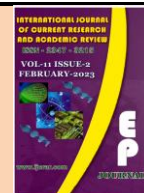




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The Way of Implementing Flipped Class Room in Computer Science Department

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Abstract

During COVID pandemic time, our education system totally affected. Nearly one year students couldn't go to either schools or colleges. At that time the concept of Flipped Class Room implemented in our education system. So students got an opportunity to continue their studies during the pandemic situation. As a Computer Science teacher, it had to be easy for implementing Flipped Class Room. However, they also faced lots of difficulties like preparing study materials and videos and internet facility for sharing these materials. Another major problem was that they were not sure about that students got all the materials. It is difficult to make the students understand the concepts with these materials. The Flipped Class Room should be an interactive class room and should be evaluated periodically to overcome these problems. Many tools and techniques are available for the creation of study materials & videos. For Example, Google Class Room, EdPuzzle, Quizizz and so on. Flipped learning is adaptive, flexible, and effective. Creative planning, creation, and distribution of content is the key to creating a successful flipped classroom. In this paper, I am going to review about the concept of Flipped Class Room for Computer Science Students like Definition, Types, Implementation, Tools & Techniques used, Advantages & Disadvantages and soon.

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Flipped Class Room, Flipped Learning, Learning Eco System, Videos, Education, Evaluation.

Introduction

Flipped Classroom is a new instructional model. In Flipped classroom activities should be conducted to make the students more productive and active. In flipped classroom teachers have to prepare the content, the way of delivering the content and the activities regarding the content. The teacher should plan the schedule for every information sharing and the activities.

The teacher should engage the students with variety of activities like Discussion, Hands on Activities, Case Study analysis, Problem Solving and so on. It is the more economical model. However it requires more effort from

teachers. Teachers should be more prepared before the academic year. That means teachers have to prepare the study materials, schedule and activities during the vacation time.

In student's perspective, Flipped classroom is the easiest way of learning. Students can watch their lesson videos anytime and anywhere with internet facilities. It helps them to understand the lessons in effective way.

They can also go through the lessons as many times to do the activities given during the class. When compared to the traditional classroom, Students learning improved for flipped classroom (Bishop *et al.*, 2013)

History of Flipped Classroom

In the shadow of Colorado's Pike's Peak, veteran Woodland Park High School chemistry teachers Jonathan Bergmann and Aaron Sams stumbled onto an idea. Struggling to find the time to reteach lessons for absent students, they plunked down \$50, bought software that allowed them to record and annotate lessons, and posted those online (Tucker, 2012). This idea is now known as Flipped Classroom. This idea was very useful to the absent students as well as other students. Other students also used this opportunity to review the classroom lessons.

Teacher's Roles and Responsibilities

In traditional classroom, the teacher delivers the lectures in the class hours and then gives student homework to be done after class hours. But in flipped classroom this concept is reversed. In flipped classroom, the teachers are responsible for,

Preparing Video Lecturers

Preparing interactive sessions

Preparing activities to be done in class hours

Discussing about video lecturers and study materials

Clarifying doubts of the student regarding lectures and activities

Encouraging the students to participate in the activities

Evaluating the activities done by students

There are three major role for the teachers in flipped classroom (Choi and Yoonjeong, 2021)

Pedagogical role

Professional role

Evaluator

As Pedagogical Role is the most prioritized role, Teachers should be able to adapt to the new technologies for the development of learning resources.

Student's Responsibilities and Roles

In Flipped classroom, student should be more responsible.

They should be self-motivated to learn the lessons and to do activities. They should also develop the Time Management Skills, then only they could finish their understanding of lectures before the class hours. They should be more interactive with teachers and their friends. It would help them to clarify the doubts regarding lectures & activities. It would also help them to improve their communication skills. In addition, Fast learners could take responsibility of teaching to their friends those who struggling to understand the lectures and activities.

Parent's Responsibilities and Roles

Like teachers, parents also play the most important role in the implementation of flipped classroom model. They should provide the proper environment, the Computer and the internet facility to the students in home to participate in flipped classroom. They should also monitor their children whether they are concentrate in the class or not. They should periodically discuss their children's performance with the teachers and try to help the children for improving their performance.

Tools for Flipped Classroom

The most digital tools used for flipped classroom can be categorized into the following software category (Loizou, 2022).

Approaches for Flipped Classroom

To implement flipped classroom idea in our class, Initially Teachers should prepare the Study materials like videos, clippings and presentation. After that they should plan more activities like quiz, discussion and mini projects. They should also completely schedule the class, activities and the final evaluation. This is the initial approach for flipped classroom. In First day of class, teachers should make all the materials available to students and have to give instructions regarding how to access the study materials. The proper schedule should be given to the students. They have to give proper instruction to the parents also.

As per the schedule, all students must go through the study materials before the class. During the class hours for few minutes, teacher would discuss about the corresponding lectures and clarify their doubts. Then teacher would give activities regarding the lectures. Students can do the activities by discussing in groups and teachers. After completing the activities, teacher should

evaluate the activities and assess about the student's understanding about the lecturers. The teacher should be check whether the students meet the course outcome or not.

Flipped Classroom for Computer Students

As a Computer Science Teacher, there are more challenges in implementing the flipped classroom. However there is a major advantage of knowledge about technologies which would help to create study materials, organize the online classes and assess the activities.

The teachers can either create their own video lecturers or use the videos already available. The teacher has to plan the classes separately for theoretical contents and practical work. There are many study materials available now from SWAYAM or NPTEL portal. Teachers can also use these course materials to deliver the lecturers. During class hours the teacher should plan more practical activities like program writing using Technical Languages, developing mini projects and so on.

Mostly a Computer Science teacher can implement the flipped classroom idea with the Project Based Learning Approach (Sanchez-Romero *et al.*, 2019). In PBL approach, students could integrate both theoretical and practical content and to apply them on real world problems. But the PBL approach is only applicable to major subjects of the courses. For the remaining subjects we can use some other approaches like quiz, forums and so on.

Advantages of Flipped Classroom

According to Computer Science students, there are many advantages in flipped classroom (Ramírez *et al.*, 2014). They are,

Flexibility to learn from videos

Better comprehension of the context

Advantage of having knowledge about class before the class starts

Motivation for learning

According to the teachers advantages of the flipped classroom (Shi-Chun *et al.*, 2014) are,

They can work closely with the students during class hours

Students attitude was improved towards learning

Teachers can group students together

Students ability for solving problems were improved.

Disadvantages of Flipped Classroom

There are many challenges in implementing flipped classroom idea.

Bad Internet connections

Need of special software and hardware

We need some examples of solved problems

Some students would feel difficult to understand by watching videos

The videos should be short, otherwise the lectures will be bored

Every new idea will be difficult to implement initially. But it will become more comfortable by practice. Even though there are many challenges in implementing the flipped classroom idea, there is an immediate need in transforming our education system. During COVID'19 pandemic period, our education system totally collapsed because we didn't be prepared for that situation. We tried the flipped classroom idea during pandemic time without proper knowledge and plan. So it looks like a disaster in education system.

Now it's a time to plan correctly and implement the flipped classroom concept in our education system. Before that our teachers as well as students must be aware of flipped classroom approaches and tools to be used. By providing proper training and counseling, the flipped classroom can be implemented in a successful way.

Fig.1

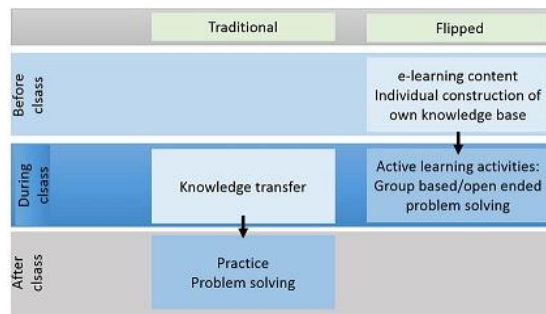


Fig.2



Fig.3

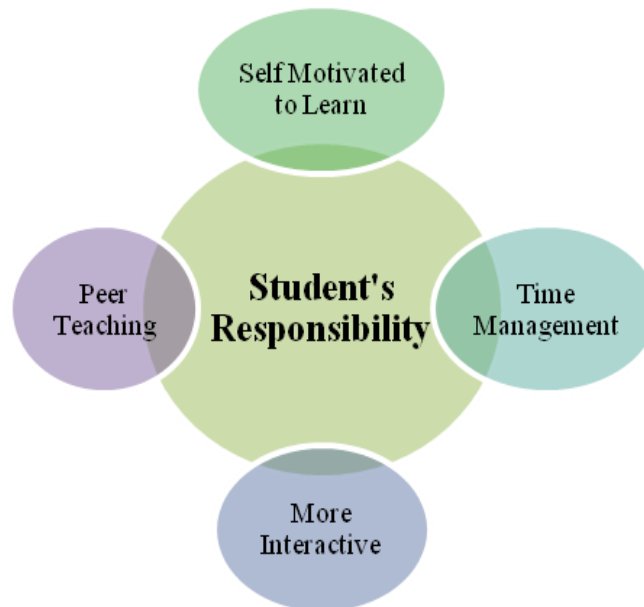


Fig.4

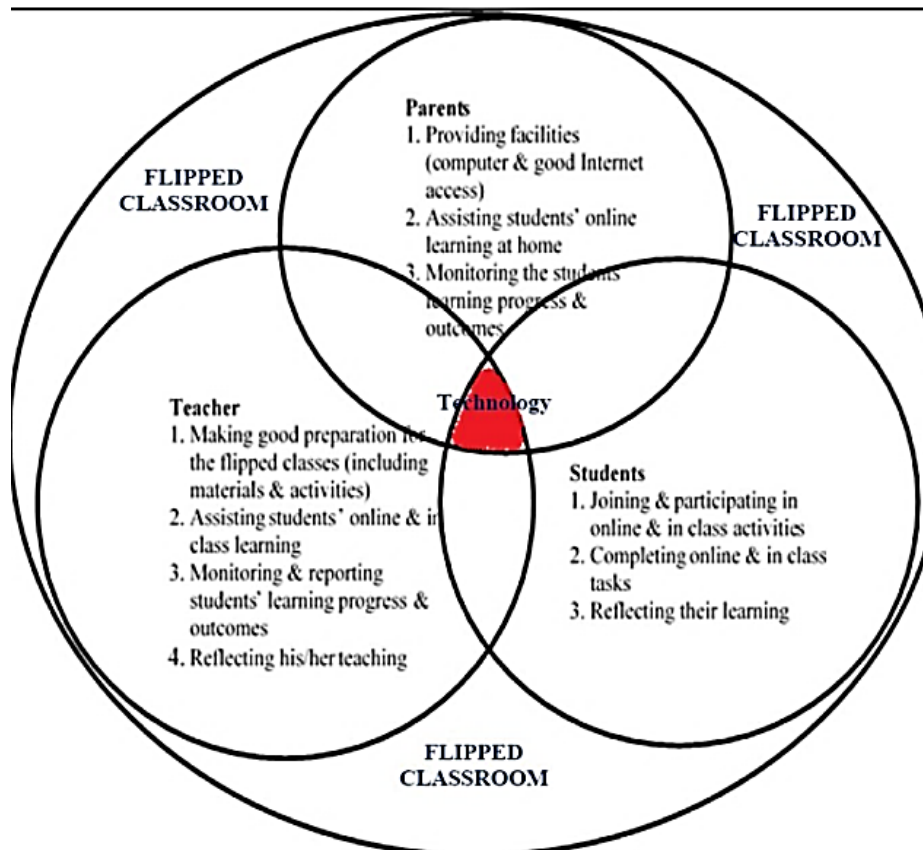
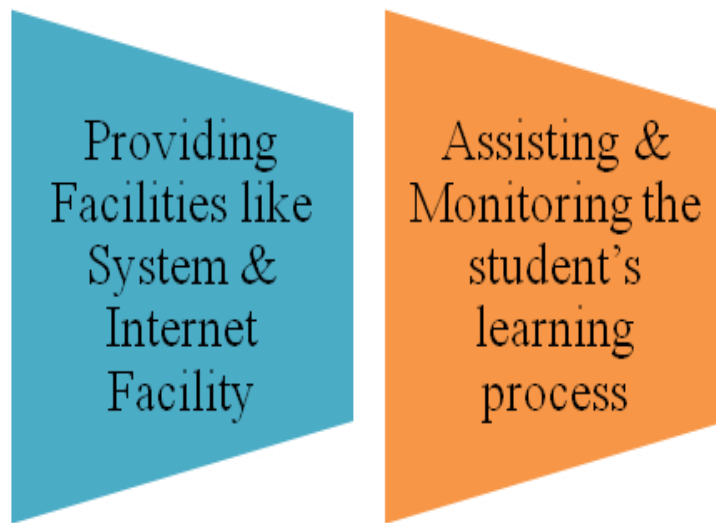


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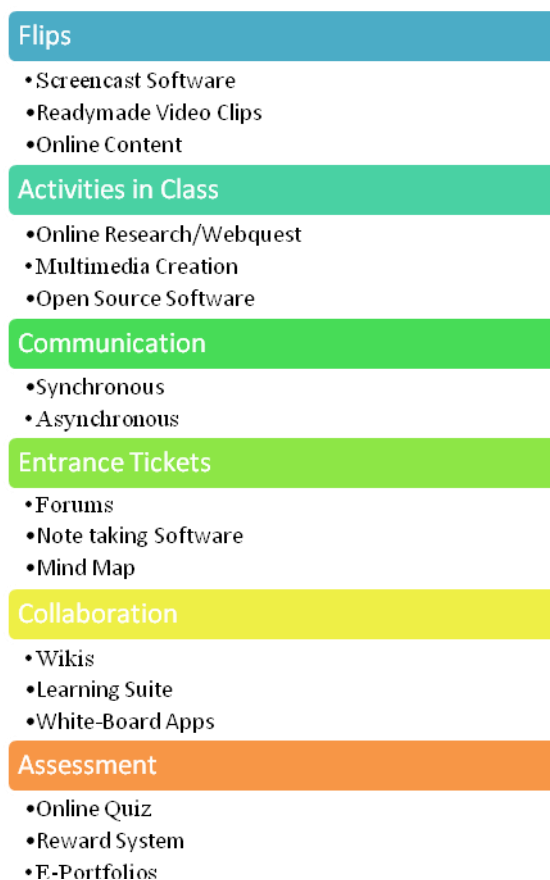


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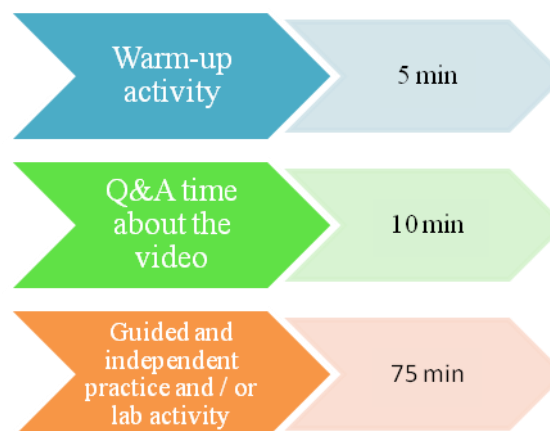


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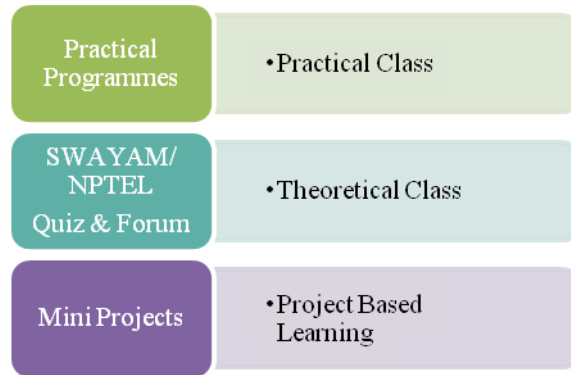


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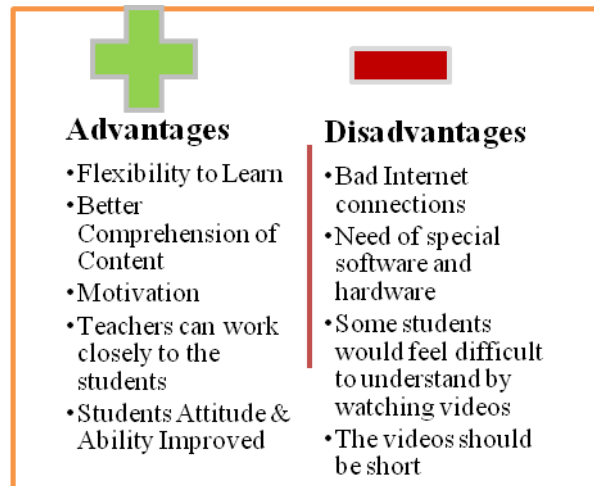
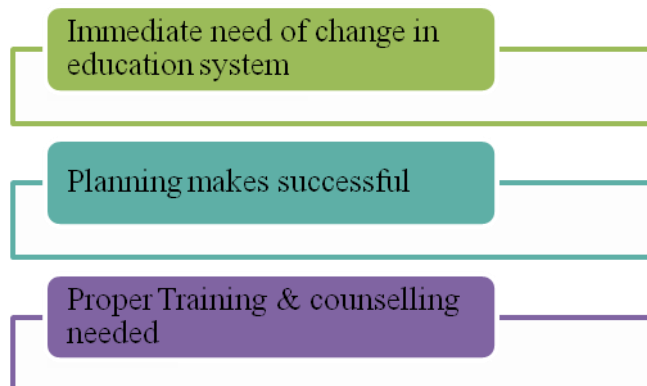


Fig.9



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