From the Chairman’s Desk......

The present COVID-19 pandemic jeopardized all sectors; education is not an exception. This pandemic caught the teachers and the taught unaware and both were forced to a panic-change in the system of teaching-learning process. All of a sudden, there is teaching online, using Google classroom, engaging ZOOM classes, etc. This shift is seen right from school education to higher education, from KG to Ph.D.

Online learning is catalyzing a pedagogical shift in how we teach and learn. There is a shift away from top-down lecturing and passive students to a more interactive, collaborative approach in which students and instructor co-create the learning process. The Instructor’s role is changing from the “sage on the stage” to “the guide on the side.” Effective teaching online requires a high level of professional knowledge and skill. The teacher needs to be able to recognize what students know and don’t know, draw on discipline knowledge, pedagogical content knowledge, educational psychology and knowledge of the context to teach the students concepts and skills that they will need to participate in society. They also need to facilitate opportunities for students to collaboratively create and critique knowledge within and beyond the formal learning environment.

The AP State Council of Higher Education has earlier brought out a guiding on “Resurgence Planning for Academic Continuity in Universities and Colleges in Andhra Pradesh - COVID 19”. And now second in the series of our endeavor in empowering the education system, this “Design and Development of Online Teaching and Learning System - A Tool-Kit” for online teaching is brought out. This tool-kit is documented with an objective of promoting online teaching not only during this pandemic situation, but also as a continual teaching-learning strategy encompassing blended learning and flipped classrooms.

As emphasized in other occasions, the AP State Council of Higher Education will be coming out with updates, other guidelines and action plan documents as and when the situation demands for strengthening the Higher Education in our state. With the reinforcing support of Dr. Audimulapu Suresh garu, Minister for Education and in coordination with Higher Education Department, Government of Andhra Pradesh we will take forward the vision and proactive policies of Hon’ble Chief Minister, Sri. Y. S. Jagan Mohan Reddy garu. I appreciate the efforts made by Sri. Srirangam Mathew, Academic Officer, APSCHE and Prof. K. Rama Mohana Rao, Vice Chairman, APSCHE in bringing out this tool kit, without whose efforts this couldn't be accomplished. I place on record my sincere appreciations to the Vice-Chairpersons, Secretary and the Academic Officers and Joint Director of APSCHE for their contributions and efforts in bringing out this document. I also appreciate the contribution of Dr. G. Srinivas Rao, Reader in Physics, Andhra Loyola College (Autonomous) to this tool-kit.

Prof. K. HEMACHANDRA REDDY
CHAIRMAN
A Toolkit for Online Teaching & Learning

A Tool-Kit

Chapter 1 : Online Learning- The New Paradigm for Teaching and Learning

Chapter 2 : Course Design and Development

Chapter 3 : Platform for launching Online Courses

Chapter 4 : Technology Tools

Chapter 5 : Student Engagement in Online Teaching Environment
Online learning is education that takes place over the Internet. It is often referred to as “e-learning” among other terms such as online learning, virtual learning, distributed learning, network and web-based learning. It involves intentional use of networked information and communications technology in teaching and learning. Online learning is catalyzing a pedagogical shift in how we teach and learn. There is a shift away from top-down lecturing and passive students to a more interactive, collaborative approach in which students and faculty co-create the learning process. The role of the Faculty is changing from the “sage on the stage” to “the guide on the side.”

Online learning promotes Constructivism. The persons actively construct new knowledge as they interact with their environment. This is a student-centered approach in which students “co-create” their learning experience. This approach empowers students as active learners instead of just passive recipients absorbing information and reproducing it for standardized tests.

According to Jean Piaget, a Swiss philosopher, constructivism emphasizes:

- The learner as a unique individual.
- The relevance of the learner’s background and culture.
- Increased responsibility for learning belongs to the student.
- Motivation for learning comes from successful completion of challenging tasks.
- Faculty as facilitators helping learners to develop their own understanding of content.
- Learning is an active, social process.
- The dynamic interaction between task, faculty and learner. Synergy!
Another dimension of online learning is **Constructionism**. It asserts that learning is particularly effective when constructing something for others to experience. This can be anything varying from a spoken sentence or an internet posting, to more complex things like a painting or a presentation. For example, you might read this page several times and still forget it by tomorrow - but if you explain these ideas to someone else in your own words, or produce a slideshow, you would gain a deeper understanding that is more integrated into your own ideas and as such memory is not a problem.

**Online learning facilitates Collaboration.** As a faculty, you focus on the experiences that would best generate learning from the learner’s point of view, rather than just publishing and assessing the information you think they need to know. Each participant in a course plays a dual role as teacher and learner. Your job changes from being the sole source of knowledge, to being a guide and a role model. You connect with students in ways that address their own learning needs by moderating discussions and activities in a way that collectively leads students towards the larger learning goals of the program. *(Reference: [http://docs.moodle.org/en/Philosophy](http://docs.moodle.org/en/Philosophy) and [http://en.wikipedia.org/wiki/Constructivism_%28learning_theory%29](http://en.wikipedia.org/wiki/Constructivism_%28learning_theory%29)).*

The minimum requirement for students to participate in an online course is access to a computer, the Internet, and the motivation to succeed in a non-traditional classroom. Online courses provide an excellent method of course delivery unbound by time or location allowing for accessibility to instruction at anytime from anywhere. Learners find the online environment a convenient way to fit education into their busy lives. The ability to access a course from any computer with Internet access, 24 hours a day, seven days a week is a tremendous incentive for many of today’s students.

**Benefits of Online Teaching and Learning**

Some of the main advantages of online learning include:

- **Convenience:** 24/7 access from any online computer; accommodates busy schedules.

- **Enhanced Learning:** Research shows increased depth of understanding and retention of course content; more meaningful discussions; emphasis on writing skills, technology skills, and life skills like time management, independence, and self-discipline.
§ **Leveling of the Playing Field:** Students can take more time to think and reflect before communicating; shy students tend to thrive online; anonymity of the online environment.

§ **Interaction:** Increased student-to-teacher and student-to-student interaction and discussion; a more student-centered learning environment; less passive listening and more active learning; a greater sense of connectedness, synergy.

§ **Innovative Teaching:** Student-centered approaches; increased variety and creativity of learning activities; address different learning styles; changes and improvements can translate to on-ground courses as well.

§ **Improved Administration:** Time to examine student work more thoroughly; ability to document and record online interactions; ability to manage grading online.

§ **Savings:** Accommodate more students; increased student satisfaction = higher retention and fewer repeats.

§ **Maximize Physical Resources:** Lessen demand on limited campus infrastructure; decrease congestion on campus.

§ **Outreach:** Give students options; reach new student markets; appeal to current students thus increasing enrollments.

### Learning modalities

- **Individualized self-paced e-learning online**
  - Individual learner accessing learning resource i.e., the course content online via an Intranet or the Internet.

- **Individualized self-paced e-learning offline**
  - An individual learner accessing learning resource i.e., the course content offline, without connected to an Intranet or the Internet.

- **Group-based e-learning synchronously**
  - Groups of learners are working together in real time via an Intranet or the Internet. It may include text-based conferencing, and one or two-way audio and videoconferencing.

- **Group-based e-learning asynchronously**
  - Groups of learners are working over an Intranet or the Internet where exchanges among participants occur with a time delay. It includes on-line discussions via electronic mailing lists and/or LMS.
**Attitude towards online environment**
An online faculty should be able to accept the value of facilitated learning as equal to the traditional model. The online classroom requires new teaching strategies and instructional techniques. The person leading a successful online class must be a proponent of facilitative learning, and have confidence in the system in order to make it work.

**Teaching style and habits needed to teach online**
The online facilitator should be open, concerned, flexible, and sincere. An online faculty must be able to compensate for the lack of physical presence in the virtual classroom by creating a supportive environment where all students feel comfortable to participate. An online faculty should be willing to give individual attention to students who may need extra help. Being sensitive, open and flexible is mandatory for success in the online realm.

**Seven Principles of Good Online Teaching**
Chickering and Gamson (1987) outlined Seven Standard principles of Good Practice for Undergraduate Education. They are widely accepted as measures for judging the effectiveness of classroom teaching. The seven principles are depicted in the following figure:

- Encourage student-faculty contact
- Encourage student cooperation
- Encourage active learning
- Give prompt feedback
- Emphasize time on task
- Communicate high expectations
- Respect diverse talents and ways of learning

Chickering, Arthur W.; Gamson, Zelda F. 1987 Seven Principles for Good Practice in Undergraduate Education., AAHE Bulletin; p3-7 Mar 1987
Types of Online Courses: There are three types of online courses. They are web facilitated, blended/hybrid and online. The differences among these three types are shown in the following figure.

- **Web facilitated**
  - Proportion of content delivered online: 1 to 29%
  - Uses a LMS or web pages to post the syllabus and assignments

- **Blended / Hybrid**
  - Proportion of content delivered online: 30 to 79%
  - Blends online and face to face meetings

- **Online**
  - Proportion of content delivered online: 80% or more
  - Typically no face to face meetings


**Online content to promote Flipped Learning Environment**

The term flipped classroom has become an emerging teaching learning strategy in higher education. The most widely used description of the flipped class is a learning environment in which the activities traditionally completed outside of class as homework are now completed in class during instruction time. And, the activities traditionally completed in class are now completed on students’ own time before class. All these activities can be delivered online using a platform or on LMS.

In this model, students watch an introductory video and/or go through a PowerPoint presentation of a lecture before it is actually delivered in the class. After arriving to class, they work through assignments or activities with peers and faculty. Flipping can mean more than watching videos of lectures. One of the goals of flipped classroom is to move beyond the lecture to deliver information and structure class time. A well-developed lecture can be effectual, but faculty members depend on it too greatly and often eliminating other more meaningful teaching and learning strategies. A flipped classroom allows faculty members to introduce new ways of doing things. It facilitates moving from faculty-centered learning environment to a student-centered learning environment. It also enables shift from individual to collaborative system. It is possible to flip a class using individual activities such as quizzes, worksheets, reflective writing prompts, and problem-solving assignments.
According to Bergmann and Sams (2012) “flipping a classroom involves shifting the energy away from the faculty and toward the students and then leveraging educational tools to enhance the learning environment.” The true essence of the flip is really to focus on the student. This allows students to spend time on problem solving, creating, critiquing, and synthesizing in class with their peers and with their faculty.


**Online content to promote Blended Learning**

The simplest definition of the term *blended learning* is the use of traditional classroom teaching methods together with the use of online learning for the same students studying the same content in the same course. It is a “thoughtful fusion of face-to-face and online learning experiences” (Garrison & Vaughan, 2008). There are also blended programmes, in which students study some courses in face-to-face classrooms and other courses are delivered fully online.

**The following are the three models of Blended Learning**

<table>
<thead>
<tr>
<th>Blended Presentations and Interaction</th>
<th>Blended Block</th>
<th>Fully online</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Activity-focussed face-to-face sessions blended with online resources</td>
<td>- Combination of intensive face-to-face sessions on a daily basis and weekly online tutorials</td>
<td>- Short lecture podcasts with online tutorials and interaction via online collaboration</td>
</tr>
</tbody>
</table>

One key concept is that blended learning is not merely the addition of some technological element to an existing course but rather is an integrated plan utilizing the best of what both face-to-face and online learning have to offer. The blended presentation and interaction model, the blended block model and the fully online model provide initial frameworks for structuring of blended learning to improve learning outcomes.
TEACHNG WEB-ENHANCED AND BLENDED CLASSES

POSTING LECTURES ONLINE

The basic question captures the minds of teachers is ‘Why should students bother to come to class if they can simply read (or view video versions of) the lectures online?’ Most online lectures consist of a body of core material, factual or introductory in nature, followed by a discussion of more complex issues, proofs, or processes. The core material constitutes the main dish of the lecture. It’s usually this material that students are expected to know. The other material serves as side dishes, which help differentiate the A category students from the B category and C category students. If the core material were posted online, enriched by graphics and charts (perhaps with a few links to other relevant material available online), students would be relieved of the chore of reproducing this material word for word in their notes. That would allow them to concentrate on the finer points of the lecture. In other words, posting the lectures online frees the students to concentrate on what is being said. For the instructor, posting lectures can be an aid in reevaluating older and possibly out-of-date course materials, improving organization, coherence, and comprehension. For the students, having the core portion of the lecture online provides an opportunity to review the material in its original form (rather than using their scribbled notes) or to catch up on material they may have missed because of illness or absence. Putting the lectures and lessons online also means that students can more easily work through the material at their own pace, then come to class prepared to delve into the issues at greater depth or to translate their newly gained information into hands-on activities.

HOW TO POST CONTENT ONLINE

Lectures content can be posted online by uploading PowerPoint, by creating a PDF version of word-processed documents, by writing directly into learning management system content area, or use one of the free sites like google classroom or Moodle, etc or on individual blogs.

CONFERRING WITH STUDENTS ONLINE

With email and instant messaging, faculty can respond to student inquiries at a time and place of their choosing, leaving them free to structure their activities during the day. Students can submit their inquiries as the need arises.

Some suggestive guidelines

§ Set strict parameters for responding to emails and other online messages and make these clear to the students in both syllabus and class.

§ Specify which kinds of problems you will respond to: for example, personal problems, requests, or issues; or difficulties comprehending the subject matter.

§ Respond to a problem you perceive as being potentially a question for all by sending one email to your entire class, or by posting an announcement in the online classroom or by compiling a FAQ page with your answers and post it on your website.
Know when to move the conversation to a face-to-face meeting or an online real-time communication.

USING A DISCUSSION BOARD

In a blended learning or web enhanced online teaching, Discussion Board could be an useful tool in making students get involved on the teaching-learning process. Students can post their initial reactions to a discussion topic online and read the postings on each topic before coming to class. The Discussion Board could also be used by the instructor for posting follow-up questions after delivering the lecture.

Synchronous and Asynchronous Online Learning

Synchronous learning

Synchronous learning happens in real time face to face learning online by using technology viz., videoconferencing tools like Zoom, WebEx, Jitsi, GoToMeeting, etc or person to person learning. BigBlueButton is an open-source alternative designed for online learning and can be integrated directly into most learning management systems. We no longer have to miss body language and facial expressions when working at a distance. The learners can meet in person at the same place, or log on to an eLearning platform that offers web conferencing or webinar tools to engage with the instructor and peers. This can be as simple as an online chat room where all agree to meet at a specific time and date, or as complex as a tool that offers presentation space, webcam software, and chat boxes. Self-guided learners may be in less need of remediation but can also benefit from the higher level of immediate support and direction offered in synchronous learning experiences (Pappas, C. (2015a). Synchronous vs asynchronous learning: Can you tell the difference? Retrieved from https://elearningindustry.com/synchronous-vs-asynchronous-learning-can-you-tell-the-difference)

Synchronous learning provides opportunity for immediate feedback as learners participate in a learning experience. It allows learners to make immediate adjustments to skill, knowledge and performance. Group activities such as brainstorming are more easily provided and facilitated synchronously, and they support cognitive presence in the exploration phase or the more difficult analysis and integration phases. The social obligation to be present and participate adds a layer of motivation and enhances social presence, encouraging communication and adding to group cohesion.

Asynchronous learning

As the name suggests, asynchronous learning is about learning that happens not at the same time or in the same place. Students learn at their own pace and time from anywhere in the world. Most asynchronous learning environments provide teaching materials online; learners read/view the materials and then participate in online discussion forums. Asynchronous activities allow learners to engage in learning activities at their convenience. Asynchronous learning is usually conducted on a learning management system or web applications like Google
classroom or Moodle that provides a common space where learners can socialise, post questions, turn in assignments or engage in suggested or self-directed learning activities.

Supplemental Resources
Confessions of an E-Dropout
(http://edweb.sdsu.edu/people/arossett/viewpoint.htm)
Strategies for Learning at a Distance
(http://www.uidaho.edu/eo/dist8.html)
What Makes a Successful Online Student?
(http://www.ion.uillinois.edu/resources/tutorials/pedagogy/StudentProfile.asp)
Tips for Online Success
(http://www.ion.uillinois.edu/resources/tutorials/pedagogy/tips.asp)
The Core Rules of Netiquette
(http://www.albion.com/netiquette/corerules.html)
Distance Learning History
(http://iml.jou.ufl.edu/projects/Spring01/deClair/history.html)
The number of online courses and degree programs in higher education are increasing year by year due to advancements in technological front and increased access of technology to millions of people in India. The faculty are required to design and develop online courses for the existing as well as new courses. Blended learning is considered as the most effective method of learning and it necessitates the teachers to equip themselves with required tools and techniques. They should develop clear understanding on the process of design and development of online courses. In the Design and Development of an Online course, the concept of ‘backward design’ promoted by Wiggins & McTighe (1998) useful. As per the concept, the design of a course or a module or a unit or a lesson should be done with the “end” in mind. The three necessary stages according to them are–

- Stage 1: Identify the desired results
- Stage 2: Determine acceptable evidence
- Stage 3: Plan learning experience and instruction

In other words, one should begin with identification of Learning Outcomes. The content of the course shall be based on the learning outcomes. It is nothing but determining the content what the students are expected to learn to achieve the learning outcomes. The learning activities needed for students to arrive at those results shall be determined and the kind evidence of student learning that would need to be assessed shall also be decided.

It is important to plot out the basic structure of a course before building it out, whether face to face (F2F), blended or online. The Online Course should ultimately give the learners a well-integrated and cohesive learning experience, and designing and developing a good structure for the courses the right strategy for the purpose.

There are three essentials of creating an online course–

1. The process of analysis
2. Course goals and learning objectives, and
3. Design.
1. **The Process of Analysis:** There is a need to analyse a few facts like for whom the course is meant? what role it is to play in the entire curriculum? What resources will be available to the teacher and to the students? and so on, before designing an online course. The following are a few more considerations in the analysis part -

   - Establishment of a reasonable timeline for designing and developing an online course.
   - Determining what you really want your students to know.
   - Explore avenues to find course content.
   - Create your own instructor participation plan.
   - Determine how you will use technology in the class.

2. **Course Goals and Learning Objectives or Learning Outcomes:** The difference between goals and objectives is basically the difference between things that can be known but not easily measured and those that can be demonstrated. For example, a goal in Animal Diversity course in Zoology may be for students “to attain a good grasp of the different phyla”. But a more precise objective would be for a student to “identify the evolutionary significance between two different phyla”. Learning objectives are also referred to as learning outcomes and they are usually expressed as expected outcomes - what we expect students to be able to do as a result of learning. One way of coming up with Learning Objectives/Outcomes is that based on Bloom’s Taxonomy, a hierarchical system of classifying different levels of thinking. Table 2.1 gives a brief understanding of the hierarchical levels and the sample verbs for writing Learning Objectives/Outcomes. The main reason for writing Learning Objectives/Outcomes is to clearly locate the level or way of knowing in which the objective is grounded.
Design: Design deals with the purposeful planning of the course, rather than simply letting it happen. While designing a course, the course objectives and the preferred teaching strategies and approaches are to be kept in mind. If a blended course is being designed, a distinction of teaching strategies for online and face to face is to be made.

There are a number of systems that have been developed to guide and evaluate quality design in online courses. The Illinois Online Network’s ‘Quality Online Course Initiative’ (QOCI) (www.ion.uillinois.edu/initiatives/qoci/index.asp), California State University Rubric for Online Instruction (www.csuchico.edu/eoithe_rubric.shtml) and the Open SUNY COTE Quality Review (OSCQR) Rubric developed by Open SUNY Centre for Online Teaching Excellence (COTE) could be referred for suggestive template for instructional design of Online Courses.

<table>
<thead>
<tr>
<th>Domains</th>
<th>Sample Verbs for Writing learning Objectives</th>
<th>Sample Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge or Remembering</td>
<td>Recall, tell, show, match, list, label, define, cite, name, brainstorm</td>
<td>Test, worksheet, quiz, labeling, table</td>
</tr>
<tr>
<td>Comprehension</td>
<td>Compare, contrast, demonstrate, identify, report, outline, summarize, review, explain, catalog</td>
<td>Outline, summary, test, identifications, review, compare-and-contrast exercise</td>
</tr>
<tr>
<td>Application</td>
<td>Compare, contrast, demonstrate, identify, report, outline, summarize, review, explain, catalog</td>
<td>Outline, summary, test, identifications, review, compare-and-contrast exercise</td>
</tr>
<tr>
<td>Application</td>
<td>Develop, organize, use, select, model, choose, construct, translate, experiment, illustrate</td>
<td>Report, diagram, graph, illustration, project, video, case study, journal</td>
</tr>
<tr>
<td>Analysis</td>
<td>Analyze, categorize, classify, distinguish, dissect, examine, differentiate, calculate, solve, arrange</td>
<td>Model, report, project, solution, debates, case study solution</td>
</tr>
<tr>
<td>Synthesis</td>
<td>Combine, compose, solve, formulate, adapt, develop, create, validate, design</td>
<td>Article, report, essay, experiment, composition, audio or video product, drawing, graph, design</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Assess, evaluate, determine, measure, select, defend, score, rank, discriminate, judge, justify, conclude, recommend</td>
<td>Peer and self-evaluations, chart, critique</td>
</tr>
</tbody>
</table>
As an example, the Course Design Template adopted from Prof. K. Srinivas, Head ICT, NIEPA, New Delhi is presented here;

(1) Course Summary Template

1. Paper Code: ICT/001
2. Mode: Blended Online Mode
3. Title: Computer Programming
4. Type of paper: (Foundation/ Discipline/ Elective): Foundation
5. Cohort for which it is compulsory: 6. Semester
6. Cohort for which it is elective: 2. Semester
7. No of Credits: 4
8. Semester and Year Offered: Winter Semester 2016
9. Course Coordinator and Team: Prof. K. Srinivas / Email: drksvasu@gmail.com
10. Pre-requisites: Knowledge of high school mathematics is essential and adequate Exposure to pre-calculus is desirable
11. Aim: Basic concepts of computer programming are introduced starting with the notion of an algorithm. Emphasis is on developing the ability to write programs to solve practical computational problems.

Level:

a. Introductory
b. Length: 24 weeks
c. Effort: 8 hours/week
d. Subject: Computer Science
e. Institution: NUEPA
f. Languages: English
g. Video Transcripts: English
h. Price: FREE

12. Brief description of modules/ Main modules:

I. Algorithms
II. Elements of C/C++ programming languages
III. Basic data types
IV. Sequential and conditional execution
13. **Learning Outcomes of the Paper**

- Learn to write C++ programs, compile, and execute using the gcc/simplecpp compiler
- How to inculcate good programming practices
- How to write programs and develop the ability to solve practical real world computational problems
- How to logically think and produce a solution (program)

14. **Paper Evaluation**

1. **Online Examination Method**
   - I. MCQ – 20%
   - II. Assignments – 20% [Cumulative]
   - III. Case Studies/Collaborative Learning - 20% [Cumulative]

2. **OFFLINE Examination Method**
   - I. Mid-term test – 20%
   - II. Semester-end examination – 20%

15. **Suggested Readings**

During the last decade higher educational institutions (HEIs) in India have been incorporating the concept of online teaching and learning in their curriculum as a part of academic reforms. Even though a number of HEIs and teachers adopted information and communication technology (ICT) tools in regular teaching activity to supplement the traditional classroom teaching, only a few institutions designed and offered open online courses. The challenges in implementation of online learning are misconceptions among faculty, students and parents related to the difficulty of teaching and learning online, availability of the technologies, lack of proper motivation and training.

The COVID-19 pandemic has affected every aspect of human life including the higher education. Online education has now a strategic priority at every educational institution. The entire education system has to undergo changes with the active involvement of all the stakeholders’ viz., policy makers, faculty, parents and students for introducing online education. Most of the suggested approaches for providing education in this crisis have centered on the use of technology. The internet/cellular network is the eventual choice for the delivery of content using the software platforms called learning management systems (LMS).

A learning management system (LMS) is a software application for the administration, documentation, tracking, reporting, automation and delivery of educational courses. An LMS delivers and manages all types of content, including videos and documents. Most modern LMSs are web-based.

Some learning management system platforms are:

§ Google Classroom
§ Blackboard.
§ Schoology.
§ Docebo.
§ TalentLMS.
§ Edmodo.
§ Moodle.
§ Absorb LMS.
To illustrate the procedure for maximization of the application benefit of such platforms, a free web service platform developed by Google for educational institutions viz., Google Classroom is selected and various aspects related to Google Classroom are discussed with the help of illustrations and screenshots.

**Introduction to Google Classroom**

Google Classroom is a free online learning platform developed by Google in 2014. It provides a set of tools for organizing virtual classes and online courses of all kinds and levels. This application is simple to set up, easy to navigate and allows teachers to offer more ICT capabilities. Any teacher having a Gmail account can simply login and create a class. Teachers can create course structure and lesson plans, distribute study and reference material, assign tasks, ask questions, monitor the progress of the students, and provide feedback. Classroom is developed to help the teachers to create, collect, and grade assignments paperless, including time-saving features like the ability to automatically make a copy of a document for each student. It also creates drive folders for each assignment and for each student to help keep everyone organize. Another interesting and useful feature of the Google Classroom is the automatic grading system which allows a teacher to grade the assignments. The teacher can customize the grades based on the nature of the category of the assignment.

Students join a class by pasting the code in their Google Classroom application. They can communicate with each other and teachers easily. Students can download the study material posted by the teacher, can answer and upload the completed assignments, can test their knowledge by taking quiz assignments and questions and access feedback in the form of comments by the teacher.

Google Classroom integrates Google Drive for making and sharing various tasks with the help of built-in Google tools like docs, forms, drawings, sheets, slides, meet and Google calendar. Using the google sheets, the information of the students can be easily obtained while google forms allow a teacher to administer objective type tests. Using docs, assignment completion can be monitored. Even though Google meet feature is not provided for individual users, using a link in stream or scheduling event in Google calendar, online class video meeting can be scheduled.

Various aspects of Google Classroom are:

- installing Google Classroom
- Creating a Class
- Inviting Students to join the Class
- Class Settings
- Stream (Announcements/Notifications and Comments)
- Class work (Assignment, Quizzes, Material, Question and Topic)
- People (Teacher, Co-teacher and Students)
- Grades (Grade Book of the Students)
Accessing/installing Google Classroom

Google Classroom application is available for both personal computer (desktop/laptop) and smart devices (tab/smart phone).

**Accessing Google Classroom on a Personal Computer Desktop/Laptop**

**Method-I**
- Open a web browser
- (Google Chrome/Mozilla Firefox/Internet Explorer/Edge)
- Go to [http://classroom.google.com](http://classroom.google.com)
- Login using Gmail account.
- Google Classroom Home page will open

**Method-II**
- Log into Gmail
- Click on the Google Apps (grid) icon on the top right corner
- In the list of Google apps, click on Classroom.

**Installing Google Classroom on a Smart Phone/Tab**
- Go to Play Store (android)/App Store (IOS)
- Download Google Classroom App
Creating a Class

1. On the Classroom Home page, click the sign ‘+’ and then click Create Class

2. The “Create Class” window will open
   a. Enter the class name (required).
   b. Enter a section (optional).
   c. Enter Subject (optional).
   d. Enter Room for the class (optional).
   e. Click Create (at the bottom).

Class with the given details will be automatically created.

Home page of Google Classroom

After the creation of a class, the Google Classroom home page appears as shown below.
The main menu of the Google Classroom consists of:

- Classes: the classes created as a teacher and the classes joined as a student
- Calendar of class schedules
- To Review: tasks assigned to the students to be reviewed by the teacher
- To-do: tasks assigned to the students by the teacher
- Archived Classes
- Settings

Classes created by the teacher are represented by the symbol ⬆️  �stitución
Classes joined by the students are represented by the symbol 🌟  🚀

**Joining the Students into the Class**

There are three ways:

(i) Using Class Code:
- Copy the Class code (5mvkyji) and share it to the students of the class using SMS/WhatsApp/Email.

(ii) Using invite link:
- Copy the Class link and share it to the students of the class using SMS/WhatsApp/Email.

(iii) Through mail:
- Click on People and then click on the symbol against students ✉️
- Enter mail IDs of the students and click invite

Note: Among the three ways, inviting the students to join a class with shared class code is relatively easy.

Once the students enter the class code in their google classroom app or click on invitation link, they will join the class and the same will be updated in the Teachers Google Classroom.

**Class Settings**

Once a class is created, using the class settings tab (i) the details about the class can be viewed and managed, (ii) the class code and the invite link can be copied, (iii) the class code can be disabled and re-enabled, (iv) stream settings can be viewed and modified, and (V) grading can be set up.
Class Details

Using the class details window, change the class name and other class details (if necessary) and then click on save.

Class Code

Using the general window (upper part),
(i) class code can be enabled, disabled or reset.
(ii) Class code and invite link can be copied.

For the changes to take place, click on save.

Stream Settings

Using the general window (lower part), posts and comments by the students can be enabled or disabled. Classwork on the stream can be made to appear (i) with all the attachments and details, which will take up more space on the stream,(ii) in a condensed notification; or (iii) hide classwork notifications. Choose whether deleted items appear. If enabled, only teachers can see deleted items.

Set up Grading

Only teachers can set up grading and only on a desktop computer/laptop. Google Classroom provides two grading systems viz., (a) Total points or (b) Weighted by category grading (%). Grading system can be disabled using “No overall grade”. Grade categories, such as essays, short answer type, homework, and tests can be added to grading system.
Google Classroom opens in the stream by default as a landing page of the class when you login to your class. It is similar to a social media platform, in which the announcements, assignments, discussion topics and comments posted by the teacher appear in chronological order with the recent post at the top. Students can share or post comments only when the teacher enables this feature to the students. However, the students can always view the posts and comments.

**Posting, Scheduling and Saving Draft of Announcements in Stream**

By default, the following box will appear in Stream. You can communicate with your class here by creating and schedule announcements along with responding to student posts.

When you click on the above box, the following window will appear.
By default, the announcement is made to all the students of a class.

In order to communicate with the students who missed the work or who have to resubmit the work, using the drop-down menu the announcement can be posted to a smaller group of students and it appears only for this group of students.

Add feature is used to make large announcements in the form of documents (word/pdf) as attachment and to share images, documents, videos and weblinks from Google Drive, PC, web resources and YouTube.

- To files, click on Add (paperclip icon).
- The left side window will popup.
- attach Using any of the four, you can add files/links.
After finishing the typing of announcement and adding/attaching required files, you can:

- Post it immediately
- Schedule it for any date and time, or
- Save draft using the drop-down menu.

You can reuse the posts made earlier in any of the classes created by you using the icon:

**Google meet link:** With the help of link in add, the Google Meet (or any online video class) can be scheduled and the web link can be shared to the students.

**Classwork**
Using the Classwork feature, a teacher can create and assign the tasks to students.

Google Classroom allows the teachers to share work with the students by creating assignments, share files or links, quizzes and questions. A date and time for the work to be completed can be added, a score if the teacher wishes to set one and a rubric to help the student understand what is being assessed and what marks will be given for if the teacher is using the scoring facility. Once a teacher has assigned work, the documents that have been used are stored together in one folder on the Google Drive. This makes it very easy for any course to be copied and reused. Students can submit their completed work for assessment.

**Creating Topics**
Topic feature in Google Classroom is similar to a folder. Topics are created to organize the entire course work and classwork. Topics include (i) course overview, (ii) syllabus, (iii) various unit names, (iv) additional learning resources, (v) previous and model question papers etc. Instead of folders, you can create “topics” on Google Classroom and then assignments, quiz assignments, questions and class materials can be grouped under topics. The topics can be arranged in an order and the contents of a topic can also be reordered.
To create a topic:
- Click on Create and then on Topic.
- Enter the name of the topic and click Add.
- To create more topics, repeat the same procedure.

**Creating an Assignment**

Teachers give assignments to the students to improve the learning skills of the students. With the help of assignments, students will be able to learn new techniques and specific writing tips which help them in their academics.

To create an assignment:
- Click on Create and then on Assignment.

- Enter the Title and Instructions for the assignment.
- Select Grade category, Due date and time, and Topic for the assignment.
- Attach a file, video or Web link to the assignment
- Select to Assign it immediately, Schedule it to post at a later date or Save a draft.

  Use add (paper clip) icon to attach an existing resource like an image, video, PPT or word/pdf document (i) from Google Drive, (ii) a Link, (iii) a file in the device or (iv) videos from YouTube.

  Use Create (+) icon to create a new Google document: (i) Docs, (ii) Slides,(iii) Sheets, (iv) Drawings or (v) Forms.

**Creating a Quiz Assignment**

Creating a quiz assignment is similar to that of an assignment. The only difference is that google classroom automatically creates a Blank Quiz Google Form in quiz assignment.
3.9.4 Creating a Question

To ask a question:

- Click on Create and then on Question
- In the pop-up window, enter the Question and Instructions for the question
- From the drop-down menu, select Short answer or Multiple choice
- Add an existing resource or create new files in Google Drive
- Select the options in the right-side bar; class(es), All or specific students, Points, Due date and Topic
- Also, select if students can reply to each other and edit their answer
- Click the Ask button (at the top right corner) when it is active
Creating Study Material

Study material and other learning resources are required for the students to study and prepare.

To Create Material:

- Click on Create and then click on Material
- In the pop-up window, complete Title and Description fields
- Use add (paper clip) icon to attach an existing resource like an image, video, PPT or word/pdf document (i) from Google Drive, (ii) a Link, (iii) a file in the device or (iv) videos from YouTube.
- Use Create (+) icon to create a new Google document: (i) Docs, (ii) Slides, (iii) Sheets, (iv) Drawings or (v) Forms.
- Select the options in the right-side bar; class(es), All or specific students and Topic
- Select to Ask it immediately, Schedule it to post at a later date or Save a draft.

Using this feature, additional teachers and students can be invited to join the class created by a teacher.

Inviting a Co-Teacher

The primary teacher of a class can invite other teachers to join the class to coordinate class activities.

To invite a teacher

- Click on People and then on the icon against Teachers
- Enter the mail ID of the teacher and then click on invite.
- The teacher you invited will receive an email invitation to join the class.
- On accepting the invitation, co-teacher will be added to the class.
Co-teachers can do everything a primary teacher can, except deleting the class. A primary teacher can (i) send mail to the co-teacher, (ii) can remove the co-teacher and (iii) can transfer the ownership of the class to a co-teacher, by clicking on three dots against the co-teacher.

**Remove, Email or Mute Students**

In addition to inviting the students to join the class as explained in section 3.6, a teacher can email, remove (permanently) or mute (temporarily) either one student or a group of students or all the students in the class.

- Click on People and then select the Students and then click on Actions in Students panel
- A window with options Email, Remove and Mute will pop up.
- Select appropriate option and complete the activity

**Viewing Tasks of the Students**

Using the People feature (i) the tasks assigned to, completed by or missed by a student, (ii) the grades obtained by the students and (iii) assignment attachments of the student can be viewed by the teacher by clicking on the student details.

**Grades**

To access the grade book of the students, click on the Grades on the class page or click on the symbol on the Google classroom main page.

**Google Classroom for Students**

The students can enroll using the class code sent by the teacher or using the invitation link. The students can also enroll from a class by clicking on “three dots” on the class theme on Google Classroom home page. When students login, they can see if there are any assignments they need to complete in all of their classes right from the home screen. The class page of student’s google classroom consists of stream, classwork and people.
On the stream page, the notifications and comments posted by the teachers and students will appear. On the classwork page (i) the material posted and the tasks assigned by the teacher and (ii) the tasks completed and missed by the student will appear. The student can submit the assignment by using to-do function or submit/turn in/hand in options. Using the people tab, the student can view his/her teacher and classmates and can send email to the teacher.

**Conclusion**

Among a number of free and paid platforms available, Google Classroom is relatively user-friendly free web-based application and can be customized to suit the needs of distance/remote learning of the students. Integrating Google Classroom with other G-suite features like meet, jamboard, docs, forms, slides, diagrams and sheets, one can collaborate and manage the online learning. Google Classroom has streamlined the classroom workflow and makes communication easier between teachers and students.
4.1 Introduction

The information and communication technology (ICT) provides diverse outcomes in teaching and learning process based on the accessibility of the tools and affordability of the technologies. A number of software and hardware tools are required for the content generation by teachers, submission of home work by students, to conduct online classes and to learn remotely. Selection of appropriate tools is important to make the best out of the online learning. Various hardware and software tools available for online teaching and learning are presented in the following paragraphs.

4.2 Hardware Requirements

4.2.1 Internet Connection

A stable, reliable, fast and quality internet connection plays a crucial role in the management of online courses and for effective online teaching and learning. All the software and learning management system (LMS) platforms will operate through the internet. The speed of the internet connection required depends on the following;

a. the content shared (video or only audio and screen sharing),

b. the number of students in the online class,

c. the number of parallel online classes, the database management system of the institution, etc.

If the internet speed is less, performance issues like page display, playback of course videos, online quiz performance etc., will be encountered. Similar to a car audio, the wireless internet connection is subjected to signal strength and reception issues. Internet connection with a minimum dedicated bandwidth of 5 MBPS is suggested by technical experts for teaching and 2 MBPS for students. A wired connection i.e., a computer connected to a router via an Ethernet cable is relatively faster, more stable and more reliable than a wireless (WI-FI) connection.

4.2.2 Desktop Computer, Laptop, Tablet and Smartphone

Onlineteaching requires adequate computer hardware. Higher educational institutions (HEIs) should ensure that all the teachers have access to a personal computer/laptop at work for preparing the content and delivering the online classes. As a part of instruction, teachers may use images, videos, animations, simulations and many other creative practices. They may also require reproduction of instructional videos. Computers/laptops need to be equipped with high speed processor, higher RAM and graphics card for such purposes. For teaching, a monitor with a large size screen is required for better visualization.
Teachers need to store the educational content developed by them in a safe and secure device. A Solid-State Drive (SSD) drastically reduces boot time and less prone to damage. Therefore, SSD is preferred over Hard Disk Drive (HDD) for data storage. In the cloud storage, the data is protected from inadvertent damages and information is encrypted and stored somewhere else. Even if something happens to the computer memory, the information is safe.

For online learning students can use a desktop or a laptop or a smart phone or a tablet based on the availability.

4.2.3 Web Camera/Digital Camera

Webcam is the most sought-after technological tool for online teaching. Most of the laptops come with built-in webcams with a resolution ranging from 360 to 720p which can be used for live teaching whereas a desktop computer does not come with a web camera. A poor quality webcam causes inconvenience for the teacher and the students due to poor image quality and unclear gestures. As most of the students watch the lessons using a smart phone in which the screen size is small, the images they see are very small. Video streaming through a quality webcam or digital camera can solve this problem. A webcam with at least 30 fps and 720p resolution can be used for online teaching for streaming good quality video. Instead of purchasing a new webcam or a digital camera, the smart phone camera fitted to a tripod stand along with a lapel microphone can be used for online teaching.

4.2.4 Head Phones with microphone

Built-in microphone and speakers of laptop/smart phone/tablet can produce howl-round and pick up background noise (even the fan sound) causing distraction to the students. Headset takes the teacher mentally into ‘teaching zone’ and the teacher is less distracted by any potential background noise so that he/she can focus on the class. Usage of a headset helps the students to hear the teacher more clearly, which supports their understanding. Headphones with noise reduction microphones help in smoother class communication. The microphone should be close to the mouth of the presenter.

4.2.5 Drawing Tablet with stylus

Drawing tablet or pen tablet is a hardware input device which has a hard plastic, touch-sensitive flat drawing surface that transfers stylus movements to a computer by plugging it to a computer via USB port. The stylus is similar to a pen, pencil, or paintbrush. Drawing tablet is like a large marker board to take notes on or to create outlines for online teaching. Initially, the user finds a little difficulty in writing on the drawing tablet surface, but with practice it’s as natural as using a pen or pencil on a paper.

Pressure sensitivity of the stylus indicates the thickness of a line drawn on the tablet surface and it depends on the pressure applied on the tablet with the stylus. If the stylus pen is
pressed hard against the drawing surface, the line or mark will become dark and thick. A device with a pressure sensitivity of 2048 or more will yield better results and better writing experience. With the help of drawing tablets, real class environment can be created.

4.2.6 Whiteboards

A whiteboard is similar to the traditional classroom blackboard, but is white, on which information is written with colored dry erase markers. While preparing video lessons or for online teaching, teachers need to draw images or to derive equations in some lessons, for bringing real classroom environment into the online classes.

An interactive whiteboard or a smart board or an electronic whiteboard, is a classroom tool using which information from a computer can be displayed onto a classroom whiteboard using a projector. Using a stylus or finger, a teacher can write on the screen. The interactive whiteboard is a powerful tool to the teachers and students to collaborate and for closer interaction to the lessons. Using smartboards, multimedia educational content can be shared and used in online classes to create interest among the students.

4.3 Software Requirements

4.3.1 Document creation tools

To supplement online teaching, teachers need to provide study material to the students on the topics they taught. Even students need to submit online assignments in the form of text documents. Microsoft Word, Google Docs and IOS pages are the word processor softwares required for the study material preparation. These softwares are the word processing application packages specially designed for typing, editing and printing of information in the form of text. These are effective tools for creating all kinds of documents like letters, reports, question papers, quizzes, study material, assignments, magazines etc. Additional features like drawing and graphics editing tools are also available for inserting images and drawings in the material/assignment.

4.3.2 Presentation Tools

To increase the visual impact, to improve audience focus, for providing annotations and highlights, slide presentation softwares like Microsoft PowerPoint, IOS Keynote, Corel Presentations and Google Slides are invaluable classroom technological tools.

In the slides, files such as text, music, picture, video, animation, chart etc., can be embedded. As most of the students watch online classes on small mobile screen, the presenter has to keep in mind the following:

- Use large fonts (greater than 30 font size),
- Select proper font, font colour and slide background to help students visualize easily.
· Use bullet points
· Do not read the screen instead explain each bullet point
· Use animations for effective teaching and learning
· Use visually clear videos with clear sound

As slide show presentation addresses a number of different learning styles and abilities, appropriate use of these tools can enhance the teaching and learning experience for both the teacher and the students.

### 4.3.3 Image/chart Creation Tools

Use of images and charts in the teaching will lead to increased student interaction and discussion. Teaching and learning with images and charts also help the students to develop their visual literacy skills and contributes to their overall critical thinking skills. Images can be created using software tools like Microsoft Word, Google Docs and iOS pages, Microsoft PowerPoint, iOS Keynote, Corel Presentations and Google Slides, Google drawings. A number of free online tools with many user-friendly features are available.

Images are more effective when meaningfully integrated into course curricula. Online search engines like google and bing can be used to get images required for online teaching. However, copyright issues will prevent the usage of the images downloaded. Hence, teachers are advised to create their own images and charts for instructional material preparation. Among a number of free tools, the online tool available on https://app.diagrams.net/ contain the full range of visual configuration, as well as web application features such as a wide range of export options, a large collection of icons, real-time collaboration and embedded widget sharing. It is completely free online diagram editor built around Google Drive, that enables to create flowcharts, entity relation, network diagrams, mockups, circuit diagrams, chemistry lab instruments and more. Sketchpad and autodraw are also useful drawing tools.

For communicating information visually, charts play a crucial role. On Onlinecharttool.com, charts can be designed online for free and can be shared. It supports a number of different chart types like: bar charts, pie charts, line charts, bubble charts and radar plots.

### 4.3.4 Audio Recording and Editing Tools

Podcast is a digital audio file made available on the internet for downloading to a personal audio player. Teachers can record and share podcast to provide additional and revision material to the students. Podcasts can immensely benefit auditory learners in their learning. Online teaching and learning process can be enriched with podcasts related to the course.

In order to create a podcast, delete the pauses out of a webinar recording, or add effects to a video soundtrack, audio editing software is needed. The selection of the audio editor ultimately depends on a few factors: the purpose, overall skill level of the user, and budget. Among a number of audio recording and editing softwares available for free download, the popular softwares are;
Of these softwares, Audacity is a free, user friendly, multi-track audio editor and recorder for Windows, macOS, Linux and other operating systems. It supports multiple plugins and libraries for enhanced functionality. Audacity can be used; (i) to record podcasts, audio books and lessons, (ii) to remove noise from an audio clip, (iii) to cut and combine clips, (iv) to apply special effects, (v) to export audio recordings in many formats and many more, to achieve truly professional results. Audacity can be downloaded from https://www.audacityteam.org/.

4.3.5 Video Lesson Recording Tools

Recorded or live Video lessons provide a new dimension to learning that makes a student’s educational experience more enriching. The ability to pause, rewind, stop and play a recorded video helps the students replay important points that they need to remember.

Video reporting by the students or submission of video assignments by the students will inspire and engage the students, facilitate student-centered learning activities, increase student motivation, enhance learning experience, develop potential for deeper learning of the subject, enhance team working and communication skills.

Video lessons enable the teachers to create a flipped classroom, or blended learning environment. Even though, teachers create video lessons for remote learning by the students, they are also beneficial to teachers who teach in traditional classroom settings. Various video lesson recording softwares/screen recording softwares available are:

- Screencastify
- Presentation Tube Recorder
- Screencast-O-Matic
- Free Cam
- Loom
- YouTube
- OBS Studio
A number of these softwares are free trial versions and after the expiry of the trial period, the softwares are to be purchased. Also, in most of the free screen recording applications, a watermark will be added to the video. Even though in most of the free versions the professional features are disabled, the application OBS Studio is available for free download with all the features.

**Introduction to OBS Studio:**

Open Broadcaster Software Studio (OBS Studio) is a videostreaming and recording software which is free, open source, and fully cross-platform i.e., Mac, Windows and Linux. OBS studio is a powerful video lesson creation tool when used with audio and video editing softwares. In order to avoid confusion and complexity, only minimal features required for recording a lesson are presented here.

Step-1: Download and install OBS Studio from [https://obsproject.com/](https://obsproject.com/)

Step-2: Open OBS Studio. On the home page of OBS studio the panels are:
Video Lesson Recording Quick Setup using OBS

Studio

Sep-3: Click + button at the bottom left corner of the Sources Panel.

For video recording of a lesson with PowerPoint presentation, the following sources are selected:

- Audio Input Capture (for recording voice)
- Image (to insert a static image or logo)
- Window Capture (to display documents, presentations and web browser)
- Video Capture Device (to record video)
- Colour Source (for background colour of the canvas)

Step-4: Click on each of the above sources one after the other, select the devices/sources, set the properties and click OK/apply.

Then the following window will appear.

The size and positions of the sources (logo/image, video and PPT can be changed to have the appearance you like.
Step-5: Once selecting the required sources and setting their sizes and positions, click on “Start Recording” in the controls panel. Now, come back to PowerPoint slide show and start teaching using PPT. All the slide transitions and text/image animations, video of the presenter and logo/image will be recorded.

Step-6: After completion of the presentation of the lesson, come back to OBS main window and click on “Stop Recording” in the Controls panel.

With practice and experience a number of other advanced features (scene transition, changing canvas size, setting video resolutions, changing the background, using a whiteboard etc.,) can be used to live stream videos or to record a video lesson with a variety of features. If one starts to learn and use all the features at the beginning, it is difficult to record the lessons with OBS Studio. After recording the lesson, click on file on OBS home page and then click on show recordings to see the recorded lesson.

4.3.6 Video Editing Tools

Generally, a video lesson will be initially recorded with high resolution and hence the file size is large. It will be difficult to share large videos using mail or to upload the videos to YouTube. VLC media player is a free and open source cross-platform multimedia player that plays most multimedia files. VLC can also convert, capture/record and be used as a server to stream video. VLC media player can be used to compress video lessons to a wide variety of extensions.

The tools useful for editing of video lessons:

· Open Short Video Editor
· Filmora9
· Handbrake
· Online Video Compressor
· Miro Video Converter
· Format Factory
· Blender

Among these video editing softwares, Blender is a free, advanced & open source software for all kinds of visual designs.

4.3.7 Animation Creation Tools

Animations support students’ cognitive processes that ultimately results in understanding the subject matter. Some concepts especially on science topics which cannot be explained either orally or using static images can be easily explained to the students. Also, in subjects other than science, teachers can supplement the class with animations. Students like animations/animated stories and enjoy the opportunity to create their own. Various animation creation tools useful for teachers are:
Integrating animation and simulation activities into the higher education curriculum helps in achieving a range of educational objectives.

### 4.3.8 Quiz Creation Tools

Quizzes have become an integral part of online education and they help (i) to identify gaps in knowledge, (ii) to build confidence and help students in retaining information, (iii) to identify the gap between teaching methodologies and the students’ learning abilities and styles and to change the teaching methodology accordingly and (iv) to know whether the learning objectives and outcomes of the course are met or not. Various online quiz creation tools available tools are:

- Google forms
- Quizlet
- Kahoot
- ProProfs Quiz Maker
- Wufoo

Advantages of online quizzes are: (i) they can be administered simultaneously to a large number of students located at different places using internet, (ii) randomization of questions and choices to prevent copying, (iii) getting instant results of the quiz, (iv) setting start and end times, (v) questions can be made compulsory and (vi) all types of questions viz., long, short, very short, multiple choice, true/false etc., can be set.

### 4.3.9 Document Management Tools

After creating documents, podcasts, images, charts, lesson plans and video lessons, the teachers have to maintain them regularly. A safe and secure location to store, organize, and manage all the instructional material is essential to properly keep track of them, especially for online teaching.
The resources can be stored on the hard disk. The secondary storage option i.e., cloud storage has its benefits viz., reasonably affordable, easy sharing of files, accessible across all operating systems and devices, and useful when hard drive damages/dies. Cloud storages like Google Drive, OneDrive and Dropbox are online storage locations. Dropbox and Google Drive are relatively simple, easy to use and relatively inexpensive for file sharing. Zoho Docs is an online document management software that allows the management and storage of all the files on the cloud.

**4.3.10 Live Streaming Tools**

The potential advantages of video conferencing in higher education are; (i) content/screen sharing, (ii) connecting the teacher and the students at different places, (iii) recording of the lecture or lesson for future reference (for teachers and students), (iv) arranging guest lectures by subject experts across the globe, (v) interaction and collaboration between students and teachers (text chat) and (vi) available in both mobile and desktop versions.

Some of the free (with limited features) and paid (with advanced features) are:

- Zoom
- Google Meet
- GoToMeeting
- Cisco Webex
- Microsoft Teams
- UberConference
- YouTube Live

**4.3.11 Virtual Whiteboards**

A virtual whiteboard is a blank space where both teachers and students can write, share and collaborate with each other in real-time from anywhere. The virtual whiteboard has become a major web based technological tool for online teaching and learning. The features of a virtual online whiteboard include (i) unlimited canvas size, (ii) variety of drawing tools (pencil, paintbrush, pen, eraser, text and image highlighter etc.), and features (shapes, colors, backgrounds), (iii) text boxes and sticky notes, (iv) importing (word processing and pdf documents, images, videos on some platforms, presentation slides, camera for taking snapshots and live videos) and exporting (canvas in the form of images and pdf) facilities, (v) zoom in and zoom out of a part of the board for better visualization on small screen devices, (vi) presentation functionality in some virtual board applications, (vii) multiple pages, (viii) ruler to draw lines and compass to measure angles, (ix) sharing the board with a link or inviting using mail ID for online collaboration, (x) saving the boards for future use and many more.

Open source virtual whiteboards useful for online teaching and learning are;
Conclusion

Teachers are expected to employ integrated technology practices in classrooms to help students learn better. The strategic use of technological tools strengthens online teaching and learning. Teachers need to be trained for using the technological tools effectively. It should be ensured that the online teaching and learning should be learner centric. The teacher’s role is to facilitate active student engagement in online teaching.
Student engagement is one of the critical challenges in online teaching and learning process. It is particularly difficult for those students who are exposed to online courses for the first time. The transition process from conventional classroom instruction to remote teaching and learning needs to be handled carefully. Online learning environment is significantly different from the college environment. Here the environment is free without any conditions. Some interventions such as home atmosphere, internet speed, quality of the e-equipment, psychological issues, and privacy may create distractions in the learning process. Students in online courses generally start with the best intentions—keeping up with the readings and assignments, engaging in discussion, and learning from their instructor's feedback and comments. Once an online course begins, students can quickly become overwhelmed to the point where they are treading water in an attempt to stay afloat. It is only when the first grades are posted that the tide goes out and students realize they are in danger. This is where instructors can easily identify the students who are not succeeding. What can instructors do to support these struggling students? A Time of Unknowns: Teaching Online with Poise and Positivity | www.facultyfocus.com.

The Online Learner Students in online courses are unlike traditional students in many ways. Some online learners may be older and busier with work and family obligations (ODL programs) than students on traditional college campuses (Roddy, Amiet, Chung, Holt, Shaw, McKenzie, Garivaldis, Lodge, & Mundy, 2017; This toll& Yates, 2016). To add to these challenges, online courses are often accelerated and demand a heavy workload and a set of technological skills (Roddy et al., 2017). In many ways, distance learning reverses traditional teacher/student roles and students are responsible for planning, organizing, and directing their own learning (This toll& Yates, 2016; Fetzner, 2013). Students must also manage the complex mixture of the learning management system (LMS), the internet, course materials, and their own electronic devices (Beins, 2017). An online learner who procrastinates may experience technical difficulties, can become confused by course content, or may feel isolated and become unmotivated to meet course requirements (Roddy et al., 2017). As a result of these issues, online students have lower retention rates (Fetzner, 2013) and fail to complete courses at a higher rate than traditional students (Schroeder-Moreno, 2010).

The Online Teacher Instructors who teach online courses also face unique challenges. Online instructors are tasked with delivering course content, helping students navigate the technology, engaging students in discussion, monitoring student progress, encouraging perseverance, providing timely and detailed feedback, and fostering interaction between students (Chen, Pedersen, & Murphy, 2011; Roddy et al., 2017; Watson, Castano, & Ferdinand-James, 2017; Zweig & Stafford, 2016). Online instructors must be flexible, responsive, and committed to engaging and retaining their students (Roddy et al., 2017). Instructors must also update courses regularly to ensure that they remain relevant and interesting (Schroeder-Moreno, 2010).
The very nature of online learning places additional demands on both students and instructors. What can instructors do to identify and support struggling online learners who are being swept up in the tide? Consider implementing the following practices in your own online courses:

1. **Implement Early Check-Ups:** Think about the first time you taught an online course and consider the steepness of the learning curve. In addition to the LMS, many online courses require proficiency in additional technology tools and programs. Each course has its own rhythm, which may include discussions, homework, papers, projects, quizzes, and exams, and some students stumble early in the course. Many students assume that online courses will be easier than traditional face-to-face courses or underestimate the technological and organizational skills and the time commitment required to be successful (Fetzner, 2013; Schroeder-Moreno, 2010). Many students experience information overload when beginning an online course (Chen et al., 2011). For these reasons, you should share expectations with students by phone or e-mail before the class begins (Thistoll & Yates, What can instructors do to identify and support struggling online learners who are being swept up in the tide? A Time of Unknowns: Teaching Online with Poise and Positivity | www.facultyfocus.com 12 2016).

   Within the course, include detailed instructions for accessing all course materials, auxiliary resources, and support services, and encourage students to ask you and each other for help. As a check to ensure that students can navigate the LMS and supplemental materials, have students post screen shots. A short multiple-choice quiz is also a good way to ensure that students can access the course procedures and policies. According to Fetzner (2013), almost 20% of unsuccessful students claim they got behind and could not catch up. For this reason, monitoring student progress and addressing early signs of distress is a priority (Roddy et al., 2017).

2. **Communicate clearly and frequently:** Although online courses provide little to no opportunity for face-to-face interaction (Chang, Hurst, & McLean, 2015; Roddy et al., 2017), the typical online environment is equipped with areas for announcements, and private and group discussions. Indeed, these asynchronous forms of communication may actually benefit introverted learners who need time to synthesize their thoughts before responding (Self, Fudge, & Hall, 2018). Timely and clear communication about course expectations, requirements, and due dates is imperative (Roddy et al., 2017). Consider posting a master schedule that consolidates all due dates in one place. Because students identify redundant information as an obstacle to learning (Chen, Pedersen, and Murphy, 2011), point students to original postings in the LMS rather than repeating information. Chang et al., (2015) report that students are more satisfied with the course when instructors encourage frequent communication.

3. **Encourage Engagement and Build Community:** We all want our students to engage in our online courses, preferably through higher order learning such as applying the content to real world problems or situations, or sharing diverse opinions and forming personal perspectives (Buelow, Barry, & Rich, 2018). Buelow, Barry, and Rich (2018) report that students enjoy thought-provoking questions posed by the instructor, hearing the positions of their peers, and sharing their own perceptions. When a student posts generic, trivial, or redundant information in a discussion, gently remind them that peer responses are expected to move the conversation
forward. Encourage students to improve their discussion posts by commenting on something specific about a classmate’s post, supplying an example from research or their own personal experience, or asking follow-up questions. Self, Fudge, and Hall (2018) report that students who procrastinate with discussions tend to interact less and are often less successful academically.

Students who are not engaging in the course may not understand the LMS, so reach out to the student’s advisor or to the student using e-mail, phone, or text messages. Encourage students to get involved early in the week by posting optional discussion items that appeal to a variety of learners. To build community within the course, Beins (2017) recommends using humor, first names, and pronouns such as “we” or “us.” Addressing the course as “team” also reminds students to work together toward the common goal of successfully completing the course.

4. **Provide Scaffolding:** An important role of instructors is to determine the right balance of scaffolding. If learners are highly motivated, possess a range of cognitive strategies, and have prior knowledge of the content, Dabbaugh (2003) recommends a low level of scaffolding. Higher levels of scaffolding are recommended for learners who lack prior knowledge and have high anxiety or low motivation (Dabbaugh, 2003). Too little scaffolding often leads to frustration, anxiety, and loss of motivation (Dabbaugh, 2003). **Types of scaffolding include indexes, glossaries, formula sheets, templates, scoring rubrics, and samples for projects and papers, and short videos to supplement background knowledge.** Instructors can also scaffold individual assignments by requiring outlines or rough drafts. Because finding the right balance for scaffolding is a shared responsibility and requires input from students, ask students to identify the level and type of scaffolding they need.

5. **Be Flexible with Deadlines:** How do you determine which students are permitted to submit work late? Some universities request faculty leniency to those affected by natural disasters, while students facing issues such as illness, injuries, family emergencies, and technology glitches are not given such leniency. A grade of zero on a high-stakes assignment may discourage students from completing further work (Wyre, 2019). When strict due dates are enforced, some students will turn in high quality work but receive lower grades due to lateness while other will receive higher grades for lower quality work that is submitted on time. Wyre (2019) states that denying a student the opportunity to submit an assignment denies them the opportunity to learn. Similarly, Cutler (2019) argues that the goal should be mastery, and some individuals may need more time to achieve mastery. Thomas (2019) reports that when the pressure of a due date is alleviated and students are permitted to complete an assignment, the work is often better.

6. **Allow “Re-Dos”:** Student disappointment over a bad grade can fuel a feeling of futility. Allowing students to re-do assignments extends the learning window and allows students to use specific, corrective feedback to improve their work and their grades. Cutler (2019) allows retakes as a way of acknowledging that occasional slip ups should not get in the way of learning. Because the goal is improvement, Cutler (2019) allows any student who did not perform at their best
the opportunity to re-do an assignment. Another option is to grant a small window of amnesty, allowing students to re-do one or more assignments to improve their grade. With amnesty, students must communicate with the instructor and make the extra effort to re-do an assignment. Some instructors average the original and the improved grade to encourage responsibility and discourage overuse of the re-do policy. The nature of online learning is unique with strong demands on both students and instructors. By implementing early check-ups, communicating clearly and frequently, encouraging engagement, building community, providing support and scaffolding, being flexible with deadlines, and allowing re-dos, we are better able to identify struggling students early on and put them on the path to success, regardless of the tide.

One of the biggest challenges in Online Teaching and Learning Process (OTLP) is keeping the student engaged. Online teaching also needs to be learner centered by ensuring active learning which improves the student performance and increases enthusiasm for learning. There are two different environments in which the students need to be kept engaged in the OTLP – one is the asynchronous and the second is the synchronous learning environments. Asynchronous learning is like students ‘going to class’ at different times of the day or not located in proximity to one another. Hence the asynchronous learning is more challenging in terms of keeping the students engaged with active learning.

Tools to engage online students in active learning

1. Quizizz(https://quizizz.com/admin) is a multiplayer trivia app that’s similar to Kahoot!, but allows the students to play along at their own pace while competing against one another. Quizizz incorporates elements of gamification by assigning points based on how accurately and how quickly students answer questions. Students can also see each other’s progress as they move through the game. The teacher can post the top scorers to the students each week, and students get recognition for their participation in the activities. There’s no app to download, and Quizizz works on any device with a browser. The teacher can develop his/her quiz (Quizizz currently allows multiple choice and multiple select questions), then share the link with students. Even images can be embedded in questions, in case the teacher wants to ask students about a diagram or have them identify a location on a map. Quizizz can be tried in any situation where teacher wants students to self-assess their understanding of a topic. It can be used at the end of a module or unit to reinforce that week’s content, or as a review before an exam.
2. **EdPuzzle**([https://edpuzzle.com/home](https://edpuzzle.com/home)) and **PlayPosit**([https://go.playposit.com/](https://go.playposit.com/)) are two different products but achieve similar end-results. EdPuzzle and PlayPosit transform any video into an interactive lesson or assignment by embedding quiz questions and opportunities for reflection. Instead of assigning a reading or a video to the students and then sending them somewhere else in the course site to complete self-assessment questions, the teacher can create one seamless lesson that better engages the students. Embedding the questions into the video helps to “chunk” the material and facilitate knowledge retention and requires the students to actively engage with the content before moving on. Teacher can use any video, as these tools don’t rely on developing new content to create engaging lessons. It can be a screenecast that the teacher has recorded, a YouTube video—anything the teacher prefers. Both tools have robust built-in video libraries, with free content from Khan Academy, National Geographic, the History Channel, and more. Once a video is selected, use the software to insert questions for students to answer at any point of the video. The video can also be cut or only use certain sections of the video or even record own audio track. Once it is done, the video can be shared with a link or embedded into a Learning Management System (LMS). Edpuzzle or PlayPosit can also be used as a way to simulate an in-class discussion that’s more engaging than just posting a topic on a discussion board. The teacher can record himself/herself (or a guest expert) talking about a subject, pause for a reflection question, and then go back to the video where the question can be debriefed that was just posed to the students. Or keep it simple—existing video lectures can be uploaded to one of these tools and add an open-ended question at the end to gather students’ ‘muddiest points’, the ones that are most unclear or most confusing.

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4. Flipgrid(https://info.flipgrid.com/) is an online platform that allows the teacher to pose a question, topic, or prompt to students, which they respond to via video. Students can chime in and respond to one another’s posts. At its core, Flipgrid is a way to jazz up the discussion boards by adding video. But it’s also built around the idea of social learning and is designed to spark collaborative conversation. Flipgrid allows to be incredibly creative in designing assignments that reach out and engage students and allows students to be equally creative as they craft their responses. For example, students can record themselves demonstrating a skill, such as practicing language or demonstrating a practical. Students can be asked to debate a topic or issue. By asking students to create something new, they can be helped to reach the highest levels of Bloom’s taxonomy.
5. **Padlet** ([https://padlet.com/](https://padlet.com/)) is a virtual bulletin board designed to facilitate collaboration and discussion through multimedia. It’s incredibly easy to create and edit Padlet boards. The teacher can choose the kind of Padlet he/she wants to create, write a description or a set of instructions. Students don’t need to log in or sign up for Padlet; they just need the link to participate, or it can be embedded into LMS. Participants can post photos, videos, Word documents, and spreadsheets—almost any kind of file. Students also can comment on one another’s posts, which makes Padlet a useful tool for peer review and online discussions. Padlet is great for “show and tell” type activities where the students need to provide examples or images that support their conclusions.

6. **AnswerGarden** ([https://answergarden.ch/](https://answergarden.ch/)) is designed as a minimalistic feedback tool. With AnswerGarden, teacher can pose a question to students, and the software turns their answers into a word cloud. The more times that an answer is given, the larger that response appears in the word cloud. And if a student agrees with someone else’s response, they can just click to make it bigger. AnswerGarden is best for short responses, no more than 40 characters. AnswerGarden can be used for audience feedback or for brainstorming about a topic or project.

One of the tools presented above can be used to facilitate online students engage themselves with the course. The tools will boost interest and improve long-term retention of the students.

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