



The Effect of Concept Mapping as a Strategy for the Development of Cognitive Skills of Nursing Students

Revista Publicando, 5 No 16. (2). 2018, 281-289. ISSN 1390-9304

The Effect of Concept Mapping as a Strategy for the Development of Cognitive Skills of Nursing Students

Saeedeh Keyvani Rad¹, Maryam Akbarilakeh^{2*}

1 MSc Student of Medical Education, Faculty of Medical Education, Shahid Beheshti University of Medical Sciences, Tehran, Iran. Social Security Organization, saeide.keivanirad@gmail.com

2 Assistant Professor of Medical Education, School of Medical Education Sciences, Faculty of Medical Education, Shahid Beheshti University of Medical Sciences, Tehran, Iran, m.akbari@sbmu.ac.ir

Abstract

Introduction: The best strategies for learning, teaching and evaluation in nursing education are the methods that make the best communication between theoretical and clinical education. Conceptual maps are very effective learning tools because of features such as dynamism, attractiveness, adaptability, and adaptation to many educational issues. They are not linear and one-dimensional, as well as a multidimensional tool for data analysis, just like traditional care plans. Nursing diagnoses, nursing interventions, evaluation criteria, and expected outcomes in an innovative way that are integrated within the charts in a fully integrated manner.

Objectives: Considering the importance of learning cardiac dysrhythmias in the implementation of nursing process and the speed of changes in the health system, community needs and new expectations of nursing, as well as the lack of internal and external studies similar to this lesson, we came up with a study titled The study of the effect of conceptual mapping training on the development of cognitive skills in the course of cardiac rhythms in nursing students.

Material and Methods: In this study, students from two classes who had similar courses in two faculties of nursing and midwifery in two different units of Islamic Azad University of Islamic Azad University in one and the same with a similar professor were selected. From both groups, a pre-test and post-test were taken after conceptual mapping. The results of the two groups were analyzed by statistical tests.

Conclusion: Based on the studies, two main objectives of this study were: a) the preferred method of teaching by conceptual map on teaching by lecture method; and b) increasing the level of students' learning based on the test scores in teaching by conceptual mapping method; Realized. The scores of the two groups under study after the improvement with the conceptual map were improved, and comparing the scores before the teaching with the conceptual map and the subsequent one had a significant statistical relation ($p < 0.01$).

Key words: Nursing education, Conceptual map, Cardiac arrhythmia, Teaching by lecture method.



The Effect of Concept Mapping as a Strategy for the Development of Cognitive Skills of Nursing Students

Revista Publicando, 5 No 16. (2). 2018, 281-289. ISSN 1390-9304

Introduction:

Students in the new millennium can not use the power to maintain science for a long time from theory to clinic [1]. As a result, the duties and responsibilities of the professors today become heavier than before, and can no longer be rooted in the complex and advanced transformations of the traditional methods of teaching, society and individuals [2]. The best strategies for learning, teaching and evaluating nursing education are the methods that make the best communication between theoretical and clinical education. Of course, nursing education has been challenged to improve clinical education and to achieve desirable learning and problem-solving ability in nursing students [3]. The pace of change in the health system and community needs is necessary to revise the teaching methods in medical sciences, while providing appropriate health care groups that are ready to deal with the challenges of the century and one [4]. Progress has been made in nursing education in education. Today, educational theorists have concluded that the use of meaningful learning enhancement methods will create more learning in learners and, in addition, increase critical thinking skills and creative thinking skills [5]. Studies show that most learners do not have the right ways to study and utilize more and better than cognitive capacities of self-awareness. As such, most of them spend most of their time on superficial learning. A learning that is often overlooked in the short history of the exam [6]. Undoubtedly, if students are familiar with meaningful learning tools from the beginning of education and prepare themselves to take exams in line with these approaches, great savings will be made in the cost of educational systems, and students will also be able to better fund their God-given assets. Exploit [7]. Therefore, the use of active teaching methods is needed to improve critical thinking rather than citation in traditional ways that only increase the power of salvation [8]. By increasing nursing knowledge and making it more complex, nursing instructors should use strategies for clinical and theoretical education that help students to learn how to learn more effectively. Changes have created hope in nursing instructors that they can create meaningful and profound learning in their learners instead of surface learning [9]. In order to achieve this goal, nursing instructors should use new educational and learning strategies [10]. As the nursing goal is professional development, in which the individual is able to guide himself and continue the educational path, the person must be instructed in the process of self-learning [11]. One of the educational strategies needed to overcome these barriers is to use conceptual map method as a learning-learning strategy to facilitate understanding of students' ability to achieve creative thinking in learning more about the health status study [12]. The theoretical framework is the conceptual mapping method based on David Azubel learning theory. Azubel believes that learners can not have real learning while maintaining scattered learning and learning, but must also enhance meaningful learning through organizing, communicating, and adding regular content to previous cognitive learning [13].

In fact, the conceptual map is the schematic presentation of the relationship between one concept and another, as well as its relation to other concepts related to a particular subject. Conceptual map is composed of concepts related to a subject and communication sentences or propositions. Concepts are arranged in a pyramid form and their relationship is described from top to bottom or from side to side [13]. The use of conceptual maps as an educational strategy was first proposed by Novak (1977) at the American Cornell University to present concepts. Conceptual map has been used since the time of inventions in effective ways in systems such as medicine, science education and psychology, and research has also shown that this method is effective in promoting meaningful learner learning [14].

The use of conceptual maps can be helpful as a bridge between the teaching of theoretical lessons, such as the study of health status and its application in the clinical setting, since it supports nursing students'



The Effect of Concept Mapping as a Strategy for the Development of Cognitive Skills of Nursing Students

Revista Publicando, 5 No 16. (2). 2018, 281-289. ISSN 1390-9304

conceptual maps of the relationship between knowledge and practice, which are an appropriate tool for improving critical thinking skills. Nursing education is an infrastructure to provide effective human resources to meet the needs of the community [15]. It includes both theoretical and practical educational processes [16, 22, 23].

Results:

The results of t-test for pre and post test scores in two groups

Independent t-test with a significant level of 99% was used to evaluate the results of the two groups and whether the concept mapping was effective in educating students. Statistical analysis was performed using SPSS software version 19.

Table 1: Results of meaningful test before and after teaching with concept map in group A

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Before	26	24.2692	4.00557	.78556
After	26	27.3846	2.43437	.47742

One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Before	30.894	25	.000	24.26923	22.6513	25.8871
After	57.360	25	.000	27.38462	26.4014	28.3679

As shown in Table 1, there is a significant difference between the scores before and after teaching with the conceptual map of group A ($p < 0.01$). This suggests that using a conceptual map for teaching students to increase the student's cardiac arrhythmia score has had a positive effect.



The Effect of Concept Mapping as a Strategy for the Development of Cognitive Skills of Nursing Students

Revista Publicando, 5 No 16. (2). 2018, 281-289. ISSN 1390-9304

Table 2: Results of meaningful test before and after teaching with concept map in group B.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Before	26	25.1923	3.78438	.74218
After	26	27.8846	2.99769	.58790

One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Before	33.944	25	.000	25.19231	23.6638	26.7209
After	47.431	25	.000	27.88462	26.6738	29.0954

As you can see in Table 2, there is a significant difference between the scores before and after the conception of group B students ($p < 0.01$). This suggests that using a conceptual map for teaching students to increase the student's cardiac arrhythmia score has had a positive effect.

Conceptual analysis of the results of each 2 academic units

Analysis of the results of Azad University Branch A

According to the results for the group A (Unit 1), the sample number is 26 people before and after ($N = 26$).

The mean (mean) score before teaching with the conceptual map is 24.27 and the mean score after teaching with the conceptual map is 27.38. These figures indicate that we had an average score of 11.3 in students, indicating that the use of the concept map for the cardiology course had a positive effect.

Std. Deviation is 4.00 before the teaching with the conceptual map and the standard deviation is 2.43 after the teaching. Here, as you can see, the standard deviation is down 1.57. In this case, the expansion of numbers or the dispersion of the numbers has decreased, and now the important point is that, due to the average increase of 11.3, it shows that the dispersion of the numbers has been reduced and has led to improvement.

The average standard error in this study before the teaching with the conceptual map is 0.78 and after the teaching with the conceptual map is 0.48. After teaching, as you can see, the amount has been reduced, indicating that the numbers have been discarded from the sample average.

A significant number (T) is before teaching with a conceptual map of 30.894 and after teaching with a conceptual map of 47,431, which in 2 cases indicates that both teaching methods (lectures and



The Effect of Concept Mapping as a Strategy for the Development of Cognitive Skills of Nursing Students

Revista Publicando, 5 No 16. (2). 2018, 281-289. ISSN 1390-9304

conceptual maps) are influential. This test, at a confidence level of 0.99, indicates that the T number must be in the range of 2.57, which is indicated by the positive integer T, and greater than 2.57, in both cases.

Grade 25 is the equivalent of $n-1$, the degree of freedom of choice refers to 25 choices.

The significance level of the 2 domains (sig.2 tailed) is 0.000 and below 0.01, indicating that both methods were effective both before and after teaching with the conceptual map. Because the level of significance is below 0.01 at the 0.99. So again, it is acknowledged that both methods are effective.

The confidence level (or confidence interval) with a confidence margin of 95% is the upper limit of 25.88 and the lower limit of 22.65 before the teaching method with the conceptual map and the precise average is 24.26 as above.

The 95% confidence margin after the teaching method with the conceptual map for the upper limit is 28.37 and the lower limit is 26.40, and the exact mean is as high as mentioned above 27.38.

Analysis of the results of Azad University Branch II

According to the results of Table 3, for students in Group B (Faculty of Liberty, Unit II), there are 26 individuals ($N = 26$). The average score before teaching with the conceptual map is 25.1923 and the mean score after teaching with the conceptual map is 27.88. These numbers indicate that we had a score of 2.69 in students, which indicates that the use of the concept map for the cardiology course has had a positive effect.

Std. Deviation before the teaching with the conceptual map is 3.78 and the standard deviation was 2.99 after the teaching. Here, as you can see, the standard deviation is down 0.79. In this case, the expansion of numbers or the dispersion of the numbers has decreased, and now the important point is that, due to the average increase of 2.69, it is indicative of the fact that the dispersion of the numbers has been reduced and brought to improvement.

The average standard error in this study was 0.74 before teaching with the conceptual map and after the teaching with the conceptual map, it was 0.59. After teaching, as you can see, the amount has been reduced, indicating that the numbers have been discarded from the sample average.

A significant number (T) is before teaching with a conceptual map of 33.944 and after teaching with a conceptual map of 47.431, which in two cases indicates that both teaching methods (lectures and conceptual maps) are effective. Since this test has been performed at a confidence level of 0.99, it indicates that the T-number must be in the range of ± 2.57 , which is because the T-number is positive and is greater than 2.57. It is confirmed in both cases. Grade 25 is the equivalent of $n-1$ ($26-1$), the degree of freedom of the right to choose indicates 25 choices.

The significance level of the 2 domains (sig.2 tailed) is 0.000 and below 0.01, indicating that both methods were effective both before and after teaching with the conceptual map. Since the significance level below 0.01 is at 99% confidence level. So again, it is acknowledged that both methods are effective.



The Effect of Concept Mapping as a Strategy for the Development of Cognitive Skills of Nursing Students

Revista Publicando, 5 No 16. (2). 2018, 281-289. ISSN 1390-9304

The confidence level (or confidence interval) of the margin of confidence is 95%, the upper limit is 26.72 and the lower limit is 23.66 before the teaching method is conceptual, and the exact average is 25.19 as above.

The 95% confidence margin after the teaching method with the conceptual map is the upper limit of 29.09 and the lower limit is 26.67 and the precise average is 27.88 as above.

Learning cognitive skills is different from teaching by conceptual mapping method compared with teaching by lecture method in comparison with teaching by conceptual mapping method. Based on the results, it was found that there is a significant difference between the two teaching methods ($p < 0.01$).

Teaching by means of a conceptual mapping method results in higher mean scores in students. Based on the results, it was found that the mean scores of students after teaching by conceptual mapping method was higher than teaching by lecture method, so this hypothesis is confirmed.

Conclusion

We have three main objectives in this study, showing the existence or absence of differences in teaching methods in the form of lectures and conceptual maps, the preferred method of teaching by concept mapping on lecture teaching and increasing the level of student learning according to the test scores. In teaching the conceptual map method, we will explain in more detail that all three of these goals were achieved.

The scores of the two groups under study after the improvement with the conceptual map and the comparison of the scores before the teaching with the conceptual map and then there was a significant relationship between the two groups ($p < 0.05$). This was in line with the study of Ghanbari et al. In this study, post-test results showed that the conceptual mapping method was able to significantly increase the post-test scores in the experimental group (12.41 + 4.7) compared with the control group (9.64 + 5.06) (17).

However, Masoumi et al study showed that both lecture and conceptual mapping methods could significantly increase post test and retention scores than pre-test, so both methods have been effective in improving student learning [18].

Conceptual mapping is used in lectures, group work, classroom discussions, clinical centers, and clinical learning activities. When students use conceptual mapping for the relationship between theory and clinical practice, their critical thinking skills increase. In Susan et al., Concept maps in students have increased their satisfaction and performance [19].

In fact, conceptual mapping is one of the strategies that improves metacognition and meaningful learning as well as reduces problems related to learning issues and critical thinking in nursing. The results also confirm the claims and opinions of the authors in this area. The study by Yuchang Hung et al. Aimed to examine the effect of integrated learning with concept mapping on improving the critical thinking of nurses working in hospitals in Taiwan. The results of the study showed that the conceptual map increased critical thinking in the intervention group [20].

Safari and Darabi showed that 72% of nursing instructors used inactive teaching methods in their teaching and only 28% of them used active methods for teaching. Other research results showed that nursing instructors have a moderate level of advanced teaching methods [15]. This does not use



The Effect of Concept Mapping as a Strategy for the Development of Cognitive Skills of Nursing Students

Revista Publicando, 5 No 16. (2). 2018, 281-289. ISSN 1390-9304

advanced teaching methods. Another study that was conducted by Mousaie Fard and Din Mohammadi in 2001 about the attitude of nursing students towards new teaching methods revealed that 92% of nursing students were interested in active teaching methods and preferred it in traditional ways [16]. On the other hand, the healthcare environment has created this need for nursing instructors to prepare graduates to be able to apply critical thinking skills and problem-solving skills in a variety of clinical settings.

Given that nurses take care of patients, professors must use techniques that help students learn concepts in a meaningful way and apply them in a clinical setting. Conceptual mapping is one of the new methods of teaching that eliminates the gap between theory and clinical practice in nursing and increases critical thinking skills. The ability to think critically is a basic principle for nurses and students can use maps to provide patient-centered and community-based care, prepare for learning clinical skills, and eliminate theoretical and clinical gap. Since nurses who are newly graduated are often critical in critical thinking skills needed to investigate and deal with patient problems and life-threatening situations, and have limited clinical decision-making ability, and hospitals have limited facilities for their education, these conflicting activities can lead to inferior consequences and litigation the patient is a major concern for nursing directors.

Therefore, nursing education should be such that they prepare them for clinical decision making and critical thinking skills and problem solving in the clinical setting, which is conceptual mapping of one of these methods. Patient Satisfaction is the basic principle in providing nursing care. When nurses are able to provide care that is based on science and to solve the patient's problem, they increase their satisfaction. In fact, conceptual mapping is a very effective and key teaching method. The main advantage over other teaching methods is that it eliminates the gap between the theory and the clinical level and increases the critical thinking skills of the students.

In a study by Rasoulzadeh et al. (2015), the subject of their study was to compare the effect of the conceptual map and the traditional method on students' practical skills, it was found that before training, there was a significant difference between the two educational groups in terms of teaching on injection skills ($P = 0.185$), Sterilization ($P = 0.568$) and cleaning ($P = 0.251$). But after teaching by conceptual design, there was a significant difference between the control and intervention groups ($P < 0.001$). Meanwhile, the intervention group's grades after training were significantly higher than those in the control group. They concluded that the concept map is a preferred and better method for teaching practical skills in nursing students compared to traditional teaching methods [21].

As we have seen in our results, the study is similar to and similar to Rasoulzadeh et al. (2015)'s study of better use and more efficient teaching method by conceptual mapping in comparison to traditional teaching method.

As we have seen in our results, the study is similar to the Dangzadeh et al. (2015) study on better use and more efficient teaching method by conceptual mapping in comparison with traditional teaching method.



The Effect of Concept Mapping as a Strategy for the Development of Cognitive Skills of Nursing Students

Revista Publicando, 5 No 16. (2). 2018, 281-289. ISSN 1390-9304

References

1. Allcock N. Teaching the skills of assessment through the use of an experiential workshop. *Nurse Educ Today* 1992; 12(4): 287-92.
2. Ahmadi F ◊ Mohammadi E ◊ Physical examination for nurses. 3rd ed. Tehran: Tarbiat Modares University. 2003 [Persian].
3. Taylor C. *Fundamentals of nursing*. 3rd ed Philadelphia: Mosby 1996
4. Yamauchi T. Correlation between work experiences and physical assessment in Japan. *Nurs Health Sci* 2001; 3(4): 213-24.
5. Rolfe IE ◊ Sanson-Fisher RW. Translating learning principles into practice: a new strategy for learning clinical skills. *Med Educ* 2002; 36(4): 345-52.
6. Plaisance L ◊ Logan C. Nursing students' knowledge and attitudes regarding pain. *Pain Manage Nurse* 2006; 7(4): 167-75.
7. Cakmak M. An examination of concept maps created by prospective teachers on teacher roles. *Procedia Social and Behavioral Sciences*. 2010; 2(2): 2464-2468
8. Black P ◊ Green N ◊ Chapin B. Concept mapping: An alternative teaching strategy. *Pelican News*. 2000;56(4):23-6.
9. Rahmani A ◊ Mohjal-Eghdam AR ◊ Fathi-Azad E ◊ Abdollahzadeh F. The combined effect of training on the concept mapping process of learning nursing teaching nursing students of Tabriz university of medical sciences. *Iran Educ Med*. 2007; 7(1):41-9. [Persian]
10. Givi-morovvat P ◊ Yekta Z ◊ Mehran A. The effects of concept mapping on students' learning approach to teaching nursing in Tehran [dissertation]. Tehran: Tehran University of Medical Sciences; 2002. [Persian]
11. JVV Antúnez (2016). Bioética y gobernanza universitaria: Un nuevo paradigma para la educación de futuro. *Opción* 32 (2)
12. Wilgis M ◊ McConnell J. Concept mapping: An educational strategy to improve graduate nurses critical thinking skills during a hospital orientation program. *J Continue Educ Nurse*. 2008; 39(3):119-26.
13. Senita J. The use of concept maps to evaluate critical thinking in the clinical setting. *Teach Learn Nurs* 2008; 3: 6-10.
14. G Nurbekova, S Odanova, B Sabdenova, L Adilbekova, Z Osmanova (2018). Methods of teaching derived words of the Kazakh language by interactive technologies. *Opción, Año 33, No. 85 (2018): 273-289*.
15. Black P ◊ Green N ◊ Chapin B. Concept mapping: An alternative teaching strategy. *Pelican News*. 2000;56(4):23-6.
16. Rahmani A ◊ Mohjal-Eghdam AR ◊ Fathi-Azad E ◊ Abdollahzadeh F. The combined effect of training on the concept mapping process of learning nursing teaching nursing students of Tabriz university of medical sciences. *Iran Educ Med*. 2007;7(1):41-9. [Persian]
17. Hsu L ◊ Hsieh SI. Concept maps as an assessment tool in a nursing course. *J Prof Nurs* 2005; 21 (3): 141-9.
18. Baugh ◊ N.G. ◊ Mellott ◊ K.G. Clinical concept mapping as preparation for student nurses' clinical experiences. *J. Nurs. Educ*. 1998; 37 (6) ◊ 253-256.
19. Nejat N ◊ Kouhestani H ◊ Rezaei K. Effect of Concept Mapping on Approach to Learning among Nursing Students. *Hayat*. 2011; 17 (2) :22-31.
20. Rezaei K, Kohestani H, Nejat N, Ebrahimi Fakhar H. Comparison of the effect of concept map and nursing process on self-regulation learning, self-efficacy and cognitive strategies of nursing students. *Two monthly nursing and midwifery faculty of Urmia* 2010; No. 2 (10): pp. 218-209.
21. Rasoul Zadeh ◊ Nasrin et al. "Comparing the Effect of Concept Mapping and Conventional Methods on Nursing Students' Practical Skill Score." *Nursing and Midwifery Studies* 4.3 (2015): e27471. PMC. Web. 24 June 2017.



The Effect of Concept Mapping as a Strategy for the Development of Cognitive Skills of Nursing Students

Revista Publicando, 5 No 16. (2). 2018, 281-289. ISSN 1390-9304

22. Zhanar O., Lyazzat K., Gaukhar Z., Sanat S., Problems and development of railway sector services in the Republic Of Kazakhstan, *Astra Salvensis - review of history and culture*, No. 10, 2017, p. 443-449.
23. Ruzalina I. Shaikhutdinova, Tatyana A. Korneyeva, Tatyana D. MarkovaZero suffixation on synchrony and diachrony, *Astra Salvensis - review of history and culture*, No. 10, 2017, p. 465-470.