

LEARNING AND PLAYING WITH CONCEPT MAPPING STRATEGY AMONG NURSING STUDENTS: A QUALITATIVE STUDY

AZZA FATHI IBRAHIM MOHAMMED

Professor, Nursing Education, Nursing Department, Al-Rayan College of Health Sciences and Nursing, Al-Madinah Al-Munawarah, Saudi Arabia.

THORAYA MOHAMMED ABDELAZIZ DAWOOD

Professor, Medical Surgical Nursing, Faculty of Nursing, Alexandria University, Egypt.

ABRAR KHALID ALOUFI

Assistant Professor, Microbiology, Department of Anesthesia, Al-Rayan College of Health Sciences and Nursing, Al-Madinah Al-Munawarah, Saudi Arabia.

SALLY EBRAHIM ALI

PhD, RN, Manzala Central Hospital, Dakahlia Governorate, Egypt & Assistant Professor, Maternity, Obstetric, and Gynecology Nursing, Nursing Department, Al-Rayan College of Health Sciences and Nursing, Al-Madinah Al-Munawarah, Saudi Arabia.

Abstract

Teaching strategies are the heart of the academic process, particularly in nursing. Concept mapping is a magic tool to enhance nursing students' cognitive abilities in studying nursing curriculums. **The aim of the current study** is to explore the perceived experience of undergraduate students with concept mapping development. **The research design** was a qualitative approach using focus group discussions (FGDs). **Sample:** the study was conducted on a purposive sample consisted of 40 nursing students at Alrayan colleges for health science, nursing program, Al Madinah, Kingdom of Saudi Arabia. **Results** revealed that the nursing students discussed the benefits of concept mapping strategy as simplify content and enhance higher cognitive skills. The barriers were a lack of knowledge, training, time, and difficult construction). Regarding self-confidence during using concept mapping, most of them were motivated with high self-confidence, and had a positive attitude toward such experience. **Conclusion:** this study highlighted the experience of nursing students in using the concept mapping strategy as a game in their learning a nursing course. The students explained and discussed important themes in terms of concept mapping strategy benefits, barriers, self-confidence, and attitude toward such experience. **Recommendations:** concept mapping strategy should be used in many courses of nursing education. All teachers and students should be trained in concept mapping. **Future studies** are needed to explore nursing students' experiences in utilization of concept mapping in other nursing courses. Implementing concept mapping and other learning strategies and comparing their impact among nursing students.

Keywords: Concept Mapping, Gaming, Nursing Students, Teaching Strategies in Nursing.

1. INTRODUCTION

A concept map or mind map is an effective and active method of teaching for organizing, designing, portraying, representing, and synthezizing data; It is an efficient learning strategy. It produces graphical construction and design of ideas presentations, therefore, the data can be fragmented and analyzed to be simple and clear for rehearsing and understanding. The concepts, relations, processes, and situations are observed more apparent in the map than text descriptions.

Organization of ideas, problems, and data tends to be simple, with definite sequence and grouping ^[1,2]. Mind mapping is defined as a technique for understanding and developing visual organization, and representation of knowledge. It shows concepts, ideas, and the relationships among different concepts. It is a strategy that enables learners or teachers to use circles, squares, triangles, or boxes which are called nodes and contain one or more concepts which are connected by arrows with or without linked phrases. Such nodes can be organized by several themes, such as: linear, spider, tree, flow chart, hierarchy, and cyclical shapes and approaches. This method of teaching can be used as a game electronically by a program or by handwriting and drawing ^[1,2,3].

The concept mapping in nursing education has benefits for both nurse educators and students; it helps to explore and understand relational links between concepts and ideas, simplify of sophisticated terms or clinical situation, relate new knowledge to prior understandings, analyze of major and difficult concepts, and discussions in nursing, reinforce thinking critically with the complex health data, encourages “brainstorming”, Sparke nursing students’ creativity, and long time for information retention. Much research has proved that using concept mapping in nursing education is an effective teaching strategy, particularly if it is presented as a game with competition, drawing and interaction ^[3,4]. Moreover, concept mapping as a game encourages students’ social interaction, communication, cooperative teamwork, and students can discover relationships among ideas and discussions; it can be used as an assessment tool for students’ formative and summative achievement ^[2,4].

To develop a concept map as a game, the teacher should follow steps as illustrated in (figure. 1) ^[3]. All steps should be arranged with students in the form of competition, gaming and using mobile programs for designing and arranging the frame and shapes of each map ^[3,5,6]. Nursing students must be equipped with higher thinking abilities which are a vital requirement for clinical judgment, decision making, problem solving, and empirical reasoning. Clinical situations require these skills to maintain effective patients’ outcomes which are the targets of nursing practices. When assessing patients’ data, the nursing students need to interpretate, integrate, and assimilate such data then formulate the nursing care plan.

Concept map as a game utilization can be a magic solution to help the students to be interested and satisfied when doing difficult, and challenging tasks. It can help students to arrange and develop a simple map about the assessment data of the clients, put alternative nursing diagnoses and patients’ goals, plan for suitable nursing interventions, evaluate outcomes and documentation.

The sequence of nursing plan steps can be settled by arrows and the students can write over such arrows, the relationships between assessment, planning, implementation, and evaluation can be easily by using boxes, circles, and colors ^[6,7,8]. When using the concept map as a game in nursing courses, the nursing students can better understand the disease or the problems among patients. They can relate and integrate ideas together and easily reach conclusions.

Many studies have found that using concept mapping in nursing education has a positive impact on the learning and teaching processes, encourages students' critical thinking, confidence and have better academic and clinical achievement [3,7,8]. Finally, it seriously affects the students' personalities, preferences, and characteristics [9,10,11]. Thus, the current qualitative study, using focus group discussions (FGDs) to explore the perceived undergraduate nursing students' experience when implementing a concept map as a teaching-learning strategy in one nursing course was conducted. Identifying and investigating such experiences will help nurse educators to design and tailor better teaching strategies in nursing curricula to success in equipping the nursing students with necessitates abilities and skills in classrooms and clinical areas.

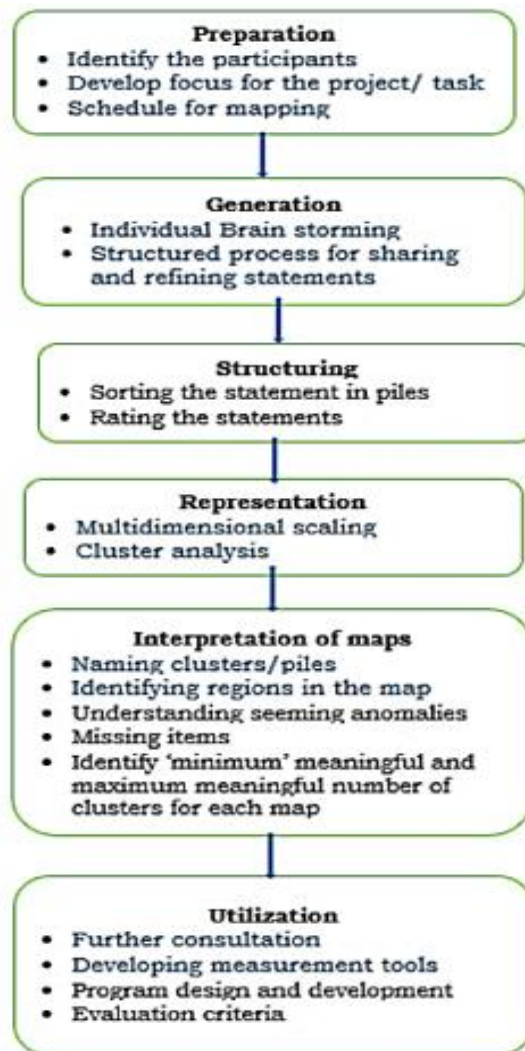


Figure 1: concept mapping developing process (Kumar R. (2021) Concept mapping in nursing education. International Journal of Advance Research in Nursing; 4(1): 305-310

2. MATERIALS AND METHOD

2.1 Study Design

A qualitative phenomenology approach using focus group discussions (FGDs).

2.2. Study Population and Setting

The current study was conducted on a purposive sample of 46 undergraduate nursing students in third year, first semester which enrolled in growth and development nursing course. The student who participated in the current study were affiliated to Al Rayan National College of Health Sciences and Nursing, Nursing Program, Madinah, Kingdom of Saudi Arabia. Male nursing students were 18 and females nursing students were 22 who registered into growth and development nursing course. The sample size was determined according to data saturation that was completed by investigation of 40 out of 46 nursing students of the mentioned sample. The epidemiological statistical program recommended minimum sample size was 32 to conduct the phenomenology qualitative approach. The participants were randomly assigned to the course topics that include growth and development phases of the human being; 5 nursing students for each topic.

2.3 Qualitative Data Collection Tools and Procedure

A case study strategy and focus group discussions (FGDs) were used to conduct a comprehensive analysis of nursing students' perceived experience (learning benefits, learning barriers, learning confidence, and perceived attitude) toward developing and implementing the concept map as learning and play strategy in their course "growth and development". Nursing students were invited individually to participate in ten separate FGDs parallel to their current random distribution of assignment' topics (8 mentioned topics for 8 FGD). The researchers through interviewing technique explained in depth the purpose, and the role of students in the study, the role of students in preparing their assignments by concept maps approach. Moreover, the researcher explained to the students how the FGD started and organized.

The nursing students identified with how to answer the FGD questions and answer any additional probes. The researchers enhanced them to participate in the focus groups\once every two weeks for 2 months, and each FGD lasted around 2 hours. Each FGD consisted of 5 nursing students and was mainly operated in a classroom. The researchers acted as moderators for the FGDs using a standardized interview protocol, which included a topic guide and a script to ensure that all focus group's students received consistent instructions.

The interview guide includes four structured questions that are followed by 2 to 4 probes to support student's responses to reach the saturated data needed and achieve the study aim. The nursing students received some gifts and incentives during data collections. The FGDs were documented and recorded and after that transcribed by computer and online assistance programs. Sociodemographic data was collected from all participants using a questionnaire at the first FGD meeting.

2.4 Interview Theme

To more comprehension the experience of concept mapping learning strategy among undergraduate nursing students, four questions were explored during the FGDs: (1) What are the benefits that nursing students gain during drawing and constructing the concept maps? (2) What are the barriers that nursing students face during conducting the steps of concept maps' development? (3) To which extent the nursing students feel self-confidence to believe and trust that they can perform their learning successfully by concept mapping? (4) What is their perceived attitude toward developing and implementing the concept map as learning and play strategy in their study to a course?

2.5. Ethical consideration

A written informed consent was obtained from the ethical committee in Al Rayan National Colleges and from all students who are willing to participate in the study after explaining the study purpose and procedure. Confidentiality of the data was ensured. Students' privacy was considered, and their participation on a voluntary basis and they have full rights to withdraw from the study at any time of the study period.

2.6. Qualitative Data Analysis

An advanced, open, axial code system was used in qualitative data analysis. The data was fragmented and grouped into distinct parts to distinguish the nursing students' responses and join the categories ^[12]. The researchers sorted, distributed, categorized, and coded the data in the transcripts, then, separated the major themes throughout all participants' responses, and matched nursing students' experience perspectives involving cohorts.

The researchers implemented the member checking and peer review validation approaches. Moreover, the researchers used reflexivity maneuvers to ensure the trustworthiness of the study ^[13]. The recordings and transcripts were sent to the nursing students for revising and confirming that their responses have transcribed in a correct way. The peer review revision included four experts' researchers in concept mapping and qualitative research.

They approved the appropriateness of study elements and methodology. The researchers' reflexivity supplied chances to investigate any biases, errors, interpretations, or transcript meaning.

3. RESULTS

3.1 Nursing Student's Profile

Table 1: slightly less than one third of students (30%) were in the age group between (17-20) years. More than one half (57.5%) of them were females. Nearly one half of them (45%) were single. Students are assigned equally into topics of growth and development. All participants didn't have any learning experience in concept mapping.

Table I: frequency distribution of nursing students' profile (No= 40)

Participant's profile	No.	%
Age		
17 ≤ 20	12	30.0
21 ≤ 24	8	20.0
25 ≤ 28	10	25.0
29 ≤ 33	5	12.5
34 ≤ 38	5	12.5
Sex		
Male	17	42.5
Female	23	57.5
Nationality		
Saudi	40	100.0
Marital Status		
Single	18	45.0
Married	15	37.5
Divorce	5	12.5
Widowed	2	5.0
Topics provided for concept map assignment		
Newborn	5	12.5
Infancy	5	12.5
Toddler	5	12.5
Pre-school	5	12.5
School	5	12.5
Adolescent	5	12.5
Adulthood	5	12.5
Elderly	5	12.5
Learn by concept mapping before		
Yes	0	0.0
No	40	100.0

3.2 Study Themes

Four key themes were illustrated after analysis of FGDs and recordings. (Table 2): shows

- (1) The benefits from learning by concept map as a game learning strategy.
- (2) The barriers while conducting the concept map.
- (3) Nursing students' self-confidence and their trust to achieve learning successfully by concept mapping.
- (4) Nursing students' perceptions toward developing and implementing the concept map as learning and play strategy in their study to a course.

Table II: Themes of the study from nursing student's FGDs.

Theme	Grouping	Interpretations
1. The benefits of concept mapping.	Simplify the content.	In the concept map, the key titles and sub-titles of the content are organized with simple clear explanation.
	Enhance higher thinking skills.	The students think, using analysis, synthesis, and create for carefully selection and organization of all content' parts.

	Interesting & motivating as a game.	The students found a challenge, motivation and interested ideas to organize the learning content and select the suitable shapes, arrows, colors, then produce a meaningful product through gaming.
	Link theory with practice.	Mapping clarifies the theoretical and operational concepts and its elements and relations with the clinical integration into nursing practice.
	Enhance active learning.	All students engage in a certain role with definite participation and missions to do.
	Use as a tool for study and evaluation.	The final maps represent the student's creativity and how they handled and understood the teaching content; maps can be a good tool to evaluate students' achievement.
2. The barriers during developing the concept maps.	Lack of training.	The students need more training to develop maps and handle the content to do task analysis carefully.
	Lack of knowledge.	The students need to have some knowledge about maps' components, types, and organization.
	Timing and anxiety.	During developing the maps, the students were anxious about its correctness, completeness, and time consuming
	Difficulty deciding components and shapes.	They found it difficult to determine the shapes, arrows, colors, and captions to present the ideas of concepts.
	Difficulties in understanding.	After finishing the maps, sometimes it looks misunderstood and vague, so the students almost need to justify and explain it.
3. Nursing students' self-confidence to learn by concept map.	Self- awareness.	The students feel that they could emphasize self-active involvement in actions, delivery of ideas, and feelings that are interesting to own-self.
	Self-trust.	The students found huge beliefs and faith in own-self and their own capabilities to achieve and do tangible and meaningful tasks or products.
	Self-expression.	The students found interesting challenging tasks such as drawing and deciding organization, sorting, painting, and playing. The maps that produced finally are the predominant forms of self-expression.
	Self-interest.	The students found self-centeredness and self-gain during mapping. They construct a map with interesting feeling to do attractive, funny, and interesting task. Therefore, because they are interested, they are continuously active and need to decide and do significant tasks which are interesting at the same time.
4. Nursing students' perceptions toward developing and implementing the concept map.	Positive.	The students found concept mapping as a learning and teaching strategy provides a lot of benefits more than limitations. They got many advantages, such as playing and learning, thinking, and interacting, and they produce a meaningful task with grade.
	Neutral.	The students found that the concept mapping is usual and like many teaching methods. They handled it as other methods. They got some benefits with some difficulties when using this method.
	Negative.	The students found that concept mapping is a very difficult method compared to other methods of learning. They want more concentration and effort during it. They found many limitations during developing the maps, like time consuming, need training, difficult to be understood and developed.

Theme 1: The Benefits from Learning by Concept Mapping as A Game

It is the major dimension of the current results that involves the students' impressions and feedback about the significance of the concept mapping as a game in learning. Most students stated that the mapping strategy is an important tool to **simplify the learning content** which helps to make it concise and to the points by students' interest and motivation. They emphasized that with the concept mapping manner they can summarize and simplify the content and its titles and sub-titles with integrated organized pathway with simple, brief, and clear explanation without details. It enhanced students' motives and gratification similarly as in games. Their play uses their cognitive abilities for synthetization and creation.

One student confirmed that "Concept map strategy enhanced and motivated me to think carefully as a game for summarization, simplifying, organization and proposing the titles and subtitles to be in a suitable meaningful structure with simple clarification".

Concept mapping **enhances higher thinking skills**: it can promote students' critical thinking skills through some intellectual processes such as analysis, building, synthesis, evaluation, concluding, reflection, and creativity. It helps the students to split a topic\title\subtitle or a problem, and situations into its sections or pieces and develop the frame and features of the relationships between concepts and sub-concepts with minimal profound interpretations.

According to one student verbalization, "concept mapping is a method that facilitates giving the large picture of the content which is developed through activation of ones' abilities of analysis, conclusion, synthetization, and validation. It helps to encourage one's critical thinking to construct a map includes all topics parts."

It is **interesting and motivating as a game**: concept map as a game depends on students' interest and initiation. It is an innovative method that can be used as games that are an efficient source of fun, and they prefer to communicate teaching topics through playing. Therefore, the nursing students found that the map as a game provided a challenge, motivation, and interesting sense. When they tried to organize the concepts with colors, shapes, and arrows, they found a significant interesting product and playing.

One student elaborated, "from the first five minutes, I think and develop the concept map, ones' feels interest with shapes and colors which striking me to continue and give a motive and a source of satisfaction at the end."

It is a strategy that **links theory with practice**: a concept map is a node-connection map representing the relations in-between concepts. In each map the students clarify the theoretical part and clinical part of the teaching content that revealed finally a strong link between theory and clinical work.

Pertaining to one student' talk, "when developing a map, we started by a conceptual part with its elements and then put the relation to apply such elements into clinical nursing practice. Arrows and shapes differ for the theoretical part and clinical part".

Using concept map strategy **enhances active learning**: through encouragement students to organize, manage, and relate concepts and its elements, then construct new frame and picture of the topic, the students are a super-active participant in concept mapping.

Two students stated that, “we find the concept mapping activities meaningfully enhanced our abilities and participation to establish a whole simple picture of the content. We work in group; each has specific role and mission to do which is very interesting.”

Students used the concept map **as a tool for study and evaluation**: a map is used as an assignment that should be assessed and involved a task that produced and reflected students' understanding, achievement, and required scores. Different topics and different maps represent to which extent the students learn, study, and retain information, then the evaluation takes place.

In relation to an explanation of one student, “I should study the topic carefully, then I can handle the concepts and develop the concept maps. During the development steps, the instructor observes us and obtain continuous feedback, and then give us a score for each developed map.”

Theme 2: The Barriers During Developing Concept Maps

Mostly the concept map lacks explanation which enhances understanding than memorization. Many students found that it can be difficult to be comprehended without details, and it considered time consuming activity. **Lack of training** is the first limitation that is discussed. The students found that they should have adequate training on how to handle the topic, do task analysis to the content and its concepts to formulate the shapes, and the relations.

According to the verbatim of one student, “the concept map needs more effort, and I should be trained well before developing it. To analysis the content, it is difficult to determine the concepts and its sub-elements without instructor assistance.”

For lacking students' knowledge, it is another difficulty facing the nursing students in following construction and engaging in concept map strategy.

The students need more explanation and information about concept mapping strategy, and how to develop its components, types, and organizations or relations. Some students found that they should obtain it as a lecture, then develop it as an application.

One student commented, “I still need information and data about mapping types, shapes, and organization. I found it difficult to decide which concepts or sub-titles be involved in my maps. Also, relations and organization with various shapes, required to be learned first”.

Some nursing students found that **timing and anxiety** are barriers to engage effectively in mapping techniques. Sometimes, when passing through the steps of developing the map, anxiety and fear may arise, because the students didn't know if it is right and

representing the needed content or not. Also, map development needs time, and the students were working at the time of the homework to complete the maps.

One student said, “mapping development needs a lot of time and aggravates our anxiety. At mostly and frequently, we go to the instructor to ensure maps’ correctness and completeness.”

In the mapping approach of learning, students found **difficulty deciding components and shapes**. Many students frequently asked how to make task analysis of the content to determine the concepts and sub-concepts, then, how to identify suitable shapes, colors, and arrows to be selected harmoniously with content and concept relation.

One student verbalized that “the major idea of the content with its sub-titles, needs a huge effort to be determined. After that I had trouble deciding which shapes and colors to select that should match with the content. Also arrows, lines and its directions need effort and time to select them appropriately.”

The last limitation of the map is the **difficulty in understanding**, which is discussed by some nursing students. They found that after finishing the development of the map, it looks vague, and it can be difficult to understand its organization and the specific meaning of the concepts.

Corresponding to a comment of one student, “after developing the map, many times, I need to explain some concepts and relation, and it looks to be misunderstood by my colleagues. Therefore, I prepare a paper with justifications and explanation with the map.”

Theme 3: Nursing Students’ Self-Confidence to Learn by Concept Map

Generally, self-confidence is the attitude about one’s capabilities, skills, and abilities to do something. The students should recognize and trust on own abilities and have the perception of control over behaviors. Moreover, to be alert appropriately about own strengths and weakness with constructive view self. **Self- awareness** is one value that the students talk about during discussions and emphasize that during concept mapping activities they feel that they are very active and empowered to understand and construct the map. They found it is an experience that may improve their perception toward themselves positively and provide a feeling of interest.

As regards one student comment in this aspect, “During map development, I feel that I have full comprehension about what I want, own ideas, feelings, and beliefs about such experience. It is a positive experience to know our talents.”

Concerning **self-trust**, it is mainly strengthened when the person does the task with complete faith in their abilities. This is what the students found while passing on the phases of map development, because they felt that they do a worthy job.

This is in line with a nursing student verbatim found that “the map is a meaningful tangible learning product. That gave us a sense of trust and a feeling that we are doing a valuable

mission. The instructor's clarifications that add more accuracy to our map, gave us more self-trust, interest, and satisfaction of the learning task."

Through mapping, nursing students found excellent ways to express-themselves, **self-expression** is a self-confidence component which encourages students' involvement. Students found that they share in course organization and through their maps, they found a meaningful self-product that represents self-expression.

Matching to this view, one student stated that "concept map as a learning experience help us to present our personality and opinions. Mapping enhances our learning activity and make us feel of our abilities to produce significant task in the course."

Self-interest is a core perception that is stressed by the experience of mapping. Through map design, the student found self-gain, interest, valuable task, and attractive activity. They found that they will earn grades, share in a significant job, and do a funny interesting experience. *According to these interpretations, one student verbalized, "while developing the map, I feel that it is my concern that produce ones' advantages and source of interest to me. I feel I should direct all my effort to gain such advantages of grades, self-presentation, and self-interest."*

Theme 4: Nursing Students' Perceptions Toward Developing and Implementing the Concept Map

Nursing students perceive the course of growth and development as one of the greatest, interesting, and challenging at the same time. Concept mapping approved that it could ease learning experiences among nursing students. The nursing students perceived, felt, and recognized such values. Many students have **positive** attitude toward this experience, but others felt **neutral or negative** attitudes. **For positive attitude**, one student stated that *"I found concept mapping as a learning strategy gave me many gains such as construct a meaningful product, earn grades, play, learn, think, interesting, and enhance me to participate."* **For neutral attitude**, other students verbalized *"concept mapping is a familiar usual method of learning that needed concentration and effort. I have felt it have some advantages with some disadvantage to me and to the learning process of the course."* **Concerning negative attitude**, a student commented that *"mapping as a learning method is a very difficult and I face many sufferings to construct it. It needed more effort and time to develop it, and continuously I want the instructor's help."*

4. DISCUSSION

The current study approved that the concept map was a valuable methodology for teaching and learning in growth and development course. Almost of the nursing students found many benefits of concept mapping, while some of them found some difficulties and limitations. Many students reported that self-confidence was enhanced through the active participation of the mapping activities. The majority have positive attitudes toward the

experience of the concept mapping, while a minimal number of them mentioned neutral or negative attitudes toward such strategy.

Regarding significance and benefits of concept maps, a concept map is a magic tool to simplify difficult or loaded content, encourage students' higher thinking abilities with optimal recognition of concepts' relationships, enhance learning motivation and interest as a game, over the gap between theory and practice, and offer a good technique for study and assessment. This is parallel with Nuuyoma and Fillipus in 2020 ^[14] who conducted a qualitative study. They found that concept mapping enables deep learning through fostering critical thinking, problem solving, and decision-making skills. Further, it makes the content topic simpler, with ease understanding of concepts and relationships.

Moreover, Ülker Dörttepe, and Arıkan in 2019 ^[4], concluded that the concept mapping assists the learner to develop and identify relationships between apparently separated concepts, and enhance students' application of theoretical part into real work with a great learning motivation and satisfaction. It encourages an organized unified knowledge structure with game interesting direction. However, contradicting the previous views, Machado, and Carvalho in 2020 ^[15] observed that the students face some disadvantages in concept mapping, particularly paper-pen type. The students suffer from formulation of the relationships, selection of design and colors or shape, and it can provide vague and confused interpretations. As well, Javonillo, and Martin-Dunlop in 2019 ^[7] stressed that the mind map is a pure tool for cognitive ability and can't be integrated in clinical work.

Concerning the barriers while developing the concept maps that are faced by the nursing students. Many studies discussed that mapping is exhausting even if it passes through game framework. They illustrated that many students found a lot of difficulties while developing the map. In the line of such discussion, Machado, and Carvalho in 2020 ^[15] clarified that the students in higher education mostly found many challenges with concept mapping. For the first instance, they found it interesting as a game, but after deciding its design and shapes, they can be confused in selection of the relationships, colors, and organization of concepts. Other students illustrated that they need explanation, knowledge, training, and demonstrations to understand concept map construction. Additionally, Kumar in 2021 ^[3], found that the nursing students may be confused and misunderstood after developing the concept map. They found that it is a stressful task with a lack of knowledge, skills, and training.

On the other hand, much evidence explained that concept mapping is a wonderful support that is designing the course materials in easy attractive content that attracting and motivating students. It encourages students' engagement without suffering ^[1,2,3].

As regards nursing students' self-confidence to learn by concept map. It was found that the concept mapping strategy has multiple positive effects on students' personality and feelings. Many of them found it enhanced their self-confidence involving awareness, trust, expression, and interest. Similarly, to these findings, Le Bras et al in 2018 ^[16], and

Moon et al, 2011 ^[5] explained that self-confidence is a basic feeling and talent can be strengthened by many learning strategies such as concept mapping.

The learners must, first, have self-confidence during concept mapping steps, that consequently is improved through such experience. The individual should be aware of the valuable task of concept mapping, and to which extend he/she trusted on own abilities to achieve this task.

Then, put full faith and believe on ones' thinking and skills to expressing the map product, and finally he/she passed through developing the map with full interesting feeling. Therefore, concept mapping is a vital learning technique for empowering personality and self-confidence.

But some evidence found that it is a fatiguing process that needs high concentration, effort, time, and training, and most of the time students may be confused and anxious. So, self-confidence and its elements may be difficult to encourage. Concept mapping needs students to be fully involved and decide well the features of the map including relationships and shapes structures. Many references found it is confusing and burden learning experience ^[7,15,17].

Regarding nursing students' perceptions toward developing and implementing the concept map. Internationally, all higher education institutions, mainly in nursing education, found that new teaching/learning strategies are necessitated to equip nursing graduates with qualified and competent professional skills. Concept mapping confirms its uses to facilitate and make simpler learning. It tends to improve cognitive learning skills and develop information comprehension methodology.

Therefore, many nursing students navigate through such valuable experience will have of course, positive, and constructive attitudes. In the current study, almost all nursing students were very interested in the concept map experience. Supporting this discussion, Fawaz M, Kavuran 2021 ^[18], and Innis, et al., 2023 ^[8], found that the nursing students were very interested, motivated and have positive attitude and value regarding the concept map experience.

Moreover, Kumar, 2021 ^[3], and Kinder, & Kurz, in 2018 ^[6] reported that the concept mapping experience among nursing students provides support, motivation, and trust, which produces an interesting attitude among them. Nursing students rehearse the teaching content which is summarized by mapping and then too such methodology in their studying with pleasure and joy as they follow a game.

In contracting, some nursing students found some difficulties with concept mapping that made them provided neutral or negative attitudes toward such learning strategy. Similarly, to these clarifications, Machado, and Carvalho in 2020 ^[15] concluded that the students may feel uneasiness and worries or have limited knowledge and training to develop maps. They have negative feelings, perceptions, and views regarding mapping experience. The teacher must discuss such issues and try to encourage students' involvement in mapping construction while giving enough data and training for them.

5. CONCLUSION

This study highlighted the experience of nursing students in using the concept mapping strategy as a game in their learning a nursing course. Initially the researcher tried to obtain a complete insight into the students' experiences, perceptions, and attitudes. The students through the FGDs explained and discussed important themes in terms of concept mapping strategy benefits, barriers, self-confidence during using such strategy, and attitude toward such experience.

Recommendations

Concept mapping strategy should be used in many courses of nursing education. All teachers and students should be trained and obtain knowledge and trading regarding concept mapping. **Future studies** are needed to explore nursing students' experiences of utilization of concept mapping in other nursing courses. Implementing concept map and other learning strategies and compare their impact among nursing students; it can be qualitative or quantitative trials.

Acknowledgements

The authors would like to thank the nursing students for sharing their experiences and Alrayan National Colleges, Madinah, KSA.

Reference

- 1) Novak D. (1998). Learning, creating, and using knowledge: Concept maps as facilitative tools in schools and corporations. Mahwah, NJ: Erlbaum.
- 2) Khrais H, Saleh A. (2017). The Outcomes of Integrating Concept Mapping in Nursing Education: An Integrative Review. Open Journal of Nursing; 7:1335-1347.
- 3) Kumar R. (2021) Concept mapping in nursing education. International Journal of Advance Research in Nursing; 4(1): 305-310.
- 4) Ülker Dörttepe Z, Arıkan B. (2019) Use of Concept Maps in Nursing Education. Hemşirelikte Eğitim ve Araştırma Dergisi;16(2):160-165.
- 5) Moon, B.M.; Hoffman, R.R.; Novak, J.D.; Cañas, A.J. (2011). Applied Concept Mapping: Capturing, Analyzing, and Organizing Knowledge (1st ed.). Boca Raton: CRC Press.
- 6) Kinder, f., & Kurz, J. (2018). Gaming Strategies in Nursing Education. Teaching and Learning in Nursing, 13 (5), 212–214.
- 7) Javonillo, R., & Martin-Dunlop, C. (2019). Linking Phrases for Concept Mapping in Introductory College Biology. Bioscene: Journal of College Biology Teaching, 45(3), 34–38.
- 8) Innis, J.; Johnston, S.; Cambly, E. (2023) Concept Mapping in Simulation within Nursing Education: A Scoping Review Protocol. Nurs. Rep; 3,13,109–113. <https://doi.org/10.3390/nursrep13010011>.
- 9) Moore-Russo, D., Wiss, A., & Grabowski, J. (2018). Integration of gamification into course design: A noble endeavor with potential pitfalls. College Teaching, 66 (1), 3-5.
- 10) Love, M. (2017). Problematizing videogames: Teaching students to be critical players. Teaching English with Technology, 17(4), 3-24.
- 11) Franco, V. (2018). Game-Based Learning: Advantages and Limitations. California State University Los Angeles, 5-6.

- 12) Sutton J. (2015) Qualitative Research: Data Collection, Analysis, and Management. The Canadian Journal of hospital pharmacy; 68(3): 226–231. doi: 10.4212/cjhp. v68i3.1456
- 13) Creswell, J. W., Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approach (5th ed.). Los Angeles, CA: Sage. 24-56.
- 14) Nuuyoma V, Fillipus K. (2020). Nursing students' perceptions and experiences of concept mapping as a learning tool in a human physiology course. Afr. J. Health Prof. Educ. (Online); (12), 3; 98-102.
- 15) Machado C, Carvalho A. (2020). Concept Mapping: Benefits and Challenges in Higher Education. The Journal of Continuing Higher Education; 68(6):1-16.
- 16) Le Bras P, Robb D, Methven TH, Padilla S, Chantler M. (2018) Improving User Confidence in Concept Maps: Exploring Data Driven Explanations. Heriot Watt Pure; 404, 1-13, Available at: <https://doi.org/10.1145/3173574.3173978>.
- 17) Duarte E, Loureiro A, Zukowsky-Tavares, C. (2017) Challenges and weaknesses in the use of concept maps as a learning strategy in undergraduate health programs; Knowledge Management & E-Learning, 9(3), 153–169, Available at: <https://www.researchgate.net/publication/320137410>.
- 18) Fawaz M, Kavuran E. (2021) Lebanese nursing students' perceptions regarding use of concept mapping. Teaching and Learning in Nursing, 16, 48-52 DOI: 10.1016/j.teln.2020.05.003.