

Effect of Flipped Classroom Approach on Undergraduate Nursing Students' Motivation, Achievement and Academic Course Evaluation

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Background: Advancements in healthcare necessitate innovative approaches in nursing education. Flipped classroom seems to be a beneficial approach that integrate technology and active learning and enhance students' outcomes. **Purpose:** To assess the effect of flipped classroom approach on undergraduate nursing students' academic motivation, achievement and course evaluation. **Design:** A quasi-experimental design (pre-posttest). **Setting:** Faculty of nursing/Cairo University. **Sample:** 200 nursing students were recruited from students enrolled in 3rd and 4th grade. **Instruments:** Data collection was conducted using four instruments: 1- Student's characteristics, 2- Motivation Scale, 3- Course's Academic Achievement and 4- Higher Education Self-Assessment of Competences Questionnaire to measure Academic Course Evaluation. **Results:** The post-test results revealed that 80% of students displayed a high level of expectancy, while 42% exhibited a high level of affect. On the other hand, the traditional lecture group demonstrated slight increases in expectancy (59%) and value component (39%), with no statistically significant relationships. Additionally, the flipped classroom led to very highly statistically significant improvements in students' total learning motivation scores and academic achievement, also exhibit higher level of total satisfaction (77%). **Conclusion:** incorporating flipped classroom was a valuable approach in teaching evidence-based course for undergraduate nursing students. **Recommendations:** Further studies are required to determine efficacy with a larger sample size and over longer durations across different courses.

Keywords: Academic course evaluation, achievement, flipped classroom, motivation.

Introduction

In order to ensure that nurses are able to meet the complex healthcare needs of today's society, new teaching strategies should be developed which not only enhance their competence but

also enable them to respond (Fan et al, 2020). Innovation strategies are becoming more necessary for universities as a way to cope with the technological revolution rather than

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conventional methods of teaching, since society has evolved (Hannaoui et al, 2021). Professional nursing education in universities is undergoing a rapid change due to advances in technology. The focus of nursing educators over the past years has been on education reform, in particular with regard to teaching methods (Yu et al, 2021). Traditional teaching cannot cope with the needs of nursing education as a result of rapid progress in health care. Blended learning seems to be a new option for addressing the current situation as Internet technologies continue to develop (Du et al, 2022). In the area of nursing education, there is a need for innovation in teaching and learning. The adoption of student-centered learning principles is required in Higher Education, but there are indications in research that many teachers continue to use teacher-centered methods (Berg & Lepp, 2023).

Flipping classroom approach ensures that students and teachers are jointly responsible for learning and enable students to play their part in the learning process (El-Banna, Whitlow & McNelis, 2017). It is defined as a new approach that has revolutionized the conventional teaching method by integrating technology. Essentially, this model involves a reversal of the traditional lecture-based teaching approach, whereby nursing students are introduced to a new subject matter beyond the confines of the traditional classroom setting. It entails assigning students the responsibility of acquiring initial knowledge at home, typically

through instructional videos with the subsequent classroom time being devoted to the assimilation of the acquired knowledge through a diverse range of learning techniques (Ramasubramaniam, Nair & Radhakrishnan, 2017, Lee & Martin, 2020 & Saira, Ajmal & Hafeez, 2021). The flipped classroom approach is considered to be one of the most appropriate pedagogical techniques for the intricate transformation in nursing curricula in contemporary times. It has the potential to augment the competencies of nursing students in tackling various challenges (Fan et al, 2020). Teachers of nursing are being urged to change the classroom with engaging teaching methods like flipped classrooms (Wells-Beede, 2020). The flipped classroom model is considered to be a more effective pedagogical approach when compared to the traditional method of instruction (Saira, Ajmal & Hafeez, 2021 & HEW & LO, 2018). From the perspective of students, there is already ample evidence for flipped classroom pedagogy as an effective and advantageous teaching method (Youhasan, Chen & Lyndon, 2022).

There have been numerous studies that have demonstrated the enhancement of several students' outcomes associated with the flipped learning methodology, including: students' perception and knowledge, academic performance, engagement, and collaboration (Salem et al., 2019), retention of knowledge, performance outcomes, and levels of student satisfaction (Lelean & Edwards, 2020), student motivation and interactions (Özbay Ö. & Çınar,

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2021), active learning and student engagement, incorporation of classroom and clinical knowledge, and the implementation of knowledge acquired in the classroom to nursing practice (Sullivan, 2022). Furthermore, within the context of Egypt, the flipped classroom model represents a viable substitute for conventional nursing education lectures, as it effectively manages the challenges posed by the increased number of nursing students and the shortage of staff. Additionally, this approach fosters greater student engagement in the classroom, leading to increased levels of satisfaction, self-pacing, and independence (Yacout & Shosha, 2016 & Awad & El-Adham, 2019).

Assisting undergraduate nursing students in the process of contextualizing the theoretical knowledge acquired in the classroom to their practical professional application can pose a challenge for educators in the nursing field (Crookes, Crookes & Walsh, 2013). The acquisition of competence in evidence-based practice is an essential component for nurses in their professional capacity (Song, Kim & Lim, 2019). The implementation of evidence-based practice is of utmost importance in guaranteeing the safety of patients. Despite the recommendation of teaching methodologies aimed at augmenting its knowledge and competencies, recent studies suggest that nurses may not receive adequate preparation to effectively apply it. In addition, it is a necessity to enhance the awareness and proficiency of educators in imparting

evidence-based practice principles, which entails the utilization of interactive and clinically integrated pedagogical approaches (Horntvedt, Nordsteien, Fermann & Severinsson, 2018). The enhancement of the program curriculum is required to strengthen student engagement in the acquisition and application of evidence-based methodologies (Dayrit, 2020). The flipped classroom approach is deemed suitable for imparting evidence-based practice education to undergraduate nursing students (Ruzafa-Martínez et al., 2023).

A considerable amount of systematic reviews has been published on flipped classrooms. However, a recent evidence of those studies has found that it is essential to conduct more comprehensive studies with adequate sample sizes in order to gather conclusive evidence about the efficacy of the flipped classrooms method in adequately preparing future nurses for the competitive practices within the existing healthcare system (Özbay Ö. & Çınar, 2021). In addition, a more recent systematic review concluded that some studies had limitations in their scope because they lacked comparison groups and insufficient details about the design of the flipped classroom. Further investigation is necessary to explore a meticulously articulated, clearly structured, well-organized, and engaging flipped classroom curriculum design, along with a rigorous methodological approach (Banks & Kay, 2022). Moreover, Further investigation is required to establish this educational method as the preferred approach. In

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order to validate the effectiveness of the flipped approach, additional rigorous methodologies are necessary to emphasize the conclusions. These findings will provide the necessary support for implementing the flipped approach in higher education and various educational settings (Barranquero-Herbosa, Abajas-Bustillo, Ortego-Maté, 2022). In Egypt, there is a lack of research on the flipped classroom approach, suggesting a limited interest in its implementation in nursing education. Additionally, this study provides valuable insights into the practical and comprehensive application of the flipped classroom. To the best of our knowledge, our study is the first in Egypt to examine student motivation in relation to this teaching method. Moreover, previous local research findings recommended that flipped classroom need to be introduced to other courses in different academic levels (Yacout & Shosha, 2016 & Awad & El-Adham, 2019). Accordingly, this work contributes to existing knowledge and provides additional evidence with respect to flipped classroom approach through the following purpose

Methods

Purpose:

To assess the effect of flipped classroom approach on undergraduate nursing students' motivation, achievement and academic course evaluation

Research hypotheses:

1. Undergraduate Nursing students who are enrolled in flipped

classroom are expected to demonstrate greater academic motivation levels than their peers who engaged in the traditional lecture-based methodology.

2. Undergraduate Nursing students who are enrolled in flipped classroom are expected to achieve higher academic scores than their peers who follow the traditional lecture-based methodology.
3. Undergraduate Nursing students who are enrolled in flipped classroom are expected to exhibit positive academic course evaluation compared to their peers who follow the traditional lecture-based methodology.

Research Design:

A quasi-experimental design was employed, incorporating pre-/post-testing in both the intervention and control groups. The intervention group participated in a flipped classroom model, while the control group received traditional teaching methods.

Setting:

The study was conducted in the Faculty of Nursing, Cairo University.

Sampling:

Total study sample was 200 nursing students with 100 participants allocated to each group. Number of students was calculated according to the following equation with confidence level 95% and margin of error 5%:

$$N = \frac{z^2 * p * (1-p) / e^2}{1 + \frac{z^2 * p * (1-p)}{e^2 * N}}$$

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Where z is the z-score associated with the confidence level chosen (1.96), P is the proportion of motivation in the population (0.5), e is the margin of error (5%) & N is the population size (400).

Inclusion criteria:

Being enrolled in the 3rd and 4th academic levels, first time of enrollment in the course.

Instruments:

Four instruments were utilized to collect data.

Instrument one: Student's characteristics:

Was developed by the researcher, it includes age, gender, nationality, marital status, academic level and study hours.

Instrument two: Motivation Scale:

It is one domain of the Motivated Strategies for Learning Questionnaire (MSLQ) created by Pintrich and De Groot (1990). It was used to examine student' motivation levels. The Motivation Scale contains 31 items that are categorized into three primary components; each one contains supplementary subscales as following:

- Value component: encompasses intrinsic goal orientation (4-item), extrinsic goal orientation (4-item) and task value (6-item).
- Expectancy component: comprises of control of learning beliefs (4-item), self-efficacy for learning and performance (8-item).
- Affective component: includes test anxiety (5-item).

The students evaluate themselves using a seven-point Likert scale ranging from "not at all true of me" to "very true of me."

Scoring system:

The scores for the individual subscales are determined by calculating the average of the items contained within that particular subscale. e.g., intrinsic goal orientation comprises four items. The score for intrinsic goal orientation of an individual is determined by adding the four items and computing the average. Prior to computing individual scores, negatively worded items were initially reversed (Pintrich, Smith, Garcia & McKeachie, 1991).

Instrument three: Course's Academic Achievement:

The evaluation techniques employed for the course were consistent across both groups and included the following:

- Quiz includes 15 multiple choice questions.
- Assignment includes 15 questions in form of essay clinical scenarios and PICOT questions.
- Mid-term exam includes 20 questions and final exam includes 50 questions, each in form of multiple choice and essay clinical scenarios and PICOT questions.

Scoring system:

One-mark is given for each correct answer for multiple choice and essay questions. The total score is calculated out of 100. A score less than 60% = fail (F), 60% - <65% = pass (D), 65% - <75% good (C), 75% - <85% = very good (B), 85% -100% = excellent (A).

Instrument four: Academic Course

Evaluation:

was measured by the Higher Education Self-Assessment of Competences Questionnaire (HEsaCom): It was developed by Braun, Gusy, Leidner and Hannover (2008) to assess students' self-rated gain in competences at the end of the semester for both groups (flipped classroom and traditional lecture). HEsaCom contains 26 items, including six competence scales: knowledge processing, systematic competence, presentational competence, communication competence, cooperation competence and personal competence. It is a 5-point Likert scale range from strong agreement to strong disagreement.

Scoring system:

An academic course evaluation is considered satisfactory when it achieves a score of 60% or more.

Validity:

Data collection tools has been assessed for content validity through a panel of three reviewers and experts in nursing field.

Reliability:

- The reliability of the motivation scale was measured using Cronbach alpha and was found equal to 0.94.
- The reliability of the Higher Education Self-Assessment of Competences Questionnaire (HEsaCom) was assessed by the Cronbach alpha coefficient yielding a value of 0.96.

Procedure:

The data collection process was identical for both groups under study. Prior to the onset of the course and upon completion of the final classroom session.

Flipped classroom group:

The intervention group students were subjected to a flipped classroom approach. The implementation of this approach was carried out over a span of 15 hours, which constituted 50% of the course duration. In the following manner:

- **Before flipped classroom:** The self-learning tasks for students were meticulously crafted and made available one week prior to the scheduled in-class session. These tasks comprised of a short voice-over PowerPoint presentation (10-15 minutes), a quiz, as well as assignments and questions pertaining to various subjects covered in the course. To foster peer collaboration and interaction, students were divided into small groups (5 groups), each consisting of twenty students.
- **In flipped classroom:** A mini lecture was given to the students at the beginning of class face to face, to improve their understanding of the basic content of the online materials, then the teacher became a facilitator of collaboration. Active learning activities, which constitute the main body of in-class time, are based on questions answering, discussion and presentation of the required assignments in a given group together followed by brief

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feedback by teachers concerning each group assignment, have been made available to students. The presentation was delivered in a team format. Finally, the teacher addressed any supplementary inquiries from the students and concluded with a summary.

- **After class:** Each team has submitted a concise report detailing their assignments, acquired learning skills, as well as any confusion or frustration experienced during in-class time. Furthermore, a social media group has been established for students to facilitate the submission of inquiries and receive comprehensive feedback from the teacher regarding group assignments, announcements, supplementary readings, or mini-lectures aimed at clarifying concepts to allow student to get help while out of class.

Traditional lecture group:

The control group was taught using the traditional teaching model, which involved delivering knowledge through PowerPoint presentations. Moreover, they participated in activities such as analyzing clinical scenarios and formulating PICOT questions. The assessment methods employed were comparable to those used for the flipped classroom group.

Statistical analysis:

SPSS version 16.0 was used in statistical analysis. Numbers and percent were used to describe qualitative variables while means and standard deviation were used to describe quantitative variables. The t -

test was used to test difference between means of study and control groups and also paired t- test to study difference between pre and post means of same group. Chi -square test was used to test difference between the two groups for variables like achievement level. All tests were considered significant if p - value less than 0.05. A statistical significant difference was considered at $P \leq .01$. A very highly statistical significant difference was considered at $P \leq .01$.

Results:

Table 1 shows that most of studied students, whether in the flipped classroom or traditional lecture groups, were females (64% and 70% respectively). The age range of students was between 20 and greater than 23 years old. Additionally, the majority of both groups were of Egyptian nationality (93% in flipped classroom and 92% in traditional lecture). Furthermore, 95% of students in both groups were in their third academic level. The majority of students in flipped classroom or traditional lecture groups were also single, with 94% and 100% respectively. On the other hand, 42% of both groups reported various study hours, with the traditional lecture group dedicating 1-10 hours per week, whereas the flipped classroom group allocated 11-20 hours per week.

Table 2 demonstrates that within the flipped classroom group, 57% of students had a high-level in relation to item of expectancy in pretest, 42% was related to value while only 13% of students exhibited high level of affect.

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However, post- test, these percentages showed notable increases, with 80% of students displayed a high level of expectancy and 42% demonstrated high level of affect with statistically significant improvements.

Table 3 indicates that 50% of the participants in the traditional lecture group had a high level of expectancy and 31% regarding value component. Following the Post-test, there was an improvement in both percentages, with 59% showed a high level of expectancy and 39% demonstrated a high level of value component. However, it is important to note that these changes were not found to be statistically significant.

Table 4 displays that throughout the intervention, findings illustrated that students' total learning motivation scores were improved with flipped classroom. Therefore, there were very highly statistically significant relations.

Table 5 demonstrated that the academic achievement of students in the flipped classroom group was higher than that of their counterparts in the traditional lecture group. Within the flipped classroom group, the highest

percentage of studied students' grades was grade B (38%) followed by grade A (30%) and 21% for grade C whereas, in traditional lecture group, 44% of studied students had grade C followed by for grade B (20%) and only 10% of them had grade A. Although there were no statistical significant differences between students having D and F course achievement, there were very highly statistical significant differences between students achieving A and C.

Table 6 displays that, although most of students in both groups reported satisfactory level of academic course evaluation, the results indicated that the flipped classroom group exhibited higher level of total satisfaction (77%). In both groups, systematic competence was primarily reported (82% in flipped classroom & 77% in traditional lecture) followed by personal competence (81% in flipped class room & 77% in traditional lecture). Furthermore, statistically significant relation can be observed in relation to presentational competence item (p-value<0.05)

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Table (1): Characteristics of studied students attending flipped classroom and traditional lecture

Items	Flipped classroom N=100		Traditional lecture N=100		X2 test	p-value
	No.	%	No.	%		
Gender						
Female	64	64.0	70	70.0	0.27	0.60
Male	36	36.0	30	30.0		
Age(years)						
20-21	70	70.0	78	78.0	1.76	0.41
22-23	23	23.0	16	16.0		
>23	7	7.0	6	6.0		
Mean Sd	Mean=22 Sd=7.6		Mean=20.9 Sd=1.2		t=1.36	0.17
Nationality						
Egyptian	93	93.0	92	92.0	0.01	0.94
African	7	7.0	8	8.0		
Academic level						
Third	95	95.0	95	95.0	0.0	1.0
Forth	5	5.0	5	5.0		
Marital Status						
Single	94	94.0	100	100.0	0.19	0.67
Married	5	5.0	0	0.0		
Divorced	1	1.0	0	0.0		
Study hours (week)						
1-10	34	34.0	42	42.0	3.47	0.32
11-20	42	42.0	31	31.0		
21-30	14	14.0	19	19.0		
>30	10	10.0	8	8.0		
Mean Sd	Mean±17.5 Sd±15		Mean±16.7 Sd±14.4		t=0.37	0.70

Table (2): Students' learning motivation scores in flipped classroom group

Item	Pre-test						Post-test						X2 test	p-value
	Low		Moderate		High		Low		Moderate		High			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
▪ Value	4	43.0	54	54.0	42	42.0	2	2.0	39	39.0	59	59.0	5.9	0.051
▪ Expectancy	3	3.0	40	40.0	57	57.0	2	2.0	18	18.0	80	80.0	12.4	0.002*
▪ Affect (anxiety)	9	9.0	78	78.0	13	13.0	4	4.0	54	54.0	42	42.0	21.5	0.000*

*significant at p-value<0.05

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Table (3): Students' learning motivation scores in traditional lecture group

Item	Pre-test						Post-test						X2 test	P-value
	Low		Moderate		High		Low		Moderate		High			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
▪ Value	7	7.0	62	62.0	31	31.0	2	2.0	59	59.0	39	39.0	3.7	0.15
▪ Expectancy	3	3.0	47	47.0	50	50.0	1	1.0	40	40.0	59	59.0	2.3	0.31
▪ Affect (anxiety)	20	20.0	58	58.0	22	22.0	14	14.0	65	65.0	21	21.0	1.4	0.47

*significant at p-value<0.05

Table (4): Students' total learning motivation scores in flipped classroom and traditional lecture groups

Item	Flipped				Traditional				X2 test	P-value
	Pre		Post		Pre		Post			
	No.	%	No.	%	No.	%	No.	%		
Low (<25%)	0	0.0	0	0.0	1	1.0	0	0.0	23.4	0.0001*
Moderate (25-75%)	49	49.0	20	20.0	55	55.0	53	53.0		
High (>75%)	51	51.0	80	80.0	44	44.0	47	47.0		
X ² test	18.6				1.13					
P-value	0.0001*				0.56					

*significant at p-value<0.05

Table (5): Students' Academic Course Achievement in flipped classroom and traditional lecture groups post intervention

Students' Achievement	Flipped classroom (n=100)		Traditional lecture (n=100)		X ² test	p-value
	No.	%	No.	%		
A	30	30.0	10	10.0	10.00	0.0001*
B	38	38.0	20	20.0	5.59	0.02*
C	21	21.0	44	44.0	8.14	0.0001*
D	9	9.0	19	19.0	3.57	0.06
F	2	2.0	7	7.0	2.78	0.10

*Significant at p-value<0.05

Table (6): Percentage distribution of Academic Course Evaluation for the flipped classroom and traditional lecture groups according to their satisfaction

Item	Flipped classroom		Traditional lecture		X ² test	P -value
	No.	%	No.	%		
▪ Knowledge Processing	77	77.0	74	74.0	0.18	0.67
▪ Systematic Competence	82	82.0	77	77.0	0.61	0.43
▪ Presentational Competence	56	56.0	31	31.0	5.53	0.02*
▪ Communication Competence	80	80.0	72	72.0	1.33	0.25
▪ Cooperation competence	79	79.0	72	72.0	1.00	0.32
▪ Personal competence	81	81.0	77	77.0	0.38	0.54
Total	77	77.0	68	68.0	2.03	0.15

*Significant at p-value<0.05

Discussion:

The current study findings revealed that students' learning motivation scores were improved after having flipped classroom and displayed statistically significant relations ($p\text{-value} < 0.001$). It seems possible that these results are due to the benefits of flipped classroom, such as pre-class activities that promote better preparation prior to class, enhance student autonomy, and increase study effort through the use of videos, assignments, and quizzes as evidenced by increased reported study hours in the flipped classroom. Also, availability of enriched learning environment that offers active learning opportunities can also lead to more efficient class time and improve student-teacher interaction through group discussions, questions and answers, and the use of small groups, which can enhance students' competencies, including communication, cooperation, knowledge exchange, and presentational skills. Furthermore, social media group that provided continuous feedback from teacher and students and facilitated seeking help outside of class. In addition to positive impact on students' learning performance and satisfaction. One of the issues that emerges from these findings is contribution to the growing area of research on flipped classroom as an innovative approach particularly, according to our search in Egypt, very little was found in the literature on implementation of flipped classroom so this is an important issue for future

research to meet the needs of today's nursing learners effectively. While there have been numerous studies that have demonstrated the improvement of several students' outcomes through the use of this methodology, it is important to note that generalized conclusions cannot be made. Current findings provide additional evidence with respect to positive outcomes associated with flipped classroom. Furthermore, this finding is in agreement with previous studies in Taiwan and Morocco which pointed out that the flipped classroom was effective among nursing students and improved their motivation (Fan et al. 2020. & Hannaoui et al., 2021). In addition, results of a systematic review about flipped classroom in nursing education concluded that it is a method that can enhance student motivation and redesigning of all nursing courses as a flipped classroom were suggested (Özbay & Çınar, 2021).

Our study findings illustrated that academic achievement of students in the flipped classroom group was significantly higher than that of their counterparts in the traditional lecture group. This finding lines up with a growing body of research, in Egypt, previous study found positive changes in undergraduate nursing students' achievement related to flipped classroom (Awad & El-Adham, 2019). Furthermore, two Chinese meta-analyses studies examined whether the flipped classroom approach affected nursing students' scores in knowledge and skills have shown that there was a

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significant difference, compared to conventional lecture groups (Hu et al., 2018 & Li et al., 2020). Also, in other studies, in China and Thailand, a flipped classroom has been an effective tool for increasing students' academic performance of nursing students (Dong, Yin, Du & Wang 2021, Xuto et al 2022 & Ng, 2023). Furthermore, prior set of systematic reviews have noted that in terms of academic performance, the flipped classroom approach applied to nursing studies and undergraduate health science disciplines has proven to be effective (HEW & LO, 2018, Salem et al., 2019, Özbay Ö & Çınar 2021, Banks & Kay, 2022, Barranquero-Herbosa, Abajas-Bustillo & Ortego-Maté, 2022 & Tan, Yue & Fu, 2017). Similarly, a study in Korea has shown that after completing the Evidence Based Practice Program coupled with Blended Learning methods, undergraduate nursing students' evidence- based practice competence was substantially increased (Oh & Yang, 2019). In addition, Omani nursing students' performance in anatomy and physiology class have been improved through a flipped classroom strategy (Joseph et al., 2021). Also, in Morocco, the results showed that the student's grades increased significantly ($p < 0.0001$) after the flipped classroom method (Hannaoui et al., 2021). Moreover, for first semester nursing students, attending flipped classroom has led to increased exam scores and a higher final grade (Moore et al., 2023). Conversely, there has been no difference between e-learning and traditional learning in terms of

knowledge acquisition, skills or satisfaction among nurses and nursing students according to a systematic review compared the impact of e-learning with traditional learning (Lahti, Hätönen & Välimäki, 2014). In addition, no statistically significant differences were observed with regard to the outcomes between flipped groups and traditional classes among baccalaureate nursing students (Harrington et al., 2015 & Geist, Larimore, Rawiszer & Al Sager 2015). [42Furthermore, in the United States, after implementing a flipped classroom approach, there was no significant difference in university course evaluations of traditional and flipped approaches between nursing students (Simpson & Richards, 2015).

Regarding students' satisfaction, the current results match those observed in earlier systematic reviews which reported that the flipped classroom has been found to receive relatively higher rating in nursing education and undergraduate health sciences discipline when compared to the traditional lecture format (Banks & Kay, 2022 & Tan, Yue & Fu, 2017). In Egypt, there was a high statistically significant relation between the pre and posttest results of both the study and control groups with respect to the satisfaction of students in community nursing pertaining to the Flipped Classroom approach (Awad & El-Adham, 2019). Also, the implementation of the flipped classroom approach yielded elevated levels of satisfaction among students enrolled in an adult-health nursing course (Fan et al., 2020). Moreover,

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flipped classroom model can improve the effectiveness of evidence-based medicine learning of medical technology interns. Most students are satisfied with this teaching method (Huang et al., 2020). In addition, students in the flipped classroom described the atmosphere as appealing and harmonious. They reported learning more actively and more efficiently (Zhu, Lian & Engström, 2020). Whereas, other studies found that incorporating modern teaching technologies with interactive classroom activities can enhance learning outcomes, but it may not necessarily lead to improved student satisfaction (Missildine, Fountain, Summers & Gosselin 2013). Students expressed greater satisfaction with traditional teaching methods than with the flipped approach (El-Banna, Whitlow & McNelis, 2017, HEW & LO, 2018 & Yacout, Shosha, 2016). Furthermore, the flipped classroom model imposed a significant workload on students and did not enhance their satisfaction or course evaluation (Dong, Yin, Du & Wang 2021).

Conclusion:

The present study has revealed that incorporating flipped classroom was a valuable approach in teaching evidence-based course for undergraduate nursing students. Findings demonstrated significant improvements in students' academic motivation and achievement along with an elevated level of course evaluation as compared to traditional lecture-based approach which provide

substantial evidence in support of the proposed hypothesis.

Recommendations:

Drawing on these findings, it is recommended that further studies be conducted to validate our findings and examine its feasibility for implementation on a larger scale and extended durations in various courses.

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