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## Use of Flipped classroom methods in nursing education: A narrative review of literature

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# Use of Flipped classroom methods in nursing education: A narrative review of literature

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## Abstract

**Introduction:** Deployment of flipped lecture room techniques in undergraduate nursing program can be a very useful tool in increasing the student's attention and learning process. It brings in a lot of accountability for self-learning among nursing students. **Aim:** The main aim of this review was to identify studies that have been conducted in nursing education using flipped classroom methods or techniques, to identify the benefits achieved by students and faculty members, to describe the current practice from studies reviewed and to develop a feasible model for practice. **Materials and methods:** The review was done using the electronic data bases including Google Scholar, Scopus, Science Direct, PubMed, and CINAHL for primary studies, which used flipped classroom techniques in nursing education. Seven articles which met the criteria for review were included. **Results:** The outcome of this review revealed that the flipped lecture room model proves to be beneficial to the students including improvement in their mean test scores, self-learning and increase in their level of confidence in performing clinical skills. Further, this review showed that it brought in satisfaction to students and faculty members (who were involved in the studies reviewed) when compared to traditional methods of teaching and a simple model to execute this flipped classroom method was developed. **Conclusion:** This review has identified seven studies which used this flipped classroom method and the benefits identified were exciting achievement for nursing students and educators, developed confidence among nursing students in performing clinical skills, enhanced self-learning, development of one's own learning style among nursing students and increase in their final grades of their exams. A total of 403 students were participants in this review and it requires further research into particular strategies and indicators which proves the effectiveness of flipped classroom methods. Studies in this review are mainly from western counterparts and few studies from the Asian continent, thereby highlighting the need for further research.

**Key words:** Flipped classroom, nursing education, innovative teaching methods, flipping classroom model, methods of flipping

## Introduction

Flipping the lecture room can be a very useful technique in delivering nursing curricula, leading to reinforcement and effectiveness of topics acquired. For instance, we find a notable number of students who miss the original lectures due to varied number of reasons and the prerecorded lectures (a flipped classroom method) help them in understanding the missed lectures. On

other hand, the students can go through the lectures for reviewing it before exams. It is a known fact that virtual learning increases the retention power of students.

### Aim

The main aim of this article is to identify studies that have been conducted in nursing education using flipped classroom methods or techniques. To identify the benefits achieved by students and faculty members, to describe the current practice from studies reviewed and to develop a feasible model for practice.

### Meaning and definitions of flipped classroom method

Flipping the lecture room is defined as a new innovative method in which the nursing students are exposed to a

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new topic outside the actual class, usually via lectures, videos, reading activities and then the actual class time is used to assimilate the knowledge gained using a variety of learning methods.

### **History and origin of flipped classroom method**

The flipped class room methods have been defined by many authors in different ways. The term “flipped classroom” became popular during the year 2007 when it was introduced by teachers - Bergman and Sams. They came up with this method as they realized that classroom time would be spent more effectively this way than the traditional method. Some authors also argued that this flipped classroom method can be a reversal of the traditional classroom teaching methods.

Bergman and Sams (2012) pointed out that the flipped teaching could be delivered via a video lesson to students before the actual class, so that they will be able to gain a deeper understanding about the topic learned. In recent days, the flipped classroom techniques have been widely used by teachers in higher educational institutions, which helped student engagement, active learning and enhance learning via technology.

There is no particular way or method to do the flipped classroom technique and it depends on the courses and the contents taught. Many educators suggest the blended learning model to be incorporated into the method. Hughes (2012) reported that the flipped classroom is a didactic idea and strategy, which replaces the standard classroom lecture. The author further discusses that this method provides the students with opportunities to reconsider, examine and interrogate the subject matter along with the educator.

Zappe et al. (2009) conducted a study among the undergraduate architectural engineering students and assessed the effectiveness of flipping the classroom technique. The results of the study revealed the students’ perception regarding the use of this classroom flipping method as a learning tool. The students felt that only half of the course content can be used with flipped classroom method. The students also felt that rest of the classes should be taken using the traditional lecture methods. Andrea Smith, a math teacher from Washington; as cited by Tucker (2012) in her article on “the flipped classroom,” used this method of 4-6 minutes video flipped classroom method and found it

had greater benefits for the students immediately after using this technique of teaching.

Hart (2013) released the results of their study done at Duke School of Nursing and published in their magazine regarding their experiment with flipped classroom method and reported the following: The faculty members conducted an experiment on the flipped classroom method to teach adult chronic and acute health problems. The instructors reported that what is taught in the class can be done confidently in the clinic by this method. The faculty members also felt that students engage in active learning rather than being passive in the traditional lecture method of teaching. The article also discusses the critiques in use of this method as it takes more time and effort for the teacher to prepare and involves work of teacher and student to work ahead of time.

### **The need for this review on new innovative flipped classroom teaching method**

Induction of this flipped method of teaching in nursing courses becomes easier if a review of literature is done. The nurse educators can read past studies using this flipped classroom technique and can adopt any one of the ways mentioned or develop a strategy on their own. Teaching complicated and important content in nursing and other health care courses is very challenging. The authors of this review, who work in different universities across Middle East, found that there is an overload of content to be taught within stipulated period of time, which remains as a major challenge for all the educators. It was essential to conduct a review of literature on nursing research studies, which have used this flipped classroom methods and gain an evidence to use this method. The existing knowledge and practice related to flipped classroom techniques in nursing education needs to be described, so that it would help the nurse educators to analyze and use it into practice. This method can be called innovative as it is a modification of the existing teaching method either using computer (for power point lectures), reading materials or technology like video recording. According to Bristol (2014) while exploring the “flip” we need to keep in mind that it is not about gaining competency but it is also about “learning how to learn” for long lasting success and retention of taught content.

The book on “Trend Perspective, the Flipped Classroom, Transforming Class time into active learning experiences” (2014) describes the core concepts. This book also emphasizes the flipped classroom technique as a prominent trend in nursing education. As we are in a dynamic and digital world, the nursing education should also be in par with the developing trends.

## Materials and Methods

The review was done using electronic data bases to search for primary studies, which used flipped classroom techniques in nursing education. The search terms used are “flipping in nursing education, flipping classroom model, innovative teaching techniques and flipped classroom.” A total of 106 articles which had direct and indirect information regarding flipped classroom teaching in nursing education were obtained. Out of which only seven articles which met the criteria for review were included. The data bases like, Google Scholar, Scopus, Science Direct, PubMed and CINAHL were searched for relevant articles.

### Criteria for selection of articles included in review

1. Articles (with abstracts and full texts) available in English language.
2. Primary studies done using flipped classroom methods in nursing programs to teach under graduate nursing subjects or clinical skills.
3. Research articles published between the years 2010-2016.
4. Studies using randomized control trials, descriptive and exploratory research designs were included.

For the purpose of assessing the quality of articles included in the review the EPHPP (Effective public health practice project) evaluation tool were used. A rating of “moderate” was obtained where it had at least one score denoting weakness in the articles reviewed. This is a global rating for quantitative studies which includes evaluation of choice influence, research approach, unobserved exposures and methods of obtaining data, missing or rejected ones, quality of interventions and systematically examining the studies under review.

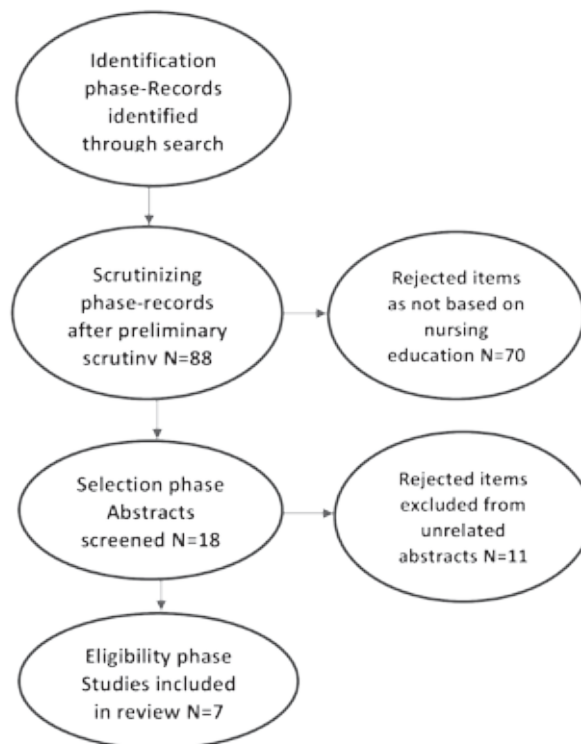


Figure 1: The PRISMA chart for identifying studies related to flipped classroom

## Results and Discussion

There are lots of studies done using the flipped classroom technique. This is commonly used in the middle and higher secondary schools and other higher education institutions worldwide. The use of flipping the classroom is sparsely used in nursing education, though there are studies reporting use of this innovative method. The authors were able to obtain seven articles that were primary studies which met the selection criteria.

The selection of studies for the review did not only include randomized control studies but also other study designs like the descriptive and exploratory studies to get a broader view. The review has revealed that the flipped classroom method has been used widely among nursing faculty members and has proved to be beneficial to students and faculty members themselves. The studies under the review had compared this new method with the traditional method of teaching to know its benefits. Most of the studies in the review (four studies) introduced this new method into their nursing curricula to see if it helped the students to

gain maximum benefits. The other studies compared this flipped method with the traditional method of lecturing if this had an effect on the student academic performance. However, studies in the review have not provided any standards or indicators for assessing the flipped classroom technique as an effective teaching method. Outweighing the benefits against this flipped classroom method, it has definitely proved beneficial. Majority of the scientific research in this review were from the USA (Five studies Critz, et al., (2013); Post, et al., (2014); Harington, et al., (2015); Geist, et al., (2016); Simpson, et al., (2015); one study from New Zealand (Rodriguez & Zealand, 2015) and one study from India (Singhla, et al., 2016). The participants involved in primary studies of this review were 403 and it was a small number across USA, New Zealand and India.

The cross-sectional study with 20 participants carried out by Critz, et al., (2013) tested the flipped model as a strategy in nursing education and described to have enormous benefits for educators and learners.

A descriptive phenomenological study which explained the experiences of student nurses enrolled in the medical-surgical nursing subjects was reported by Post, et al., (2014). The study evolved four themes that are slightly different from all other studies. Even though the study reported benefits of flipped classroom, it was with challenges. The themes which were reported by the authors are frustration, disconnectedness, depersonalization and additional time. These findings could be due to the reason that any new methodology (video lessons as the flipped model) introduced into curriculum can also have negative experiences and shows people do not easily adapt to new changes.

The study reported from New Zealand by Rodriguez, & Zealand, (2015) compared student's results and feedback after using flipped classroom models. The results of the study showed increase in confidence among them to perform clinical skills using case scenario methods and gave an opportunity for students to develop their own learning style. This finding would serve as a base for other students to identify and adopt their own style of learning.

An experimental study using a constructivist theory approach was carried out to compare two pedagogies

both traditional classroom teaching and flipped methods (focus groups and video sessions as flipped methods) by Harington et al. (2015). This study reported no statistically significant differences between group outcomes but found it as an effective strategy. Whereas, a similar study of comparing traditional and flipped classroom models by Geist. et al. (2016) reported knowledge gains and positive responses from students who used flipped classroom methods, which used HESI (Health Education Services Inc) using HPL principle (how people learn principle as flipped methods). Similar kind of results were reported by Singhla . et al. (2016) from India ,which also compared traditional and flipped classroom methods (using quiz, brain storming and discussion methods) and found that the mean scores of flipped classroom groups proved to be higher than the traditional methods. Simpson et al. (2015) reported in his descriptive exploratory study that further research is required to note the similarity between learner effectiveness for different subjects using discrete teaching strategies and models.

All the above studies provide us an evidence of a definitive benefit for students to gain knowledge and skills as the investigators in the reviewed studies had used a variety of techniques for flipping the classroom, but they do not provide us with specific indicators for the success of flipping lecture room models in graduate nursing education. The number of evidences to support the success of this method is very less and hence the findings cannot be generalized. The review also showed that it requires a lot of accountability from students towards self-learning and demands a significant amount of work from the faculty point of view.

This review adds to literature that flipped classroom strategies need to be based on certain framework for practical usage and hence the authors attempted to develop one. Further, this review describes that students would like to attempt new innovative techniques like flipped classroom models than the traditional lecture methods. The current nursing education trends invite new innovative teaching methods which would enhance student centered learning.

**Method of using the flipped classroom technique**

This review has guided the authors to have a solid discussion about various methods of how the flipping of a classroom can be used in a nursing program. It involves the process, which includes flipping with its foundation, guiding the study, the classroom time experience and examining the effectiveness of the flipping the lecture room method.

Flipping involves in helping the students to gain a competency before they engage in the actual or real-time classroom experience against pre-identified outcomes and goals. It is basically student centered and requires that the instructor emphasizes on the accountability among the students to learn. The student’s prior knowledge and understanding which is required before the start of a class should be planned. It is appropriate to prepare a study guide for the students to have a better clarity about flipping techniques and the expected learner outcomes.

The flipped classroom instructor prepares a video based lesson (or any methods like reading materials, power point lectures, case scenarios, discussions, quizzes etc.) and post it to the students or learners. Following that the students are expected to watch the video and gain an understanding about the topic, which would be dealt in the upcoming class. The following day in actual class the students can review, analyze and investigate more deeply along with the instructor so that they gain maximum knowledge regarding the topic. The inventors of this method Bergman et al. (2012) pointed out that it may take the students more time initially to adapt to this method. Bergman (2012) discussed that it enhanced the student’s understanding of the topic and it encourages students to ask in-depth questions from the topic. Further, he points out that more time will be available to deal with individual students.

The instructors have the freedom to develop their own learning experiences and use that in their clinical settings. For example, use of simulated patients or standardized patients may help the students to learn and discover new knowledge areas. The teacher can just function as a facilitator, monitor and guide. Another example can be asking each student to write a two-minute plan of care for their patients and after that to flip that with their co students. The objectives will be met realistically

using this method. Ultimately, the innovative teaching methods like a flipped classroom model can offer a change from routine teaching learning process thereby creating an enjoyable learning environment for the nursing students.

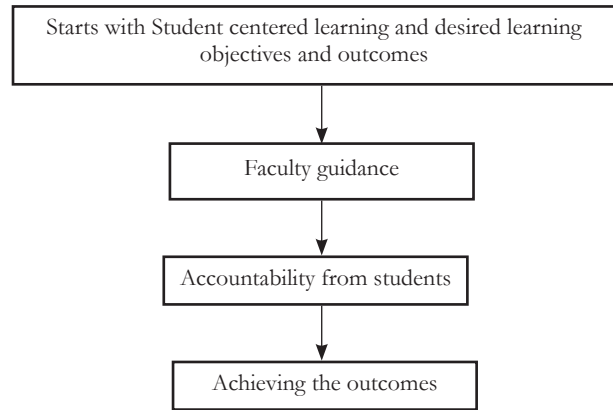


Figure 2: Suggested Model for flipped classroom techniques: Based on Tim Bristol model (2014)

The above model was developed with extensive literature support, expert opinion and modified from the model developed by a nurse educator Bristol (2014). The model begins with a central idea of having students as the midpoint of this innovative learning method and it is based on their learning objectives and outcomes. Induction of this method begins, when students are actually aware of their learning needs, their goals and expected outcome. The faculty member just serves as a guide and helps the students in getting the concept in the right way. The next step flows down to the heart of this model, as requiring accountability from students themselves. If they are not making real efforts to go through the content which is taught by the flipped method (such as video lessons, power point presentations or any method which is adopted for this method), then this teaching method ends up in failure. The last step of this model is achieving the outcomes of the learning process. If any of the step does not work out the process has to be repeated from the beginning.

There were a total of seven studies, which met the criteria and those are summarized below for a better understanding of this review. This summary describes the objectives, samples, research design and outcome of the studies reviewed.

Table 1:

*Summary of Studies which used Flipped Classroom Techniques in Nursing Education*

Name of the author, year of study and place of study	Objectives of the study	Study design	Participants	Outcome of the study
Critz & Knight (2013), United States of America	To test the flipped model as a proven method in graduate nursing education	Cross sectional	20	The tested model proved to have enormous benefits for the learners and educators.
Post, Deal & Hermam (2014), University of Texas, United States of America	Explained student experiences of flipping the classroom in two medical-surgical nursing courses	Descriptive phenomenological study	Convenient sample of 18 students out of which 15 were female and three were male.	Perception of nursing students after which four themes evolved: -frustration -disconnect -de-personalization - additional time, even though flipped class room was beneficial there remained challenges
Rodriguez & Zealand, (2015), New Zealand	Utilizing the flipped lecture room model in clinical practice course for the third-year nursing students	Simulated case scenarios	60	The similarities between older methods and flipped lecture room methods were analyzed with students' comeback reports and revealed that it had created a feeling of self-assurance while using clinical skills and further it paved way for the students to develop and adopt self-learning styles.
Harrington, Bosch, Schoofs, Bales, Anderson & Kirk (2015), United States of America	To examine the after-effect of learners through various methods between two groups, utilizing flipped and traditional classroom teaching	Experimental design –constructivist theory approach	82 undergraduate nursing students	The results revealed that there were no observable difference found between the 2 groups and further reported that flipping technique was observed to be successful and innovative method for teaching nursing students.
Geist et al. (2016), United States of America	The objective of the study was to examine if there were any observable difference in the knowledge gain while using the traditional lecture strategy and flipping technique.	Quasi experimental design (two groups)	40 in control group, 46 - treatment group	The study findings showed that there were observable differences between previous three unit exams but no difference was found in the mean scores of final-exam grade. Meanwhile, the students had an optimistic response for the new innovative method of teaching.
Simpson & Richards, (2015) United States of America	Reconstructing the process of teaching the subject matter after curriculum revision by flipping the classroom design	Descriptive exploratory study	64 third year nursing students using convenient sampling technique	The study results encouraged the use of flipping techniques and methods and future research is necessary to identify the difference in learner outcomes while using this innovative method in comparison with other methods of teaching.
Singhla, Saini & Kaur (2016), India	To assess the efficacy of flipped classroom method with traditional teaching methods on student nurses' performance	Quasi experimental	73 students out of which 35 students in group A in traditional method and 38 students in group B in the flipped classroom method.	The study results concluded that flipped classroom method had better results on student performance as compared to traditional teaching method.

### Limitations of the review

This review had included all possible primary studies, but some relevant studies would have been missed out. Articles written in other than English language would have reported strong evidences but these were not examined in the review. The quality of primary studies were not all experimental or randomized controls trials, instead descriptive exploratory studies even with small samples were included in the review which may not provide strong evidence.

### Implications for practice

Flipped classroom method can be included as a routine method of teaching theory and clinical courses in the nursing curricula as many studies have proved its benefits. This method also supports higher order of learning and can help in achieving the Blooms taxonomy of objectives. This method will also be helpful to students to review their lessons before exams, which would increase their retention of knowledge and retain it for longer periods of time. The results of studies in the review have shown that either the method or the flipped classroom model had given satisfaction to students and faculty and hence, development of more models and research can be undertaken in this area.

### Conclusion

The use of flipped classroom techniques for nursing education still needs to be researched for its effectiveness. This review has identified seven studies, which used this flipped classroom method and the benefits identified were enormous benefits for both learners and educators, developed confidence among nursing students in performing clinical skills, enhanced self-learning, development of own learning style, and increase in their final grades of their exams. The review reveals that even though there are many studies conducted using flipped classroom techniques, it requires further query into particular strategies and indicators which proves the effectiveness of flipped classroom methods. Moreover, studies documented are mainly from western counterparts and few studies have been documented from the Asian continent thereby highlighting the need for further research.

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