Implementation of internet based content delivery practices

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Abstract: The internet has taken education out of the conventional classrooms. The 21st century academicians believe in sharing their knowledge and embracing other's ideas. The MOOC courses, use of ICT, collaborative learning are some of the methods being followed by academicians around the world and they are also very much appreciated by students of current generations. This paper discusses implementation of few internets based teaching-learning approaches which could be used in schools and colleges for any subject. The methods aim at students' engagement and effective education.

Keywords: flipped classroom, Think-Pair-Share, Creative commons, Open Courseware, Google Classroom

1. Introduction:

The internet has opened up tremendous resources for the students around the world. There are various blogs, forums, MOOCs, open Courseware, websites and loads of video lectures almost for every subject. With availability of translations and subtitles today, the language is no more a barrier.

The conventional teaching involves classroom teaching, assignments or exams followed by their assessments. The teacher aims at teaching maximum syllabus but also covers some relevant content that might be beyond syllabus, attend student queries, re-explain the concepts to slow learners, manage study/reference material, manage students' submission, assess submission and maintain grades. This job isn't quite easy though. In a diverse culture country like India, the festivals and subsequent holidays give comparatively less number of contact days with students. Considering every student's pace of learning, the available time duration doesn't prove to be sufficient to complete the portion. A teacher must also provide food for intelligent brains by giving them high cognition challenges. At the same time, the teacher must keep track of students' submissions and subsequent assessments. All these activities become little bit of management task when one teaches more than one subjects in one semester.

Thankfully, there are some solutions available to address these issues in the current teaching learning process. This paper intends to discuss such practises those could be adopted at any level of education and for any faculty. Here, section II of the paper elaborates the most practised methods in the category of internet based practises in teaching-learning process. I have practised some of them in my final year engineering class, and put forth the students' feedback analysis about the same in section III. Section IV discusses the strengths and weaknesses of those methods and section V gives a list of references.

2. Background work:

The academicians have been trying different pedagogical methods in the teaching-learning process since many years. The Massachusetts Institute of Technology has been sharing their Open Courseware since 2001 for engineering courses. These courseware give guidelines about the syllabus, lecture slides and assignments. In India, IIT Bombay also has been running various disciplinary and interdisciplinary courses to introduce various approaches to teachers under National Mission on Education through ICT. All these attempts are certainly getting succeeded in making classroom teaching more effective, interactive and more productive. Few of the most popular internet based content delivery practises are flipped classroom, Think-Pair-Share, Share/use courseware licensed with common creatives, create and use Open Educational resources and usage of Google classroom for course management.

The traditional teaching learning methodology involves teaching the concepts in classroom and giving the assignments based on those concepts as homework. Some of the lectures address comprehension and recall level teaching while most of the homework assignments follow application, analysis, synthesis and design level

activities. Flipped classroom concept proposes to move the low cognition activities like knowledge and comprehension out of class and address high cognition activities inside during classroom interaction. The idea is to create short length videos upto max 7 minutes of duration explaining low cognition concept and discuss the applications, synthesis, evaluation and design kind of high cognition aspects of the same in classroom [2][3].

Think-Pair-Share[TPS] is the method that guarantees highest student participation. Sometimes ome problem may have multiple solutions with varying efficiency, and all of them aren't equally feasible and/or optimal. In such cases, the teacher may wish to assess students' understanding of the topic with help of Think-Pair-Share method. The TPS phases are assigned time duration just enough for people to discuss the constructive points and not go off-topic after the same. During a TPS, the three phases go as- Think: teacher poses a question on a topic for all students to think independently. Students compose their own ideas about the answer, Pair: Students pair with neighbors to collaborate their ideas, share: the Student pairs share their discussion outcome with the whole class and teacher sums up the discussion with her comments.

Creative commons is a non-profit organization which has defined several kinds of licences one can define for their material. This organization has been functioning since 2001 and every year there is significant increase in their followers. The creative commons licences are[4]- Attribution(BY), Share-alike(SA), Non-commercial(NC), No derivative works(ND). One can create any resource viz a document, video, picture, painting, courseware and declare creative commons licences for the same. The creative commons doesn't endorse plagiarism; but It's a legal way of making own documents available for others with your own restriction declaration on usage.

One need not reinvent wheel if there's already one! Open Educational Resources (OER) believe and emphasize on strengthening and updating wheels than reinventing them again, in our case- educational resources. Open educational resources are another movement which though was rooted in late 20th century, took its first step in 2001 with MIT's open courseware project. Open educational resources[5] (OER) define freely accessible, openly licensed documents and media that are useful for teaching, learning, and assessing as well as for research purposes. With the openness movement, it's one of the leading trends in open and distance education. OER are supposed to be intellectual property and are released under several creative commons licenses. www.oercommons.org is one of the platforms that homes management of such open educational resources.

Google Classroom is part of Google Apps for Education and is a free suite of productivity tools which also includes Gmail, Google documents, and Google drive storage. It helps in saving time, keeping the multiple classes organized, and improving communication with students. The google classroom works in two different modes- teacher and student mode. This classroom helps both the parties in Courseware management, Submissions & assessment management [1].

3. Evaluation and analysis

For last three years I have been using Google classroom for theory and practical assignment submission and for courseware sharing. I introduced this idea to the 2017 graduating batch when they were in their third semester. In the first attempt itself students liked the idea of this online submissions and being able to submit it from anywhere. The deadlines of their work varied based on complexity of the assignments. They recommended other teachers to use google classroom approach for their subject too. Teachers found it quite useful as it maintained submission status and was hassle free. Also synching the google drive to your computer downloaded all classroom assignments to teacher's machine and also maintained all unsubmitted-submitted versions of the students' work. Before Google classroom, I used to accept students' assignments and share notes/lecture slides over email. Most of the times it used to end up in getting buried under pile of old emails and I had to manually manage multiple submissions done by a student for the same assignment, in case any. With time, both teachers and students both grew more happy to share course announcements and material at one place- Google Classroom.

This semester I also tried following flipped-classroom and Think-Pair-Share approach while teaching "Artificial Intelligence" course to final year students. The class is very big with two divisions and a massive strength of 150 students. As part of the same, flipped classroom videos were created to explain concepts like 'properties of task environment', 'model for an intelligent agent' , 'appropriateness of every agent architecture for problem solving' and 'step by step approach to knowledge engineering'. The videos were lectures slides complimented with narration. To keep the students engaged, I used the cursor to point the line/words being explained. The think-pair-share activities were conducted while teaching performance measure, environment, actuators and sensor(PEAS) analysis, solving the

problems with greedy & A* algorithms, designing intelligent agent solution using various agent architectures, application of knowledge engineering processes to given example[6][7][8][9]. All these videos are released under Creative Commons BY-SA-NC license and are also released under as OER on oercommons.org. Teaching those concepts turned out to be a very amazing experience for both the parties. Students asked for more flipped classroom videos and test papers proved students had understood the concepts very well. To learn how students perceived this experiment on various parameters, a feedback was taken and it received 97 responses.

Though the students were supposed to watch the videos before coming to the class, all of them didn't follow it. The numbers increased in due course though. By the end of mid semester, 46% of them felt that watching videos before lectures was a lot helpful. As these slides also had embedded narration, 78.4% of them felt like being active part of the learning process and it helped them in catching up missing classes. For some of them this proved to be a great help as they could follow it with their own pace and later on they could ask their queries in their free time. Some students love to redo some concepts, almost 60% of the students answered that these videos helped them in refreshing the concepts. The first video was 10:04minutes long while the last one could be compiled into 3:40mins. The average video length was 5mins and so 39% of the students agreed that such short duration of video kept their interest and concentration, both. Interestingly one student found the video creation was time wasting activity.

Table 1: Effectiveness of Flipped classroom

Parameter	response in %
Watching beforehand helps during class	46.4
catch up missed lectures	78.4
videos with teacher's narration are better than mere slides	38.1
helps in learning at your own pace	26.8
refreshing concepts,	59.8
short duration helps in concentration	39.2
it's waste of time	1

Artificial intelligence is a kind of tricky subject. While designing intelligent agent solutions for any given problem, one needs to know a lot of information which is generally taken as common sense. Surprisingly students try to think more on technical stuff and less on common sense/domain knowledge of given problem. Think-pair-share activities taken for PEAS analysis, designing intelligent agent solution, evaluating/analysing every agent architecture and applying steps of knowledge engineering to various problems turned out to be great fun. Most these problem areas don't have just one fixed solution but churns out huge list of answer elements which needs to be prioritized to give a good solution. Think-pair-share makes everyone active in class and involves brain storming of such ideas. Almost 62% of the students believed that TPS helped them in understanding the concepts in better manner with self learning during the process. 54.6% of them thought it helped them realize their misconceptions while 42% of them appreciated this activity as it took higher levels of cognition. 37% of the students answered that TPS helped them in concentrating back during one hour long lecture with refreshed brain.

Table 2: Effectiveness of Think-Pair-Share

Parameter	response in %
Pairing and discussions help more understanding	61.9
corrects myths/misconcepts	54.6
Application-analysis level understanding	42.3
concentrating back with refreshed mind	37.1
none of the above	6.2

As the current batch has been using Google classroom since their semester III, it has become integral part of their life. As the computer department teachers ask students to submit softcopies of the write-ups, students can revise their work N number of times before the teacher finally accepts the same. Google classroom offers many advantages right from being the paperless solution to eliminate the hurdles of version control/physical submission. For laboratory assignments, teachers generally expect students to submit their work by the end of practical. However in traditional teaching one has to wait for next turn to review the work. With google classroom the teacher can estimate approximate time required to solve the programming assignment and ask students to upload their work. This flexibility was appreciated by most of the students over the scale of 5 to1. Some of the students also use the private/public comments section for the assignments to turn virtually every assignment thread into a discussion forum. This instant discussions' facility works the best during active

teaching-learning. Also many of them replied that Google calendar feature that gives the deadlines for every day, helps them in prioritizing and maintaining the deadlines.

Table 3: Appreciation of Google Classroom features

Sr no	Google classroom features	Feedback in % on the scale 5-1(Excellent-poor)				
		5	4	3	2	1
1	help in Focusing on content quality	50.5	43.3	6.2	0	0
2	Flexible time frame for submissions; especially for laboratory work	41.2	39.2	16.5	3.1	0
3	effectiveness of comments facility in teaching learning process	16.5	34	26.8	17.5	5.2
4	Helpfulness in tracking and managing deadlines with Google calendar	34	42.3	19.6	4.1	0

Availability of Google App for classroom and its good design helps teachers and students equally. The comments section is also an amazing feature which could be used very well for student-student and students-teacher interactions.

Table 4: Why Google Classroom submissions are easy

What are the reasons you find Google Classroom submissions so easy	
Parameter	response in %
User friendly interface	82.5
Good Design of overall classroom as a tool	72.2
Google Apps for classroom	35.1
None of above	1

Google classroom allows multiple teachers in one classroom, thereby helps batches with large intake with multiple teachers and multiple divisions. Support for different file formats and sizes is some other thing 47% of them love the most. But what takes the cherry on cake in is, the availability of all courseware and course announcements at one place. The topic management facility recently provided by the Google helps the cause even more.

Table 5: Why Google classroom should be used for courseware sharing

Why do you think sharing courseware using Google Classroom is better than sharing it over email?	
Parameter	response in %
Multiple teachers give multiple views in single classroom	73.2
All courseware available at one location	81.4
Diff file formats and large file sizes	47.4
No worries of document version management	37.1
Topic management facility within classroom by Google	33
None of the above	0

4. Discussions and conclusions

The classroom is full of different levels of students such as brainier, slow-learners and those who are involved in co-curricular & extra-curricular activities. Flipped classroom are a great help to all such students and teachers. Flipped classroom doesn't prohibit using other's videos provided that you give due credit to the original creator. Though having created own videos which focus on special learning objectives, helps the cause more. Flipped classroom are not the replacements for the face-to-face classroom interactions, they are aid in focusing over outcome based quality education with a good attempt at time management.

Irrespective of how hard teachers try, most of the classroom sessions end up being one way communication. Given the number of subjects a student has to study in a day, it's also difficult for them to pay attention for the entire lecture duration. Think –pair-share turn these one-way communication into an interactive class.

The internet has opened the giant knowledgebase to every user who is connected to it. Students aren't satisfied with the education they receive in four walls; rather they explore various resources available to them. The

movement of creative commons and Open Educational resources started in 2001, have opened various virtual classrooms to the every student around the globe. Since 2008, MOOCs have joined the same mission. Within less than a decade, the CoursEra, Edx, Udacity, IITBombayX , Khans Academy have opened free classrooms of world class education. The use of Open Educational Resources and Creative commons licences also imbibe the concept of ethics and no plagiarism.

Google classrooms are available only to those institutes which are under the umbrella of Google for Education Suit. Many universities and private colleges have purchased the Google for education suite. The Google Classroom solution is robust and stable. Once started with a classroom for one subject's laboratory work submission, students found it wonderful and requested Goggle classrooms for most of the remaining subjects.

The teachers have appreciated use of Think-Pair-Share, Google Classroom and flipped classroom as one combination altogether. The TPS helps the teacher in detecting the weak areas of students' learnings and the flipped classroom videos help in reducing re-explanations of same concepts. Open educational resources aren't very popular in Indian teachers though. The teachers should share their courseware and adopt other teacher's well designed course contents.

Initially all this sounds like more work added to teacher's plate amidst other workload. But once one gets in the process, things appear to be simple. The task of video creation, designing of Think-Pair-share could be shared amongst faculty. This will help in brainstorming as well as in collaboration .It's now big time that teachers from all faculties should embrace the era of paperless classrooms with more share and reuse of course material for improvement of teaching learning process.

5. References

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