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Flipped classroom: A Systematic Review

Dr. Ananthi Sheshasaayee[1], Ms. Renuka Priya. N[2]
[1]*Associate Professor & Head, PG & Research Department of Computer Science, Quaid-E-Millath Government College for Women (A),Anna Salai, Chennai-02.,*
[2] *M.Phil. Research Scholar, PG & Research Department of Computer Science, Quaid-E-Millath Government College for Women (A), Anna Salai, Chennai-02.*

ABSTRACT

In the modern world, the learning materials have gradually been applied to flipped classrooms. In fact, with colleges being forced to shift their teaching on-line because of the COVID-19 pandemic, the flipped classroom has become one in every of the foremost effective teaching for learning. Flipped classroom model may be an education approach which implies that activities that have historically taken place within the room and the other way around. The flipped classroom ensures that students become additional active participants compared at intervals the normal classroom. Flipped learning is additionally cited as inverted learning. In Flipped learning, half or all of direct instruction is delivered through videos and different media. Several faculties and Universities have embraced Flipped learning model because it provides opportunities for enlarged peer interaction. The most objectives of this survey paper to fulfil the wants concerning the review of recent literature on the utilization of the Flipped classroom approach in education.

KEYWORDS: Flipped learning, Inverted learning, Descriptive content analysis, learning outcomes, online learning environments

I. INTRODUCTION

With the recognition of flipped classroom, most lecturers have begun to implement the flipped learning approach, which permits students to preview learning materials before class. Flipped classrooms are a student-centered method, that is, students can spend more time [1]. The Flipped classroom (which is additionally cited because the inverted classroom or the reverse classroom) educational model could be a teaching approach, that reorients the learning method by reversing ancient in-class activities and out-class activities (Lage et al. 2000). These changes offer opportunities for students to move and engage in instructor-monitored learning activities throughout face-to-face in-class sessions whereas being supported by personal technology-mediated instruction during out-of-class learning (Bishop and Verleger 2013). Consequently, the flipped classroom replaces what was previously in-class lecture content with what was previously out-of-class preparation (Pierce and Fox 2012). Consequently, the flipped classroom educational model stimulates an education transformation that permits student-centered learning practices and moves far away from ancient teacher-centered pedogogies [2]. Flipped learning has many functionality benefits which include extra one-to-one interaction time among instructor and students, lively learning and co-operation, and self-paced learning. Also, it offers students with flexibility with inside the event that they pass over some lectures (Roach 2014). According to Bergmann Overmyer & Wilie (2015), the flipped classroom allows the teacher to be a facilitator and also increase interaction and personalized contact time between students and teachers. The flipped classroom is also explained as creating problem-based learning inside the class and replacing direct instruction with the videos in order to provide instructional content to be accessed whenever and wherever it is required by students (Bergmann Overmyer & Wilie). Hamdan et al. (2013) stated that instruction can be delivered by recording and narrating screen casts of work on devices, creating videos of teachers while teaching or gathering video lessons [3]. This survey article aims to provide a review of recent literature on the use of the flipped classroom model in education.

II. LITERATURE REVIEW

1. David Gonzalez-Gomez, Jin Su Jeong (2016) developed performance and perception in the flipped learning method. They aimed to evaluate the effects of the flipped classroom on the students' performance and perception of this flipped learning methodology.

Author aimed to assess the suitability of the IIM usability in terms of Students' performance and perception, comparing the results with a TCS. The study was conducted in a general science course, Somophore of the primary education bachelor degree in the training teaching school of the University of Extremadura (Spain) during the course 2014/2015. Authors implemented t-test comparing TCS with IIM. Authors highlighted that the flipped activities were more students' oriented than the traditional settings. Generally all the students agreed that the flipped instruction method provided them the possibility to work autonomously and in their own place, and possibility of re-watching the multimedia material was of great help, especially for the students to catch up on missed material. This relatively new instructional methodology claims that flipping your classroom engages more effectively students with the learning process, achieving better results [4].

2. Khe Foon Hew and Chung Kwan Lo (2018) used flipped classroom approach to improve student learning in health profession education. Author examined the flipped classroom approach versus traditional classroom on student learning. Twenty Eight eligible comparative studies showed associate in nursing overall important impact in favour of flipped classrooms over traditional classrooms for health profession education (Standardized mean difference, SMD=0.33, 95% confidence interval, C-I=0.21-0.46, $p<0.001$) with no proof of publication bias, additionally, the flipped classroom approach was more effective when instructors used quizzes at the beginning of every in-class. More respondents reported they most well-liked flipped to traditional classroom [5].

3. Gokce Akcayir, Murat Akcaryir (2018) present a large-scale systematic review of the literature on the flipped classroom, with the goals of examining its reported advantages and challenges for both students and instructors. The full range of Social Sciences Citation Indexed Journals was surveyed through the Web of Science site, and a total of 71 research articles were selected for the review. The findings revealed that the most frequently reported advantage of the flipped classroom is the improvement of students' learning performance. Author found a number of challenges and majority of these are related to out-of-class activities, such as much reported inadequate student preparation prior to class [6].

4. Bengi Birgili, Fatma Nevra Seggie (2021) developed the trends and outcomes of flipped learning research between 2012 and 2018. Descriptive content analysis was used to review 316 research and conceptual article published in academic journals. The flipped learning approach is mostly conducted in higher education. Author states that flipped learning method is considerably effective. The outcomes of flipped learning indicate an increase in student performance and positive influence on cognitive, affective, and soft skills [7].

5. Yu-Sheng Su and Chin-Fenng Lai (2021) have applied educational data mining to explore viewing behaviours performance with flipped classroom on the social media platform Facebook. The learning achievements of students may be improved by using the social media platform Facebook for students to actively engage in flipped classroom. Author implemented K-means Clustering Algorithm which generated cluster of learning performance. Their study provides insights that may be useful for understanding how students engage in flipped classroom with the social media platform Facebook [8].

6. Yongsung Kim, Eenjun Hwang (2018) developed Twitter news-in-education platform for social, collaborative and flipped learning. They proposed a platform called TNIE that utilizes Twitter in the NIE environment. It has many advantages when compared to traditional NIE. To evaluate the performance of the platform, authors implemented a prototype system, and used SVM classification to improve scheme's performance. According to the results, 87.8% F-measure on average is superior to the 78.94% of previous studies. SVM gave the best performance when compared to Naive Bayes, K-NN, Decision tree (C4.5), and Random Forest [9].

7. Dizou, Haoran Xie (2020) proposed Wikipedia can be integrated into flipped learning in higher education through the project based learning approach. They proposed a flipped learning model where Wikipedia was involved in creating a collaborative learning environment. An online collaborative learning platform, GMoodle was developed to provide an interactive learning environment for the participants' learning Wikipedia. The result showed that learning with Wikipedia in the flipped classroom was more effective than learning with Wikipedia in the conventional classroom [10].

8. Rouo Martinez-Jimenez, M.carmen Ruiz-jimenez (2020) presented an experience about flipped classroom in two courses related to business management in a Spanish University. The most purpose of the paper was to test if the flipped classroom methodology improves students' performance and to research the students' level of satisfaction. All the information data has been analysed, additionally, author used Mann-Whitney U test to analyse if statistically difference between the two courses marks exist. Result show that students are very satisfied with the experience. Academic results have been improved with flipping courses, compared with traditional course [11].

9. Tsai-Fa (TF) (2020) Yen aimed at verifying the procedures and effects of flipped classroom for online teaching. Data was collected by the students after they have finished the online teaching course of Tourist management, Sichean University of science and Engineering. According to the basic information of the participants, of 39 respondents, 3 were males and 36 were females. Regarding class attendance, 34 were full attendance. These flipped classroom activities include in-class activities, before-class activities, after-class activities could promote learning performance. They introduced sense of humour for teacher and the atmosphere within the class is found to have the positive benefits to the flipped classroom for online teaching. The activities of online teaching for flipped classroom in the department of Tourism management can improve students' learning effectiveness, including knowledge learning, skills and engagement [12].

10. Mohamed Ali Nagy Elmaadaway (2018) developed a flipped classroom approach on class engagement and skill performance in a blackboard course. Author reported on a study that investigated whether a flipped classroom approach enhanced perception of levels of engagement and skill performance among students enrolled in a blackboard course at Saudi University. 58 participants were divided into flipped and traditional group. Students' performance was examined in terms of quantitative descriptive analysis. The study examined the effect of flipped teaching on students' self-perceived classroom engagement and blackboard skill acquisition. The result received significantly higher perceived classroom engagement in the flipped group, and participants reported a preference for the flipped approach over other teaching methods [13].

11. Chung kwan Lo and Khe Foon (2017) Hew proposed a critical review of flipped classroom approach in k-12 education. Author provided an overview of their flipped learning activities, the findings about the effects of flipped course on achievement, student attitude toward flipped classroom approach, and challenges associated with its implementation. They have mentioned that there is no proof that flipped classroom approach negatively impact student learning in k-12 education [14].

12. William James Zuber (2016) presented a review of flipped classroom. They explored a set of literature in order to clarify the flipped classroom model (FCM) theoretical frameworks and to determine improvements in learning for students in comparison with traditional teaching method. The FCM literature received in this paper indicates inconsistencies of the tactic, very little proof that the FCM improves student performance. This is, however, a uniform outcome that the surveys indicate positive views of a FCM, a preference over traditional lecture strategies from each students and academics in addition to proof that the tactic doesn't decrease student performance. The FCM is heavily dependent on technology and this can be very important thought for all who consider employing the FCM [15].

13. Hafidi Mohamed, Mahnane Lamia (2018) developed implementing flipped classroom that used an intelligent tutoring system into learning process. Author implemented flipped classroom as an element of Internet of things (IOT) into learning process of mathematical logic course. In the flipped classroom, an Intelligent Tutoring System (ITS) was used to help students work with the problems in the course outside the classroom. Their article showed that perceived usefulness, self efficacy, compatibility, and perceived support for enhancing socialites are important antecedents to continuance intention to use flipped classroom [16].

14. Juan A Martinez-Carrascal, Teresa Sancho-Vinuesa (2020) developed a flipped classroom performance prediction which is based on a different data-mining technique. The proposed system uses data collected from a first-year Engineering degree offered at public university. This prediction will be made by considering whether students' perform different activities are instructed. Author used Decision tree (DT), Support Vector Machine (SVC), and K-Nearest Neighbor (K-NN) Algorithm. Support Vector machine (SVC) provides good results when compared to Decision tree (DT) and K-NN [17].

15. Marie Barnard, Erin Dehon (2020) have developed a competency model and tailored assessment method for high school science teachers by using a flipped learning approach. They aimed to improve teachers' ability to effectively implement technologically engaged modules in a flipped classroom setting. Competencies were identified via participatory evaluation techniques and assessments were aligned to the competencies. The competency of teachers in the knowledge, skills, and ability needed for creation and delivery of effective flipped lessons can be tracked using a radar graph tailored professional development [18].

Flipped learning as an effective teaching and learning tool : Flipped learning appears to be used as an effective teaching and learning method more and more across the globe. As this study shows, the extent of studies conducted on flipped learning is developing daily. The findings emphasize that flipped learning allows students examine statistics greater completely in comparison to different modes of teaching and that it boosts the

students' educational overall performance and overall success. Flipped learning techniques are among the most efficient ways of facilitating permanent learning in education and in other fields.

III. CONCLUSION

The trend in flipped learning studies suggests that this method is considerably effective. Flipped learning has played an important role in traditional educational methods giving way to non-traditional technology-based methods. Students find flipped learning pedagogy to be an effective method in the classroom. This method positively effects students' achievement, attitude, cognitive skills, and soft skills since they take more responsibility for their own learning. This survey article presents various works on flipped learning approach. This survey justifies the capabilities of flipped learning technique in the educational sector. It is conducted through this survey that without any doubts, flipped learning method will improve the quality of education and the educational system.

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