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Concept Mapping as a Learning Tool among BSN Students at a Private College Karachi

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ABSTRACT

Concept Mapping (CM) is a learning tool that plays an important role in education and provides a systematic path towards improving nursing knowledge, clinical skills and curriculum development. **Objective:** To assess whether CM is a useful learning tool for the students of nursing at a private college in Karachi. **Methods:** A descriptive cross-sectional approach using a non-probability convenient sampling technique was applied, and a well-structured questionnaire containing 20 questions was distributed among the participants. Data were collected from post-RN BSc N students at Horizon School of Nursing from October to December 2023. Written consent was obtained from the participants. Data analysis was done using statistical package for social science (SPSS version 26.0). **Results:** Results showed that majority (30.0%) of the participants were in age group 31-35 years, most of them were females (87.5%), regarding level of education majority (87.5%) were in 2nd year and 82.5% were married. The data overwhelmingly supported concept mapping's usefulness among undergraduate nurses, with 80% to 95% of the responses were in favor of its benefits. Participants, ranging from 87.5% to 97%, agreed that CM aids in understanding topics thoroughly, promotes critical thinking, and enhances study skills. Moreover, 80% of the students told that CM is a useful learning tool. **Conclusions:** CM in higher education is a useful learning tool supported by the students, they agreed that it enhances understanding and critical thinking making it a highly valued learning strategy. Therefore, the use of this tool should be implemented in all nursing schools and colleges.

INTRODUCTION

Many teaching-learning techniques have been created to quicken students' learning [1]. To improve the educational system, especially the health care educational system and curriculum development concept mapping (CM) is considered as one of the most helpful learning tools [2]. It has a positive impact on students' quality of learning and retention of knowledge. This teaching learning strategy has been widely used in education since the 1970s. Undergraduate and postgraduate nursing students are frequently asked to develop concept maps or mind maps during their clinical rotations and in their classes as well. These assignments are usually given to groups or sometimes to individuals to map up clinical cases in their workplaces. These projects are considered graded assignments and starting points for the students [3]. The visual depiction of concepts and ideas is as old as the 3rd century [4] and the CM learning strategy was developed between the 1960s-70s by Dr. Joseph Novak, who was a child educationist at Cornell University. This tool has helped students to understand ideas clearly and enhance brainstorming. Moreover, this tool also helped students in learning different concepts in a meaningful way [5]. The pattern of mapping different concepts, propositions, and their integration with one another helps students to

logically develop the sense of a central concept by seeing the big picture. In addition, CM identifies the most comprehensive central concept, especially for the knowledge domain [6]. Creating concept maps that connect various ideas to the clinical environment can be helpful for nursing students to exercise, how theoretical knowledge translates into practical applications [7]. The clinical environment refers to the setting where healthcare professionals deliver direct patient care and where patients receive medical treatment, diagnosis, and other healthcare services [8, 9]. The CM tool is proven to enhance learning quality in higher education and transform abstract knowledge into a more concrete one [10, 11]. Similarly, another study which was done in 2020, in Ethiopia, to understand effectiveness of concept mapping teaching method, study results showed that students treated with concept mapping method exhibited better understanding of the science subject as compared to the lecture method [12]. Additionally, a quasi-experimental research design was used in 2022, in faculty of nursing in Al-Mansoura University, Egypt, to determine the effectiveness of mind mapping learning technique among undergraduate nursing students, results showed that mind mapping learning method was superior than any other method used for learning subjects [13].

Although concept mapping has been widely recognized internationally as an effective strategy to enhance critical thinking and meaningful learning, limited empirical evidence exists regarding its effectiveness among Post RN BSN students in Pakistan, particularly within private nursing institutions in Karachi. Most local studies focus on traditional teaching methods, with minimal evaluation of structured visual learning tools in higher nursing education. Furthermore, there is a scarcity of context-specific data assessing students' perceptions of concept mapping as a formal learning and assessment strategy. Addressing this gap is essential to inform evidence-based instructional practices in nursing education. Therefore, this study aimed to assess whether CM is a useful learning tool for the students of nursing at a private college in Karachi.

METHODS

This was a descriptive cross-sectional study among Post RN BSN students (Post Registered Nurse, Bachelor of Science in Nursing) at Horizon Institute of Nursing and Health Sciences, Karachi. The study took about three months from October to December 2023. The respondents were selected by "non-probability- convenient sampling technique". Moreover, 103 students were selected for the study, sample size was calculated with the help of openepi.com, with 95% confidence interval and 5% margin of error. Students who had clinical experience of more than one year and had utilized the CM as a tool in their clinical as well as academic setting were included and those who were on leave and were unwilling to participate in the study were excluded. Permission was taken from the Institutional Review Board and Ethical Committee (IRB and EC) for data collection with reference no (IRB#102/23) and Informed consent was taken from the participants before filling out the questionnaire. Every participant had the right to refuse to be a part of the study. The principal investigators visited the above-mentioned study settings and collected the data with the help of a well-structured and well-designed questionnaire, containing 26 questions, 6 for sociodemographic characteristics, age, gender, year of education, qualification, experience, and marital status and 20 questions for concept mapping with a dichotomous scale ("yes," "no") were used. The questionnaire was first validated by 3 experts in the field of education and reliability was checked by a pilot study for which the cronbach alpha value was found to be 0.72 showing that the tool is reliable to be used. The data were analyzed by using Statistical Package for Social Sciences (SPSS) version 26.0.Frequency and percentages were computed for demographic variables and summation of all positive questions showed the usefulness of concept mapping as a learning tool.

RESULTS

In table 1 the demographic data presents information on 103 participants in the study. In terms of age distribution, the majority fall within the 31-35 years range (30.0%), followed closely by those aged 36-40 years (25.0%). Participants above 40 years and those between 26-30 years make up 22.5% and 10.0% of the sample, respectively, while the smallest proportion was in the 20-25 years' age group (12.5%). Gender distribution shows a predominance of females (87.5%) over males (12.5%). Regarding nursing education level, the majority were in Post RN year II (87.5%). Academic qualifications of Post RN BscN students vary, with most having an intermediate qualification (57.5%), followed by matriculation (32.5%), and smaller proportions holding other degrees (10%). In terms of professional experience, the largest group has more than 15 years of experience (42.5%), followed by 5-10 years (32.5%), 11-15 years (22.5%), and less than 5 years (2.5%). The majority of Post RN BscN students were married (82.5%) as compared to singles (17.5%).

Table 1: Demographic Characteristics of the Study Participants

Variables	Frequency (%)
Age	
20-25 Years	13 (12.5%)
26-30 Years	11 (10.0%)
31-35 Years	30 (30.0%)

36-40 Years	25 (25.0%)
above 40 Years	24 (22.5%)
Gender	
Male	14 (12.5%)
Female	89 (87.5%)
Nursing Education Level	
Post RN Year 1	14 (12.5%)
Post RN Year 2	89 (87.5%)
Academic Qualification of Post RN BscN Students	
Matriculation	34 (32.5%)
Intermediate	58 (57.5%)
Other	11 (10.0%)
Professional Experience of Post RN BscN Students	
>05 Years	3 (2.5%)
05-10 Years	33 (32.5%)
11-15 Years	24 (22.5%)
More than 15 Years	43 (42.5%)
Marital Status of Post RN BscN Students	
Single	19 (17.5%)
Married	84 (82.5%)

Table 2 illustrates the percentages of affirmative and negative responses to a wide range of questions regarding the usefulness and utility of CM as a learning tool among students in higher education. Overall, the results showed that CM is a useful learning tool with responses ranging from 80% to 95% in favor of its benefits. Specifically, the majority of participants (ranging from 87.5% to 95%) agreed that CM aids in various aspects of learning, including understanding topics thoroughly, promoting critical thinking, and enhancing logical thinking and study skills. Moreover, CM is favored over other assessment tools by 92.5% of respondents for its ability to facilitate meaningful learning and retention. Despite some concerns about the time-consuming nature of creating concept maps and their engagement level in class activities, the consensus remains strongly positive, with responses ranging from 82.5% to 97.5%, indicating the use of CM in promoting group understanding and collaboration.

Table 2: Responses of The Students to Concept Mapping as a Learning Tool (n=103)

Questions	Yes (%)	No (%)
Do the students have positive attitude towards Concept Mapping as a learning tool in higher education?	97.50%	2.50%
Is Concept Mapping supportive and encouraging in students' learning?	97.50%	2.50%
Does concept mapping help understand the topic well and relate new information to what the student already knows?	95%	5%
Do students choose concept mapping as a learning strategy for a better understanding?	92.5%	7.5%
Does Concept Mapping exhibit the extent of re-organizing students' knowledge structure?	92.5%	7.5%

Questions	Yes (%)	No (%)
Can concept maps help in the enhancement of critical thinking ability of nursing students?	97.50%	2.50%
Do the CM show explanations require deeper or more dynamic thinking?	95%	5%
Do CM produces a measurable increase in student problem-solving ability and a decrease in failure rate?	93%	3%
Does concept mapping contribute to students' learning and ensure that an appropriate structure is promoted within any mapping activity?	87.5%	12.5%
Is concept mapping utilized where assessment is focused on retainable and meaningful learning?	97.50%	2.50%
Is CM useful as a teaching, learning tool and illustrates how the knowledge is arranged in students' minds?	80%	20%
Is CM as effective as personal interviews at revealing different patterns of knowledge?	97.50%	2.50%
Does the process of developing a concept map enhances meaningful learning by instructing students to think aboutthe relationships among different ideas?	100%	0%
Can concept maps help enhance critical thinking by revealing relationship among different concepts that can simplify new concepts?	94%	6%
Is it time-consuming to create concept maps during class activity without engaging all students.	82.5%	17.5%
Can a concept map also be used for discussions to document class progress and provide stimuli for in-depth conversations?	95%	5.0%
Will concept maps indicate that your students are thinking logically and help you to generate ideas for improvement in their understanding?	97.50%	2.50%
Do mapping tools facilitate students with opportunities to determine their understanding?	91%	9%
Do the assessments through CM provide a different perspective on student understanding ability that endorse selected-response and performance-based instruments?	92%	8%
Does concept map provide a prompt assessment of knowledge and group understanding, learning with collaboration?	91%	9%

Figure 1 shows that CM is a useful learning tool among the students. The figure illustrated that 95.25% of the respondents told that CM is a usefulness learning tool, only 4.75% expressed disagreement.
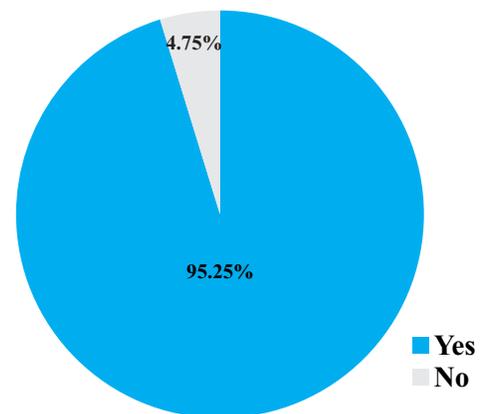
Concept Mapping as a Useful Learning Tool

Figure 1: Perception of Concept Mapping as a Useful Learning Tool among students

DISCUSSION

In nursing education, developing deep conceptual comprehension, critical thinking abilities, and successful information integration is crucial, yet conventional teaching approaches might not be sufficient to meet these demands. Additionally, the complex and interdisciplinary nature of nursing practice requires innovative approaches to learning that can effectively support students in developing necessary cognitive skills and competencies [14]. Therefore, this study aimed to explore alternative educational strategies, such as concept mapping, to enhance learning outcomes and better prepared BSN students for the demands of contemporary nursing practice. The current findings showed that 97.50% agreed CM helps students to think and generate different ideas for improving their understanding. In the same way, another study showed that CM can improve their level of interest in studying accounting by using ideas mapping to better understand integrate, and explain accounting concepts [15]. These findings indicated that 97.50% agreed that concept maps help develop critical thinking in nursing education. Similarly result of another research showed that CM improves academic performance and is considered a useful tool for learning the progress and assessment of the students. Moreover, CM also fosters the enhancement of critical thinking skills, makes it easier to integrate theory into practice, promotes meaningful learning, encourages the inclusion of technology, and fosters student collaboration [16]. Current findings showed that 95.25% agreed that creating a concept map promotes meaningful learning which is necessary for undergraduate students to think about the relationships among different concepts. Another study also showed that concept maps are useful tools for assessment, instructional planning, meaningful learning, and identifying related concepts [17]. Moreover, the current study showed that 95% of the participants agreed that developing a concept map requires more dynamic and deeper thinking skills. In the same way, another review showed that concept mapping is a teaching and learning strategy that helps nurse educators teach students to think critically in a complicated healthcare environment [18]. Present findings showed that 93% of the study participants agreed providing feedback on CM produces a remarkable increase in student problem-solving ability and reduction in failure rates and reflects on their learning process as they organize and construct their maps [19, 20]. In the current study, 95.25% of students agreed that CM is a useful learning tool, in the same way, a pre-post study showed that teaching with a CM approach significantly affects students' retention and meaningful learning. It is advised that more nurse educators would try to apply the idea-mapping technique to promote meaningful learning by addressing these challenges [21]. Another study showed that CM can lead to better long-term retention of information compared to traditional learning methods [22].

This study is limited by its single-center design and use of non-probability convenience sampling, which may restrict the generalizability of the findings. The reliance on self-reported responses may also introduce response bias. Additionally, the descriptive cross-sectional design limits the ability to establish causal relationships between concept mapping and learning outcomes. Future research should incorporate multi-center, longitudinal, and quasi-experimental designs to objectively evaluate the impact of concept mapping on academic performance, knowledge retention, and critical thinking skills across diverse nursing institutions.

CONCLUSIONS

It is concluded from the study that concept mapping (CM) is a very useful tool in learning in nursing education as well as in clinical settings to understand different ideas and concepts. Moreover, the teaching-learning strategy of CM can enhance knowledge retention in a meaningful way and promote critical thinking skills which is an integral component in nursing education and practice. Therefore, this tool may be implemented in all nursing schools and colleges.

Authors Contribution

Conceptualization: AURY, SUF
Methodology: NA, ZA
Formal analysis: JK, NA, ZA A
Writing and Drafting: H, MA, AQA, AKJ
Review and Editing: H, MA, AQA, AKJ, AURY, SUF, NA, ZA, NA, ZA

All authors approved the final manuscript and take responsibility for the integrity of the work.

Conflicts of Interest

Source of Funding

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