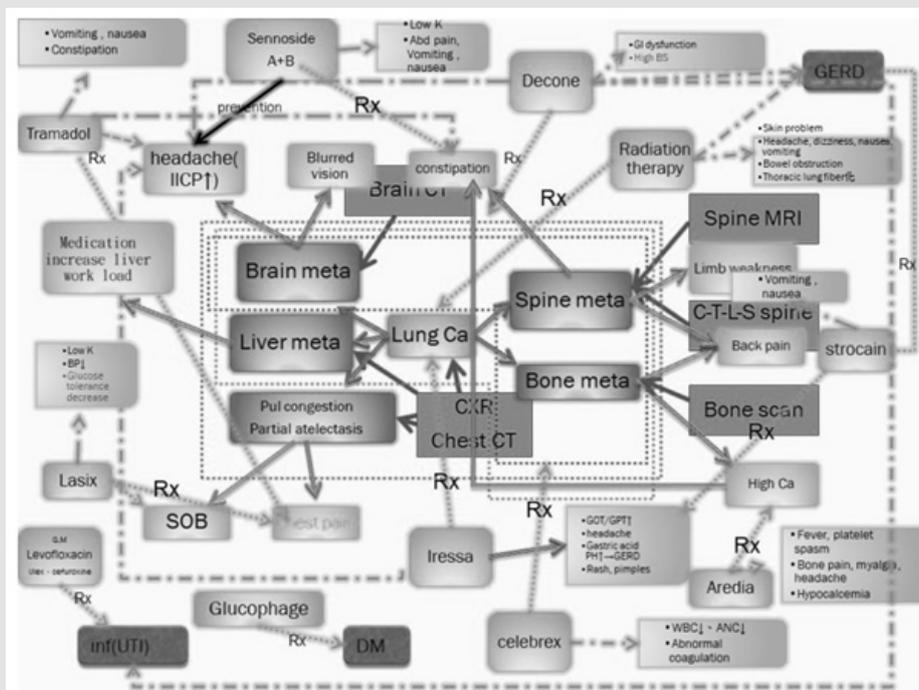


Figure 4: Relationship to the context of a scenario or task The degree of meaningful interconnection between different concepts.

**Students' Creative Ability and Critical Thinking Skills**

Students' abilities and the practice of critical thinking help students to establish their communication skills and to stimulate their interest in clinical condition problem solving (Figure 5).

During the construction of concepts, students draw concepts related to a certain domain and link them. Initially, most students can only copy information from textbooks. The role of teachers is

to use the scaffolding for teaching assistance [3]. Students should improve their concept mapping performance in this scenario. The so-called scaffolding teaching approach refers to the role of teachers in professional counseling to assist students' learning [3]. Chiu [5] indicated that this teaching mode can direct students in learning and in problem-solving methods; students learn how to understand core issues and to establish appropriate thinking processes for solving problems [3].

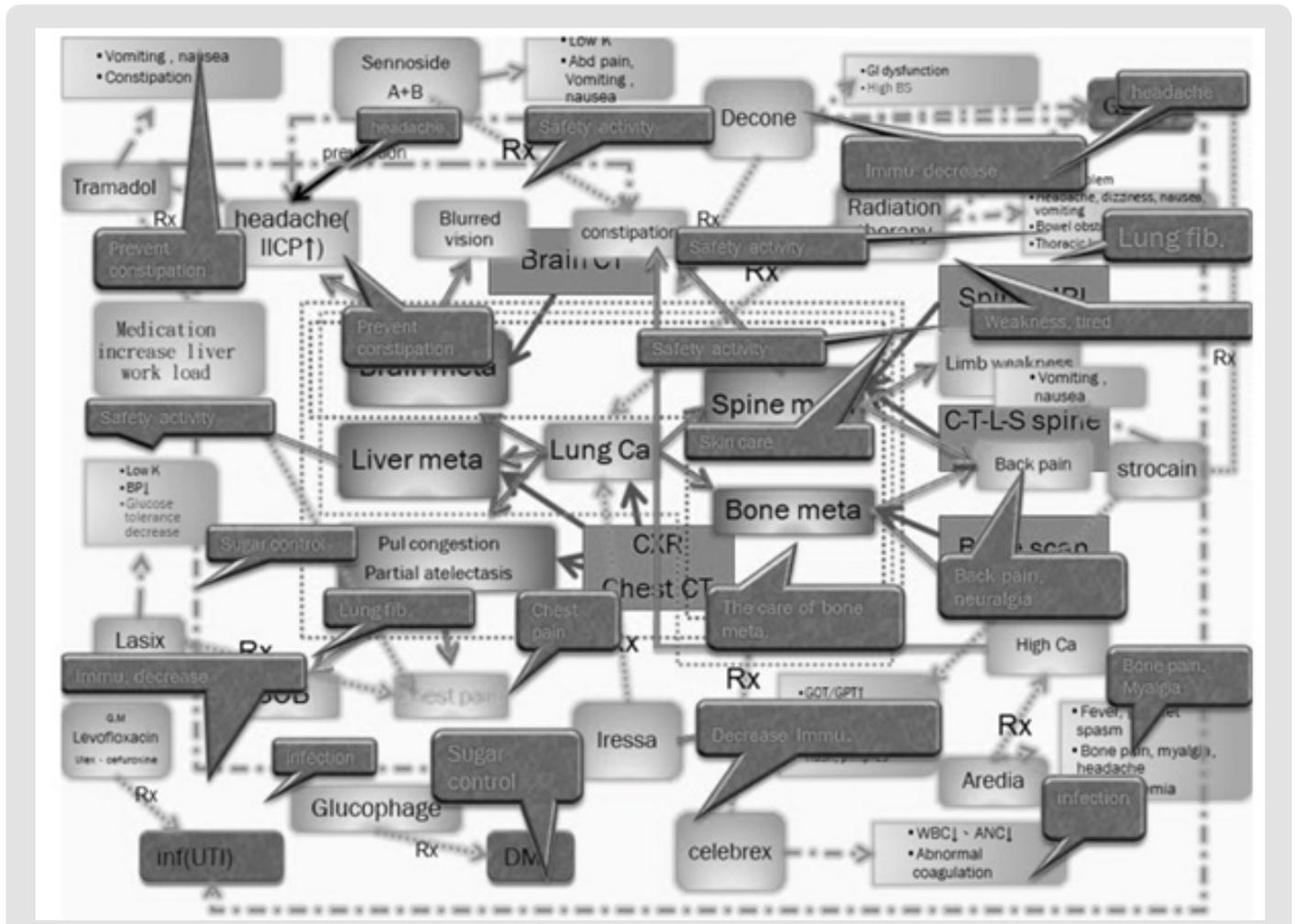


Figure 5: Students' creative ability and critical thinking skills: degree of meaningful interconnection between different concepts.

**Teacher Preparation**

Concept maps graphically display the conceptual structure of an OSCE or situational simulation condition. By drawing and using concept maps, the basic structure of the scenario is concretely presented, and the relationship between each related concept and theme, and concept branches are clarified. Therefore, a teacher requires comprehensive knowledge including of pathology, anatomy and physiology, and pharmacology, as well as various nursing-related knowledge, to assist students with learning concept map in OSCE or situational simulation conditions. Lin et al. [2] stated that

considerations and concerns that teachers should take into account in the OSCE and situational training program include

**Time, comprehension, and numbers of scenarios:** The concept principles and application skills must be clearly stated. In addition, students require adequate time for training and practice scenarios.

**Assistance Offered**

Teachers must provide assistance in the processes of conceptual mapping. Both teachers and students must concern

students' cognitive ability and reduce the difficulty associated with conceptual maps. In particular, when students attempt to ascertain patients' conditions and establish an initial concept regarding patients' conditions.

### **Time**

Allow students time to reflect on and adapt to new learning styles. Usually, the reasons for students to abandon learning programs are not only difficulty in grasping key points for scenarios but also pressure from other students, because some students require more time to think than others.

### **Drawing Concept Maps Independently**

Students should create their own concept maps. If teachers provide all details of concept maps, they do not serve their purpose.

### **Teacher Feedback**

Students must be rewarded for creating concept maps by their teachers. Teachers must also analyze students' concept map in detail. Feedback in group discussions might be appropriate for students to explain their thinking processes.

### **Diverse Teaching Strategies**

When teachers use concept maps for teaching and learning, diverse styles and content are not limited.

## **Results**

### **Students' Attitudes**

Students who participated in the program found concept maps challenging but had a positive attitude toward use of conceptual learning using concept maps. In the process of teaching, the author observed that students were keen to learn and to share knowledge. Students' attitudes about concept map into OSCE training were also described by Lin et al. [2]. The authors applied concept maps in students' OSCE training. Their study [2] indicated that students had difficulty with concept maps, but they had a positive attitude regarding the use of concept maps in conceptual learning. In the course of teaching, the author noted that these participating students wished to learn and were willing to share what they knew.

### **Students' Performance Based on Different Cognitive Styles**

The learning strategy used for concept map not only focuses on the learning of individual concepts or points but also extends to the whole picture of patients' conditions. The outcomes of students were such that students who preferred rote learning required more time to create concept maps than did the students who prefer cognitive learning styles, because conceptual map required students to discern the relationship between different concepts. In addition, students who performed outstandingly were not necessarily able

to quickly construct concept map ideas in each scenario. A similar viewpoint was proposed by Lin [3], who stated that learners who are principally cognitive preference oriented perform better than conceptual and adaptive learners in the study of conceptual maps because conceptual maps require students to discern relationships between concepts.

### **Student Performance Outcomes**

The main purpose of the concept map is to help students to learn how to use thinking. Some students mentioned that when discussing their concept maps with others, they could also perceive their own opinions through communication and debate and through the ideas of their classmates, enabling them to subsequently clarify concepts and achieve consensus.

## **Conclusion**

Kaddoura et al. [6] suggested that nurses face complex problems and decisions that require critical thinking to determine patient needs and to implement best practices, and they empirically demonstrated that concept maps are a critical consideration for nursing students. However, concept map teaching is a major challenge for nursing educators. Concept maps are essential for enabling familiarization with knowledge from textbooks, for integrating knowledge, and for constructing a conceptual map into the curriculum. Guiding students in drawing and modification also takes plenty of time. The process starts with highly interactive teaching of students. Scaffolding is provided according to different students' learning levels. As long as the opportunity exists for students to learn more effectively, they should attempt to do this. Concept maps can help students to convert their knowledge into meaningful learning and to establish their ability to actively learn and critically think in the process of composition. Therefore, the emphasis of student-centered learning experiences is a key educational goal.

Since 2012, the authors have focused on the program design of concept maps for OSCE and situational simulation teaching. In our view, concept maps are worthwhile learning tools that can help students to exercise critical thinking and clinical resilience. Researchers who participated in the training for this study also had a positive attitude toward this learning style and were even able to offer similar guidance to students in other contexts, such as patient chart reading or clinical internships. Students participating in the program also recognized the value and utility of conceptual maps and performed better as a result of their use. Thus, the design of concept maps for OSCE and situational simulation teaching is a suitable clinical practice teaching and training strategy. We hope that with this sharing of experience, more people may apply concept maps in clinical care and situational response.

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The research related expenses are all taken care of by the researchers.

## Conflict of Interest

The authors declare no conflict of interest.

## Contribution

Li-Chiu Lin: program coordinator, 1. design the program 2. one of the students' trainers 3. drafting the article 4. the final approval of the version of the paper.

Yi-Chun Lin and Hsiao-Chun Chen: 1. students' trainers, 2. establish the scenario and task for the training program 3. drafting the article

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