



GANDHINAGAR
INSTITUTE OF
TECHNOLOGY

REPORT ON FLIPPED CLASSROOM EXPERIMENT

Under the initiative of 'Active Learning' by,



Gujarat Technological University



By:
Prof. Ashish R. Majithiya
Assistant Professor,
Department of Mechanical Engineering,
Gandhinagar Institute of Technology,
Contact: ashish.majithiya@git.org.in
97 23456 982

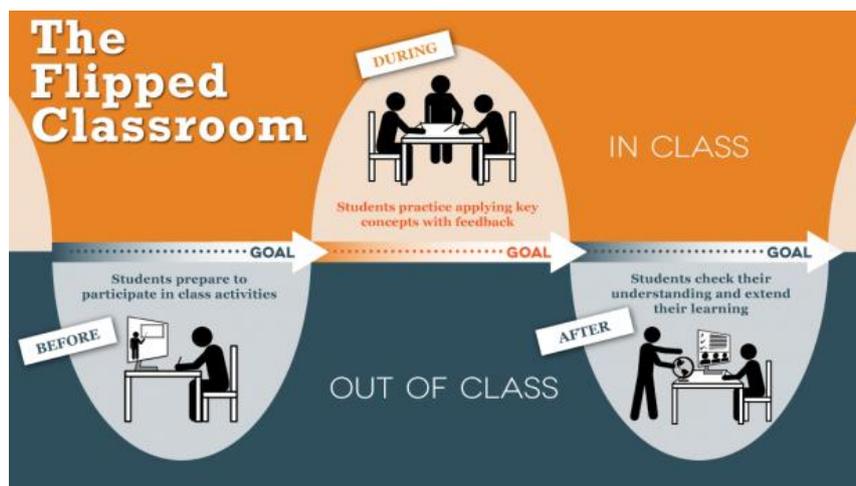
Active Learning:

Shana K. Carpenter from department of psychology, Iowa state University (USA) has done many experiments in order to check the relation between teaching quality and actual learning process. He shows that the personality traits like language fluency, eye contact, body language, appropriate gesture & posture doesn't really improve the actual learning process. Students just get perception that they learn better from a fluent teacher but **actual learning is same from fluent and diffluent faculty**. [4] So, better quality of delivery of lecture does not always lead to better learning. The only way to improve actual learning is to make the students **engaged and active into the classroom** for maximum time duration.

Active learning is a process whereby students engage in brainstorming activities, such as reading, writing, discussion, or problem solving that promote analysis, synthesis, and evaluation of class content. [1]

Flipped Learning:

The flipped classroom is a **pedagogical model** in which the typical lecture and homework elements of a course are **reversed**. Short video lectures are viewed by students at home before the class session, while in-class time is devoted to exercises, projects, or discussions.



The notion of a flipped classroom draws on such concepts as **active learning**, **student engagement**, **hybrid course design**, and **course podcasting**. The value of a flipped class is in the repurposing of class time into a workshop where students can inquire about lecture content, test their skills in applying knowledge, and interact with one another in hands-on activities. During class sessions, teachers function as coaches or advisors, encouraging students in individual inquiry and collaborative effort. [2]

Teacher transforms from 'sage on the stage' to '**guide on the side**'. Classrooms become more active, the teacher is turning into a **facilitator**, and he/she converts the classroom into a studio where students collate, collaborate and put into practice what they learn online. Flipped classrooms can transform the one-to-many model of passive teaching into a **one-to-one active coaching**.

Methodology to introduce Flipped Learning:

1. Identify Topic and Class.
2. Prepare or Search for teaching material i.e. video clips, documents.
3. Identify a platform to where, study material can be uploaded. (Google sites, Google Classroom, YouTube, Moodle etc.)
4. Identify a medium to share the resources to the students (Mail, Whatsapp etc.)
5. Design an in-class activity. It could be in the form of discussion for theory topics and a project based activity for numerical.

Flipped Classroom at Gandhinagar Institute of Technology:

After the discussion meeting on Flipped Classroom held at GTU on 14th Feb. 2016 with **Dr. Dilip Barad**, **Prof. Ravi Gor** and **Dr. Apurv J. Raval**, the ends and means of Flipped Classroom concept was clear. After taking permission from **Dr. N. M. Bhatt** (Director, GIT) and **Prof. Umang Patdiwala** (HoD, ME, GIT), I started to plan for this activity for a specific topic.

Topic: 1D Structural Analysis through Finite Element Method (Computer Aided Design)

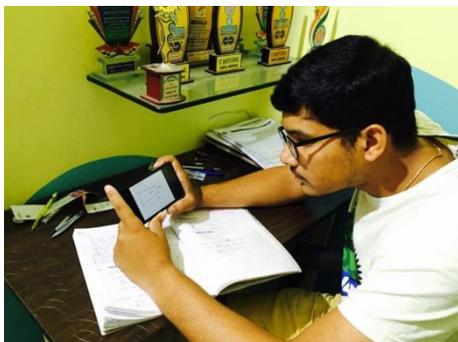
Class: 6th Semester, Mechanical Engineering, Division 'A'.

For the mentioned topic, one video clip was prepared using the software **SRecorder**. Software captures the screen and records audio from microphone. The clip was uploaded on **YouTube** and links were sent to the students through **Whatsapp** groups. To avoid problems of Internet connectivity, the clip was shared to students by Xender application, through that a 20 MB file can be sent to 6-8 mobile phones at a time in a minute.

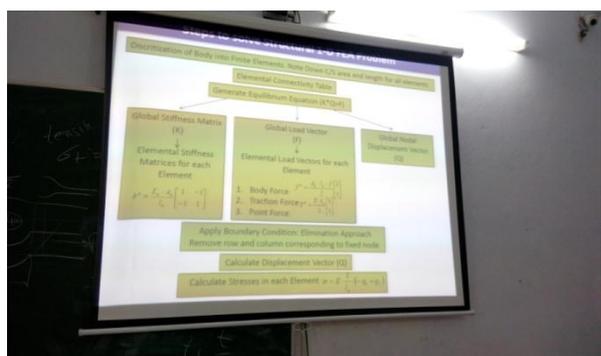
On **10th March 2016**, in the classroom, groups of **4-5 students** were formed. All the groups were **balanced** with brilliant and ordinary students.

A 1D FEA structural problem was given to all the groups and they were asked to solve it in 40 minutes. The numerical consist of a step in which students need to discretise the body in to finite number of elements. More the number of elements; students take, better the result they get and more the calculation is to be done. So, students made discussion and decided an optimum number of elements so that they can complete the task in-time and get better result. Students were informed that making the steps clear to all the team members is more important than getting the result.

Students were told to take photographs while they watch video clip at home.



Photographs were taken in the classroom while they are working in the groups. Students can be seen doing collaborative activity interestingly.





Outcome:

Through the first experiment with the Flipped Classroom Model, I and students got motivation to incorporate it in next semester from the 1st lecture. As cited in literatures, students quite enjoyed the way of learning Engineering Core concept.

Followings are the observed pros and cons on implementing Flipped Model into the classroom.

The Pros

1. Active Learning

Almost **100% students get activated** throughout the lecture whereas in traditional lecture style, it becomes difficult to make the students concentrated.

2. Study Material Accessible to students

The video clip, shared with students could be a very good study material to refer the concepts **at time of exam**. (In the websites like NPTEL, a large amount of video lectures are there but learning from own faculty in their familiar style might be more beneficial to increase acceptance level)

3. TPS – Think Pair Share

As the groups are balanced with intelligent and ordinary students and they solve the problems together, **knowledge equivalency** is formed. Many a times, students can acquire more knowledge while learning from their class-mates then learning from faculty. That **Peer learning platform** is provided in Flipped Learning.

4. Soft Skills

Working in groups would improve the soft skills like **Communication Skill, Team Work, Leadership Quality, and Argument Skill**.

5. Formative Assessment

As the teacher communicates individually with the students throughout the lecture, appropriate **feedback** can be given to them and Formative Assessment can be incorporated.

The cons

1. Create Digital Divide

It creates digital divide between **tech-savvy** and non tech savvy students. Only if 100% students have smart phone or computer at home, this model can be incorporated.

2. Relies on preparation of students

The concept is only successful if we can motivate the students to **refer study material at home**. And it is difficult at under graduate level.

3. A Challenge for Teachers

As the students are exposed to the topic well before they come into classroom, their depth of information and knowledge on that topic can't be assumed. They may acquire more details and may raise questions much beyond our expectation. So, a teacher must be ready for it.

Feedback of Students:

“The complete idea of such a group activity is amazing. This not only involves the active participation of one and all, but also makes the tedious work of lengthy matrix calculations very interesting and a fun task to do. Additionally, the competitive part of the activity also promotes to do it with more engrossment. Gratitude....!!!”

Simranjeet Bhatia (130120119020)

“This is very innovative idea to give knowledge to the students.. and All the students can get knowledge easily and at any time from this.. By the way.. From this Technique student can get knowledge with more interest in it.. Because they are interested in watching videos.. so they can easily catch up it..”

Mit bhavsar (130120119017)

“It was very helpful and user friendly for learning and making the lecture useful and the most important thing is that you can again go through it when you have any doubts regarding that lecture”

Rushabh gadhvi (130120119053)

References:

1. Center for Research on Learning and Teaching, University of Michigan
www.crlt.umich.edu/
2. 7 Things You Should Know About Flipped Classrooms
<https://net.educause.edu/ir/library/pdf/eli7081.pdf>
3. GTU circular on Flipped classroom
http://files.gtu.ac.in/circulars/16JAN/Circular%20at%20GTU_Ver%202.pdf
4. S K Carpenter, ‘Appearances can be deceiving: instructor fluency increases perceptions of learning without increasing actual learning’
5. 5 Steps to Flipping Your Engineering Classroom at
http://www.ptc.com/~media/Files/PDFs/Academic/5_Steps_to_Flipping_Your_Classroom.ashx?la=en
6. Boston University - College of Engineering Article
<http://www.bu.edu/phpbin/news-cms/news/?dept=666&id=59184>
7. Harvard- John A Paulson- School of Engineering and Applied Sciences
<https://www.seas.harvard.edu/news/2013/03/flipped-classroom-will-redefine-role-educators>
8. Flipped Learning Environment- Why, What and How about FLE- Dilip Barad and H.I. Sarvaiya
9. Flip Learning- Citation: Flipped Learning Network (FLN). (2014). The Four Pillars of F-L-I-P™
Reproducible PDF can be found at
www.flippedlearning.org/definition