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Nursing Students' Perception about Mind Mapping as an Innovative Learning Approach and its Relation to Teaching Effectiveness

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Abstract: **Nursing students face lots of difficulties during their learning process as a result of using traditional teaching methods, so innovative learning approach has appeared. Mind map is one of the most effective teaching and learning method which has massive benefits on both educators and students. Aim of the study: Is to assess nursing students' knowledge about mind maps, their perception about mind maps and to assess relation between mind maps and teaching effectiveness. Design: Descriptive correlational research design was utilized in this study. Setting: The study was conducted in the Faculty of nursing Helwan University. Subjects: All available (125) nursing students in fourth year Faculty of Nursing-Helwan University. Tools of data collection: Three tools were used for data collection included: Nursing students' knowledge about mind maps questionnaire, their perception about mind map questionnaire and teaching effectiveness regarding to innovative learning strategy questionnaire. Results: The study findings revealed that: majority of the studied nursing students had satisfactory level of knowledge regarding mind maps. Also more than two thirds of the studied nursing students had positive response of perception regarding mind maps and more than two thirds of the studied nursing students had satisfactory level of teaching effectiveness regarding mind maps. Conclusion: the nursing students had satisfactory level of knowledge, positive response level of perception regarding mind maps and satisfactory level of teaching effectiveness. Also, the study indicates that there was positive correlation with statistical significance difference between total score of mind map knowledge, total score of perception about mind map among the studied nursing students and total score of teaching effectiveness regarding using mind maps. Recommendations: Apply mind maps in all curriculums in all study years for students, assess students' difficulties in learning process periodically.**

Keywords: **Innovative teaching methods, mind maps, Student centered learning and teaching effectiveness.**

I. INTRODUCTION

Problems in learning are the main issues of education and learning problems as the main activities in education. Difficulties in learning can occur at any level of education. Even the learning difficulty can be seen from students' inability to solve a problem, make decisions, remember and recall knowledge they have learned before **(Kereh, Sabandar & Tjiang, 2019 and Dirgantoro, 2019**).

Most students get difficulty in working on differential exams due to various factors which caused students to get errors in answering questions. That finding confirms that difficulty is the reason of mistakes in strategy, concept, logical decision, redraw conclusion, using symbols, and inaccuracies in answering questions **(Sumargiyani & Nafi'ah, 2020).**

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There are particular dimensions of Student Centered Learning (SCL) that faculty and students strongly have desire to subscribe to, (SCL) leads to class engagement, skills building and having motivated students. However, they fail to readily question how assessments and power relations between teachers and students are part of SCL. SCL had appeared and teacher centered learning started to be reduced and shifted to effective classroom practices that have more interesting things to do with more foundational aspects of the teacher–student relationship and manifold possibilities for learning **(Trinidad, 2020).**

Based on the left and right brain theory, mind maps(MM) had appeared as one of the innovative teaching and learning approach. MMs stimulate the knowledge stored in the mind, open the mind to enrich the writing content, increase thinking and creative abilities. Application of mind maps strategy in teaching is highly recommended to activate relevant background knowledge as teachers should design based on students' cognitive development level and writing ability, and combine other writing teaching methods to achieve more efficient teaching effect **(Gou & Jia, 2021)**.

Tony Buzan created Mind Map in the early 1970s as an instrument to help individuals more efficiently take notes and make it easy for us to remember a lot of data. Mind mapping is generally like art because it uses many colorful photos and symbols. Buzan confirmed that mind mapping is a strong graphic method that offers a universal key for unlocking the brain's potential through symbols, images, emotional significance, and colors is precisely the same as the processing of our brains. Mind Map is also in line with the Dual Coding theory, which states that data presented with both verbal patterns and mental images can improve memory and understanding recognition **(Aziz, 2020)**.

Traditional methods such as lectures are amongst the best means of information transfer, but there is no guarantee of knowledge transfer through such methods. Visual teaching techniques (mind map) help effective learning in 65% of visual learners. Nowadays, critical thinking is increasingly gaining ground in the education of nursing students, which is applied through various educational strategies including mind mapping as one of these innovative learning methods **(Rezapour, 2019).**

Both nursing graduates and students should be able to think critically to solve clinical problems. The best strategy to do this is to acquire the skills needed to draw mind maps, which should be addressed by clinical instructors and nursing schools. mapping indicates that this learning method can help nursing educators to prepare students for active learning of critical thinking in order to work in complex health care centers **(Eslami & Ahmadi, 2019).**

Nursing instructors are responsible for creating an environment that can help students reach their educational goals. Learning outcomes are aimed at achieving high cognitive, affective and psycho-motor skill levels in the classroom, laboratory and clinical area. Instructors can motivate all students 'attention by the new teaching and learning strategy especially mind map which also can be electronic to cope with new evolution of technology. Nursing students must be fully prepared by both "knowing" the issues required for nursing functions and "performing" these functions perfectly by interacting with instructors and with their colleagues **(Dağ et al.,2019).**

Significance of the study

Several Previous researches approved that mind map has an obvious effective role in improving student's performance. According to **(Paul, 2015)** 62.5% of the students in his research strongly agreed that they were able to understand concepts better with mind mapping. Mind map as mentioned by **(Shashank, 2016)** makes significant, impact on memory recall in undergraduate students and increased the memory recall up to 10% and there was a significant decrease in motivation during the use of traditional method. Also **(Sholikhah,** 2017) approved that the design of mind map painting media can improve student's ability to solve problems, improve the ability to think, and maximize brain power and improve student interest. It has been confirmed that mind-mapping can improve learning study efficiency up to 15% over the traditional methods. Another study concluded that low-ability students may benefit more from mind mapping than high-ability students **(Yuan, et al.,** 2018). 95% of students agreed that their achievement in learning had increased when they used visual mind map **(Idris & Kamaruddin, 2022)**.

Learning development is important to overcome the obstacles students face. These limitations are caused by inability to remember or recall information. One of the learning development steps is selecting the right learning model such as mind map learning model. It is known since the 3rd century. It can help students collect content, memorize a separated concept, express the relationships between concepts, useful in note taking and critical thinking. Mind map captures concepts, writes keywords, and connects with each other and forms new knowledge **(Grazziotin et al.,2021).**

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Aim of the study:

The aim of this study was to assess the nursing student's perception about mind mapping as an innovative learning approach and its relation with teaching effectiveness through:

1. Assess the nursing student's knowledge about the mind mapping as an innovative learning approach.
2. Determine the nursing student's perception about mind mapping as an innovative learning approach.
3. Assessing teaching effectiveness by students.
4. Confirm if there is a relationship between mind mapping and teaching effectiveness.

Research question:

1. Do nursing students have knowledge about the mind mapping?
2. Do nursing students have positive or negative perception about the mind mapping?
3. Is there a positive or a negative relationship between mind mapping and teaching effectiveness?

II. BODY OF ARTICLE

Subject and Methods

The methodology of the study was portrayed under four main designs as follows:

I. Technical item

II. Operational item

III. Administration item

IV. Statistical item

I. Technical item:

The Technical design included: research design, setting, subject and tools for data collection.

Research Design

Descriptive correlational research design was utilized in this study.

Study Settings

The study was conducted in the Faculty of Nursing-Helwan University. It consists of 4 floors; Ground floor contains Technical Institute of Nursing, security office, managerial offices, post graduate studies office, stores, meetings halls and Prof. Dr. Aisha Awad El-Sayed hall. Then first floor contains Dean's office, department of maternity and newborn, department of adult medical surgical, anatomy lab, skills labs, computer labs, stores, seminar halls and control rooms. Then second floor contains pediatric department, psychiatric department, post graduate seminar halls, classes, stores, labs, control rooms and lockers. Then finally third floor contains administration department, community department, the remaining part of psychiatric department, library, seminar halls, stores, lockers and classes.

Subjects

Purposive sampling was used to collect data from all available senior nursing students in the fourth year from the (2019-2020) year, Faculty of nursing Nursing, Helwan University who accepted to participate in the study. The total number of fourth-year nursing students is 180 students. The total number of nursing students was (125) students.

Tools of Data Collection

Tools will be divided into three tools:

Tool 1: Nursing student's knowledge about mind map:

Which was used for collecting data by the researcher to assess nursing students' knowledge about mind maps**,** it consisted of two parts as following:

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Part 1: Demographic data of the students: This tool was developed by the researcher and it was used to collect demographic data of the participants such as (Age, gender, the studying year, faculty, university, academic qualifications before faculty, last year score, number of hours spent in the lectures, number of studying hours at home).

Part 2: Nursing student's knowledge about mind map questionnaire**:** It was developed by the researcher after reviewing relevant literature and based on (**Polat & Aydin, 2020**, **Wang, 2019** and **Amilia, 2018),** then consulting experts in related field to assess student's knowledge about mind map**.** This tool consisted of (10 items) expressed mind maps knowledge such as: (definition of mind maps, uses, advantages, disadvantages, types, who can use them, rules, the right shape of mind maps, branches colors and personalization of mind maps) in form of multiple choice questions.

Scoring system:

This tool consisted of (10 items) with a total grade (20), expressed mind maps knowledge in form of multiple choice questions. The right answer denoted one score (2). Incorrect answer denoted zero score (1). Subject responses were calculated in scoring system as following; the right answer(satisfactory) which equal and more than 60%, but the wrong answer (unsatisfactory) which less than 60%. Total nursing students' knowledge were classified into: (**Unsatisfactory,** if the total score was less than 60 %, which less than 12 points) and (**Satisfactory,** if the total score was equal and more than 60%, which equal and more than12 points).

Tool 2: Nursing student's perception about mind mapping questionnaire:

This tool was developed by "**Karen Goodnough and Robin Woods (2002)"** originally contained **(**7) items, then modified by the researcher after reviewing relevant literature and based on ***Nisak et al. (2017***) consulting experts in related field to be (17 items) expressed nursing student's perception of the mind mapping as an innovative learning approach such as: (creating mind maps was easy, mind maps were not boring, helped students in organizing thoughts, in understanding concepts, in taking notes, in planning an essay, …etc.).

Scoring system:

This tool consisted of (17 items) with the total score (51); the participants chose one of "agree, not sure or disagree". the answers were rated on using 3 points Likert-scale as the following (strongly agree) which denoted (3) points, then (not sure) which denoted (2) points and (strongly disagree) denoted (1) point. Subject responses were calculated in scoring system as following: **(Negative response,** if the total score was less than 60 %, less than 31 points) and (**Positive response,** if the total score was equal and more than 60%, equal and more than 31 points).

Tool 3: Nursing students' assessment of teaching effectiveness: This tool was developed by **(Van, et al., 2018)** then modified by the researcher after reviewing relevant literature and after consulting experts in related field to allow the students to assess the teaching effectiveness regarding using mind maps. It consists of (32 questions). This tool consisted of 6 dimensions namely: safe and stimulating learning climate (4 items), efficient organization (3 items), clear and structured instructions (6 items), activating teaching methods (7 items), adjusting instructions, and learner processing to inter-learner differences (3 items) and teaching-learning strategies (9 items).

Scoring system:

This tool consisted totally of (32 items) with a total score (96). 32 questions were answered then collected using 3 points Likert scale ranging from (strongly agree) which denoted 3 points then (not certain) denoted 2 points and (disagree) denoted 1 point. Subject responses were calculated in scoring system as following: (**Unsatisfactory,** if the total score was less than 60 %, less than 58 grade) and (**Satisfactory,** if the total score was equal and more than 60%, equal and more than 58 grade).

Validity of the tools*:*

The three tools were tested by five experts in the field of the study for their face and content validity through an opinionnaire sheets. Accordingly, necessary modifications were done. The Jury group of experts specialized in nursing education(Administration department) from Faculty of Nursing Cairo University and Meunofia University.

Face Validity

Jury opinions were elicited regarding the tools' format, layout and clarity of parts, then modifications done after that according to their comments.

Content validity

Content validity was conducted to determine agreement of the experts about the extent to which its relevance and matching with the study variables and translation of each item of the questionnaire sheets. Based on jury recommendations and corrections in some items were done.

Reliability of the tools:

All three tools were tested for their reliability, the stability aspect of the tools (consistency of the results over time) was assessed in test-retest (2 weeks interval). The internal consistency reliability of the items composing the tool was assessed using Cronbach's Alpha coeffecient to determine the extent to which the questionnaire items were related to each other. Questionnaire yield Cronbach's alpha showed (0.86), this indicates that both instruments were showed an excellent reliability. The Cronbach's alpha model for knowledge was (0.791), for perception was (0.777) and for teaching effectiveness was (0.869). Total question yield was (0.86).

Ethical consideration:

An official permission to conduct the proposed study was obtained from Scientific Research Ethics Committee of Faculty of Nursing-Helwan University before starting the study. Study subjects were informed about research purposes and nature of the study. Study subjects were informed about research purposes. The researcher assured anonymity and confidentiality of the nursing students' data, nursing students were informed that they were allowed to choose to participate or not in the study. Also, they had the right to withdraw from the study at any time; ethics, values, culture, and beliefs were respected.

II. Operational item:

The operational item included: Preparatory phase, pilot study and field work.

A. Preparatory Phase:

It included reviewing of most past, current, national and international related literature and theoretical knowledge from various aspects of the study through using of books, articles, internet, periodicals and journals to develop tools for data collection.

B. Pilot study:

After reviewing of the tools by the experts, the researcher conducted a pilot study before administering the final questionnaire. The pilot study was carried out to confirm understanding, clarity and applicability of the tools, to determine required time to fulfill tools. The pilot study was carried out on 10% of the total sample size, (13) nursing students from (125) students. the purpose of the pilot study was to assess the feasibility, applicability of the study, test the adequacy and internal consistency of the study tool. Based on the result of the pilot study no modifications were done to the tools. So, final version was proposed for distributing to the study subjects and the pilot study sample the (13) nursing students were included to the total sample size.

A. Field work:

The actual fieldwork started at the end of August 2020 after securing all official permissions. It was completed on the 7th of September 2020. The researcher met the head of administration department in Faculty of Nursing- Helwan university then the teaching assistants who educate the nursing students in the 4th year there to explain that the researcher will collect the sample from nursing students, then the researcher collected data through meeting the participant, before beginning to collect data from the study subject, the researcher introduced herself to them, explained the aim of the study, obtained a verbal consent to participate in the study, and informed them that, their information will be treated confidential and was be used only for the purpose of the research, additionally, each participant was notified about the right to accept or refuse to participate in the study. Then the researcher estimate the time needed by the nurses to complete the tool was ranged between (20 to 30 minutes) and checked the completeness of each field in the questionnaire sheet after the participant

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completed it to insure absence of any missing data. Collecting questionnaire sheet was completed by the investigator from each student (over 3 days, from 9 am -2pm).

II. Administration design:

Approval to carry out the study was obtained from the dean of Faculty of Nursing-Helwan University explaining the purpose of the study and to conduct this study in the Faculty of Nursing- Helwan University.

III.Statistical design:

The collected data were organized, tabulated, and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 32, SPSS Inc. Chicago, IL, USA). For quantitative data, mean and standard deviation were calculated. For qualitative data, which describe a categorical set of data by frequency, percentage or proportion of each category. The correlation between variables was evaluated using Pearson's correlation coefficient (r). Significance was adopted at $p<0.05$ for interpretation of results of tests of significance. So, the p-value was considered significant as the following:

- P value <0.05 was considered significant.
- P value <0.001 was considered as highly significant.
- P value >0.05 was considered insignificant.

III. RESULTS

Table (1): Frequency distribution of the studied nursing students' demographic data (n= 125).

Variables	N	%
Age		
▪ 20 < 23 years	111	88.8
▪ 23-26 years	14	11.2
▪ $\bar{x}$ & SD	21.30 ± 0.813	
Sex		
▪ Mal	27	21.6
▪ Female	98	78.4
Pre university study		
▪ General secondary school	79	63.2
▪ Nursing institute	46	36.8
Hours spent in university		
▪ 5 hours	16	12.8
▪ 6 hours	52	41.6
▪ > 6 hours	57	45.6
Daily studying hours		
▪ 1 < 5 hours	87	69.6
▪ 5 < 8 hours	38	30.4
▪ $\bar{x}$ & SD	3.85 ± 1.136	

Table (1): Illustrates that 88.8% of the age of the studied nursing students was ranged between 20 < 23 years old with a mean age of 21.30 ± 0.813. Around four fifth (78.4%) of the studied nursing students were female. While regarding daily studying hours, more than two third (69.6%) of the studied nursing students studying 1 < 5 hours with a mean hour of 3.85 ± 1.136.

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Table (2): Frequency distribution of total mean score of knowledge regarding mind maps among the studied nursing students (n=125).

Total Mean Score of Knowledge	N	%	Min	Max	$\bar{x}$	SD	T test	P value
Satisfactory	99	79.2	13	20	19.1	1.6		
Un-satisfactory	26	20.8	10	11	10.4	0.49		
Total	125	100.0	10	20	**17.3**	**3.89**	15.4	0.000**

**Highly significant p ≤ 0.01

Table (2): it represents that the total mean score of knowledge regarding mind maps among the studied nursing students is $\bar{x} \pm$ SD= 17.3 ±3.89 with a significant statistical difference at P = 0.000.

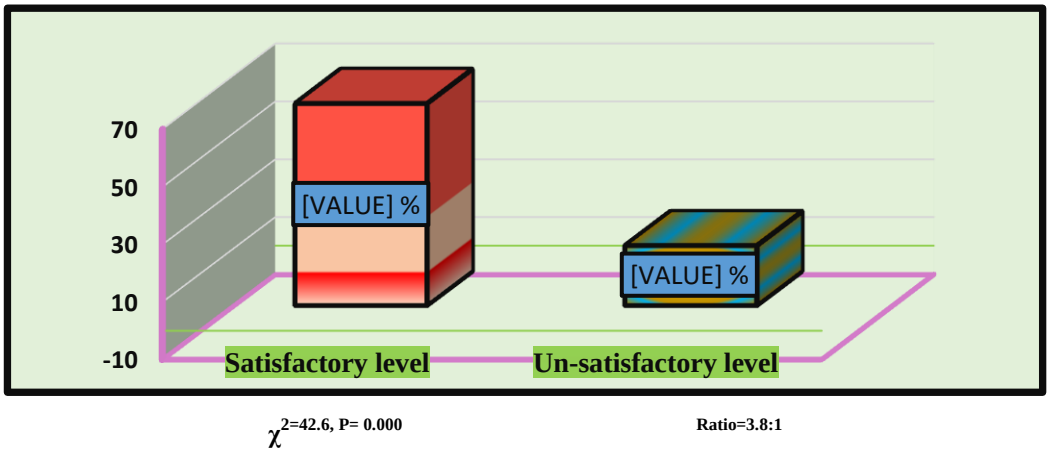

Figure (1): Percentage distribution of total satisfactory level of knowledge regarding mind maps among the studied nursing students

Figure (1) clarifies that around four fifth (79.2%) of the studied nursing students had satisfactory level of knowledge regarding mind maps, while around o fifth (20.8%) of nursing students had unsatisfactory level of knowledge regarding mind maps. In addition to presence of difference between observed and expected values with a significant statistical difference at P = 0.000. Moreover, satisfactory to un-satisfactory level of knowledge ratio = 3.8:1.

Table (3): Frequency distribution of total mean score of perception regarding mind maps among the studied nursing students

Total Mean Score of Perception	N	%	Min	Max	$\bar{x}$	SD	T test	P value
Positive response	88	70.4	31	49	47.4	3.7		
Negative response	37	29.6	17	29	18.1	2.6		
Total	125	100.0	17	49	**38.78**	**13.89**	6.3	0.000**

**Highly significant p ≤ 0.01

Table (3): it represents that the total mean score of perception regarding mind maps among the studied nursing students was $\bar{x} \pm$ SD= 38.78 ±13.89 with a significant statistical difference at P = 0.000.

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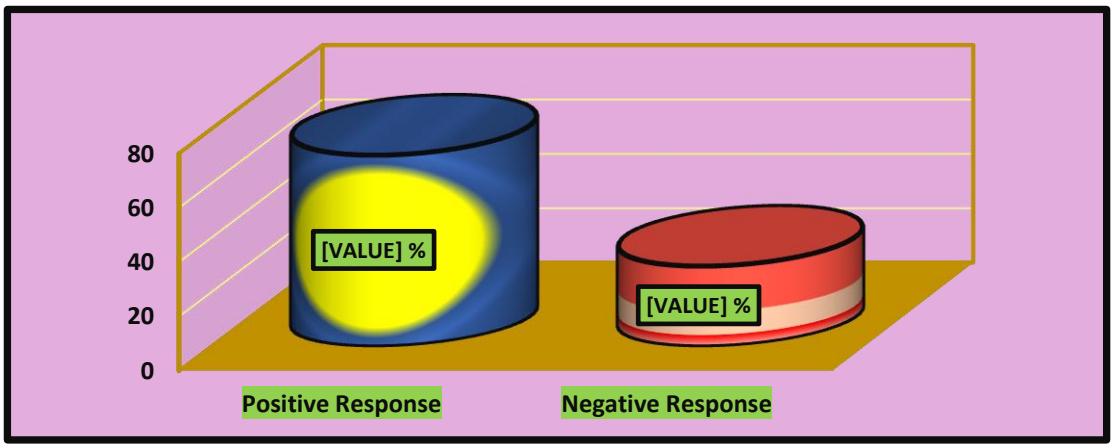


χ^2=20.8, P= 0.000 Ratio=2.4:1

Figure (2): Percentage distribution of total response of perception regarding mind maps among the studied nursing students

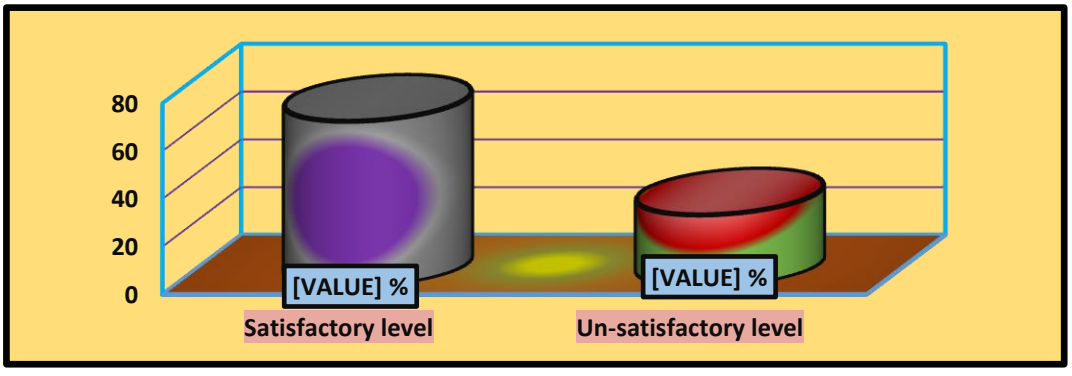
Figure (2) which illustrates percentage distribution of total response of perception regarding mind maps among the studied nursing students. It shows that more than two third (70.4%) of the studied nursing students had positive response of perception regarding mind maps while (29.6%) of studied nursing students had negative response of perception regarding mind maps. In addition to presence of difference between observed and expected values with a significant statistical difference at P = 0.000. Moreover, positive to negative response of perception ratio = 2.4:1.

Table (4): Frequency distribution of total mean score of teaching effectiveness in relation to mind maps among the studied nursing students (n=125).

Variable	Min	Max	$\bar{x}$	SD	T test	P value
Teaching Effectiveness	32	96	73.5	25.9	6.7	0.000**

**Highly significant p $\leq$ 0.01

Table (4): it represents that the total mean score of teaching effectiveness in relation to mind maps among the studied nursing students is $\bar{x} \pm$ SD= 73.5 $\pm$25.9 with a significant statistical difference at P = 0.000.



χ^2=19.2, P= 0.000 Ratio=2.3:1

Figure (3): Percentage Distribution of Total Satisfactory Level of Teaching effectiveness regarding mind maps among the studied nursing students

Figure (3) which illustrates percentage distribution of total satisfactory level of teaching effectiveness regarding mind maps among the studied nursing students. It shows that more than two third (69.6%) of the studied nursing students had satisfactory level of teaching effectiveness regarding mind maps while (30.4%) of studied nursing students had

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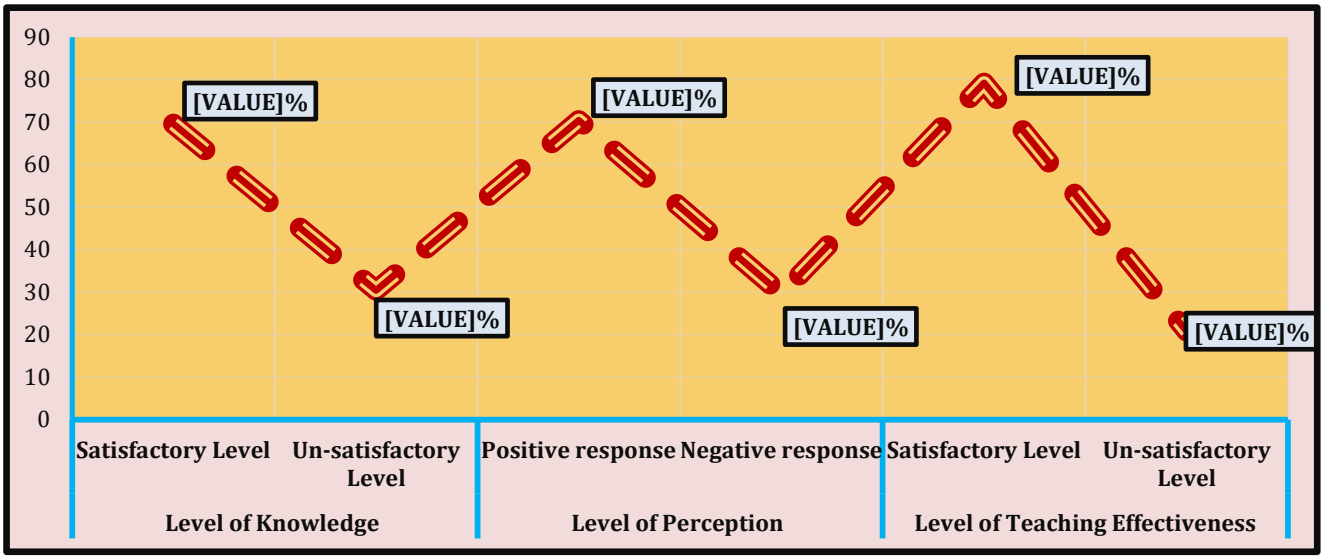
unsatisfactory level of teaching effectiveness regarding mind maps. In addition to presence of difference between observed and expected values with a significant statistical difference at P = 0.000. Moreover, satisfactory to un-satisfactory level of knowledge ratio = 2.3:1.



χ^{2}=3.60, P= 0.165

Figure (4): Percentage distribution of total satisfactory level of knowledge, perception and teaching effectiveness regarding mind maps among the studied nursing students

Figure (4) which illustrates percentage distribution of total satisfactory level of knowledge, perception, and teaching effectiveness regarding mind maps among the studied nursing students. It shows that more than two third of the studied nursing students had satisfactory level of knowledge, perception, and teaching effectiveness regarding mind maps with the percentage of 69.6%, 70.4% & 79.2%. In addition to, there is no presence of difference between level of knowledge, perception, and teaching effectiveness at P = 0.165.

Table (5): Correlation between total score of mind map knowledge and total score of perception among the studied nursing students.

Variable	Total Score of Mind Map Knowledge	
	Correlation Coefficient (r)	P- Value
Total Score of Perception about Mind Map	0.965	0.000**

**highly significant p < 0.01

Table (5): shows that, there was a significant statistical positive correlation between total score of mind map knowledge and total score of perception among the studied nursing students, r = 0.965, at P = 0.000.

Table (6): Correlation between total score of mind map knowledge and total score of teaching effectiveness among the studied nursing students.

Variable	Total Score of Mind Map Knowledge	
	Correlation Coefficient (r)	P- Value
Total Score of Teaching Effectiveness	0.962	0.000**

**highly significant p < 0.01

Table (6): shows that, there was a significant statistical positive correlation between total score of mind map knowledge and total score of teaching effectiveness among the studied nursing students, r = 0.962, at P = 0.000.

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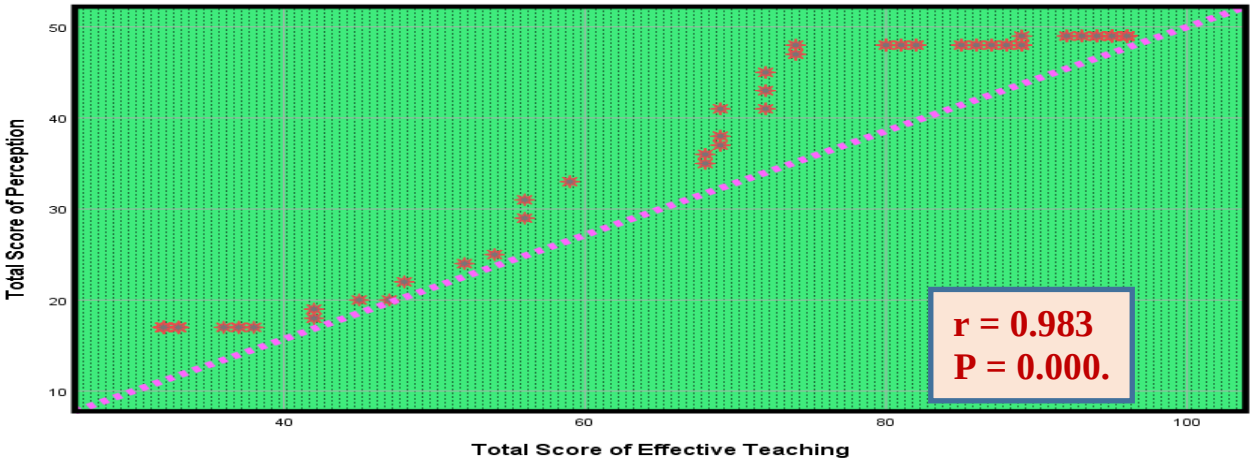

Figure (5): Correlation between total score of perception about mind map and total score of teaching effectiveness among the studied nursing students

Figure (5): shows that, there was a significant statistical positive correlation between total score of perception and total score of teaching effectiveness among the studied nursing students, r = 0.983, at P = 0.000.

Table (7): Correlation between total score of mind map knowledge and total Score of teaching effectiveness among the studied nursing students (n=125).

Variables	Total score of perception about Mind Map	
	Correlation coefficient	P-Value
Total score of teaching effectiveness	0.983	0.000

Table (7): shows that, there was a significant statistical positive correlation between total score of mind map perception and total score of teaching effectiveness among the studied nursing students, r = 0.983, at P = 0.000.

IV. DISCUSSION

Regarding characteristics of the studied students personal the present study shows that the majority of the study participants were from twenty to less than twenty-three years old, more than three quarters were female and almost all of them were at the fourth year in the academic level at the faculty, also, near two thirds of them entered the faculty after general secondary school and around half of them had very good grade in their academic achievement.

These results were supported by the finding of **Nasrabad (2019),** who studied the "Mind map learning technique: an educational interactive approach" reported that sixty percent of study sample in the intervention group and sixty-five in the control group their aged between twenty to twenty-five years old. In terms of gender, the number of girls and boys was nearest to be equal in the intervention group, while most fifty-five percent of students were female in the control group.

These results were disagreeing with the findings of **Abbas et al. (2018)** who studied the "the effect of mapping utilization on students understanding level; an empirical study, Egypt", revealed that two third of respondents were male and on third were female. Two third of them aged less than or equal twenty years old while the reaming one third aged from twenty-one to twenty-nine years old. For the specialization of students under experiment, around three quarter had general specialization, while seventeen percent specialized in computer science. From the researcher's point of view, university education in Egypt begins after high school and requires recent graduates so, ages of fourth year university students range between twenty and twenty-three. In Egypt, there are schools, institutes and nursing colleges established first for females.

Concerning knowledge about mind map of the study participants the current study illustrated that, more than three quarters of the study participants had satisfactory knowledge about uses, advantage, user, and types of mind maps. Also, the majority of them had satisfactory knowledge about definition of mind maps.

Regarding total knowledge about mind maps of the studied students, the present study revealed that, more than three quarter of the study sample had satisfactory level of knowledge regarding mind maps. These finding in same line with finding of **Idris (2018),** who studied the "The Effectiveness Use of Mind Maps in Learning 4th years History Textbooks" stated that students using visual mind map learning agree to improve understanding in historical subjects. Students not only enhance the understanding of the topics, but can also use this method to solve the problem while responding to the end exam in a more confident way.

These finding were contradicted with **Zvauya, et al. (2019),** who studied the "The Use of Mind Maps as an Assessment Tool in a Problem Based Learning Course" found that the mind maps were scored using two mind map rubrics (MMR) they are structural and holistic qualitative rubrics. The structural mind map rubric scoring method gave moderate satisfactory. While the qualitative mind map rubric scoring method had poor satisfactory. The validity with end of year assessments was poor for two methods.

From the researcher's point of view, the reason for high students' knowledge about the definition, uses, and types of mind maps they had past experience and knowledge about mind maps.

Concerning total perception regarding mind map of the studied nursing students the result of the study explained that more than two third of the study participants had satisfactory level of perception regarding mind maps while less than one third of them had unsatisfactory level of perception.

These findings were congruent with **Akbar and Taqi (2019)** who studied the "Does mind mapping enhance learning" mentioned that, a higher level of perception and performance when the students learn their study material using mind map as opposed to student not used it. More positive attitudes in favor of mind map were also getting from their chosen between the three responses knows, remember and guess.

These finding were inconsistent with **Erdem (2017),** who studied the "Mind maps as a lifelong learning tool" reported that the participant were unsatisfactory about using of mind map their answers are collected under the topics of individual and material, while participants specify the restrictions of using mind map in the scope of "individual" as being difficult for the brain, being difficult for others to understand the meaning since it is personal, forgetting to some symbols, not having a good skill of drawing and the hard of finding the symbols regard to the subject, they specified them in the scope of "material" as not having the colored pens, pencil and not finding the visuals material every time.

Concerning level of teaching effectiveness in relation to using mind maps regarding activating teaching methods of the studied students, the present study showed that, more than three quarter were satisfactory about educator offers activities and work forms that stimulate learners to take an active approach and specifies the lesson aims at the start of the lesson.

These results were in agreement with the findings of **Rashid and zaman (2019),** who studied the "effects of teacher's behavior on Academic Performance of students" found that, highlighting beneficial behaviors from teachers, importance as it lays out an effective teaching regimen for university lecturers in particular and teachers in general, to adapt and utilize, for material and methods of high achieving academic performance from their students. Also two components of the variables have a highly significant positive relationship with academic performance, that is, way of speech and clarity.

These results were in similarity with **Bin-Hady, and Abdulsafi (2020)** who studied the "who can I prepare an ideal lesson-plan?" reported that teacher should specify his teaching objectives and enhance his students to participate effectively in the lesson. Also, teacher should check the efficiency of their teaching by immediate feedback and post-test about what they have taught to their pupils to find out their level of achievement.

These results were disagreed with the finding of **Agir (2019)** who studied the "effect of perceived teacher behaviors on students' self-esteem and attitudes towards learning, in Turkey" indicated that teacher attitudes have different effects on self-esteem, behavior and attitudes towards learning, although indicated that the perception of negative teacher attitudes show short-term positive results on students opposite to expectations.

From researcher's point of view, most of faculty members have efficient experience about teaching methods especial lecture, they try to higher education so they make students more "active" learners, teacher believe that simply teaching placing students actively engage in their learning by identify subject, give introduction, and asking questions.

Regarding percentage distribution of total satisfactory level of knowledge, perception, and teaching effectiveness regarding mind maps among the studied students, present study illustrates that more than two third of the studied nursing students had satisfactory level of knowledge, perception, and teaching effectiveness regarding mind maps.

These finding results were in accordance with the result of **Bawaneh (2019)**, who studied the "The effectiveness of using mind mapping on tenth grade students' immediate achievement and retention of electric energy concepts" showed that the mind maps teaching was more effective than the traditional teaching method in immediate performance and retention of electric energy concepts.

These finding results in the same line with the result of **Jangra (2018),** who studied the "effectiveness of mind mapping technique in teaching science to secondary school students in relation to their academic achievement" concluded that using mind maps with school students of all ages, helping them understand course contains, boost memory and recall, summarize ideas, and assists as a revision aid.

These results agree with the finding of **Ferandez-Garcia, et al. (2019),** who studied the "Student perceptions of secondary education teaching effectiveness: general profile, the role of personal factors, and educational Level" stated that the interaction between age, and gender had significant effects in instructional clarity. Regarding the interaction between age, teaching experience, significant effects were observed long teaching experience in: learning climate, efficient classroom management, instructional clarity, activating teaching, differentiation and teaching learning strategies from student point of view.

Regarding correlation between total score of mind map knowledge and total score of perception among the studied students mention that, there was a significant statistical positive correlation between total score of mind map knowledge and total score of perception among the studied nursing students.

These results were supported by **Tseng, et al. (2017)** who studied the "How concept-mapping perception navigates student knowledge Transfer Performance" cleared that, positive concept-mapping perception is helpful for knowledge transfer in five learning stages: acquisition, communication, application, acceptance, and assimilation.

Regarding correlation between total score of mind map knowledge and total score of teaching effectiveness among the studied students, present study illustrates that, there was a significant statistical positive correlation between total score of mind map knowledge and total score of teaching effectiveness among the studied students.

These finding were in same line with the result of **Joshi and Vyas, (2018),** who studied the "Assessment of perception and effectiveness of concept mapping in learning epidemiology" who revealed that study group consistently scored higher knowledge in both exams immediate use mapping and in final. Difference in scored mean marks was highly significant in term of ending examination. Largely positive feedback was received on utility of concept maps in memorizing, confidence-boosting, and understanding subject.

Regarding correlation between total score of perception about mind map and total score of teaching effectiveness among the studied students, present study revealed that there was a significant statistical positive correlation between total score of perception and total score of teaching effectiveness among the studied students.

V. CONCLUSION

In the light of the present study results, it can be concluded that:

The nursing students had satisfactory level of mind map knowledge, positive response level of perception regarding mind mapping and satisfactory level of teaching effectiveness regarding using mind maps. There was positive correlation with statistical significance difference between total mind map knowledge, total perception and total teaching effectiveness regarding using mind maps among the studied nursing students.

VI. RECOMMENDATIONS

Based on the findings of this study and the review of the literature, the following recommendations are proposed:

At managers level

1- Apply mind maps by instructors and educators in educational process and enhance their adv.

2- Implement an educational program for nursing leaders about how to apply mind maps with their learners.

At Educational Level:

1. Develop policies and curriculums that include innovative learning strategy in all stages in the educational organization.
2. Provide resources and materials that facilitate applying new teaching methods during educational process.
3. Supervise, monitor and assure applying these new teaching methods.
4. Prepare and organize workshops for educators and learners to allow improving and training the new teaching methods.
5. Assess periodically the academic performance regarding applying innovative teaching strategies.
6. Develop and implement training program for all academic staff about innovative teaching and learning strategies.
7. Apply questionnaires to measure instructors' performance periodically fulfill by students.
8. Evaluate effect of applying new teaching methods especially mind maps on instructors and student performance.

At Research Level:

1. Replication of the study on large sample size and in different settings.
2. Future research to assess the effect of applying mind maps on educators and learners.

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