Implementing Different Learning Strategies: It's Effect on Nurse Students Critical Thinking Dispositions

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Abstract

Background: Interactive approach during the lecturing method encourages students' CTDs, during the interactive lecture a combination of educational methods are used. **Aim of the study:** determine the effect of implementing different learning strategies on developing nursing students' critical thinking disposition. **Design:** experimental research design, (Experimental and control group). **Setting:** Technical institute of nursing that affiliated to Tanta University. **Subjects:** 252 nursing students divided into two main equal groups one as experimental and second for control group, each group contained (126) nursing students. **Tools of data collection:** Critical Thinking Knowledge Questionnaire sheet, and California Critical Thinking Disposition Inventory (CCTDI). **Results:** At pre implementing different learning strategies phase minority of nursing students in both groups had satisfactory level in total critical thinking knowledge level and critical thinking disposition, with no statistically significant difference between both groups in this phase. Moreover, as observed the level of critical thinking knowledge and critical thinking disposition was improved markedly among interactive learning group, with highly statistically significant difference between both groups throughout learning strategies phases. **Conclusion:** The level of total critical thinking knowledge level and critical thinking disposition was improved markedly among interactive learning group compared to control group, with highly statistically significant difference between both groups throughout learning strategies. **Recommendations:** Nursing Educators must implement a variety of strategies to foster CTS and CTD; training and educational opportunities about critical thinking should be conducted.

Keywords: Critical thinking, Nursing students, Interactive learning, Dispositions.

Introduction

Active learning is a crucial component in the learning process; the learner needs to be actively engaged during the lecture for effective learning to take place. There is a growing realization that, students need to do more than just listen to learn in a changing environment. Active learning is a key element in the learning process and most adult learning models view interaction (active learning) as a crucial component ***(Fayombo, 2012).***

As stated by ***MOE, (2012),*** there are many new approaches that have been introduced in improving the efficacy of teaching and learning strategies which includes using inquiry learning, contextual learning, constructivism and mastery learning. For the past several years, active learning has become an alternative option to traditional teaching methods and received considerable attention.

Studies in education have demonstrated that, active learning increased attention and motivation enhance memory ***(Thaman et al, 2013).*** Interaction helps student engagement in the lecture and motivates them positively to learn. Active participation and involvement is a prerequisite for learning beyond the recall of facts, and improvement in academic performance. Moreover interactive learning through assessment, evaluation, decision making and error correction creates a stronger learning environment than passive instruction ***(Gupta et al, 2015)***.

In addition, the various activities under the concept of active learning may involve deferent forms of instruction and be related to deferent cognitive processes. The lack of clear definitions of active learning and shared terminology may cause some discrepancies

when active learning activities are considered **(Menekse et al, 2013).**

Learning styles can be described as the way students begin to concentrate on, process, internalize, and remember new and difficult academic information **(Tulbure, 2012).** Learning styles show difference from individual to another, and they are the preferences of the individual in information acquisition process **(Kafadar, 2013)**

Critical thinking in nursing is skill and ability to use of risk taking creativity to make a decision and knowledge as a result, analysis and synthesis that, evaluation, to acquire, information search, to develop thinking, as an individual aware of his own thinking. Nursing students are visual barriers critical thinking, often react without thinking, cause and effect relationship does not install, perception difficulties, not being flexible, as a waste of time to think. Critical thinking is to be important educational programs important prepared of the implementation and evaluation. Critical thinking and learning are interrelated; one must think to gain knowledge ***(Özkahraman and Yildirim, 2011).***

Critical thinking is made up of two main domains: the cognitive and disposition skills. Cognitive skills allude to nurses' capability to participate in activities like explanation, inference, analysis, assessment, and self-adjustment to specific issues, decisions or judgments. While, disposition to think critically can be defined as consistent willingness, motivation, inclination and an intention to be engaged in critical thinking while reflecting on significant issues, making decisions and solving problems

Critical thinking dispositions (CTD) and learning strategies or styles (LS) of student nurses are of major concern to nurse educators because it affects the teaching methods used in their development. Higher education has endorsed learner-centered approaches and emphasizes that learners should come to know their own learning styles. For learning tasks, an effective strategy is to guide and enable learners to be effective learners to understand their own learning styles and to manage their own learning **(Yuh-Shiow et al., 2011).**

Significance of the study

Critical thinking competence is an outcome of excellence of undergraduate nursing programs **(*Wangensteen et al., 2010; National League for Nursing (NLN), 2013)***. To have qualified and experienced nurses, nursing educators should be sure that students are acquired preparedness toward utilization of their critical thinking abilities to examine surrounding situations, resolve problems and make judicious decisions related to competent patient care ***(Marchigiano et al., 2011)***.

Assessment for learning approaches and critical thinking are necessary in order for teachers to truly determine if these skills are present and how of them needs to be further developed.

Aim of the study:

This study aimed to determine the effect of implementing different learning strategies on developing nurse students' critical thinking disposition through: assessing nurse students' knowledge regarding critical thinking before implementing different learning strategies , assessing nurse students' critical thinking disposition, implementing the different learning strategies and measuring the effect of different learning strategies on nurse students' critical thinking dispositions after the implementing different learning strategies.

Subjects and Methods

Research design:

Design: Quasi experimental research design, (Experimental and control group).

Setting: Technical institute of nursing that affiliated to Tanta University. **Subjects:** 252 nursing students enrolled second years divided into two main equal groups one as experimental and second for control group, each group contained 126 nursing students

Data collection tools:

Data for this study was collected by using two main tools namely knowledge

questionnaire sheet and California Critical Thinking Disposition Inventory (CCTDI)

First Tool: Knowledge questionnaire sheet. This tool was intended to assess nurse students' knowledge regarding critical thinking. It divided into two parts:

Part 1: This part was intended to collect data related to personal characteristics of the study subjects including age, gender, marital status, ranking among brothers, hobbies, attended courses on critical thinking and studied in one of the previous classes of critical thinking.

Part II: this part developed by the researcher based on review of literature **Shaban. (2010), Shahn. (2011**) and **Sultana. Alfaleh. (2017)** It consists of twenty five multiple- choice questions concerning areas as definition, importance, benefits, advantages, disadvantages impacts.

❖ **Scoring system:**

Each question was assigned a score of (one) if correct answer and (zero) if incorrect answer. Maximum score was twenty five. Mean and standard deviation was calculated and then converted into percent score. The knowledge was considered satisfactory if percent score was 60% or more and unsatisfactory if less than 60%.

Second Tool: California Critical Thinking Disposition Inventory (CCTDI) .

It was a Self-administered tool which aimed to assess nursing student's critical thinking dispositions. It divided into two parts:

Part 1: This part was intended to collect data related to personal characteristics of the study subjects including age, gender, marital status, ranking among brothers, hobbies, attended courses on critical thinking and studied in one of the previous classes of critical thinking.

Part II: this part developed by **Facione (2006)** and adapted from **Ragab (2015), Abd El Rhim,N.A(2016)** It consists of 75 items grouped into seven dispositional characteristics as follows:

Table (1): Description of CCTDI

dispositional characteristics	Number of items	Example
Truth seeking	(12 items)	It is never easy to decide between competing points of view
Analyticity	(11 items)	I pretend to be logical, but I'm not.
Systematicity	(11 items)	My trouble is that I'm easily distracted.
Self-confidence	(9items)	I pride myself on coming up with creative alternatives
Inquisitiveness	(10 items)	Studying new things all my life would be wonderful
Open-mindedness	(12 items)	Men and women are equally logical.
Cognitive maturity	(10 items)	Truth always depends on your view.

❖ **Scoring system:**

Responses were scored on a 5-point likert scale ranging from strongly agrees to strongly disagree. This scored respectively from '5' to '1'. So that a higher score reflects higher disposition towards critical thinking. Total score above 280 indicates a positive inclination ,i.e., high critical thinking score, while lower scores indicate strong opposition toward critical thinking, i.e., low critical thinking scores .Subscale scores above 40 indicate a positive inclination, i.e., high subscale scores, and scores below 40 indicate a strong opposition toward critical thinking, i.e., low subscale scores **(Facione et al., 2001)**

Tools validity and reliability:

The developed tools were rigorously reviewed by the jury group consisting of nine experts in nursing administration, psychiatric nursing and college education for face and content validation. They assessed the tools for

relevance, comprehensiveness, and applicability. The tools were revised and modified according to their comments. The reliability of the tools was tested through assessing their internal consistency. They demonstrated high levels of reliability with the study tools were tested for its internal consistency using Cronbach's Alpha coefficient. Internal reliability coefficient scores for the study tools. Critical thinking knowledge questionnaire 0.948 and for California Critical Thinking Disposition Inventory (CCTDI 0.951. The tools were finalized after a pilot test was conducted on ten staff nurses. Pre –post

Fieldwork:

Once official permissions were obtained, the fieldwork was started. The researcher met with the nursing director of the technical institute of nursing to determine the suitable time to collect the data and confirm the days and times to implement the strategy. The study was carried out through the questionnaire sheet took from 30:45 minutes.

The field work of this study was carried out through assessment, planning, implementation, and evaluation phases.

Assessment phase:

The researcher introduced herself to the study subjects and explained the aim and nature of the study. Pre- test questionnaire distributed to the study subjects both groups (intervention & control) to assess their knowledge regarding critical thinking and interactive lecture strategies and California Critical Thinking Disposition Inventory (CCTDI). Each participant filled in the questionnaire sheet and backs it to the researcher to check each one to ensure its completeness. The study questionnaires were distributed three times throughout the training strategy phases: before the beginning of the training strategy (pre-test), at the end of the training strategy immediately (post-test), and three months after implementation of the training strategy (follow-up).

Planning phase:

Based on the analysis of the data obtained from the assessment phase, and review of the related literature, the researcher pointed out the component of the training program. The schedule was set and the place to carry out the program was booked, after consultation with the nursing director, and coordination with the head of staff development department. The audiovisual aids as data show also booked.

Implementation phase:

Data collection of the study was started at the beginning of April to May during the academic year 2019. After obtaining the oral consent, students were divided into two groups each group consisted of 63 Students they were divided into groups (7groups) ranging from 7-9 members for each group to work together during the lectures. Studied at mandatory nursing administration course during one semester at the second term:

Evaluation phase:

This stage performed immediately post and after three months using the same data collection tools used in the assessment phase for these tools were distributed to evaluate the effect of implementing different learning strategies on developing nurse students' critical thinking disposition.

Administrative Design:

An approval to conduct the study was obtained from the Faculty of Nursing at Ain-Shams University, and from technical institute of nursing Director using official channels.

Ethical Considerations:

An ethical approval of the study protocol was obtained from the Research Ethics Committee at the Faculty of Nursing, Ain-Shams University. Informed verbal consents were secured from every participant (staff nurses and patients) after explanation of the study aim and procedures. All participants were assured about their right to refuse or to withdraw from the study at any time. Full anonymity and confidentiality of any obtained information was guaranteed.

Statistical analysis:

Data entry was done using SPSS V17 computer software package. Data were presented using descriptive statistics in the form of frequencies and percentages for

qualitative variables, and means ± standard deviations for quantitative variables. Qualitative variables were compared using chi-square test. T-test was used to comparisons between two-independent quantitative variables. Paired t-test was used to compare between two means in the same studied group pre and post learning strategies& between two means post learning strategies and during follow up phase.

Pearson correlation co-efficient (r) was used for assessment of the inter-relationship among quantitative variables. In order to identify the independent predictor of critical thinking scores, multiple linear regression analysis was used. The confidence level chosen for the study was 95%. Statistical significance was considered at p value <0.05.

Results:

Table (1): shows that, slightly less than two thirds (62.7%) of nursing students in control group, and slightly less than three quarters (74.6%) of experimental group had age less than 20 years old with mean age of 20.04±1.97, and 20.10±1.00 respectively. Moreover, slightly more than two thirds (69.8%), (68.3%) of nursing students in both group was female respectively. Also, majority of nursing students respectively in both group were single, and was from rural area. In addition, slightly more than two fifths (42.9%) of nursing students in control group was the middle brother, while slightly more than one thirds (38.9%), of experimental group was the oldest brother respectively.

Table (2): illustrates that, at pre implementing different learning strategies phase the mean score of total critical thinking knowledge of both groups were (8.09±5.82, 7.99±5.15**)** respectively, with no statistically significant differences. Moreover, the mean score among nursing students in the experimental group was increased markedly in post implementing different learning strategies and follow up phase (22.99±3.12, 22.05±3.88) respectively.

Table (3): clears that, more than one fifth (25.4%, 24.6%) of nursing students in both experimental, and control groups respectively had satisfactory level of total critical thinking knowledge before implementing different learning strategies, with no statistical significant differences between satisfactory level of both groups before implementing different learning strategies. Moreover, total critical thinking knowledge increased markedly (93.7%, 88.9%) respectively in both post implementing different learning strategies and follow up phase in the experimental group, while more than one fifth (28.6%, 27.0%) of nursing students in the control group respectively had satisfactory level of total critical thinking knowledge in both post implementing different learning strategies and follow up phases.

Table (4): shows that, at pre-learning strategies phase the mean score of open-mindedness disposition among interactive learning and traditional learning group was the highest one (30.17±6.49, 30.51±6.31) respectively. While, the self – confidence disposition had the lowest (23.71±5.00, 23.51±4.92) mean score among the both groups respectively. Also, there were no statistically significant differences between all critical thinking dispositions between the two groups in this phase.

Table (5): shows that, at immediate post learning strategies phase the mean score of open-mindedness disposition increased markedly among interactive learning group, (52.52±9.83), while didn't increase markedly among traditional learning group (30.95±5.99) respectively. While, the self – confidence had the lowest mean score (42.15±5.00, 23.81±5.02) among both groups respectively. Furthermore, there was markedly improvement in the total critical thinking mean score among interactive learning group (333.56±51.99), compared to no improvement among traditional learning group (187.84±25.86) respectively. Also, there were highly statistically significant differences between all critical thinking dispositions among both groups in this phase.

Table (6): shows that, there were no statistically significance correlation between

total critical thinking score and score of critical thinking knowledge among nursing students of traditional lecture throughout learning strategies phases.

Table (7): shows that, there were high statistically significance correlation between total critical thinking score and score of critical thinking knowledge among nursing students of experimental group interactive lecture throughout post and follow up learning strategies phases.

Table (1): Personal characteristics of the study sample (n= 252).

Items	Nursing students			
	Control group n=126		Experimental group n=126	
	Frequency	Percent	Frequency	Percent
Age (in Years)				
< 20	79	62.7	94	74.6
≥20	47	37.3	32	25.4
Mean ± SD	20.04±1.97		20.10±1.00	
Range	18-23		18-23	
Gender				
Male	38	30.2	40	31.7
Female	88	69.8	86	68.3
Marital status				
Single	121	96.0	118	93.7
Married	5	4.0	8	6.3
Residence area				
Rural	90	71.4	106	84.1
Urban	36	28.6	20	15.9
Rank among brother				
Youngest brother	24	19.0	36	28.6
Middle brother	54	42.9	41	32.5
Oldest brother	48	38.1	49	38.9
Hobbies				
Yes	99	78.6	99	78.6
No	27	21.4	27	21.4
Attending Training programs about critical thinking				
Yes	36	28.6	22	17.5
No	90	71.4	104	82.5
Attending Previous classes of critical thinking				
Yes	32	25.4	21	16.7
No	94	74.6	105	83.3

Table (2): Nursing students' knowledge mean scores regarding critical thinking (n= 252).

Learning strategies phases	Total critical thinking knowledge mean score Nursing students'		T test	P
	Experimental n=126	Control group n=126		
	Mean± SD	Mean± SD		
Pre	8.09±5.82	7.99±5.15	0.109	>0.05
Post	22.99±3.12	8.26±5.97	23.10	<0.001**
Follow up	22.05±3.88	8.79±4.70	23.20	<0.001**

(*) Statistically significant at p<0.05 (**) High Significant at P < 0.010

Table (3): Total nursing students knowledge regarding *Critical* thinking throughout learning strategies phases (n= 252).

Total satisfactory knowledge 60%+	Nursing students Experimental n=126		Control n=126		X^2	P
	NO	Percent	NO	Percent		
Pre	32	25.4	31	24.6	0.021	>0.05
Post	118	93.7	36	28.6	112.3	<0.001**
Follow up	112	88.9	34	27.0	99.07	<0.001**

(*) Statistically significant at p<0.05 (**) High Significant at P < 0.01

Table (4): Nursing Students' mean scores Regarding Critical Thinking before Implementing the Learning Strategies

Critical thinking disposition	Nursing students' Experimental groups (Interactive lecture) n=126 Mean±SD	Control groups (Traditional lecture) n=126 Mean±SD	T test	P
Truth Seeking	28.46±7.82	28.41±7.41	0.018	>0.05
Analyticity	26.53±5.38	26.26±5.20	0.404	>0.05
Systematicity	27.69±5.91	27.26±5.67	0.587	>0.05
Self – confidence	23.71±5.00	23.51±4.92	0.119	>0.05
Inquisitiveness	25.42±5.45	25.22±5.57	0.297	>0.05
Open-mindedness	30.17±6.49	30.51±6.31	0.423	>0.05
Maturity	24.84±5.33	25.07±4.99	0.341	>0.05
Total critical thinking	186.84±31.71	186.29±30.57	0.142	>0.05

Table (5): Nursing students mean scores 'regarding critical thinking immediate after implementing the learning strategies.

Critical thinking disposition	Nursing students' Experimental groups (Interactive lecture) n=126 Mean±SD	Control groups (Traditional lecture) n=126 Mean±SD	T test	P
Truth Seeking	50.35±10.73	28.60±7.04	19.02	< 0.01**
Analyticity	47.66±9.94	26.48± 5.20	22.50	< 0.01**
Systematicity	50.12±6.74	27.46±4.95	29.56	< 0.01**
Self – confidence	42.15±5.00	23.81±5.02	30.32	< 0.01**
Inquisitiveness	45.81±6.33	25.34±5.50	27.37	< 0.01**
Open-mindedness	52.52±9.83	30.95±5.99	21.03	< 0.01**
Maturity	44.92±7.33	25.15±4.84	25.24	< 0.01**
Total critical thinking	333.56±51.99	187.84±25.86	28.88	< 0.01**

(*) Statistically significant at p<0.05 (**) High Significant at P < 0.01

Table (6): Correlations between total critical thinking score and score of critical thinking knowledge among Control groups throughout learning strategies phases.

Parameter	Total critical thinking score Pre		Post		Follow up	
	R	P–value	r	P–value	R	P–value
Critical thinking knowledge score	0.026	>0.05	0.009	>0.05	0.043	>0.05

(*) Statistically significant at p<0.05 (**) High Significant at P < 0.01

Table (7): Correlations between critical thinking score and score of critical thinking knowledge among experimental group throughout learning strategies phases.

Parameter	Total critical thinking score					
	Pre		Post		Follow up	
	R	P–value	r	P–value	r	P–value
critical thinking knowledge score	0.117	<0.05	0.706	< 0.01**	0.741	< 0.01**

(*) Statistically significant at p<0.05 (**) High Significant at P < 0.01

Discussion:

Nurse educators have the challenge of providing students with an education that prepares them for the future marketplace. Critical thinking is a valued educational outcome. Therefore, nurse educators agree that critical thinking is an integral component and essential competency for the professional nurse in today's ever changing health care environment. The effective program for teaching thinking dispositions, therefore, should create a culture of thinking in the educational system **(El-Demerdash et al, 2011).**

Critical thinking is a desirable outcome; so to develop and practice critical thinking; educators need to re-consider course content and curricular strategies used to develop critical thinking. The study aimed to determine the effect of implementing different learning strategies on developing nursing students' critical thinking disposition.

Nursing students' knowledge regarding critical thinking throughout program phases

The present study findings showed that, more than one fifth of nursing students in both experimental, and control groups respectively had satisfactory level of total critical thinking knowledge before implementing different learning strategies. In the same line with the study finding **Tumkaya (2011)** who reported that, the level of critical thinking disposition knowledge was found to be low. The result of the study conducted by **Kucuk and Uzun (2013)** demonstrated that, the pre-service music teachers had low level of critical thinking disposition knowledge in general.

According to the findings of the study by **Saglam and Buyukuysal (2013)** was concluded that, the critical thinking levels of the students in the last year of the department of Turkish Education and Primary School Teaching in the Faculty of Education were low in general. From the researcher point of view, this result may be due to the application of traditional methods among nursing education, also there are numerous components of critical thinking (CT) involved in the development of valued educational strategies. Educational strategies that promote CTDs are never simple and require careful planning**.**

Finding goes in the same line with **Choi et al., (2015)** who reported that the there was no statistically significant difference between critical thinking of both the intervention and the control groups before implementing the program. This finding may be due to due the lack of the required standards for the development of critical thinking, standards such as the learning environment in the classroom.

Moreover, total critical thinking knowledge increased markedly respectively in both post implementing different learning strategies and follow up phase among the experimental group, while more than one fifth of nursing students in the control group respectively had satisfactory level of total critical thinking knowledge in both post implementing different learning strategies and follow up phases.

Regarding nursing students' critical thinking throughout program phases

According to the study finding, the mean score of open-mindedness disposition among interactive learning and traditional learning group was the highest one respectively at pre-learning strategies phase, with no statistically significant differences between both groups at this phase. This finding may be due to nursing students opening to new ideas and they are

strong in clarifying or seeking understanding of situation.

This result is congruent with **Kim et al., (2014); Mslm et al., (2020)** found that, open mindedness had the highest mean score among third year nursing students. In agreements with the study flinging with **Kaya et al., (2018)** who reported that, truth seeking, and open mindedness had the highest score. In contrary with the study finding **Ojewole, (2013)** who reported that, the means for truth-seeking, open-mindedness, and maturity in judgment subscales are within the ambivalent range.

Also, this study is agreements with **Serin , (2013); Ekinci and Aybek, (2010)** mentioned that, according to the attending class of teacher candidates and critical thinking skills, significant differences were found in consciousness in critical thinking, empathy in critical thinking, adoption in critical thinking, and in total scores in critical thinking. In contrary with the study finding **Zarifsanaiey et al., (2016)** concluded that, a training course alone is not signif In addition, there were statistically significance relation between interactive lectures level regarding critical thinking and attending previous classes of critical thinking at posttest and follow up phase. These findings imply that the academic level, the content of the theoretical and practical courses and the clinical work experience gained contribute to the development of critical thinking skills. Another explanation could be related to the maturity development that the student gets along the years of his study in nursing till reach the top at last semester of nursing program.

In same line with **Ghazivakili et al., (2014)** suggested a relationship between critical thinking skills and the previous semester's GPA as a criterion for determining academic achievement. In the study the mean GPA score of the students was increased by increasing the understanding skill of critical thinking. In contrary with the study finding of **Azodi et al., (2010); Shirazi and Heidari, (2019)** who reported that, no significant relationship was observed between the critical thinking and the academic achievement of the students.

In addition, there were statistically significance relation between interactive lectures level regarding critical thinking, and attending training program or workshops, at posttest and follow up phase. This finding may be due to attending training program or workshops enable nursing students to fulfill the use of previous critical thinking knowledge, that make critical thinking subject more interest and the content subsequently appears more relevant.

This study is agreements **Serin , (2013); Ekinci and Aybek, (2010)** mentioned that, according to the attending class of teacher candidates and critical thinking skills, significant differences were found in consciousness in critical thinking, empathy in critical thinking, adoption in critical thinking, and in total scores in critical thinking. In contrary with the study finding **Zarifsanaiey et al., (2016)** concluded that, a training course alone is not significantly correlated with the critical thinking.

Best fitting multiple liner regression models for total score of critical thinking throughout learning strategies among interactive lecture

Moreover, the best fitting multiple linear regression models for total score of critical thinking immediate post implementing learning strategies among interactive lecture showed that, nursing students' gender score was negative predicator for the score of critical thinking immediate post implementing learning strategies. From the researcher point of view, understanding gender could help nurse educators to have more effective teaching methods and contribute to future definitions of critical thinking.

In same line with the study finding **Aliakbari and Sadeghdaghighi (2012)** attempted to examine the extent to which Iranian students in Ilam University are critical thinkers. The effect of gender on CT ability was supported. In contrast **Taskesen, (2019)** stated that, gender variable is an independent predictor for critical thinking disposition. In contrary with the study finding **Ernst and Monroe, (2004)** who concluded that, gender, and ethnicity,

environment-based programs had a positive effect on 12th grade students' critical thinking skills.

Moreover, **Harrison, (2018)** concluded that, sex did not influence nursing students' critical thinking. Also, **Ghadi et al., (2012)** conducted a study aimed to determine the level of CT dispositions (CTD) among the surveyed male and female undergraduate students. The findings showed that, there was no significant difference between male and female students in this regard.

Furthermore, **Salahshoor and Rafiee, (2016)** mentioned that, gender did not affect the CT level of the learners, indicated that males and females were not significantly different from one another in applying CT. These dissimilarities between the present study finding and other finding may be due to differences between sample sizes, target populations, or other socio-cultural factors.

In addition, total critical thinking knowledge score was positive dependent predicator for the score of total critical thinking immediate post and follows up learning strategies phases among interactive lecture. As indicated by the value of R; they explain 42%, `40% of the variation of critical thinking score respectively.

This finding may be due to during interactive lecture, students may assume an active stance, thus increasing the opportunity for exchange of knowledge, discussion and inquiry, which encourage of CTS and dispositions. In this regard, **Cheng and Wan (2017); Shakurnia and Baniasad (2018)** stated that, the content being taught affect positively critical thinking dispositions of students. In contrary **Raymond et al. (2018)** considered clinical experience affecting positively critical thinking dispositions of students.

Conclusion:

According to the study findings, it can be concluded that, less than two fifth of nursing students in experimental and control group respectively had satisfactory knowledge regarding critical thinking before implementing different learning strategies with no statistically significant differences between both groups in this phase. Also, there were no statistically significant differences between all critical thinking dispositions between the two groups in this phase

Recommendations:

Based on the main study findings, the following recommendations were deducted:

- Nurse educators must be knowledgeable about CTS and dispositions and strategies to assess them.
- Nurse educators need to scrutinize curriculum frameworks, course elements, and teaching strategies to ascertain if and how these various components reflect the encouragement or obstruction of CTS and dispositions.
- Nurse educators must implement a variety of learning strategies to foster CTS and CTD.
- Nurse educators should use teaching methodologies and techniques to foster inquisitiveness instead of the passive teaching/ learning that takes place in a classroom
- Nurse educators must motivate their students to use critical thinking dispositions while solving problems and take decisions
- Nurse educators have to encouraged to use student-active learning models and be aware of the relationship between teaching strategies and critical thinking.
- It is essential for nursing education program to define the educational objectives that encourage nursing students' critical thinking abilities and to develop curricula and teaching methods to fulfill such objectives and dealing with different learning styles.

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