

Effectiveness of Flipped Learning: A Critical Review of Researches

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Abstract

This study analyses the research findings related to the effectiveness of flipped learning on student learning by conducting a critical literature review. Content analysis method was used to study extensive research articles from referred/peer reviewed journals of last 10 years. The findings of the present study revealed that flipped learning method has the potentiality to develop students' positive attitude and motivation to learning, higher order thinking skills, 21st century skills and learning achievement. The study concluded with the suggestions to teaching community to apply flipped learning in their classes and the research community to carry out researches in Indian context.

KEYWORDS: Flipped learning, attitude, motivation, higher order thinking skills. 21st century skills

Introduction

The use of technology in teaching and learning has become standard in 21st-century educational endeavours. Technology has continued to have an impact on our day-to-day affairs like how we read, write, and use written language for communication and learning as a result of the widespread use of computers and global communication networks. Technology can also be an effective tool for improving self-learning, developing a communicative environment, and enhancing learners' accuracy (Pardosi 2021). Integration of technology, e-learning are being reflected in country wide educational policies. According to current worldwide educational goals, it is of utmost important to cultivate students' reading ability, mathematical ability, and scientific literacy, encourage collaboration with others, and develop problem-solving skills. (Chou, Chen & Hung, 2021). With the innovations in digital learning and online learning, in India, National Education Policy in 2020 proposed to blend online learning with activity based and experiential learning at all levels of education (NEP, 2020). Teachers are inspired to become more creative with the development of the digital age and the accessibility of cutting-edge teaching tools. One example of a technology-driven approach that is gaining popularity and relevance is the flipped learning.

Flipped learning otherwise known as inverted classroom where the traditional class undergoes a flip that is the classwork is done outside of class hours and the homework is done in class hours. In flipped learning method, students are provided with immediate access to video lectures, slideshows, and other educational materials of the content on online educational platforms that they are supposed go through at home. (Bergmann & Sams, 2012 as cited in Campillo-Ferrer & Miralles-Martínez, 2021). The in-class time is devoted to clarify the doubts, to discuss the ideas presented, to enhance thinking, collaborative learning and to provide different

student-centred activities(Alsowat, 2016). The flipped learning implies an educational process in which students enter synchronous mode with some theoretical knowledge and awareness of the subject learnt from asynchronous mode (Irianti, Febriani and Friatin, 2021). “In flipped learning lessons are delivered outsideof the group learning space using video or other modes of delivery. Class time, then, is availablefor students to engage in hands-on learning, collaborate with their peers, and evaluate theirprogress, and for teachers to provide one-on-one assistance, guidance and inspiration”(Hamdan et al., 2013 as sighted in Sahoo & Mohalik, 2023, p. 156). In this context, the researcher was interested to conduct a literature review critically to reflect on the studies that were designed to assess the effectiveness of flipped learning method.

Methodology

The present study is focussed on critically analysing the effectiveness of flipped learning on students learning as an instructional method. A total of fifteen peer reviewed articles from referred/peer reviewed journals of last 10 years were collected, out of which nine studies were experimental studies, three were survey articles and rest three were review articles. Maximum studies were conducted in foreign countries China, Indonesia, Malaysia, Saudi Arabia, Egypt, Pakistan, United States of America, Sweden, Taiwan and Spain and only two studies were from India. Content analysis method was used to analyse the research papers critically.

Analysis of Researches on Flipped Learning

Due to vast use of technology and innovative pedagogy, many researches were conducted on the different aspects of flipped learning both in India and Abroad. Some of the relevant research findings are discussed in following paragraphs.

Experimental Studies:

Irianti et al. in 2022 carried out a study to compare the effectiveness of the flipped classroom model with traditional instruction in promoting higher order thinking skills in listening comprehension classes. The participants were third-semester students at a private university in Indonesia, purposively assigned to experimental and control group. The experimental group received instruction using the flipped classroom model, while the control group received traditional instruction. The researchers collected data through pre- and post-tests, which measured students' listening comprehension skills and performance-based assessment as proposed by Brookhart, 2010 which measured higher order thinking skills. They also used a modified form of questionnaire prepared by Ahmad, 2016 together students' perceptionson the flipped classroom model. The data was analysed using descriptive statistics and inferential statistics. The study concluded that the flipped classroom model proved to be an effective approach in promoting higher order thinking skills inlistening comprehension classes and in bringing positive attitudes towards the flipped classroom model and felt more engaged and motivated in their learning. The study highlighted the necessity of instructor's plan, internet accessibility, individual students' involvement were some factors connected to flipped learning.

Zain, et.al. in 2022, discovered that group-based flipped learning (GBFL) is a successful strategy for developing higher order thinking skillsamongpre-service teachers. The level of higher order thinking abilities among pre-service teachers and the indicators of GBFL that can enhance higher order thinking skills were the two

research objectives that the researchers developed. Higher order thinking skills including integrating theory into practical teaching and learning practice, comparing and contrasting theories, and evaluating the validity of various theories were all addressed by the rubric used to assess the success of GBFL. The findings revealed that pre-service teachers who took part in GBFL performed much better than non-participants in every category. cooperative learning, active engagement, and self-directed learning, are the factors which can enhance higher order thinking abilities. These results collectively imply that GBFL is a promising strategy for developing higher order thinking skills in future teachers.

Campillo-Ferrer & Miralles-Martínez (2021) carried out an experimental study to explore the perception of student teachers of primary education on their learning and motivation taught through flipped classroom approach. Total 179 student teachers were taught for a term through synchronous and asynchronous mode of learning. The pre-test post-test control group design was adopted and a questionnaire was used at both the stages. Result of this study revealed the presence of significant difference exists between experimental and control group towards a positive perception towards the variety of techniques and strategies used in this model, which contributed to their level of motivation. The categorical variable gender was found to be neutral. This study recommended flipped learning as an effective pedagogy to improve student motivation and learning during challenging times such as a pandemic.

Chou et al. (2021) conducted an experimental study to evaluate the effectiveness of flipped learning towards learning motivation and attitude in language learning. Total 386 high school students were considered as sample. A pre-test post-test control group design was used with the statistical methods such as analysis of variance and regression analysis for analysing the data. The findings revealed a significant positive learning motivation and learning attitude among experimental group and suggested flipped learning method can be used to eradicate poor language performance.

Pardosi (2021) found that flipped learning method of teaching had a positive impact on Chinese undergraduate students' development of higher order thinking skills (HOTS). Quasi experimental research design was adopted for this study. The researchers used statistical analysis paired sample t-test, to analyse the significant difference between the pre-test and post-test scores of the participants. The results showed that the students who received flipped learning instruction had significantly higher scores on the post-tests than those who received traditional teaching methods.

Angadi, et.al. (2019) carried out a study to assess the effectiveness of flipped learning in a medical science under graduate course. Pre-test Post-test control group design was adopted for 98 medical students. The study found a significant difference existed between pre test and post test score at $p < 0.001$ and a positive perception towards flipped learning as an engaging and interesting instructional method was observed among the students.

Ghoneim & Badawy in 2018 tried to explore the impact of flipped learning on the higher-order thinking skills and engagement of students. The study was conducted on a sample of 110 students of a nursing program which is randomly distributed to experimental and control groups. The findings suggested that flipped learning was an effective learning method and promoted student-centred learning which allows for

more interactive classroom environments. The study also highlighted the importance of engagement and satisfaction in predicting student learning and achievement.

Nwosisi, et.al. (2016) conducted a study to analyse the effectiveness in flipping thirty percent of the course content and concluded with a positive result of learning effectiveness among students. An improvement in grade score as well as positive perception towards flipped learning which helped in learning the material in a better way was collected from both quantitative and qualitative tools from a total 109 school students. This study suggested further researches to carry out for different student populations like special children to have an understanding on its wide range effectiveness.

Alsowat in 2016 reflected that the flipped classroom was successful in boosting students' engagement, contentment, and higher order thinking skills in foreign languages. A quasi-experimental research design was adopted and a total of 67 graduate students were considered as sample. The study also reported that students had an opportunity to review the lesson and concretize their understanding of the content while going through the posted lesson. Additionally, students had enough time to acquire the lower-order thinking skills at their own pace and may submit notes and comments about the lesson. Lower-order thinking skills were revised in the classroom to facilitate students' learning. Activities under the instructor's control, such as discussions, critical thinking, pair work, group work, etc. were designed to practice higher order thinking skills during the in-class period which ultimately offered more student engagement.

Szparagowski (2014) revealed in a high school mathematics course, the use of a flipped classroom strategy boosted student learning results and engagement. When compared to regular classroom settings, students who used this strategy showed more creativity and teamwork.

Survey Studies:

Asad, et.al. (2022) reported that flipped learning method had potential to improve student engagement, performance, and learning in the class. A survey method was adopted and 73 higher secondary grade students were considered as sample. The finding of this study demonstrated students' belief that flipped learning can develop 21st-century skills such as communication, thinking, interpersonal, and self-direction among students.

Lee & Lai in 2017 concluded that the flipped classroom paradigm was a successful strategy for encouraging pupils to engage in higher-order thinking. According to the study, students generally felt good about the flipped classroom strategy and demonstrated a growth in their capacity of critical thinking. Focus group interviews and online quizzes were used to collect quantitative and qualitative data, which helped to provide a thorough knowledge of students' perspectives and results.

An descriptive survey by Nouri in 2016 revealed a majority of the students were favourable towards the utilisation of Moodle, video and appreciated the use of flipped learning. Positive attitudes towards flipped classrooms were closely associated to beliefs that learning experience was more effective, motivated, and engaging. The researcher used a questionnaire to collect information from 240 number of students on various experiences and attitudes of pupils with poor and high academic achievement.

Overall, the results point to the potential effectiveness of the flipped classroom model as a teaching method for increasing student involvement and academic success.

Review Articles:

From a meta-analysis of 95 research articles with an objective to understand the effectiveness of flipped learning on students' learning achievement and motivation carried out by Zheng, Bhagat, Zhen, & Zhang, in 2020. The results of this study revealed that flipped learning approach had a moderate effect size on learning achievement and motivation. Sample size, intervention duration and sample regions were significantly moderating the effect sizes.

A conceptual review prepared by Pang in 2020 concluded that the quality of learning in English as a Foreign Language (EFL) was improved as a result of the flipped learning method and the use of social media and had the potential to improve critical thinking in EFL students.

Ligi & Raja in 2018 made a comprehensive analysis on the concept and potential benefits of cloud computing and its integration with flipped learning and how effectively that would help students, and teachers. The basic features of cloud computing like open access, space for collaborative work, creative & effective management of class will assist flipped learning in bringing more effectiveness to it.

Findings & Discussion:

Flipped learning method was found to be effective in creating productive student engagement (Szparagowski, 2014, Alsowat, 2016, Lee & Lai, 2017, Ghoneim & Badawy, 2018). 21st century skills like communication, higher order thinking skills, critical thinking, creativity, self-direction and interpersonal skills were found to be improved by adopting flipped learning method (Szparagowski, 2014, Alsowat, 2016, Lee & Lai, 2017, Pang, 2020, Pardosi, 2021, Zain et al., 2022, Irianti et al., 2022, Asad et al., 2022). A positive attitude, motivation and perception of students' towards flipped learning experience was quite evident as it employs students' engagement and providing learning autonomy to the students (Nwosisi, et al., 2016, Angadi, 2019, Chou et al., 2021, Campillo-Ferrer & Miralles-Martínez, 2021, Irianti et al., 2022). The post score analysis of experimental studies reflects a comparative better achievement score which again depicts the potential benefit of flipped learning (Nwosisi et al., 2016, Angadi et. al., 2019, Zheng et al., 2020). Integration of technology cloud computing with flipped learning was found to be effective (Ligi & Raja, 2018).

Reflection on the Research on Flipped Learning

From the above experimental studies, it was found that flipped learning method as an instructional method gained success different educational programs. But it was observed that the studies did not bother about the covariates and other intervening variables like gender, qualification, experience which may also affect the result of the study (Irianti, 2022). Lack of randomization hinders the generalizability of a study, which was noticed among the studies undertook (Pardosi, 2021, Irianti, 2022). Few sample size also a factor to be concerned towards the generalization of the study (Zain et al., 2022). Lastly a significant observation was most of the experimental studies didn't mention the exact difference between the experimental and control group in terms of intervention, that brings a question mark to the findings of the experiment.

Educational Implications:

The use of technology-enhanced learning to flip the classroom has a favourable impact on students' motivation, engagement, and innovation in the classroom. Flipped learning has been proved to have the strength to cater the needs and demands of 21st century education. The results of this study explored the effectiveness of flipped learning in achieving 21st century skills, learning achievement, positive attitude, motivation, higher order thinking skills. Thus, hereby it calls the teachers and teacher educators to apply flipped learning method in their regular classes. The present study recognised the need to do analyse the effect of flipped learning method on different dimensions of learning by controlling the covariates and intervening variables. A need of conducting true experimental study was realized. As most of the studies were of international studies so it is suggested to carry out researches in Indian context by taking local context into consideration. As it was evident that flipped learning is powered to design students' engagement so it is recommended to teachers' community of distance and open learning to apply in their classes.

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