An Experimental Study to Evaluate the Effectiveness of Concept Mapping as a Teaching Strategy to Improve the Critical Thinking Skills of Nursing Students in Selected Nursing Institutes of Delhi

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ABSTRACT

The objectives of the study were: to assess and evaluate the critical thinking skills of under- graduate nurses before and after administration of concept mapping as teaching strategy, to develop teaching plan using concept mapping on the topic Mental Status Examination, to assess the of satisfaction towards concept mapping as a teaching strategy.

Materials & Methods: The present study is Experimental study. Students selected for the study were undergraduate nursing student doing diploma in nursing (GNM) and mental health (psychiatric) nursing as their subject. Tools used for the collection of data were structured questionnaire to collect demographic characteristics and to assess the improvement in critical thinking skill and Structured opinionnaire to assess the level of satisfaction

Result: All participants are female (100%) undergoing diploma course, got their mental health psychiatric nursing experience from PVT hospital. This study shows that concept mapping as a teaching strategy is effective to improve critical thinking skills of undergraduate nurses with the mean post -test score on improvement in critical thinking skills as the effect of concept mapping as a teaching strategy in experimental group (7.266) was higher than control group (5.066) with mean difference 2.2. It is also showing there is moderately high correlation exist between gain in critical thinking score and satisfaction and conclude that concept mapping is an effective teaching strategy.

KEYWORDS: [Concept Mapping, Critical Thinking, Mental Health Nursing]

INTRODUCTION

Foundation of learning is laid down as soon as the child comes in contact with the environment, and Decision-making skill is assumed to be a key feature of the nurse's role in today's health care organizations. Thus, educators should use different teaching strategies to develop competence in student's critical thinking [1]

To remember information longer and to be use it more effectively, it should move to long term memory and technique of concept mapping will help student to achieve this [2].

Teaching and assessing critical thinking have great professional benefit to nursing education. The quasi-experimental study was based upon David Ausubel's theory of meaningful learning (1968) and Joseph Novak and Bob Gowin's (1984) work on the application of meaningful learning using concept mapping. The findings of this study suggest that concept mapping triggers critical thinking, which guides the student to engage in meaningful

learning. However, the need still exists for researchers to use other critical thinking tools that may capture students' growth of critical thinking over time. [3]

In nursing, critical thinking is the ability to think systematic and logical manner with openness to question and reflect on the reasoning process which is employed to ensure safe nursing practice and quality care [4]. The primary goal of nursing education is to help nurses and nursing students find out how to synthesize information, think critically, and use clinical evidence appropriately so we took-up this research to assess the effectiveness of concept mapping to improve critical thinking

MATERIALS & METHODS

Formal permission was obtained from the concerned authority to conduct the study. The present study comprised of two groups i.e. Experimental group and control group. Students selected for the study were undergraduate nursing student doing diploma in nursing (GNM) and mental health (psychiatric) nursing as their subject. The experimental groups were given teaching through concept mapping teaching strategy on the topic mental status examination and the control group were given teaching through traditional method of teaching. For development of concept mapping researcher got course certification and concept mapping of mental status examination. Tools used for the collection of data were structured questionnaire to collect demographic characteristics and to assess the improvement in critical thinking skill and Structured opinionnaire to assess the level of satisfaction.

STATISTICAL ANALYSIS

The obtained data were analysed, tabulated and interpreted by employing descriptive and inferential statistics. Comparison of pre-test and post-test scores of critical thinking skills among under-graduate nurses in the experimental group by computing mean, median and standard deviation and t value. Association between post test score and satisfaction score are computed by Karl Pearson product moment correlation.

RESULT
Section I: Description of sample characteristics

The highest frequency of sample in both groups were in the age group of 18-20 years of age. In the experimental group 83.33% and in the control group 86.66% were in this age group. All participants are female (100%) undergoing diploma course, got their mental health psychiatric nursing experience from pvt hospital

According to the data majority of the students i.e. 76.67% in experimental group and 80% in control group were spending 2-3 hours for self-study on regular basis.

In experimental group majority of the students (80%) were not having prior knowledge regarding concept mapping.

Section_2: comparison of pre-test and post-test level of critical thinking skills among under-graduate nurses in the experimental group

The mean post test score in critical thinking skills as the effect of concept mapping as a teaching strategy (7.266) was higher than pre-test score means (3.866). This indicates that concept mapping as a teaching strategy is effective in improving critical thinking skills. The data also show that median post-test score 7.2 and median pre-test score 4.13, standard deviation of post- test was 1.123 and pre-test was 1.522

Thus, it indicates that there is improvement in the level of critical thinking skills among under graduate nurses after the application of concept mapping as a teaching strategy.

The mean post test score in critical thinking skills as the effect of concept mapping as a teaching strategy (7.266) was higher than pre-test score mean (3.866) with a mean difference 3.4, pooled standard deviation 1.34, standard error of mean difference 0.3513 and 't' value of 9.474 which was found to be statistically significant for df(29) at 0.05 level of significant. Thus, it is established that concept mapping as a teaching strategy is effective to improve the critical thinking skill of undergraduate nurses.

Section_3: comparison of post-test level of critical thinking skills among under-graduate nurses between experimental and control group

The mean post test score in critical thinking skills as the effect of concept mapping as a teaching strategy in experimental group (7.266) was higher than control group (5.066). This indicates that concept mapping as a teaching strategy is effective in improving critical thinking skills. The data also show that median post-test score of Experimental groups was 7.2 and median post-test score of control group was 6.571. The data also show that standard deviation of experimental group was 1.123 and control group was 1.617. This indicate that the experimental more group is homogeneous. Thus, it indicates that there is improvement in the level of critical thinking skills among under graduate nurses after the application of concept mapping as a teaching strategy

The mean post test score in critical thinking skills as the effect of concept mapping as a teaching strategy in experimental group (7.266) was higher than post-test score mean (5.066) of control group with a mean difference 2.2, pooled standard deviation 1.392, standard error of mean difference 0.366 and 't' value of 6.2654 which was found to be statistically significant for df(29) at 0.05 level of significant. Thus, it is established that concept mapping as a teaching strategy is effective to improve the critical thinking skill of undergraduate nurses.

Section _4: correlation between post test scores and satisfaction scores

The mean value of post test score (7.266) and mean value of satisfaction score (3.8) of experimental group and Karl Pearson product moment correlation between post test score and satisfaction score of experimental groups was significant at 0.05 level ford(f)=29

Thus, it was established that moderately high correlation i.e., 0.7 exist between effectiveness of concept mapping as a teaching strategy to improve critical thinking skills and satisfaction

TABLE-1.1: Frequency and Percentage Distribution of Demographic Data of Students in Both Experimental and Control Group N=60

SLNO	SAMPLE CHARACTERISTICS	EXPERIMENTAL GROUP		CONTROL GROUP		Total F	Total %
		F	%	F	%		
1	Age (Years) 18-20 20-22 22-24	25 4 1	83.33% 13.33 % 3.33%	26 4 0	86.66% 13.33% 0	51 8 1	85% 13.33% 1.66%
2	Gender Male Female	30	100%	30	100%	60	100%
3	Area of clinical experience in mental health (psychiatric) nursing Pvt Govt Semi-govt	30 0 0	100%	30 0 0	100% 0 0	60 0 0	100%
4	Duration of study time per day 2-3hrs 4-5 hrs 6-7 hrs	23 6 1	76.67% 20% 3.33%	24 6 0	80% 20% 0	47 12 1	78.33% 20% 1.67%
5	Level of Education Graduation Diploma in Nursing	0 30	0 100%	0 30	0 100%	60	100%
6	Do you have knowledge regarding concept mapping? Yes No	6 24	20% 80%	6 24	20% 80%	12 48	20% 80%

Mean, Median and Standard Deviation of pre-test scores of critical Thinking skills in the Experimental and control group.
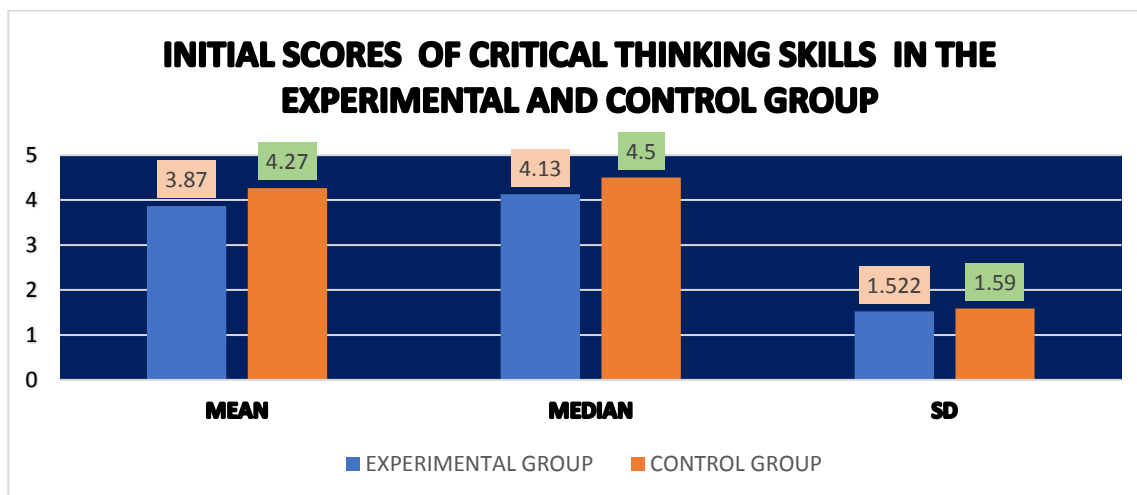
Figure 1.1: Bar Diagram showing Mean, Median and Standard Deviation of pre-test scores of critical Thinking skills in the Experimental and control group

TABLE-1.2: Mean, Mean D, Pooled Standard Deviation Standard Error of Mean Difference and 't' Value of Pre- Test Score on Critical Thinking Skills Between Experimental and Control Group. N=60

Group	Mean	Mean D	SD	SE MD	't' value
Experimental group (n1=30)	3.87				
		0.4	1.56	0.317	0.995*
Control Group (n2=30)	4.27				

Df (58), t=2.001 at 0.05 level of significance

Data in Table-1.2 shows that the mean pre-test score in experimental group (3.87) and control group was (4.27) with a mean difference 0.4, pooled standard deviation 1.56, standard error of mean difference 0.317 and 't' value of 0.995 which was found to be statistically not significant for df(58) at 0.05 level of significant.

Mean, Median, Standard Deviation on Post-test scores of Critical Thinking skill in the Experimental and Control Group
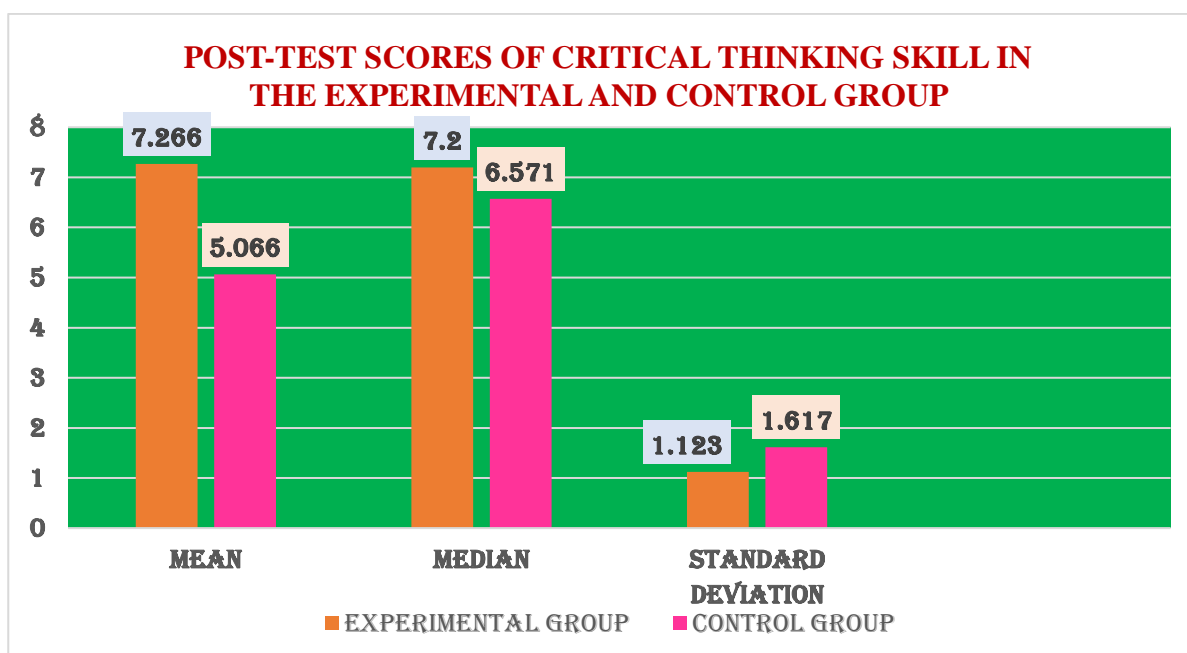

Figure -1.2: Bar Diagram showing Mean, Median, Standard Deviation on Post-test scores of Critical Thinking skill in the Experimental and Control Group

TABLE-1.3: Mean, Mean D, Pooled Standard Deviation Standard Error of Mean Difference and 't' Value of   Post -Test Score on Critical Thinking Skills Between Experimental and Control Group N=60

Group	Mean	Mean D	SD	SE MD	't' value
Experimental group (n1=30)	7.266	2.2	1.392	0.366	6.2654*
Control Group (n2=30)	5.066				

Df (29), t=2.045 at 0.05 level of significance
*Significant

Data in Table-1.3 shows that the mean post-test score in critical thinking skills as the effect of concept mapping as a teaching strategy in experimental group (7.266) was higher than post-test score mean (5.066) of control group with a mean difference 2.2, pooled standard deviation 1.392, standard error of mean difference 0.366 and 't' value of 6.2654 which was found to be statistically significant for df(29) at 0.05 level of significant.

Mean, Median and Standard Deviation of pre-test post-test score of critical Thinking Skills in the Experimental group
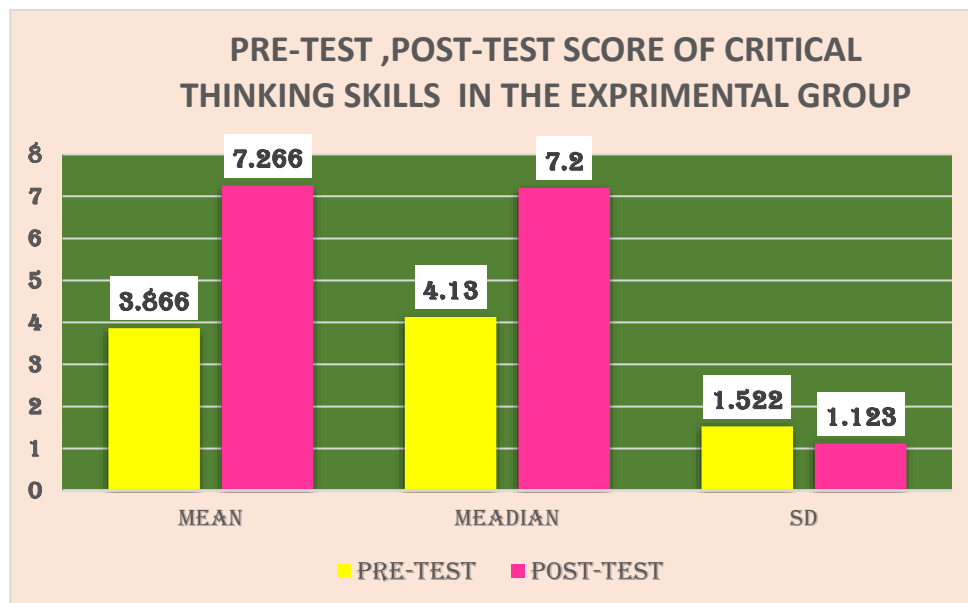

Figure 1.3: Bar Diagram showing Mean, Median and Standard Deviation of pre-test post-test score of critical Thinking Skills in the Experimental group
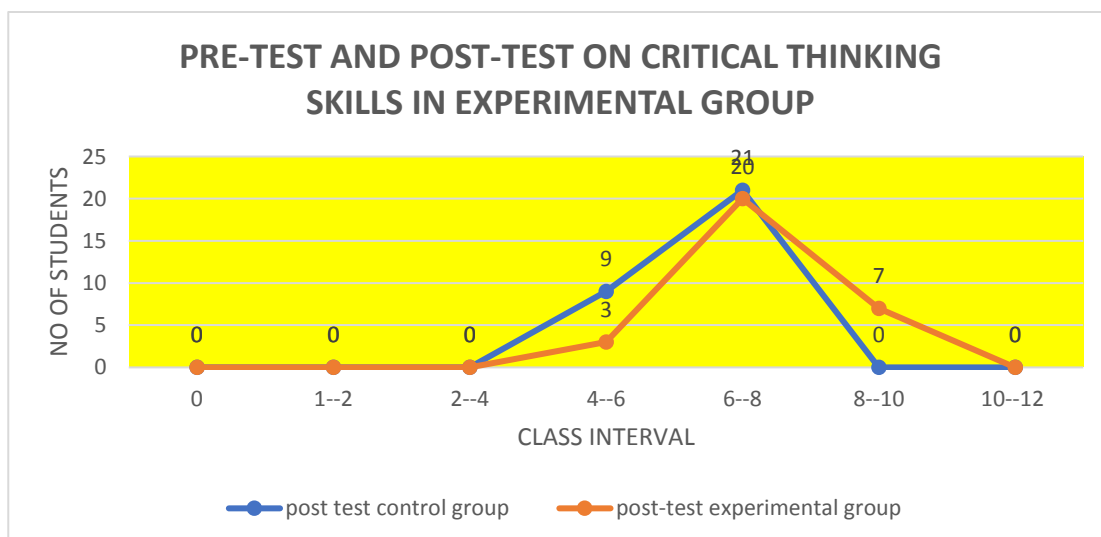

Figure-1.4: Frequency Polygon Showing Distribution of Pre-Test and Post-Test Scores on Critical Thinking Skills in the Experimental Group.

TABLE-1.4: Mean, Mean D, Pooled Standard Deviation Standard Error of Mean Difference and 't' Value of Pre-Test and Post Test Score of Experimental Group. N=60

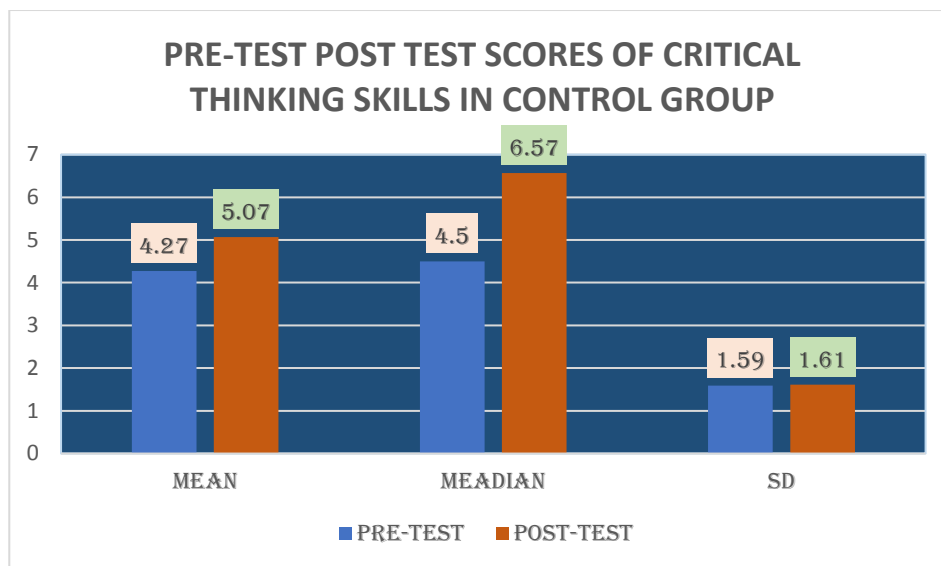| EXPERIMENTAL GROUP	MEAN	MEAN D	SD	SEMD	't' VALUE
PRE-TEST (n=30)	3.866				
POST TEST (n=30)	7.266	3.4	1.34	0.3513	9.474*

Df (29), t=2.045 at 0.05 level of significance
*Significant

Data in Table-1.4 shows that the mean post-test score in critical thinking skills as the effect of concept mapping as a teaching strategy (7.266) was higher than pre-test score mean (3.866) with a mean difference 3.4, pooled standard deviation 1.34, standard error of mean difference 0.3513 and 't' value of 9.474 which was found to be statistically significant for df(29) at 0.05 level of significant.

Mean, Median and Standard Deviation of pre-test post-test scores of critical Thinking skills in the control group

Figure 1.4: Bar Diagram showing Mean, Median and Standard Deviation of pre-test post-test scores of critical Thinking skills in the control group

TABLE-1.5: Mean, Mean D, Pooled Standard Deviation Standard Error of Mean Difference and 't' Value of Pre-Test and Post Test Score of Control Group. N=60

EXPERIMENTAL GROUP	MEAN	MEAN D	SD	SEMD	't' VALUE
PRE-TEST (n=30)	4.27				
POST TEST (n=30)	5.07	0.8	2.263	0.418	6.721*

Df(29), t=2.045 at 0.05 level of significance
*Significant

Data in Table-1.5 shows that the mean post test score in critical thinking skills as the effect of traditional teaching strategy (5.07) was higher than pre-test score mean (4.27) with a mean difference 0.8, pooled standard deviation 2.263, standard error of mean difference 0.418 and 't' value of 6.721 which was found to be statistically significant for df(29) at 0.05 level of significant.

TABLE-1.6: Mean, Karl Pearson Product Moment Correlation Between Post- Test Score of Experimental Group and Satisfaction Score of Experimental Groups. N=60

EXPERIMENTAL GROUP	MEAN	S.D	KARL PEARSON PRODUCT MOMENT
POST SCORE(n=30)	7.266	1.123	0.7*
Satisfaction score(n=30)	3.8	0.6	

D(f) = 29
*Moderately high correlation

Data presented in the table-1.6 show the mean value of post test score (7.266) and mean value of satisfaction score (3.8) of experimental group and Karl Pearson product moment correlation between post test score and satisfaction score of experimental groups was significant at 0.05 level ford(f)=29

Thus, it was established that moderately high correlation i.e., 0.7 exist between effectiveness of concept mapping as a teaching strategy to improve critical thinking skills and satisfaction

DISCUSSION
The present study aimed to assess the effectiveness of the effectiveness of concept mapping as a teaching strategy to improve the critical thinking skills of nursing students.

comparison of pre-test and post-test level of critical thinking among under-graduate nurses in the experimental group shows that there was significant difference between pre-test and post-test level of critical thinking skills among under-graduate nurses in the experimental group with the calculated t value of 9.474 which was found to be statistically significant for df(29) at 0.05 level of significant Above study was consist with study finding of Zadeh NR, Gandomani HS et al [5] who reported that The students mean scores were significantly increased after the education and the difference between pre and post intervention of students mean scores were significant in the both groups (P < 0.001).

Comparison of post-test level of critical thinking skills among under-graduate nurses between experimental and control group shows that there was significant difference post-test level of critical thinking skills among under-graduate nurses between experimental and control group with the calculated mean post test score in critical thinking skills as the effect of concept mapping as a teaching strategy in experimental group (7.266) was higher than post-test score mean (5.066) of control group with a mean difference 2.2, pooled standard deviation 1.392, standard error of mean difference 0.366 and 't' value of 6.2654 which was found to be statistically significant for df(29) at 0.05 level of significant. These findings were supported by the study findings of Dr. Ram Kumar [6], Aein F, Aliakbari F[7], Yue M, Zhang M, Zhang C, Jin C[8]. All of these studies confirmed that concept mapping is superior to traditional method of teaching to improve students critical thinking skills.

LIMITATION
Sample is limited to under-graduating nursing students studying mental health nursing subject

Students are exposed only one time to concept mapping teaching strategy

CONCLUSION
The finding of the study proved that concept mapping is superior to traditional method of teaching to improve students critical thinking skills.

REFERENCES
1. Thabet, Mona &Taha, Eman&Abood, Sahar &Morsy, Shadia. The effect of problem-based learning on nursing students' decision-making skills and styles. Journal of Nursing Education and Practice [Internet] 2017 [Cited on 2021 June 12]; 7(6): 108-116. Available from: http://dx.doi.org/10.5430/jnep.v7n6p108.
2. Patrick O Ajaja. Concept Mapping as a Study Skill. International Journal of Educational Sciences[Internet]. 2011[Cited on 2022 Jan]; 3(1): 49-57. Available from: https://doi.org/10.1080/09751122.2011.11890008
3. SamawiZepure. The effect of concept mapping on critical thinking skills and dispositions of junior and senior baccalaureate nursing students. Thesis (D.S. N) – Wider University [Internet]. 2006 [Cited 2022 jan 1]; 155:2-164. Available from: https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.412.5521&rep=rep1&type=pdf
4. Nirmala T, Shakuntala BS. Concept mapping– An effective tool to promote critical thinking skills among nurses. Journal of Health and Allied Sciences NU[Internet]. 2011[cited 2021

Nov 04]; 1(04):21-6. Available from DOI: 10.1055/s-0040-1703534

5. Zadeh NR, Gandomani HS, Delaram M, Yekta ZP. Comparing the effect of concept mapping and conventional methods on nursing students' practical skill score. Nursing and midwifery studies [Internet]. 2015 [Cited on 2021Sep];4(3):e27471. Available from:doi: 10.17795/nmsjournal27471

6. Kumar, Dr. Concept mapping in nursing education. International Journal of Advance Research in Nursing [Internet].2021 [Cited on 2021 Dec]; 4: 305-310. Available from DOI: https://doi.org/10.33545/nursing.2021.v4.i1.E.165.

7. Aein F, Aliakbari F. Effectiveness of concept mapping and traditional linear nursing care plans on critical thinking skills in clinical pediatric nursing course. Journal of 84 education and health promotion [Internet].

2017 [Cited on 2021 Nov];6.13. Available from:doi: 10.4103/jehp.jehp_49_14.

8. Yue M, Zhang M, Zhang C, Jin C. The effectiveness of concept mapping on development of critical thinking in nursing education: A systematic review and meta-analysis. Nurse education today [Internet]. 2017 [cited on 2021 Nov]; 52:87-94. Available From: https://doi.org/10.1016/j.nedt.2017.02.018.

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