Flipped Classroom Model – A Response to the Emerging Trends in the Teaching Learning Landscape

Sudha Srinivasan, Harish Kumar

Abstract: Flipped Classroom Model has emerged over the last two decades and its popularity is growing rapidly in the recent years. This study reviews and analyses the research on Flipped Classroom Model in higher education from a variety of aspects. The main aim of this study is to identify the factors that influence the popularity of Flipped Classroom Model and making it a worthwhile activity to implement. The study also examines the new trends and rapid transformation in the digital and education landscape and the associated changes in the current education system. A six-step process suggested by Cooper & Hedges (2011) is used to identify and synthesis the data required for this study. Findings from the study show positive influence of Flipped Classroom Model in higher education on different parameters including students’ academic achievement and their level of engagement. Further, this paper discusses the opportunities and challenges in designing and implementing Flipped Classroom Model deeply associated with our traditional higher education system.

Keywords: flipped classroom model, higher education, research synthesis, student engagement.

I. INTRODUCTION

While the world aligns with the big data management and digitalization, data dumping prevailed in the classrooms as the instructors flood the students with extensive information to cover the scholastic curriculum. Equipping students seemingly for the future world was an unreasonable matter with the role of educators.

Technological advancements and innovations dominate all sectors of society in the modern world. While different domains were quick to adapt to the changes, education sector remained comparatively unchanged till the massive digitalization. A look into many classrooms has literally proven the incapability of the sector in adopting the rapid changes in the recent past decades. Though the classrooms are equipped with new technology like smart boards, the method of teaching and learning remains more or less unchanged when compared with the traditional ways.

The theory and practice of learning is referred to as ‘pedagogy’. The term refers to various elements in the teaching-learning process like instructors, students, learning environment and learning tasks. The nature of relationship between teachers and students as well as the teaching and learning approaches utilized in the instructional design is confined in the term ‘pedagogy’. Conventional methods of teaching are replaced in the modern world of teaching with different perspectives on learning. Current teaching methods combine the traditional and modern perspectives of learning to effectively use the range of possibilities in pedagogy.

In the domain of Teaching and Learning, the Flipped Classroom Model (FCM) is a new instructional strategy, which uses digital learning as an effective tool. FCM is the reverse of Traditional Learning Method (TLM) where delivery of content often happens online or at the exterior environment of usual classrooms. In FCM students can use online media as a learning medium as well as a platform for collaborative discussions.

NEED AND SIGNIFICANCE OF THE STUDY:

Current research is focused on the impact of FCM, a new pedagogical approach on the student community. In TLM, sharing of knowledge is not effectively enunciated, as it is a one-side approach. Instructors play a prominent role in teaching and learning as they share their knowledge with the students. Student participation or sharing of their views is comparatively less or nil in this kind of approach. The new approach of FCM enables and equips the student community to gather knowledge from the online platforms instead of traditional face-to-face approach. Present research analyses the impact of FCM on the learners from the previous studies conducted by the researchers. Cognitive and constructivist theories are integrated to evaluate the results of the new pedagogical approach.

The present era is witnessing swift changes in information technology domain and the education sector experiences specific countenance or serious compulsion to replace the TLM with modern learning techniques. The new learning techniques should leverage the power of technology to the fullest extent and should inculcate latest skills such as Critical thinking, Collaborative learning, Communication and Creativity. Many kinds of research on the effectiveness of FCM have proved it to be more suitable in the modern scenario. Similar studies throw light on the challenges involved in transitioning to a new model, identifies factors that can influence the teaching-learning process when FCM is used.

The present research study focuses on reviewing the existing studies done so far in the adoption of the FCM in the education sector and on identifying the need for further study. A review is carried out on related research studies to

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see the trends, observations and findings from the researchers across the globe. This study is delimited to the university level courses and classrooms where FCM have been experimented.

**OBJECTIVES:**
The study has been able to achieve the following objectives:
1. To analyze various perspectives and views on the concept of FCM
2. To explain the concept of the FCM as a worthwhile activity to provide an engaging learning experience for the learners
3. To identify and understand the key components of the FCM and their relevance
4. To articulate the changing role of teachers and students in the context of the FCM

**II. RESEARCH QUESTIONS:**
The following research questions formed the basis of the present study:
1. What are the various perspectives and views on the concept of flipped classroom model?
2. What are the pedagogical factors that make FCM a worthwhile activity to provide an engaging learning experience for the learners?
3. What are the key components of FCM?
4. What are the challenges faced by the different stakeholders in adopting FCM?
5. What is the impact of FCM on student’s learning?

**III. RESEARCH METHODOLOGY:**
The process of identifying and synthesizing the available research articles was based on the six-step process suggested by Cooper & Hedges (2011)

- **Step 1: The Research Problem – Is Flipped Classroom Model an Effective Response to the Emerging Trends in the Teaching Learning Process**
- **Step 2: Setting up the criteria for searching the relevant literature**
- **Step 3: Evaluating the studies for suitability to explore the research questions under consideration**
- **Step 4: Gathering information and data from the selected studies**
- **Step 5: Interpreting the evidence to support the research questions**
- **Step 6: Presenting the results**

Current research problem explained with Cooper’s 6 step process below:

**Step 1. The Research Problem:**
Is Flipped Classroom Learning an Effective Response to the Emerging Trends in the Teaching Learning Process

Traditional Learning Model (TLM) has the inability to make students actively participate in the learning process. The lectures delivered in the classrooms fail to hold the attention of the students for the required period. The need for a more active and effective method that will make students actively involved in the learning process through various methods and techniques arises because of the weakness of the TLM. The utilisation of modern techniques in scholastic curriculum will equip students with effective knowledge sharing and enhanced engagement. Students can be more pro-active with the support of the new techniques in their academic activities. Active learning has got much weightage as the active elements like deep learning, concentration etc. have found to have a positive or active effect on students, while procrastination in upper-level learning can have a negative effect on students.

Flipped Learning is a method of learning that has an active effect on students. The word flipped is related to the word inverted. In flipped learning the traditional method of education is inverted with the latest tools available for learning, making the students actively participate in the learning process. Online classes and video-based studies can be used for teaching the students in flipped method. As a result, the education system benefits with more time and space for teaching rather planning for making students engaged and concentrated. In a flipped classroom model students are taught via video-based or video recorded teaching modules, or through problem-solving technique, which will engage them more. Homework on problem-solving skills can be done as a group activity through Internet medium where students will involve in smaller or larger groups in order to solve the problem. A community of peer learners can be created where students can join with a group during their study process, making it more engaging and fun to learn, as it’s their peer whom they learning with. The flipped model has some features like:
- Flexible timing
- Better utilization of outside classroom time
- An effective way of class homework’s completion
- Productive in-class, out of class tasks
- Active learning, peer circle learning and deep learning
- Efficient learning activities prior and post the class
- Usage of modern technology in education

**Step 2. Literature Review**
There is a sizeable and increasing literature of studies investigating FCM, on different factors comparing it with the Traditional Lecturing Method. The popularity of FCM does not match the magnitude of primary research studies. The criteria of inclusion in literature review:
1. Papers that included the words “Flipped Learning”, “Flipped Classroom”, “Flipping”, “Reverse Teaching” in the title
2. Papers published between 2015 and 2018 in English Language
3. Papers with variables associated with learning
4. Setting is based on the Course of study, Methodology adopted in research, Duration of the study and Sample size
5. Findings and Conclusions based on the research data analysis and which gives further scope for FCM model in learning

**Step 3: Evaluating the Suitability of the studies**
Articles and review papers on ‘flipped learning’ were examined and evaluated to establish the desired outcome of the research. Aspects under consideration while collecting data
1. Reliability of data
2. Suitability of data
3. Accuracy
Kevin R. Clark, et al (2015) studied The Effects of the Flipped Model of Instruction on Student Engagement and Performance in the Secondary Mathematics Classroom and discussed that FCM gave the possibilities of an active Mathematics classroom instead of a passive one. The students performance was analyzed based on pre and post-survey record and were monitored on daily basis. By making classroom activities and the home work more engaging, active learning happened in the class. The students demonstrated positive influence and response to flipped learning.

Stacy M.P. Schmidt et al., (2016) in ‘The Flipped Classroom: A Twist on Teaching’ discussed that the flipped classroom was found as one the effective way of teaching students in the modern education system. The study deals with the methods of flipped classroom since it has various ways of implementing it. The pros and cons of flipped classroom are also discussed in this paper.

Arina Evseeva et al., (2015) analyzed the Use of Flipped Classroom Technology in Language Learning and discussed the process of flipped classroom implementation in language classes. The results were found to be positively correlated to student’s motivation as well as the students’ academic performance, the model of flipped classroom was found to be more effective in the language classroom.

Step 4: Data Collection—Gathering Information from Secondary Sources and Reviews on FCM

20 Studies that were screened using Step 2 and Step 3 are tabulated below:

<table>
<thead>
<tr>
<th>No.</th>
<th>Author(s)</th>
<th>Variables</th>
<th>Context setting Methodology</th>
<th>Findings/ Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lombardo, Lakshmi &amp; Munkkonen (2018)</td>
<td>1. Achievement of learning outcomes 2. Student Satisfaction 3. First-year undergrad students</td>
<td>Course: Principles of Microeconomics  Methodology: Quasi-Experimental study  Duration: Over three years  Active Learning methods, Partial flip, Full flip  N = 117 for a full flipped class  First-year undergrad students</td>
<td>Students achieved higher grades in both flipped courses compared to the non-flipped active learning course. The partial flip strategy saw better learning outcomes than full flip and non-flip</td>
</tr>
<tr>
<td>2</td>
<td>Foldnes (2016)</td>
<td>Scores of students Cooperative Learning</td>
<td>Methodology: Randomized control-group pretest-posttest experiment  Course: Study 1 – Statistics  Study 2 – Mathematics  Duration: 1 Semester  Two variations of Flipped Classroom implemented. One without cooperative learning and the other with collaborative learning  In both cases, the Flipped Classroom compared to the Traditional Lecture Method  First-year undergraduate students</td>
<td>The second study where Cooperative learning integrated gave better results proving that cooperative learning is an essential component of Flipped Classroom</td>
</tr>
<tr>
<td>3</td>
<td>Rotellar, C., &amp; Research, Perspectives, and recommendations on implementing the flipped classroom.</td>
<td>Course: Pharmaceutical Methodology: Experimental study</td>
<td>Technology advancements facilitated Flipped Model in Pharmaceutical Education</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Sneegri, mani, (2018) India</td>
<td>Student perception</td>
<td>Course: Anatomy  Duration: not mentioned  First-year MBBS students  Sample: 163</td>
<td>Flipped Classroom is more engaging than the traditional classroom. Students exhibited positive perception of this method of teaching</td>
</tr>
<tr>
<td>5</td>
<td>Siewiran, Rudi Subramaniam (2018) Malaysia</td>
<td>Concept of the Flipped Classroom</td>
<td>NA  Characteristics of Flipped Classroom</td>
<td>The concept is based on Baker’s suggestion of a stage on the stage and Fimian’s view is a democratization of learning</td>
</tr>
<tr>
<td>6</td>
<td>Lo and Hew (2017) Hongkong</td>
<td>Mathematics achievement</td>
<td>Course: Mathematics  Duration: 2 to 4 weeks  One group pre-test post-test design  Grade 12 (Form 5)  13 underperforming students and 24 high ability students</td>
<td>Both extremes underperforming and high ability students showed learning gains using a flipped classroom</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Reference</th>
<th>Academic Performance</th>
<th>Course/Methodology</th>
<th>Duration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lee and Choi (2016)</td>
<td>Course: Pre-dental curriculum</td>
<td>Pre-class learning helped achieve the intended learning gains in FCM self-directions but not self-regulation found to significantly influence pre-class learning performance and perceived learning readiness. It contradicts the studies which claimed self-regulation changes FCM.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yilmaz (2017)</td>
<td>Course: Computing</td>
<td>Students’ and teachers’ readiness level in e-learning differed before FCM. They should be provided training on the e-learning skills if needed before applying FCM.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nguyen, Vu, Japutra (2019)</td>
<td>Course: Advanced Marketing class</td>
<td>Main dimensions of Reverse teaching are preparation, interaction, and outcomes. There is a crucial link between these dimensions and the understanding of reverse teaching.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uohi &amp; Oshin, (2017)</td>
<td>Academic achievement</td>
<td>When compared to the traditional model, students showed higher learning gains, more positive student perception, and higher student satisfaction. The teacher reported increased opportunities to communicate and collaborate with students. Teachers found that the substantial front-end preparation can be a limitation and slow down the progress.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hwang, Lai, &amp; Wenz (2015)</td>
<td>Learning strategies</td>
<td>Seamless learning which suggests learning across house, in-class and in real-world context can achieve by using the mobile and wireless communication technology.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tabas &amp; Toto, (2018)</td>
<td>Attitude towards Mathematics</td>
<td>The gain in student performance, positive attitude about Mathematics, positive perceptions about the usefulness of the Flipped classroom model.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Student Engagement</td>
<td>Students were more positive when the semester progressed though it varied at the beginning of the semester. No steady academic gains. Suggests that the more than the theoretical increase the impact is on the engagement with peers and administrators that needs further research using appropriate tools.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blau &amp; Shamarin-Neibl, (2017)</td>
<td>Roles of co-creation and cooperation</td>
<td>Active learning helps improve results. Teachers felt more satisfied and declared their experience as “excellent.” Provides longer retention, better communication, develop mastery, and personalized learning.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Step 5: Interpreting the Evidence

The findings from the most recent studies show that different subject areas were dealt with FCM treatment and very interesting variables were studied. Some predominant subject areas are from Engineering, Medicine, Mathematics and Teacher Education.

Different parameters considered in the included studies are tabulated below.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Outcomes</th>
<th>Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Outcomes</td>
<td>Positive</td>
<td>1, 2, 6, 7, 10, 12</td>
</tr>
<tr>
<td>Learning Outcomes</td>
<td>No change</td>
<td>13</td>
</tr>
<tr>
<td>Engagement</td>
<td>Improved</td>
<td>4, 13, 16</td>
</tr>
<tr>
<td>Perception</td>
<td>Positive</td>
<td>4, 10, 12, 14</td>
</tr>
<tr>
<td>Concept and Characteristics</td>
<td>NA</td>
<td>5</td>
</tr>
<tr>
<td>Use of Technology</td>
<td>NA</td>
<td>1</td>
</tr>
<tr>
<td>Deeper Learning</td>
<td>Positive</td>
<td>17, 18, 19, 20</td>
</tr>
<tr>
<td>Knowledge sharing and Focus</td>
<td>NA</td>
<td>11</td>
</tr>
<tr>
<td>Real world application</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>

In the TLM, the learning content is accessible by the student only through the teacher. A mirroring process is followed in the TLM, where the teachers play the prominent role in distributing knowledge to the student. Student listens, reads and recalls the information shared by the teacher in the class. Therefore, TLM is less interactive and very limiting in its approach.

Step 7: Presenting the Report

Transition from TLM to Futuristic Learning Model
A futuristic model is comparatively different with its innovative approaches and standards. The role of the teachers changed to a facilitator of learning where they aim to create an inquiring mind among the student community by creating an inquiry atmosphere. Teachers support the students in developing their skills and in rightly engaging their ideas and concepts.

1. **Factors that make FCM a worthwhile activity**
   - **Students prefer visuals and digital resources**
   - **Time Saving Model**
   - **Video lessons can be viewed with ease by pausing, slowing down or clicking on links**
   - **Prior learning of the topic to be discussed in the class**
   - **Repeated watching or listening of instructional materials is possible**
   - **Equips with upgraded and latest skills.**

2. **Collaborative Learning:** Pre-class tasks allowed learners to gain basic knowledge about the new concept. This freed up classroom time to promote deeper learning by engaging in collaborative in-class activities. Interaction and active participation is possible with group discussion, applications etc. Pre-class videos and discussions will be more cognitive in nature. Collaborative tasks bring in the dimension of metacognition that helps students to be reflective and evaluative about their progress.

3. **Integration of Technology:** Few researchers consider FCM as a branch out of Blended Learning due it is huge dependency on Technology. To attain the expected outcome from the active learning tasks planned for the in-class activities, learners should come prepared to the class with some basic knowledge and readiness level. Researchers report that E online platforms like Moodle, social networking sites and communication tools like Whatsapp need to be effectively integrating in the implementation and delivery of FCM.

4. **Alternate modes of assessment:** The mechanism to assess student learning in FCM must be designed in multiple stages. Pre-class tasks should be assessed using worksheets an writing assignments. Online quizzes provide immediate feedback both to the teacher and the learner. Collaborative activities need to be evaluated not only to check students understanding of the concepts but also on their ability to work in groups and presentation skills. The level of student understanding can be evaluated from the rate of video participations and the tough concepts which need more detailed explanations, and can be done in direct interaction.

**The Next Gen Model**

The Next Gen Model has clear-cut advantage over the TLM as it is more dynamic. A change from the traditional model is inevitable to gain articulation in curriculum. Students in the new model will be equipped with required capability to deal with unfamiliar questions which need a higher order thinking and upgraded skills.

**Flipped Classroom Model**

In a flipped classroom or inverted classroom the learning model is completely reversed. The major activities of learning such as lecturing and home assignments are being flipped or reversed in the new model. Practice assignments which were completed earlier at home is now discussed and worked on during the class hours. Direct instruction or lecturing is provided to students as videos or reading assignments which can be completed at home.

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**Key components of FCM**

1. **Self-directed Learning:** One of the biggest changes that FCM brings in is providing an opportunity to inculcate self-learning habit in learners through the pre-class tasks. The practice in many formal educational institutions is that the control of learning is in the hands of the educators and administrators. In FCM learners take responsibility of their learning by making connections of the new concept with their previous knowledge and constructing meaning to the new content. This is in line with the increasing need to develop lifelong learning habits in the learners.

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**The Challenges in adopting FCM**

The success of the Flipped Classroom Model depends on

1. **Internet Speed and Availability:** The speed of the Internet connection determines the speed of data download and upload. Speed gets affected by hardware, software, number of users etc. It is suggested that the teachers have thought of alternate solutions like sharing the digital resources in flash drives or through other online mediums where the resources can be downloaded.
2. **Different instructors explaining the concept in different ways:** The videos and resources found on the internet may not suit the learners because of alternate approaches or language or the difficulty level of the content dealt in. It is suggested that the teachers get trained to produce some digital resources in such situations.
3. **Digital Absenteeism:** It is not guaranteed that students will watch the videos or other digital resources that are assigned to them as self-study material. It is suggested that attendance or grades are linked with the pre-class activities. Care should also be taken to ensure that the mere access of resources should not be awarded grades activities. Care should also be taken to ensure that the

This study aims to analyse the benefits of implementing flipped classroom based on the chosen 20 articles that report on flipped learning classroom initiatives between the years 2016–2018. It was observed that research into the flipped classroom engaged different

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areas of studies, methodologies and technology tools or online platforms.

The flipped classroom motivated students to study at their own pace and made classroom time available for interactive learning activities. It also benefitted students academically and motivationally.

**Practical Implications: The impacts of applying FCM on student’s learning**

FCM helped teachers as well as students in managing time effectively. Instead of giving instructional lectures in the class, educators can utilize the classroom time in the best manner. Learners can learn the different concepts at their own pace and engage in discussions with the educators during the direct interaction. Information can be accessed repeatedly in the flipped model, so the level of understanding can be more. Opportunities of giving feedback to the learners increases in FCM. There is scope for the educators to personalize the content according to the capability of different learners.

**FUTURE SCOPE OF THE STUDY:** From the responses of the teachers and students who have adopted FCM, it is clear that Flipped learning is a necessary learning strategy to achieve relevant and meaningful educational outcomes. Rigorous experimental studies should be carried out in different geographical locations to understand the impact of FCM in the global context. More studies should be conducted to examine the suitability of Flipped Classroom Model in K-12 segment.

FCM has emerged over the last two decades. There is more work to be done to further our understanding of FCM. A particular challenge will be to develop a framework for the instructional design for FCM. Future studies should not only focus on videos and other digital resources for self-learning by students but should also give more importance to structure and design of in-class activities that will deepens the students learning. The flipped classroom model should be practiced correctly and thoughtfully to develop students higher cognitive domains.

Some future research directions would be to understand the influence of FCM in developing lifelong learners who possess the capacity of self-initiated educational growth. The current emphasis on FCM makes it appropriate to understand the psychological dimensions of FCM.

**IV. CONCLUSION:**

Educators and learners need a changed mindset to accept a new strategy like Flipped Classroom Model. Active learning methods help students to develop creativity and higher order thinking skills. It gives the students an engaging experience and an efficient way of understanding different topics. Students develop self-efficacy in independent learning. Students prefer interactive learning than in-person lecturing. When compared to traditional instructional methodologies, student learning is improved with flipped classroom models. The flipped model provides opportunity for educational institutions to provide more relevant and meaningful learning to millennial students.

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