Effective use of online Teaching-Learning Platform and MOOC for Virtual Learning

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Abstract: The process of Teaching-Learning has evolved tremendously within the last 5-10 years. The mode of teaching is changed from normal blackboard classroom teaching to technological teaching. Due to the COVID-19 outbreak, the education system has been disrupted especially; it affects more for Higher Educational Institutes where students have come from various regions. The immediate lockdown in the country made the outside students reach their homes without any prior knowledge of its effects. Most of the education sector has switched to distance learning. Our institute has also adopted Virtual Learning. Various virtual platforms are available as the Learning Management System. We have adopted the use of ICT in education for the last 3-4 years. This helped us to handle the Teaching-Learning during a pandemic outbreak. We have used Moodle Learning Management System for Virtual Learning. Learners Centric MOOCs (LCM) model is implemented through LMS and the effectiveness is improved by adding Feedback and Assessment to it. The LCM model consists of structural elements: Learning Dialogs (LeD) in the form of short 10 to 12 minutes Videos, Learning by Doing (LbD) in the form of an assignment question or activity to do, Learning Experience Interactions (LxI) in the form reflection spot and discussion on the video provided and Learning Extension Trajectories (LxT) in the form of a small quiz on the video and resources. The major challenge for Virtual Learning is learner’s engagement. We have added feedback to improve the teaching-learning process. The model is effectively applied for Third Year Computer Science and Engineering class. The course of Compiler Construction is taken in to account for the implementation. A total of 73 students were involved in this activity. The results of feedback from students are satisfactory. More than 83% of the learners have given positive feedback towards this technological change of teaching. Learner’s engagement has improved to 30%.

Keywords: Virtual Learning, Online Teaching-Learning, Learning Management System, Moodle, LCM Mode, MOOC.

1. Introduction

The world is evolving into a new place to look at in the pandemic situation. Now the technology is playing a very important role in this pandemic situation. Each one is welcoming the new lifestyle. Even the Education field has a lot of improvement. Nowadays the student’s perspective has changed.
They have been adaptive to all methods of teaching. Especially the students are now comfortable having technological class.

Now the method of chalk and talk is not appreciated in fact, the ICT teaching is followed and appreciated. ICT in education has been used to enhance and optimize the learning. Students are now capable of understanding things in this way. The way of teaching which uses the technology to its fullest is the appropriate and effective way. The emerging teaching-learning process needs ICT in education. While this pandemic situation ICT has been a necessity for the learning process. Teaching by this process has eventually made it easy to understand some concepts. This generation has a lot of good learning skills. So ICT can give great support to the education world. The virtual teaching-learning process has brought up a lot of advantageous effects. This process has not only helped the students but also a teacher to get a new innovative way to put forth their knowledge. ICT has proved to be the evolving need of today’s generation. During this pandemic situation, the practice of going to actual classes has been dissolved, and going to a virtual class is preferred. The habitual understanding ability of a student has also adapted the virtual classes.

This teaching and learning process has a great opportunity for the students as well as the teachers to put in all their efforts in this process to get the required outputs. ICT being an important aspect of education has taught to emerge and mold the technology according to the human need. The world of education has begun to have a new introduction to different platforms. The new beginning of this generation has virtually created a classroom where students can attend the lectures and teachers can arrange the lectures. During a lecture, a student feels comfortable to have his own way of learning. In this process, the teaching method has not only changed in a virtual manner the learning speed of a student has also increased.

Information and Communication Technology (ICT) is used in education to enhance the teaching-learning process and optimize information delivery. ICT use has enhanced student learning. It provides Virtual learning and distance mode of education. It enhances the learning experience with better teaching skills. Reaching to every student through online mode has become easier through various tools and platforms which are available free or with negligible cost.

2. Background

In recent years, innovations in teaching Learning for higher education are taking place gradually. Student’s learning perspective is also changing accordingly. The usual chalk-and-talk mode has evolved drastically with various modes of teaching like face-to-face mode, distance learning mode, online mode, hybrid modes, etc. The teaching is focused on a student-centric approach and also self-learning methodology is creating more confidence among the learner’s community with the help of the internet.

Before March 2020, most of the teaching-learning process was going on through face-to-face mode. A sudden Covid-19 outbreak in India during March 2020 has completely stopped the teaching process almost throughout India. Our institute has also faced the same situation during this period. An immediate announcement of Lockdown for the pandemic situation has not given time to us to plan for a better approach. The impact of the Coronavirus has disrupted the education sector also more or less. It has generated long-term uncertainty on regular classes, exam cycles, internships, placement, etc. The structure of schooling and learning including teaching and assessment has also been affected.

In the lockdown period, technology played an important role like a study from home and work from home. Transformation is needed. Online teaching is the need of an hour in today’s pandemic
situation. We have also adopted the same online teaching mode through various platforms available accordingly. Technology has provided a solution for this. The digital skills of teacher and student helped to face this situation with a proper digital solution. Various digital learning platforms came in to picture to cope with this situation. We have adopted the online teaching mode through one of the online teaching platforms. Teachers have started showing their digital skills by preparing presentations, demos, practical problem solutions, etc.

Face-to-face mode of teaching has the major impact on learners due to the peer assessment, monitoring and face-to-face discussions for problem solving. In this mode teacher can personally monitor the progress of the student and can make a student active based on his teaching skills.

2.1. Problems addressed

For the online mode of teaching, it has become a challenge to every teacher on “how to make a student active during the class?” Apart from this online mode of teaching has few problems enlisted as

1. Online mode of teaching is boring according to learner’s view
2. Technical difficulties like an Internet connection problem, Less internet bandwidth
3. Lack of awareness of online teaching platform

To address the above challenges we have used a flipped mode of learning using the Learning Management System like MOODLE for virtual learning with the Learner’s Centric MOOCs (LCM). This model consists of learning resources and the assessment with variations followed by discussion. In this method, we are trying to solve the problems which are occurring in online teaching mode. This method is the flipped combination of the online and offline mode of teaching for improving learning.

2.2. Objectives of this method

1. To improve the learner’s engagement
2. To enhance the effectiveness of online teaching-learning
3. Handling the problems raised due to pandemic in higher education

3. The need of an hour

In the pandemic situation, the education system was disturbed. The need of the student to learn and the teacher to teach then took a new turn. The student made their alternatives for online classes. No chalk no talk situation has arrived. As the situation being serious the outgoing of teacher and student was stopped. The undecided pandemic situation brought an immediate breakdown in the education system. The plans prepared for the academic year were interrupted. Then the unplanned semester their preparation for all these things started. The ICT helped to get on all the things stable and continue the teaching-learning process. ICT being an important aspect of education gave a ray of hope. Where students and teachers can come together and share knowledge.
4. Moodle Learning Management System (LMS)

Moodle is a platform providing a course management system for the teaching-learning process. It is a free open source platform for educators. It is also called a Learning Management System (LMS). This platform is used by various institutions to manage the courses. It provides a blended learning platform. It is a secure All-in-one tool providing flexibility and scalability. It is user-friendly and highly configurable also. Anybody can use it any-time, any-where on any-device [moodle.org]. It has features like:

1. Course creation
2. Content management
3. File management
4. Logging and reporting
5. Collaborative activity tools
6. Customizable design and layout
7. User roles and permission management
8. Course administration

Teacher and students can easily use this platform for the teaching-learning process effectively.[1,2,3] Our institute has a MOODLE server. Teachers and students are enrolled in our Moodle through this server which is available 24X7 to all. Every individual teacher can create and manage their courses effectively. An example of a course created is given in the below screenshot.

![Example Course Created on Moodle](image)

**Fig.1. Example Course Created on Moodle**

5. Learners Centric MOOCs(LCM) model through Moodle LMS

IIT Bombay has provided this LCM model for effective use ICT in Education. The LCM model focuses on learner-centric approach for designing MOOC Courses.[5,7,8] The LCM model consists of structural elements: [lcm-model.org]
1. **Learning Dialogs (LeD)** in the form of short 10 to 12 minutes Videos providing learner interaction
2. **Learning by Doing (LbD)** in the form of a Quiz, Assignment question or an Activity to do
3. **Learning Experience Interactions (LxI)** in the form reflection spot and discussion and doubt clearing session on the video provided
4. **Learning Extension Trajectories (LxT)** in the form of notes and other supporting study resources.
5. **Feedback** on Video contents and delivery

Components of LCM model are as shown in below Fig.2.

![Fig.2. Components of LCM model](image)

6. **Implementation**

Taking into account a pandemic situation we have started taking online classes through various online meet platforms like Google Meet, Zoom, Webex. Etc. But coping up with the immediate transformation of offline to online mode took some time for teachers and students too. Then too there were some challenges. Student engagement was a major problem through this mode. Learners are getting bored due to online content delivery. We have faced technical difficulties like:

1. Internet connection problem
2. Less internet bandwidth: due to which audio and video problems have occurred
3. No power supply: if during online class if the power supply is not available then students are unable to join the classes.

To solve the above challenges, we have initiated the LCM implementation model through the Moodle Learning Management System. In this mode, we are combining the online and offline modes of teaching-learning. In this mode of teaching, students are given time for watching videos according to their pace and also according to the availability of the internet. Monitoring takes place in this through quizzes, assignments, activities, and discussions. Student’s doubts are cleared through the teacher’s communication with online mode discussion session.

This LCM Model is implemented through the Moodle LMS. As Moodle is providing a Course Content Management facility, we have created courses providing LeD, LbD, LxI, and LxTs. In the end, Feedback is collected for improvement. The following screenshot shows its implementation for the course Compiler Construction as Fig.3.
6.1. Sample Used

The experiment is conducted for pre-final year students of Computer Science and Engineering students. The course undertaken is Compiler Construction. A total of 73 students have participated in this activity.

Fig.3. Implementation of LCM for a course

6.2. Experimental Setup and Steps of implementation

1. The teacher creates short 10-12 minutes Videos on a topic as Learning Dialogues
2. The teacher creates an Assignment question, a small Quiz, or an activity to do based on the Video contents for LbD
3. The teacher provides notes and other study material as a learning resource for LxT
4. The teacher will upload all the above material through a moodle course (It is shown in Fig.3.)
5. On a given topic minimum of 3 to 5 videos are given to students for learning along with quizzes and assignments
6. The student will watch Videos and solve the quizzes and submit the assignments
7. The teacher will have an online doubt clearing session as a discussion session on that topic for solving the student’s problems and doubts.
8. In the end, students are providing feedback for contents and delivery
9. The teacher will assess the quizzes, assignments and grade the student accordingly
10. The teacher will analyze the feedback for the improvement

7. Results and Conclusion

The experiment is conducted for a pre-final year Computer Science and Engineering class of 73 students. The part of a course taught is Compiler Construction. We have collected feedback from students for both the modes as one which is a completely online mode of teaching and another blended mode of teaching through our LCM Model which is also called as the flipped mode of teaching.
The feedback form is designed with various questions based on Delivery, Content, Technical difficulties, the satisfaction of learners, etc. Table 1. shows the feedback which we have collected from the students. A total of 73 students’ feedback is collected. It is shown in percentage. Few questions and the learner’s view are shown in this table.

### Table 1. Learner’s Feedback

| Questions                                                    | online mode of teaching | blended mode of teaching through LCM Model |
|--------------------------------------------------------------|-------------------------|------------------------------------------|
| Are you able to clear your concepts?                         | 49.32%                  | 82.19%                                   |
| Is the network a major Problem?                              | 61.64%                  | 15.06%                                   |
| Are your lectures fruitful enough?                           | 68.49%                  | 86.30%                                   |
| Can you give your whole concentration?                       | 54.79%                  | 95.89%                                   |
| Are the sessions Interactive?                               | 86.30%                  | 61.64%                                   |
| Do you feel motivated to attend the lectures?                | 53.42%                  | 83.56%                                   |
| Are you comfortable with this technological change of teaching? | 57.53%                  | 93.15%                                   |

It is observed that the challenges we faced in online mode are minimized in this blended mode of teaching like network issues minimized due to the convenience and network availability. As a learner can watch videos according to his pace the engagement of the student increases automatically. Students are satisfied with this kind of learning as it is giving them time to learn anywhere anytime on their own device and own pace. More than 83% of the students were happy with this mode of learning. The engagement is also improved due to the timely assessment. This encourages students and teachers both for better delivery and learning. This blended mode minimizes the technical difficulties to almost 90% and the doubt clearing session helps the learner to better understand the topic. The teacher can also monitor the student’s engagement through the assessment of quizzes, assignments, etc. It also enlightens self-directed learning and participative learning. The teacher is also satisfied with this mode even though it takes time for the preparation of the learning material.

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