



### From Sage on the Stage to Guide on the Side": A Teacher's Role in Flipping the Classroom Activities for Undergraduate Engineering Students

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#### Abstract

The education field in India has experienced rapid growth in research and developments in formulating and executing innovative methods and approaches of English language teaching. From OHP (Over Head Projector) to interactive boards, from PPTs (Power Point Templates) to glass boards, from age old desktop computers to latest tablets, integration of modern technology has boosted these advancements by making learning more engaging and interesting.

COVID-19 has definitely created a devastating impact on human existence. This has eventually resulted into innovative and cautious ways for all our endeavours positively too. Education is not an exception to it as virtual is the new normal due to this pandemic. Though there are some limitations to this online classroom teaching, the teachers have always been keen to address and solve these issues constructively.

Professor Eric Mazur from the Harvard University developed the concepts influencing flipped teaching as peer instruction. He explained this instructional strategy in his book *Peer Instruction: A User's Manual* in 1997. Through his experiments and their conclusions, he realised that through flipped classroom, he could transfer information out of the classroom and allowed his learners to engage in discussion as a post-learning activity during classroom teaching. Salman Khan has developed his Khan Academy on this model.

Gujarat Technological University, Ahmedabad introduced the flipped classroom strategy in 2016 when the online world was not that much welcomed and accessible. In today's pandemic situation, it is an essential mode of teaching where a learner can learn at his/her pace and place. They can revisit the learning materials mostly recorded videos as many times as they wish. Later in the classrooms, which are now online, they discuss with their teachers. A flipped classroom provides more opportunity for interaction and discussion

among students and teachers. This pandemic also motivated the researcher to conduct an experiment by teaching some topics using flipped classroom. The major focus of this experiment was on learning of students rather than on lecturing or teaching by the researcher. The experiment emphasized on promoting more active, engaging, interactive learning. During the teaching of a subject ETC (Effective Technical Communication) to Semester 3 students of Bachelor of Engineering, some sub-topics from a unit entitled Ethics in Engineering were discussed by flipping classroom.

The proposed paper elaborates the journey by explaining the background of flipped classroom. It also talks about the experiment that the researcher has conducted recently. This instructional approach and a blended way of learning emphasizes on more involvement by students and therefore on their intense learning. The flipped classroom provides ample opportunities to the teacher to cope up with individual differences and to understand and solve students' queries. Alison King, in "From Sage on the Stage to Guide on the Side" (1993) emphasized that the classroom activities prove to be important as they construct meaning and not just transmit information. The paper traces the effectiveness of this flipped classroom approach in a systematic manner where the teacher in the classroom performs his role as a 'Guide on the Side'.

**Keywords:** Flipped classroom, Engineering Students, Subject Effective Technical Communication

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## "From Sage on the Stage to Guide on the Side": A Teacher's Role in Flipping the Classroom Activities for Undergraduate Engineering Students

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The Father of American Literature, Mark Twain, has once proclaimed, "India is the cradle of the human race, the birthplace of human speech, the mother of history, the grandmother of legend, and the great grandmother of tradition. Our most valuable and most artistic materials in the history of man are treasured up in India only!" This treasure lies in our tradition and modernity, in our culture and scientific advancement. The education sector in India has also experienced rapid growth in research and developments in formulating and executing innovative methods and approaches of teaching in general and of teaching English language in particular. From OHP (Over Head Projector) to interactive boards, from PPTs (Power Point Templates) to glass boards, from age old desktop computers to latest tablets, this integration of modern technology has boosted these developments by making learning more engaging and interesting.

Year 2020 has experienced an unprecedented time due to corona virus. Even though COVID-19 has definitely created a devastating impact on human existence, it has eventually motivated us to function with innovative and cautious ways too. Education is not an exception to it as virtual is the new normal due to this pandemic. Though there are a few limitations of this online teaching learning process, the teachers have always been keen to address and solve these issues constructively. In the same regard, ICT based teaching is being carried out widely and encouraged.

Professor Eric Mazur from the Harvard University developed the concepts influencing flipped teaching as peer instruction. He explained this instructional strategy in his book *Peer Instruction: A User's Manual* in 1997. Through his experiments and their conclusions, he realised that through flipped classroom, he could transfer information out of the classroom and allowed his learners to engage in discussion as a post-learning activity during classroom teaching. Salman Khan has developed his Khan Academy on this model.

Comparing to the traditional way of teaching, 'classroom instruction model', this flipped classroom allows more time in discussion in the class after pre-learning of the concepts.

Bergmann and Sams (2012) provided a comparison between traditional and flipped teaching. They divide a tradition class into warm-up activity (5 min), discussion about homework (20 min), discussion of new content (30-45 min) and guidance for practice activities (20-30 min). They also provide such divisions for flipped classrooms in which homework discussion is replaced by Q&A activity that about their learning prior to the classroom. Instead of discussing new concepts, guidance of practice activities is given more time for better involvement of students. (Bergmann and Sams, 2012)

This comparison also shows that in the traditional way of classroom teaching, most of the time is devoted for teachers to impart contents readied for the lecture and later, students have to do related activities at home. In the flipped situation, the reverse happens. Students are motivated to learn the things by their own at their pace and place prior to the actual classroom. They have an opportunity to take part in the discussion during the classroom activity.

This interesting approach has many advantages for both students and teachers. Everyone follows the course contents as per their own capability. They can revisit and re-watch the online contents, mostly videos. The given work is done in class wherein students raise their queries about the things they haven't understood. The time spent in the classroom is mostly used effectively for re-learning the concepts and in applying those things under the teacher's guidance and observation. Interaction is much emphasized in the classroom which enables students for more clarity of the contents.

As a coin has two sides, this approach has some limitations. By minimizing them, the better results can be obtained by the able teachers. It is difficult for teachers to find out whether the students watch the videos and study online materials. They also need computer and internet which may not be accessible to all. The use of technology can increase costs for both the end users – the teachers and the students. After learning through the videos, students may be shy not to take part in classroom discussion which can mar the effect of the approach. Proper time duration should be given to students for visiting and revisiting the learning material.

To enhance interactive learning among technological students, the Gujarat Technological University (GTU), Ahmedabad, India introduced the flipped classroom strategy in 2016 when the online world was not that much welcomed and accessible. In

today's pandemic situation, it can prove to be an essential mode of teaching where a learner can learn at his/her pace and place. They can revisit recorded videos as many times as they wish. Later in the classrooms, which are now online, they discuss with their teachers. A flipped classroom provides more opportunity for interaction and discussion among students and teachers. This pandemic also motivated the researcher to conduct an experiment with a small group of students. During undergraduate engineering course (BE), the researcher selected 5 divisions of 3<sup>rd</sup> semester to teach a subject ETC (Effective Technical Communication). From this syllabus, two topics related to Ethics in Engineering were selected. The major focus of this experiment was on learning of students rather than on lecturing or teaching by the researcher. The experiment emphasized on promoting more active, engaging, interactive learning.

For the experiment, four small videos were recorded and uploaded on Youtube.com (an online portal) for students' learning.

Links of 4 Self-made videos

- <https://www.youtube.com/watch?v=RESKcOOOY9Q>
- <https://www.youtube.com/watch?v=N9ZwPCKFg7Q>
- <https://www.youtube.com/watch?v=LbIrqqGnT6g>
- [https://www.youtube.com/watch?v=89VKW8C\\_ZA8](https://www.youtube.com/watch?v=89VKW8C_ZA8)

For these videos, total number of viewers scored on the portal was 1239 with 85% average (for each video). The least watched video had 70% of total students considered for the experiment.

Along with these videos, some case studies were prepared. Each component had some questions and issues to ponder. Their learning in terms of answers to these questions and queries was an entry ticket to online classroom. Instructions regarding their self-study through online videos and materials were provided with timeline. In actual classroom where the teacher ('the researcher') was present 'online' had an opportunity to initiate the discussion of their learning, solution of their queries. Later, the learned concepts were practiced with some real-life examples in application mode.

As a formal and simple feedback, the researcher shared a questionnaire to the participants. 83% students gave 4 or more than 4 score out of 5-rating scale about its effectiveness. Only 2% students gave less than 2 score on this rating scale.

Thus, the paper elaborates the journey by explaining the background of flipped classroom and talks about the experiment that the researcher has conducted recently. This instructional approach and a blended way of learning emphasizes on more involvement by

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students and therefore their intense learning. The flipped classroom provides ample opportunities to the teacher to cope up with individual differences and to understand and solve students' queries. Alison King, in "From Sage on the Stage to Guide on the Side" (1993) emphasized that the classroom activities prove to be important as they construct meaning and not just transmit information. In that way, the experiment has proved the effectiveness of the strategy to reform traditional higher education teaching and to transform the sage on the stage into the guide on the side. This paves way for student-centered active learning approaches which have never been as effective as now.

The experiment confirms the evidences of students' involvement, engagement and enthusiasm though it was online during classroom interaction too.

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