

Effect of Flipped Classroom Strategy on Nursing Students' Habits of Mind and Academic Stress.

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Abstract:

Background: The flipped classroom strategy has a significant popularity in recent years and focuses on providing up-to-date materials prepared by teachers. It also expects students to engage with and understand the material before attending class, allow the student to present their materials, and encourage student participation in class. It also reinforces self-directed learning and helps them develop independence and responsibility for their learning in a relaxed, flexible environment. **Objective:** The study aimed to identify the impact of the flipped classroom on habits of mind and academic stress among nursing students. **Setting:** A quasi-experimental study was conducted in the nursing education department, faculty of Alexandria. **Subjects:** 80 study and control group nursing students who were registered for a health education course in the second semester of the academic year 2022-2023. They were randomly allocated into two equal groups: the study group and the control group, with 40 students for each. **Tools:** Two tools were used for data collection: the habits of mind scale and the academic stress scale. **Results:** revealed that there was an apparent improvement in the study group's scores compared to the control group regarding habits of mind and decreased academic stress after applying the flipped classroom. Thus, there was a statistically significant difference between the study and control groups after their participation in the intervention in favor of the study group. **Conclusion:** The flipped classroom strategy had a significant positive impact on developing students' habits of mind, thereby positively influencing their academic stress with the course and their understanding of the content. **Recommendation:** The study recommends that educational workshops be organized for the nurse educators in the nursing education department at the Faculty of Nursing at Alexandria University to increase their knowledge about the flipped classroom and its development.

Keywords: Flipped classroom strategy, habits of mind, academic stress, innovative teaching strategy.

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INTRODUCTION

Higher education has a vital role to play in mainstreaming education for sustainable development and can also serve as a catalyst for sustainability progress in academic and practical innovation. The 17 Sustainable Development Goals (SDGs) were officially adopted by the United Nations 2030 Agenda as the outcome of a major global consultative

process. Goal 4 of Agenda 2030 advocates for the promotion of fair, high-quality education for sustainable development, which creates the knowledge, abilities, attitudes, behaviors, and values required for both lifelong learning and a more sustainable future (Žalėnienė, & Pereira, 2021; Shava et al, 2021).

Additionally, the development of an educational system is a modern necessity at a time when technology is spreading around the world. The need of achieving sustainable goals (4), integrating technology into the classroom, and seeking for innovative teaching methods that respond to the demands of the current generation. The flipped classroom is an example of an innovative learner-centered teaching strategy that needs to be implemented in nursing education (Uzunboylu & Karagözlü, 2017).

The flipped classroom was developed by American educators Jonathan Bergmann and Aaron Sams. It is connected to and supported by constructivism, social theory, and behaviorism theory. This strategy integrates activities that students complete at home, like case studies and discussions into the classroom. Through the use of the flipped classroom strategy, students are given the opportunity to master academic material and gain competency in their learning by making the most of the time allowed for them to view videos online, study relevant materials, and complete assignments at home. Furthermore, students engage more fully in the teaching-learning process when they receive more interactive instruction and learning opportunities during actual applications. (Van Alten et al, 2019; Kazu & Kurtoğlu Yalçın, 2022; Diningrat & Ngussa, 2022).

In addition, the flipped classroom promotes student engagement, interactive learning, flexibility, reflection, and assessment of the higher education learning process. This method also enables students to learn outside of the classroom, build their own awareness, critical thinking, self-learning, and communication skills, and cooperative teamwork, and become independent researchers through the effective use of technology (Nickerson, 2018; Talan & Gulcesen, 2019).

Furthermore, it fosters the development of habits of mind by encouraging students to use the knowledge and acquire the skills necessary to effectively solve problems and

manage demanding academic environments. Moreover, flipped classroom develops these competencies, which include patient care, knowledge of practice, interpersonal and communication skills, professionalism and inter professional collaboration should result in more effective inter professional education and better care should also have an impact on students' educational outcomes (Hurtubise et al, 2015; Nickerson, 2018; Talan & Gulcesen, 2019).

The flipped classroom approach can offer students excellent educational materials and simplify significant theoretical and practical knowledge. Additionally, the flipped classroom seeks to provide students the chance to develop better habits of mind, analytical thinking skills, and a deeper understanding of a particular subject. According to current educational trends, developing good habits of mind should be the main goal at all educational levels and a crucial part of students' education and lives. As a result, teachers should incorporate these practices into the curriculum and foster a critical thinking environment in the classroom. The definition habits of mind is "a set of cognitive skills and behaviors that the student uses to deal with mathematics problems or situations, in order to achieve its objectives" (Mohamed, 2019; Youssef & Al-Shahrani, 2021).

Costa and Kallick describe habits of mind as a combination of intelligent behaviors, cognitive processes, and thinking skills. Their classification of habits of mind produced sixteen mental habits, and the current research aims at developing eight of these habits: perseverance, control your recklessness thinking flexibly, questioning and posing problems, striving for accuracy, mutual thinking, applying past knowledge in new situations, imagination and innovation and responding with amazement and wonderment. (Costa & Kallick, 2015; Maiese, 2018; Mohamed, 2019).

It is obvious that habits of mind enhance rapid decision-making in a range of settings

and aid in situation management and challenge acceptance, which allow people to react to situations correctly to address difficulties. In addition, the following justifies the importance of developing habits of mind for successful education: controlling the learning process, organizing it and accepting responsibility for it, using thinking skills to manage thinking and develop it promptly, choosing the appropriate procedures, fostering achievement, paying attention to details, and skillfully handling stressful academic situations (Youssef & Al-Shahrani, 2021).

Nursing students encounter a great deal of stress during their university education as they strive to fulfill academic demands for their future. Multiple specializations, feeling under pressure to perform well on exams, poor time management, an excessive number of assignments, crowded classes, a semester grading system, peer competition, the pressure to perform well, a strained relationship between students and teachers, and a lack of facilities and resources comprise some of the common stressors mentioned in an academic setting. Academic stress can be described as "the body's response to academic pressures which exceed students' adaptation abilities" (Alsulami et al., 2018 ; Podila & Sastry, 2019 ; Devchoudhury & Devasagayam, 2022).

Students who experience academic stress may experience negative effects such as physical and psychological stress, which could hinder their academic performance and possibly even prohibit them from continuing a career in nursing. Additionally, there could not be enough individuals entering the nursing field. The implementation of flipped classrooms for nursing students might result in benefits for their mental and physical health, such as improved coping mechanisms for stressful situations or the ability to deliver high-quality and efficient care in low-pressure situations. Therefore, the researcher intended to conduct this study (Shah, 2010;

Ali & El-Sherbini, 2018; Patel, 2016; Kumari, 2017).

Research hypotheses:

H1: Undergraduate nursing students who are instructed by flipped classroom strategy exhibit higher habits of mind than those who following the traditional method.

H2: Undergraduate students who are instructed by flipped classroom strategy exhibit less academic stress levels than those who following traditional method.

Materials and method

Materials

Design: A quasi-experimental research design was used in this study.

Settings: This study was conducted at Nursing Education Department, Faculty of Nursing, at Alexandria University.

Subjects: The subjects of this study included a convenience sample of eighty (80) nursing students who were enrolled in a health education course (elective, 2 hours) at the nursing education department during the second semester of the academic year 2022-2023 and agreed to participate in the study.

Tools:

The following tools were used in this study for data collection.

Tool I: Habits of Mind Scale:

This tool was developed (Al-Ghoweri and Al-Zboun., 2020) to assess students' habits of mind. It was modified and translated into Arabic by researcher to be congruent with the study aim. The tool composed of 31 items with 5 points likert scale ranged from never(1) to always (5). It distributed over 8 subscales as follow "perseverance (4 items), control of recklessness(3 items), reciprocal thinking(4 items), thinking flexibly(4 items), questioning and posing problems(4 item), applying knowledge in new situations(4

items), imagining and innovating(4 items), responding with amazement (4 items)".

The scoring system of this scale ranged from 31 to 155 and was distributed as follows: From 31 to 72 indicated low level habits of mind development, from 73 to 113 indicated moderate level habits of mind development and from 114 to 155 indicated high level habits of mind development. The tool was valid and reliable, and the coefficient value was 0.873.

Attached to the previously tool a sheet contains personal and academic data about nursing students such as age, gender, academic semester, previous GPA, residence and social status.

Tool II: Academic stress scale:

This tool was developed by Hosseinkhani, et al., (2020) to measure the perceived sources of academic stress among nursing students. It was modified by researcher to be applicable with the study aim. This tool consisted of 35 statements with 5 point Likert scale ranged from never (1), to always (5).

The scoring system of this scale was ranged from 35 to 175 and was distributed as follows: From 35 to 81 indicated low level academic stress, from 82 to 128 indicated moderate level of academic stress and from 129 to 175 indicated high level of academic stress.

Method

Approval from the Research Ethics Committee (REC) of the Faculty of Nursing was obtained before carrying out this study. An official permission from the dean of the Faculty of Nursing and Head of Nursing Education Department to collect data was obtained before carrying out this study. the study tools were tested for their content validity by five experts in the psychiatric and nursing education department and the necessary modifications was made. Study tools were tested for their reliability using Cronbach's Alpha test. They were reliable

and their coefficient values were 0.873 for tool I and 0.909 for tool II. A pilot study was carried out on 10 students to ensure the clarity and applicability of the tools and the necessary modifications were done accordingly.

Data collection phases:

The study was conducted in three phases: preparation, implementation and evaluation.

Phase I : Preparation

During this phase the researcher, the course content, the learning environment, and the study group students were prepared as follows:

A. **Researcher's preparation:** The researcher reviewed recent researches, books, and online resources about the flipped classroom educational strategy to be knowledgeable and skillful about its application in teaching the content.

B. **Content preparation:** The health education course objectives and content were revised to be congruent with the purpose of the study and some modifications were made.

A Microsoft team has been created for the course. The researcher prepared a recorded PowerPoint and educational materials for each topic. Case studies and assignments for the content were developed to be covered in the classroom. These include developing educational objectives, a case study, patient-problem scenarios, assessments, quizzes for every session, and a lesson plan to implement the steps of the health education process following each session.

A recorded PowerPoint was uploaded to the Microsoft teams platform to allow the study group to read and understand material from prior class sessions. Additionally, upload all prepared homework assignments and tests associated with each topic so that students can access them in accordance with the course schedule.

C- Students' preparation:

For the control group: the control group was followed the routine schedule of the

course as previous semesters blended learning

For the study group:

The researcher conducted a face-to-face introductory session with the study group in the classroom to explain the purpose of the research, schedule of the course and the tools that needed to be measured. Those who consented to participate in the research signed an informed consent form.

The study group was asked to join the Microsoft Team platform before to the start of the course, and a discussion channel was set up on this platform so that the study sample may freely ask questions and communicate with the researcher and each other. Students in the study group (40 students) were divided randomly into 6 subgroups. Each group contains six to seven students.

Students were taught the health education process in this phase through flipped classroom, with six sessions spread over six weeks, lasting roughly two hours each. The researcher assigned each group particular topic to work on and explained to the student how to prepare content for team work which, included presenting class activities related to each topic in front of their peers and the researcher.

Phase II: Implementation

Following the students' completion of their Microsoft team joining, every week before classroom sessions, the researcher gave students instructions to watch the recorded PowerPoint presentations and read the related educational material. they were required to complete the case study or quiz after watching each recorded PowerPoint presentation before classroom meeting to assess their understanding of the content. For example, during clinical training in the nursing course, the study group was required to apply the assessment steps on hospitalized patients following watching of the PowerPoint recording of the assessment phase .

After watching each recorded PowerPoint in accordance with the prescribed schedule and reviewing over the relevant content, the researcher and the students engaged in an online discussion at a regular time. Some students engaged in an active participation in the discussion by asking questions on the discussion forum. While the others simply went over the questions posed by their colleagues and the responses posted on the discussion board by the researcher.

Actual implementation during classroom:

In accordance with the course schedule, the researcher selected the assigned group to present information and an activity related to the assigned topic. The group members prepared audiovisual materials, including posters, PowerPoint presentations, and role plays in the implementation phase of the health education process to support the group's presentation. . The researcher acted as a facilitator, guiding the session and regulating interaction between groups as each group posed questions to the others to promote conversation between them.

The group to which they were assigned rewarded students who participated in discussions and answered questions. Each group member received direct feedback, both positive and negative regarding their activity and presentation from the researcher and peers. Following the session, each group's activity and presentation was assessed by the researcher, who also provided a summary of the content and corrected any misunderstandings or misconceptions which had arisen during the lesson.

After classroom sessions

After discussing each phase of the health education process, the researcher asked the student to apply the program and provide them online feedback via a discussion forum regarding each phase. Also, ask that students complete the program at the end of the course.

To ensure that students understand the material delivered after each classroom session, the effective health education technique was applied when giving hospital patients with health education during clinical training.

(III): Evaluation Phase.

At the end of the course the students' habits of mind and their academic stress were re-assessed for both groups using tool I, II, respectively.

Ethical considerations

A written informed consent was obtained from the students. They were assured that their participation in the study was voluntary. their right to withdraw from the study at any time was emphasized. Confidentiality of collected data was ensured.

Statistical Analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 23.0. The Shapiro-Wilk was used to verify the normality of distribution of variables; Comparisons between groups for categorical variables were assessed using Chi-square test (Monte Carlo or Fisher Exact). Student t-test was used to compare two groups for normally distributed quantitative variables while paired t-test comparing between before and after in each group. Significance of the obtained results was judged at the 5% level.

Results

Table 1 shows the distribution of nursing students in the study and control groups according to their personal and academic characteristics. It can be seen that more than half of the students (55%, 60%) in both groups were aged from 21 to 23 years old. Concerning the gender, the majority of them in the study group (95.0%) compared to more than three quarter of them in the control group (87.5%) were females.

Regarding the academic semester, it was found that 97.5% of the students in both groups were at the second academic semester. Meanwhile the **last GPA**, more than half of the students in both groups were fluctuated between B- to B+ (52.0% and 65% respectively). While, 82.5% of the students in both groups were from Urban area. Almost all of the students in both groups (100%) were single, Regarding, the information about flipped classrooms, it was discovered that almost all of them (87.5% and 100%, respectively) answered No. Finally, there were statistically significant differences between the two groups regarding you having any information about flipped classroom strategy P (<0.055*).

Table (2): reveals a comparison between the study and control groups according to habits of mind before and after applying flipped classroom strategy. Before intervention, it was observed that 62.5% of the students in the study group had a moderate level of habits of mind development compared to 57.5% of the control group had high level. After intervention, 95% of the students in the study group had high level of habits of mind development compared to 50% of the control group had moderate and high level .

There was statistically significant difference before and after participation of flipped classroom in favor of the study group in relation to students' habits of mind (p = <0.001*). Moreover, it was found that there was no statistically significant in control group before and after intervention p = (0.889). While, highly statistically significant difference was found between both groups after applying flipped classroom across overall habits of mind P = (<0.001*). **Table (3):** displays a comparison between study and control groups in according to academic stress before and after applying flipped classroom strategy. Before intervention, it was noted that about two third of the both groups had moderate level of academic stress (60.0%, 67.0% respectively). After applying the intervention, it was found that more than half of the study group had low level of academic stress (55%) compared to about

two third of the control group had moderate level of academic stress (67.5%).

There was statistically significant difference within the study group $P = (<0.001^*)$, while no statistically significant difference regarding control group before and after applying the intervention $P = (0.991)$. There was statistically significant difference between the both groups after applying the intervention $P = (<0.001^*)$ in favor of the study group.

Discussion

The study's findings revealed that the majority of studied students had a high level of habits of mind development in all its elements including Perseverance, Control recklessness, Reciprocal thinking, Thinking flexibly, Questioning and posing problems, Applying past knowledge in new situations, Imagination and innovation and Responding with amazement and wonderment after their participation in the flipped classroom. This result indicates the acceptance of the first hypothesis "undergraduate nursing students who are instructed by flipped classroom strategy exhibit higher habits of mind development than those who following the traditional method".

The high level of habits of mind development observed in the results can be explained by the fact that the students' first time studying a course through the flipped classroom strategy, they found that the flipped classroom strategy increased students' motivation, autonomy, and sense of accountability for their academic objectives. Additionally, it changes students from being passive learners to active participants by having them search through a variety of educational resources for information. All of the activities used in the classroom were clear and relevant to the course material, encouraging students to think critically, solve problems, share their ideas, pay attention, and increase their concentration in a flexible setting that helps them form mental habits.

This finding was aligned with many studies that have revealed a positive impact on the development of habits of mind in an experimental group of students who were

taught by the flipped classroom strategy (Muhanna,2015; Youssef & AlShahrai, 2021; Khalil et al,2021).

Regarding the **second hypothesis**, "undergraduate students who are instructed by a flipped classroom strategy exhibit lower academic stress scale scores than those who follow the traditional method". In the current study, there was a highly statistically significant difference between the study and control groups in relation to their academic stress after intervention **in favour of the study group**. Therefore, this finding of the study validated the effect of the flipped classroom strategy on decreasing the academic stress of nursing students; thus, the second hypothesis was accepted.

From the researcher's point of view, the result may be caused by the fact that the flipped classroom offered a flexible and non-judgmental learning environment in which group members felt comfortable expressing and exchanging ideas and thoughts. Moreover, the students in the current study are given the freedom to learn on their own time and at their own pace. The educators also take into consideration the demands of the students and their potential for better learning, which keeps them motivated and actively involved in the course given the importance and applicability of the material covered in the classroom. Students may have also directed their own learning and felt accountable, which lessens the stress of academics.

The decrease in students' academic stress in this study may be attributed to giving them access to educational media or internet resources at their convenience for use at home. Additionally, using class time to apply educational activities and have teacher-supervised discussions may have also helped to lower students' stress levels. Furthermore, with the researcher's assistance, students were able to engage in peer interaction by exchanging ideas and providing clarifications during conversations to address any misunderstandings or areas of ambiguity regarding the material. The discussion forum

also enabled the researcher to remain in contact with the students, respond to their questions, promote engagement in the course, and help them become more independent and self-aware learners. Additionally, the students received regular, timely, and helpful feedback about their informational presentations and classroom activities from the flipped classroom environment, the researcher, and classmates. This feedback helped them confirm their understanding and clarify misconceptions.

The current study results were supported by Kaur and Kuats (2020), who examined the impact of the flipped classroom instructional strategy on academic stress. According to the majority of study participants, students who were taught using the flipped instructional technique reported lower academic stress levels than students in traditional classrooms, and there were statistically significant differences between both groups. Furthermore, this finding is in line with the study of Noori et al. (2022), who discovered that a majority of students preferred a flipped classroom approach over the traditional method. They found that the implementation of the flipped classroom model enhances student satisfaction, lowers stress levels in the classroom, and improves learning outcomes.

The findings of the current study are consistent with the Aydin & Demirer (2022) study, which examined the effects of the flipped classroom model on students' academic progress and stress levels related to assignments. It was shown that flipped learning in small study groups and in the present study environments resulted in students feeling less pressured about their assignments. Furthermore, flipped learning was perceived by most students as having reduced stress and increased ease regarding their assignments. According to Kurt (2017), learning occurs in a less stressful and socially and psychologically relaxed environment while using flipped classrooms. Sun (2017) also discovered that students had good opinions about the flipped classroom

approach since they thought it made learning less stressful.

Conclusion

This study demonstrated the positive impact of the flipped classroom approach on students' habits of mind, which significantly improved their critical thinking, self-regulation, and behavior throughout the health education course. It also helped students feel less stressed while completing tasks. Moreover, these features may have contributed to the success of the success of the flipped classroom strategy in improving habits of mind and decreasing academic stress for students while also increasing their satisfaction with the strategy.

Recommendations

Based on the findings of the current study, the following are recommended

- Educational workshops should be conducted for the nurse educators at the faculty of nursing at Alexandria University to increase their knowledge about flipped classroom and its development.
- The habits of mind should be integrated in the curriculum with all its elements due to their enhanced efficacy for learners to engage their daily tasks and consider individual differences and special tendencies.
- The effectiveness of a training program to enhance habits of mind to attain professional competence among the members of the Lecturers in Alexandria University.
- . Replicate studies in other courses to investigate the effect of the flipped classroom on nursing students' software mastery and computational thinking in the computer course.

Table (1): Comparison between the study and control group according to socio-demographic data

Personal and academic characteristics	Study (n = 40)		Control (n = 40)		χ^2	P
	No.	%	No.	%		
Age in years					3.893	MC _p =0.169
17<19	3	7.5%	0	0.0%		
19<21	13	32.5%	18	45.0%		
21<23	24	60.0%	22	55.0%		
Gender					1.409	FE _p =0.432
Male	2	5.0%	5	12.5%		
Female	38	95.0%	35	87.5%		
Academic semester					1.013	FE _p =1.000
First	1	2.5%	0	0.0%		
Second	39	97.5%	40	100.0%		
GPA					2.475	MC _p =0.299
C- – C+	4	10.0%	1	2.5%		
B- – B+	21	52.5%	26	65.0%		
A- – A	15	37.5%	13	32.5%		
Residence					0.000	1.000
Rural	7	17.5%	7	17.5%		
Urban	33	82.5%	33	82.5%		
Social status					2.051	FE _p =0.494
Single	40	100.0%	38	95.0%		
Married	0	0.0%	2	5.0%		
Did you have any information about flipped classroom strategy?					5.333	FE _p =0.055
Yes	5	12.5%	0	0.0%		
No	35	87.5%	40	100.0%		

χ^2 : Chi square test

MC: Monte Carlo

FE: Fisher Exact

Table (2): Comparison between the study and control group according to habits of mind .

Habits of Mind	Study (n = 40)				Control (n = 40)				Study vs control	
	before		after		Before		After		χ^2 (p ₁)	χ^2 (p ₁)
	No.	%	No.	%	No.	%	No.	%		
Overall										
Low	1	2.5%	0	0.0%	0	0.0%	0	0.0%	4.602 (0.070)	20.313* (<0.001*)
Moderate	25	62.5%	2	5.0%	17	42.5%	20	50.0%		
High	14	35.0%	38	95.0%	23	57.5%	20	50.0%		
Total score									t (p ₁)	t (p ₁)
Min. – Max.	63.0-130.0		74.0-145.0		80.0-151.0		93.0-143.0		1.530 (0.130)	5.162* (<0.001*)
Mean ± SD	110.1±11.4		128.6±11.4		114.7±15.3		114.3±13.3			
t(p ₀)	9.794* (<0.001*)				0.141 (0.889)					

χ^2 : Chi square test

t,p₀: Paired t-test comparing between pre and post intervention in each study and control

t,p₁: Student t-test for comparing between study and control in each pre and post intervention

*: Statistically significant at p ≤ 0.05

Table (3): Comparison between the study and control group according to academic stress

Academic stress	Study (n = 40)				Control (n = 40)				Study vs control	
	Before		After		Before		After		Before	After
	No.	%	No.	%	No.	%	No.	%	χ^2 (p1)	χ^2 (p1)
Overall										
Low	5	12.5 %	22	55.0 %	4	10.0 %	5	12.5 %		
Moderate	24	60.0 %	15	37.5 %	27	67.5 %	27	67.5 %	0.548 (0.794)	16.405* (<0.001*)
High	11	27.5 %	3	7.5%	9	22.5 %	8	20.0 %		
Total score									t (p1)	t (p1)
Min. – Max.	73.0-145.0		60.0-158.0		58.0-145.0		67.0-151.0		0.740	3.988*
Mean ± SD	113.6±23.7		89.0±24.4		109.8±22.8		109.8±22.2		(0.462)	(<0.001*)
t(p0)	5.916* (<0.001*)				0.011 (0.991)					

χ^2 : Chi square test

t,p0: Paired t-test comparing between pre and post intervention in each study and control

t,p1: Student t-test for comparing between study and control in each pre and post intervention

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