Application of Computer-aided Concept Map in Nursing Teaching

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Abstract. This article aims at discussing application of the computer-aided concept map in nursing classroom teaching. Based on case studies, the teacher performed teaching on second-year and third-year students majored in nursing and selected from Grades 2010-2014 in the university by using the concept map software and adopted a classroom observation method, a questionaries’ method and a concept map evaluation method to understand the students’ learning status. The results showed that the computer-aided concept map teaching could promote the students to tease out knowledge and improve their ability sufficient for clinical judgment. It follows that the computer-aided concept map teaching can well assist teachers to perform teaching design, evaluation and reflection, enhance critical thinking ability and learning reflection ability of the students, and improve the teaching effect effectively.

Introduction

The concept map is a learning tool proposed by Professor Joseph D Novak from the Department of Education in Cornell University, which visualizes the knowledge structure. It is mainly characterized by concept, proposition, cross connection and hierarchical structure.

Medical curricula include the knowledge contents of a large number of principles, laws and clinical evidence bases, most related to the concept. Numerous overseas studies show that the concept map is an excellent tool for nursing teaching and learning effects and also an effective means to promote the critical thinking ability of the students majored in nursing. The interactive teaching mode using the computer-aided concept map is remarkable in effect [1], but it is still in the initial stage domestically.

In recent years, concept map teaching has been developed in many courses in the nursing majority of our university, especially the computer-aided concept map teaching for some courses, and certain teaching experiences are obtained.

Application of the Computer-Aided Concept Map in Classroom Teaching

Second-year and third-year students majored in nursing, who have completed learning of basic medical courses, were selected from students of Grades 2010-2014 in our university.

Principles and steps of application of the computer-aided concept map in teaching

The concept map teaching was performed step by step according to different grades and professional courses. First, the sophomores received the training of concept map basic theory and operating method during learning of professional basic course Health Assessment before class for about 1 period (45min). The teacher mainly introduced basic theories, application targets, drawing method and evaluation standard gauge related to the concept map to the students, and also introduced use of the concept map software, such as Inspiration, Cmap Tool, Mindmanager and XMind, to allow the students to draw the electronic concept map independently. It's required that the knowledge elements should be highlighted in the layout and hierarchical structure, cross connection and conjunction should be clear. When teaching Case Study in related courses of juniors like Medical Nursing, the teacher distributed case data 1-2 weeks before the class. After data acquisition and
arrangement, the students found problems rapidly, looked for a theoretical basis and performed critical thinking and analysis, completed medical diagnosis concept map individually and prepared the case concept map of the nursing plan according to the nursing procedure frame. Then the students had a group discussion to discover problems and modify the case concept map repeatedly to improve it. For computer-aided concept map tool, the interest and creativity of the students could be motivated by means of bright color selection, easy modification of pictures and diversified display mode.

After completing modification of the case concept maps, the groups had an oral presentation in the class, each group assigned one member to display its electronic concept map, explain and summarize the map and answer questions raised by other groups. Meanwhile, the teacher raised questions in due time to guide the students to have a discussion and help them understand the level and the connection between the concepts. Finally the teacher would summarize relevant theoretical knowledge and study methods in the case. By means of display of the concept map drawn by the teacher, the students can understand and absorb relevant theoretical knowledge and grasp the drawing method of the concept map.

**Evaluation of the concept map**

After the students complete unit learning by applying the computer-aided concept map, the following modes can be adopted for evaluating the learning effect. The first one is a four-level scoring method, which is used for assessing the students in terms of four dimensions of proposition, level, cross relation and case in the concept map. The second one is concept map level assessment, achieved by means of the consistency degree with the reference map (standard concept map drawn by the expert). The third one refers to scoring according to clinical nursing case study capability, i.e. the case study professional score as the scoring standard can reflect the grasp and application degree of the learned medical professional knowledge by the students. In addition, individual and group formative evaluation should be further performed in the teaching unit. By means of such comprehensive evaluation mode, the group members can be conscious of the necessity of teamwork, good learning mutual assistance atmosphere can be built, and the learning enthusiasm of the students can be motivated sufficiently.

**Discussion**

To learn the teaching effect deeply, based on the classroom observation method, self-designed teaching effect questionnaires were adopted after the end of semester courses, and the students were required to finish them within a specified time and submit a written summary and evaluation. Seen from the students' feedback opinions, the concept map teaching effect is mainly highlighted in three aspects of teaching, learning and teaching evaluation.

**Computer-aided concept map can assist teaching efficiently**

*Help teachers develop teaching design*

In teaching practices, starting with student characteristic analysis, teaching target determination, teaching content display and teaching strategy selection by combining features of clinical nursing professional courses, the computer-aided concept map is adopted to perform teaching design, tease out the internal logical relation and knowledge structure of the teaching content, present visualized course knowledge structure in the form of network frame structure and implement it in the teaching plan. The concept map has significant effect and meaning on "teaching" of teachers and "learning" of students, the students acquire clear knowledge context and better knowledge system, and the teaching efficiency and teaching quality are improved efficiently.

*Help teachers perform teaching reflection*

The concept map was widely applied in teaching abroad initially as an evaluation tool. The cognition degree of the learned concepts and relation between the concepts by the students and
comprehension ability of the knowledge extensibility three dimensions can be reflected by means of the hierarchical structure of the concept map. The application effect of the learning tool is evaluated by adopting the four-level scoring method, concept map level assessment and clinical nursing case study ability. Meanwhile, the concept map can be employed in any stage of the teaching cavities as the teaching evaluation tool. As the formative evaluation mode, the concept map can also promote the teacher to grasp learning progress and thinking activities of the students dynamically in class evaluation through the concept maps drawn by the students in different stages, diagnose misunderstanding of the concept by the students and mistake omission in knowledge structure and content comprehension timely and further adjust the teaching strategy timely to optimize teaching content and improve teaching efficiency.

**Computer-aided concept map can promote learning ability of students**

*Promote critical thinking ability of the students*

Critical thinking is an essential thinking way in nursing work and also a core skill of the nurses to make an effective clinical decision. The critical thinking ability of the nurses will also be developed in the problem finding and solving process by applying the nursing procedure. The traditional nursing case teaching is inclined to linear thinking, and students often apply inherent standard answers in books mechanically, thereby being weak in classification and organization of complex case information and difficult to make targeted individual nursing plan. While applying the computer-aided concept map to perform case study, the students should first screen out the integrated information to confirm the key concept and then conduct graphical arrangement and meaningful connection. Specific to nursing diagnosis, the students are requested to label the relation between nursing diagnosis and supporting data on the concept map, fully reflecting the idea of evidence-based nursing. Therefore, the concept map method is more precise based on the evidence compared with the traditional nursing procedure method. The students will think more actively to clarify the relations between the nursing concepts, so that the rapid information analyzing and treatment ability, systematization ability and truth finding ability of the students can be enhanced, and the self-directed learning momentum is also motivated. In order to label connections between the nursing problems on the concept map for display of mutual correlation, the students must conduct critical thinking carefully on the clinical manifestation of patients and treatment nursing, so that they can treat the patient integrally from macro perspectives and draw the case concept map in detail. By drawing the concept map and modifying it constantly, the students can see the thinking change process clearly and find out the knowledge structure shortages and improvements, thereby enhancing the critical thinking ability [2-3].

*Promote learning reflection of the students*

As a learning cognitive tool, the computer-aided concept map can urge the students to integrate old and new knowledge to build self-knowledge structure and network and motivate the participation and creativity of the students. By virtue of the computer-aided concept map tool, the students can have a group discussion more conveniently via the network platform and can modify the map quickly and synchronously during discussion, thereby saving a large amount of time. For the students, application of the concept map promotes cooperative learning and creative learning. They can do learning by modifying the knowledge structure constantly, and the learning reflection ability is promoted accordingly.

*Enhance communication skills and team cooperation consciousness of the students*

At present, group discussion is used more and more frequently in medical education [4-6], the students must have mutual cooperation, share resources and bear responsibilities together in the concept map drawing process during case study from group task distribution, data acquisition and discussion to final presentation. By means of such cooperative learning, the student groups share group thinking and wisdom, which shows cooperative learning spirit and teamwork consciousness [7], promotes meaningful learning and improves their communication skills obviously.
Achieve role interaction between teachers and students

By means of computer-aided concept map teaching, the role of the students is converted from audiences in the traditional classroom into the subject of classroom activities, achieving role interchange between the teachers and the students. Such interchange builds democratic passionate teaching atmosphere and achieves the "student-centered" teaching aim of classroom teaching.

Limitations and suggestions for application of concept map

Introduce flipped classroom into concept map teaching

The concept map also has certain limitations in nursing teaching application. The most salient problem is that the teaching load is high and the teachers waste time and energy in reading over the homework. Especially in case study with the concept map, the teachers often cannot provide comprehensive teaching feedbacks aiming at every student in the class, which reduces the teaching quality. I suggest developing flipped classroom teaching actively to solve the problem.

Flipped classroom refers to a teaching form where the students watch the teaching videos created by the teachers outside the classroom and then return to the classroom to share and communicate the learning outcomes and experiences with the teacher face to face to achieve the teaching target [8]. With the theoretical basis of constructivism and relying on the modern teaching technology, the flipped classroom achieves knowledge instruction outside the classroom and achieves knowledge internalization in the classroom under assistance of the teacher and the students driven by tasks. For example, during concept map teaching of the clinical nursing course, the teacher records the teaching micro video about relevant knowledge before the class and assigns some simple learning tasks or case study to promote the students to perform self-directed learning or prepare the case concept map by resourcing. In the classroom, the teacher and the students can discuss the key and difficult points deeply or finish the case teaching. The students and the teacher have discussion and prepare the map face to face, so that classroom flipping based on computer-aided teaching content can be achieved efficiently. This can also make the teacher grasp the learning progress of the students quickly to guide the students better. Due to preciousness of the class time, the teacher can only correct and answer common prominent difficult points or errors of the students. In such case, the teacher can record the micro videos outside the classroom to provide detailed explanation to other questions in the video and feedback the answers to the students timely, so that the teaching effect can be improved greatly. Taking Inspiration software as an example, the teacher's feedback can be made in various forms. In case the case study map drawn by the students has errors, the teacher can explain the error correction by utilizing the recording plug-in of Inspiration, save the record and send it to the students by e-mail. In case of the need to make detailed modification explanation on the concept map, the teacher can make the micro video and adopt Camtasia Studio software to record Inspiration synchronous explanation video. Therefore, by means of introduction of the flipped classroom teaching, the teacher and student interaction time is increased, the interaction in the classroom is more effective, and the independent depth learning demand of the students can be met. The personalized education experience is obtained, and the concept map teaching effect is improved.

Upgrade the concept map to be an online learning new tool

With rapid development of network teaching, the students are excited but lost, because most network teaching navigation systems are lack of knowledge system internal relation on the network frame structure, and the students cannot build proper relation between the concepts or understand the learning contents correctly. The organizational knowledge set and knowledge flow can be formed by integrating, collecting and correlating relevant knowledge resources in the organization with the concept, the knowledge or the unit as the node by combining the concept maps and the knowledge maps. Meanwhile, a novel navigation map tool supporting
network teaching and self-directed learning is formed by drawing the concept map, and the students can find corresponding knowledge quickly for self-directed learning by following up a clue in the vast amount of network platforms with the clear subject knowledge system. Therefore, the students can know how to find the knowledge points in the relevant course teaching website and relevant expansion continuity problems according to the found problems and acquire the knowledge more conveniently, thereby performing self-directed learning efficiently.

Conclusions

As a novel teaching tool and learning tool, the computer-aided concept map is more and more important for teaching of the teachers and learning of the students and can assist the teachers to perform teaching design, evaluation and reflection and promote the critical thinking ability and learning reflection ability of the students, thereby improving the teaching effect.

Application of the concept map is still in the initial stage in nursing education in China, there are still many problems to be explored in application of it, especially concept map evaluation indigenous research. I believe, with the deepening of the research, the computer-aided concept map as a teaching tool and strategy will certainly have a brilliant display in the nursing field in China in the near future.

References


