Training of KRPs of DIET on Integration of ICT in Teaching Learning Process

PAC No. 23.22 (January 15-19 2024)

Programme Coordinator
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National Council of Educational Research and Training

NAAC Accredited A^{++} Institute

Foreword

Use of ICT in education is an emerging need of the time. Keeping this emerging concern in view, SSA also emphasized on the importance of use of ICT in education. The MHRD has undertaken a programme entitled ICT@schools. Recently, MHRD launched a national repository on open educational resources and launched e-pathshala. Thus, efforts from govt. side are going on to provide ICT resources to schools. However, it is very important to ensure the effective use of these ICT resources. The stakeholders must be enabled to use these resources effectively. An equipped teacher educator can equip the in-service and pre-service teachers in all necessary aspects of teaching learning. Hence, a training programme is necessary to make aware and equip DIET faculty with basic skills of ICT. Therefore, this programme was initiated.

In its very first stage, modules were developed by organising three-day workshop from 3 to 5 January 2024. Resource persons from renowned universities like IGNOU and MANUU were called to develop the modules. I express my sincere thanks to Prof. Mushtaq Ahmed I. Patel, MANUU, Hyderabad; Dr. Anjuli Suhane, IGNOU, N. Delhi; Dr. Shruti Tripathi, RIE, NCERT, Bhopal; Dr. N. C. Ojha, RIE, NCERT, Bhopal; Mr. Ashok Shaky, RIE, NCERT, Bhopal; Ms. Urvashi Shrivastava, RIE, NCERT, Bhopal; Mr. L. S. Chauhan, RIE, NCERT, Bhopal; Dr. Ganga Mahto, RIE, NCERT, Bhopal; Ms. Swati Yadav, RIE, NCERT, Bhopal; Mr. Aji Thomas, RIE, NCERT, Bhopal; Dr. S. Sebu, RIE, NCERT, Bhopal for contributing in the process of module development.

After completion of modules, the first training programme is scheduled for the DIET faculties and principals of the states of Maharashtra, Gujarat and Goa. Overall, 40 participants are invited for this training programme. The lists of topics covered are given in the programme schedule.

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Programme Schedule

Venue: Conference Hall No. 30, RIE Bhopal

Days & Dates	**Session 1 9.45-11.15 AM**	T E A B R E A K	**Session 2 11.30-1.00 PM**	L U N C H B R E A K	**Session 3 2.00 – 3.30 PM**	T E A B R E A K	**Session 4 3.45 – 5.15 PM**
Monday **15/01/2024**	Registration & Inauguration (Pre-Test) - **SP**		Philosophy of Technology – **BRB**		Selection and Integration of ICT Resources – **VL**		ICT for Teaching Learning - **MAIP**
Tuesday **16/01/2024**	ICT for Teaching Learning - **MAIP**		Web 2.0 Technology – **SP**		Open Educational Resources – **VL**		Learning Management System - **ST**
Wednesday **17/01/2024**	Development of E-content - **NCO**		Concept and Creation of e-Portfolio – **AS**		Assistive Technology – **SP**		Google Collaborative Tools – **VL/AS**
Thursday **18/01/2024**	ICT For Science – **LSC**		Equitable Integration of Technology – **SP**		H5P Authoring tool – **US**		ICT for Language and Social Science - **ST**
Friday **19/01/2024**	Video and Audio Editing Tools – **AS/US**		Google Form for Assessment – **GM**		Online Assessment Tools - **SY**		Valedictory Session (Post-Test/ Feedback) - **SP**

BRB – Prof. B. Ramesh Babu, RIE, NCERT, Bhopal; **VL** - Mr. Vinay Lautre, TISS Mumbai; **MAIP** – Prof. Mushtaq Ahmed I. Patel, MANUU, Hyderabad; **SP** - Dr. Sanjay Kumar Pandagale, RIE, NCERT, Bhopal; **ST -** Dr. Shruti Tripathi, RIE, NCERT, Bhopal**; NCO** – Dr. N. C. Ojha, RIE, NCERT, Bhopal; **AS –** Mr. Ashok Shaky, RIE, NCERT, Bhopal; **US –** Ms. Urvashi Shrivastava, RIE, NCERT, Bhopal; **LSC** – Mr. L. S. Chauhan, RIE, NCERT, Bhopal; **GM** – Dr. Ganga Mahto, RIE, NCERT, Bhopal; **SY** – Ms. Swati Yadav, RIE, NCERT, Bhopal

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Selection and Integration of ICT Resources

- Dr. Anjuli Suhane

Structure

1.1 INTRODUCTION

The knowledge of various ICT resources helps a teacher while transacting learning experiences. Sometimes, it is very difficult on the part of a teacher to judge which ICT out of an array of ICTs is the best for a given learning task .All ICTs are not suitable or appropriate for all types of teaching-learning tasks. Each ICT has its own capabilities or attributes. Each teaching-learning task also requires ICTs with specified characteristics or attributes. It is, therefore, considered that ICT selection is an important part of teaching-learning design and delivery. But it is very difficult on the part of a teacher to judge which medium out of the available media is the best for a given instructional task. A teacher, therefore, takes into consideration various factors, which affect ICT selection for the transaction of learning experience.

1.2 SIGNIFICANCE OF ICT INTEGRATION

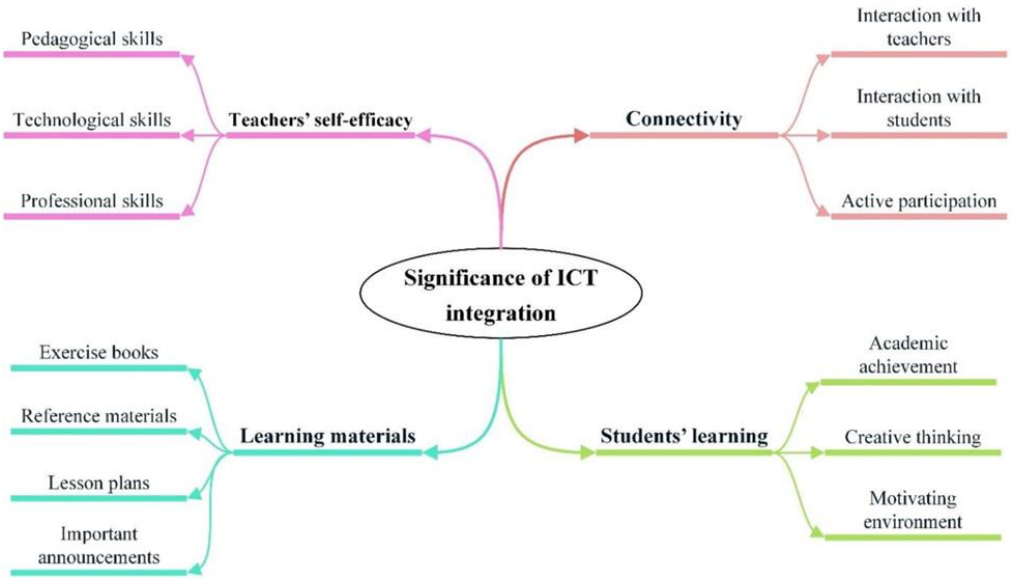


Figure 1:

Connectivity

Teachers feel comfortable guiding and discussing with their students within or outside the school through several digital platforms such as WhatsApp, Facebook, and google groups. Regarding the connection of learners with other students, ICT integration in educational practice encourages students to interact with their classmates more, which helps resolve their academic challenges and keeps them socially active.

Teachers' Self-Efficacy

ICT integration enhances the quality of the teaching-learning process and found a significant correlation between teachers' technological pedagogical and content knowledge (TPACK) and their technological competencies. Positive attitudes of teachers toward applying technology in their instructional practices and identified a significant association between technology use with their technological competencies.

Students Learning

Teacher plays an important role in cultivating successful students' online learning. ICT utilization in teaching-learning practices enables a student to make meaningful use of technologies in education by accessing, selecting, establishing, and interpreting the information. Its effective integration help in meeting the learners' educational needs by providing creative solutions to different types of learning inquiries.

Learning Materials

Students' learning is supported when they receive adequate supplementary materials, such as reference books, exercise books, or teaching aids. The correct use of such materials not only assists them in making their prospective concepts clear but also boosts their academic achievement. In this regard, technology-assisted learning enables a learner to acquire supportive learning materials easily.

1.3 FACTORS AFFECTING ICT SELECTION

While selecting ICTs for teaching-learning purposes, we are generally concerned with questions like (a) What teaching methods we are adopting; (b) What learning tasks we are going to provide the learners; and (c) What are the special characteristics of the learners? Apart from these basic concerns, there are also other factors, which contribute to ICT selection. Do the teachers and the learners have favourable attitude to the ICTs going to be used in the teaching-learning process? What is the cost of the ICT? Is it user friendly? Does the ICT effectively communicate the message? Is it available as weIl as accessible to the teacher and students? Questions such as these have to be taken into consideration in the selection of ICTs.

All the factors which contribute to the ICT selection may be categorized into the following:

1) Pedagogical Utility
2) Human Factors
3) Availability and Accessibility : Licensing
4) User Friendly
5) Cost Facilities
6) Time Availability

7) Effective Communication
8) Infrastructural Facilities
9) Hardware

Pedagogic Utility: This factor is concerned with two aspects: First, the learning objectives to be achieved at the end of the teaching-learning process. Second, learning experiences based on contents to be provided during the teaching-learning process. Learning objectives mainly pertain to three domains of Bloom's Taxonomy of objectives. These are: Cognitive Domain, Affective Domain and Psycho-motor Domain. Cognitive Domain includes Factual information, visual identification, concept formation, principle/ rule learning, learning procedures, etc. Affective Domain includes development of attitudes, interest, opinion, motivation etc. Psychomotor Domain includes development of psychomotor skills and skill coordination.

Following media can be used for development of each domain:

- Drawings, charts, maps, flip-chart etc.
- Model, real objects, simulators
- PPT Slides, filmstrips
- Individualised instruction through CAL/CAI, audio tape etc.
- TV and CCTV
- Video
- E- resources
- OERs

Selection of ICTs is also governed by the kind of content knowledge a teacher wants to provide his/her students. For example, most ICTs can handle abstract knowledge, but there are some such as television or multi-media computers that are excellent for representing concrete knowledge. ICTs also differ in the extent to which they help to develop different skills. This is related to the control characteristics and the representation features of the ICTs. For example, television, videos and computers are excellent ICTs for imparting skill education.

Human Factors: Human factors related to the selection of ICTs are the teacher who uses ICTs for teaching purposes and the learner who uses for learning purposes. So far as a teacher is considered, he/she should have favourable attitude towards the use of ICTs in teaching-learning process. Learner factor also plays a great role in ICT selection. Learners even bring to teaching-learning situation a set of capabilities for learning. These include prior information about the particular subject and basic intellectual skills to decode and process the new material. Learners interact in many ways to influence the choice of ICTs. For example, learners with low ability are more benefited from a highly structured mediated instruction, whereas learners with high ability are profited from unstructured presentation.

Availability and Accessibility: Whenever a teacher decides to use any ICT for teaching-learning purposes, he/ she should consider their availability both inside and outside the institution. me substitutes a file.

User Friendliness, Control and Interactivity: ICTs should be easy to operate and handle by their users. The operations of ICTs should not be so complex that the users have to depend on technical people for their management. The user should be able to control ICTs according to requirements. Similarly, a teacher can make use of ICTs like audio, video or computer programmes in his/her teaching and control them according to the requirements during teaching. Learners do have more control over permanent ICTs like computers than ephemeral ICTs like telecast or broadcasts. Interactivity means the ability of the learner to respond to ICTs and obtain feedback on the response. This enhances student learning to a great extent. There are 'two kinds of interactivity:

Learning material interactivity: This means learner interacts with the ICT, gets feedback from it and the ICT accommodates learner's own input and direction.

Social interactivity: Learners interact with teachers and with each other via the ICT. For example, in teleconferencing, learners situated in different locations interact with each other through it.

Effective Communication : Effective communication is the' most important factor in the process of ICT selection. While selecting any ICT, one has to look into the fact that the ICT selected is able to communicate the intended message or information effectively. If the ICT does not communicate the message effectively, use of such ICT in the teaching-learning process is meaningless.

1.4 HOW TO SELECT ICTS?

Following are the steps for the selection of ICTs:

- Select the content to be taught.
- Write a learning objective
- Determine the domain in which the learning objective can be classified:Cognitive, Affective, Psychomotor.
- Consider various methods/techniques to be adopted.
- Select appropriate ICTs.

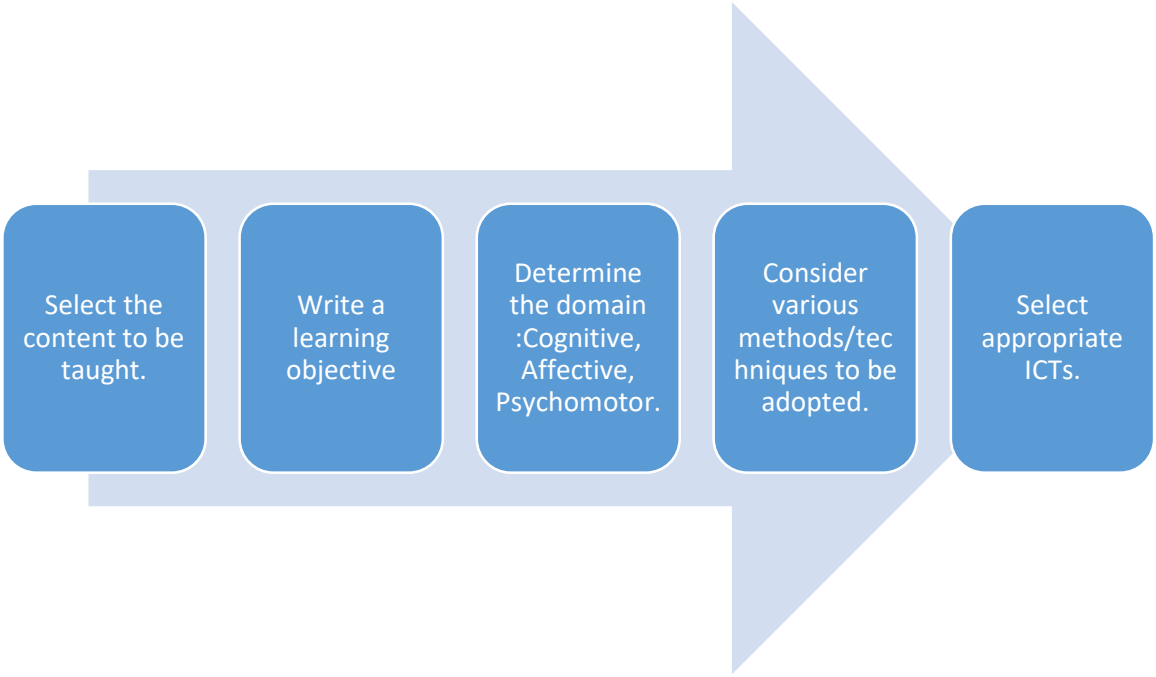
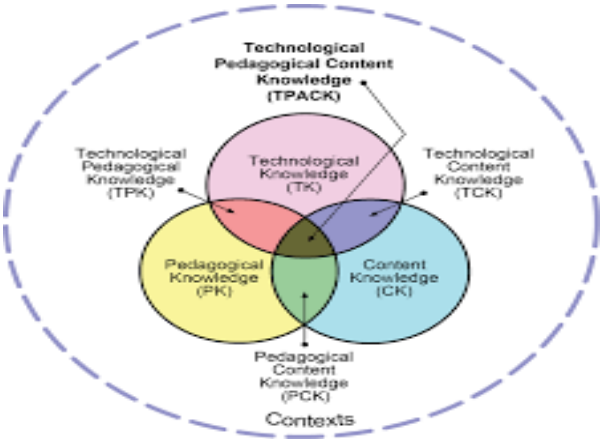


Figure 2: Steps for ICT Selection

1.5 TPACK

Mishra and Koehler (2006) developed a framework, called technological pedagogical content knowledge (TPACK). According to them, this framework emphasizes how the connections among teachers' understanding of content, pedagogy, and technology interact with one another to produce effective teaching. Their framework is an extension of the pedagogical content knowledge (or PCK) framework of Shulman (1986). Shulman's framework emphasizes "blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction" (Kohler, et.al, 2014). TPACK framework as developed by Mishra and Kohler is given in Fig.



According to (Kohler, et.al, 2014), three major knowledge components form the foundation of the TPACK framework are as follows:

- Content knowledge (CK) refers to any subject-matter knowledge that a teacher is responsible for teaching.
- Pedagogical knowledge (PK) refers to teacher knowledge about a variety of instructional practices, strategies, and methods to promote students' learning.
- Technology knowledge (TK) refers to teacher knowledge about traditional and new technologies that can be integrated into curriculum.

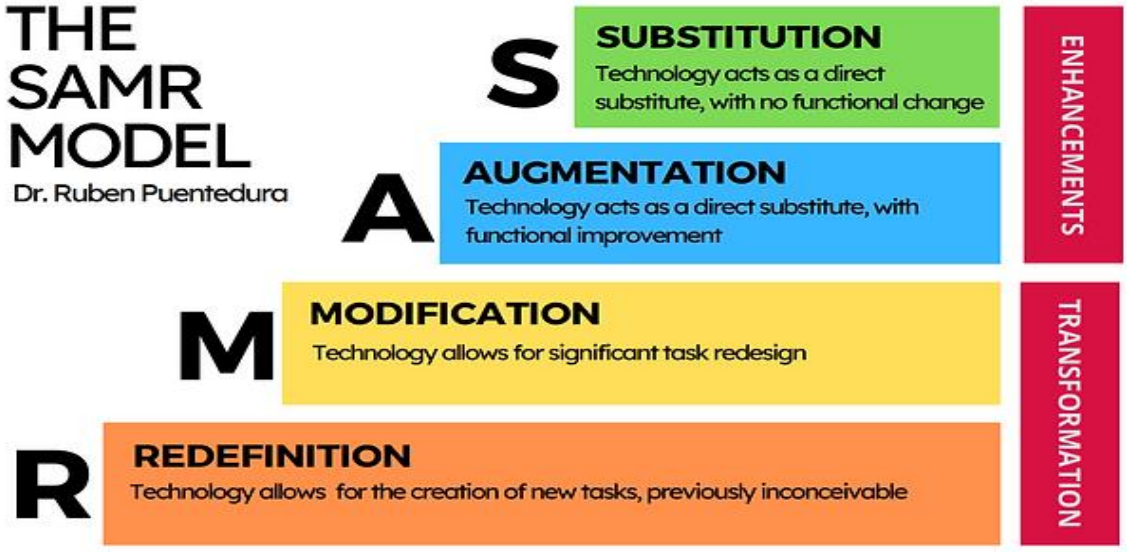
According to (Kohler, et.al, 2014), four components in the TPACK framework, address how these three bodies of knowledge interact, constrain, and afford each other as follows:

- Technological Content Knowledge (TCK) refers to knowledge of the reciprocal relationship between technology and content. Disciplinary knowledge is often defined and constrained by technologies and their representational and functional capabilities
- Pedagogical Content Knowledge (PCK) is to Shulman's (1986) notion of "an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction: (p.8)
- Technological Pedagogical Knowledge (TCK) refers to an understanding of technology can constrain and afford specific pedagogical practices.
- Technological Pedagogical Content Knowledge (TPACK) refers to knowledge about the complex relations among technology, pedagogy, and content that enable teachers to develop appropriate and context-specific teaching strategies.

As a teacher, when you intent to use TPACK framework for classroom teaching, you must have deep understanding of content to be taught, pedagogy to be used and technology or ICT to be integrated so that you can orchestrate and coordinate each of these components into your teaching.

1.6 SAMR Model

The SAMR model is a framework that orders strategies for classroom technology implementation into four stages:



Substitution and augmentation strategies use EdTech to enhance learning and add value, whereas modification and redefinition stages harness EdTech to transform learning and make new things possible. The effectiveness of any of these four strategies depends on when and how it is used.

Substitution: This is the simplest stage, where EdTech is used as a direct substitute for traditional practices. Substitution strategies can save you time and space by cutting back on laborious pen and paper tasks. Instead of printing out twenty-plus paper resources that clog the cupboard, you can use technology to manage resources with just a few clicks.Substitution also provides a much more accessible introduction to technological soft skills than modification and redefinition. It's the perfect opportunity for students to get comfortable with new technology before you start to transform their learning.

Examples of substitution

- having students type their work instead of handwriting it
- using online quizzes and programs instead of pen and paper
- uploading a worksheet in PDF for student access, as opposed to photocopying
- using a digital interactive whiteboard as opposed to a traditional whiteboard and saving the results as a document.

Remember: Substitution strategies do not change the learning process or outcome. Ask yourself what you and your students will gain from the technology before implementing it. If it adds nothing but hassle, stick to pen and paper.

Augmentation: At the augmentation stage, technology adds something to the learning process beyond just convenience. It might give your students a clearer understanding of a complex topic or making it engaging in a way that traditional methods can't.

It also allows for the introduction of more independent and student-centric learning. By using technology as a source of information, students can start actively learning without requiring constant teacher-led instruction.

Examples of augmentation

- Students give more informative and engaging oral presentations accompanied by a PowerPoint or Prezi containing multimedia elements.
- Students use the internet to independently research a topic, as opposed to relying on teacher input.
- Students use an EdTech program that gamifies curriculum content for student engagement and allows students to track progress in an accessible way.
- Teacher instruction is supplemented with a video that clarifies a particularly hard to explain concept.

Modification: At the modification stage, technology is used to design interactive and dynamic tasks that go beyond the limitations of a traditional classroom.

For example, students can collaborate on shared documents, or work in large groups, allowing for seamless collaboration and knowledge sharing. This peer-to-peer work nurtures a more cooperative and dynamic class culture.

Technologically modified tasks also allow students to generate inspired and innovative work that isn't confined to paper. Some students will jump at the opportunity to get in front of a camera, while others will do anything to make it onto the global Mathletics leaderboard.

Examples of modification

- Students produce podcasts summarising a topic, which can then be accessed by other students as a revision resource.
- Students create an informative video presentation in place of a standard oral presentation. They can use their voice alongside a broader variety of creative multimodal components.
- Students use a technological tool that makes an abstract concept visible in a hands-on, responsive way (e.g. voyaging on Google Earth to better understand measurement and geography).

Redefinition: The most sophisticated stage of SAMR, redefinition sees you using technology to make entirely new learning opportunities possible.

Redefining learning has the potential to connect learning with the real world and produce authentic outcomes. It also gives students strong technological soft skills such as digital collaboration, communication, technological literacy, and the ability to adapt to new systems and processes. Most importantly, using technology to redefine learning in your classroom translates to vibrant and engaged students who embrace a growth mindset.

Examples of redefinition

- connecting your students with other people around the world as part of the learning journey or use of video conferencing to connect classrooms in different countries.
- having students publish their work online where it can be viewed by peers and the broader community
- recording students as they deliver a presentation or practice a physical skill, then using this recording to prompt student reflection
- experimenting with tasks that use extensive multimodal elements (e.g. producing documentaries or short films, webpages, print documents with creative layouts).

1.7 ICT INTEGRATION

Each ICT has some pedagogic value or the other. Therefore, use of a single ICT cannot fulfill the requirement of any teaching-learning activity. Various ICTs have to be used in combination. Although one of the ICTs could be the ‘Main ICT’, other ICTs should be used so that the quality of presentation becomes maximally effective. ICTs also can be combined with appropriate methods so that teaching-learning activity becomes effective. Let us take an example of a class on geography wherein the teacher teaches about “Natural resources”. The class period is 40 minutes. ICT integration on the topic “Natural Resources ” is presented in Table 1.

Table 1: Example of ICT Integration on the topic “Natural Resources

Teacher Activity	ICT Integration
Introduction to the Topic	PPT slides/ audio tapes/ teacher made small clipping Video/Concept map(c-map. Mind map)

Teaching the main Content	Video/PPT/Nature Walk/Virtual nature walk/Use of assistive technologies for inclusion
Citing Examples	Video sequence /a set of 10 slides
Summary	Through chart, concept map
Evaluation	Through Online quizzes (hot potato, Kahooty, Quizlet). Google form, concept map, E portfolio

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Information Communication Technology (ICT) for Teaching-Learning

- Prof. Mushtaq Ahmed I. Patel

1.0 Introduction

Information Communication Technology (ICT) plays an important role in enhancing the quality of education. Teaching and Learning applications of ICT are currently popular in various fields due to their capabilities in facilitating the educational process from data admission to result declaration and more specifically in the teaching-learning process. Nowadays, ICT is used everywhere. With more than a billion people having access to the internet, and 8 to 10 internet users owning a smartphone, information and data are increasing by leaps and bounds. This rapid growth has led ICT to become a key item in everyday life. The National Education Policy 2020 has proposed a great role of the role of ICT in the education sector in days to come Educational houses and agencies are integrating text, and teaching resources using QR codes, and the internet. Thus, it is necessary for teachers, and resource persons working for school education to know about the use of ICT in Education.

In this module, we will look into the role of ICT in Education; understand ICT tools for teaching and learning, and pedagogical approaches to ICT. ICT usage can not be restricted to only specific subjects, it has to be integrated across the curriculum and it has to facilitate assessing and evaluating learning. Moreover, in this context, it becomes essential that there have to be efforts for the professional development of educators in ICT integration. The module ends by looking into future trends in ICT. This module is meant for the the teachers, resource persons, researchers working in the area of school education and hence a common term educator is used at most of the places. Similarly, the content uses technology, which refers to the ICT for all practical purposes of this module. The term education refers to the teaching and learning of students within and outside the school, whereas teaching-learning and assessment is meant for academic purposes within the school or the classroom.

1.1 ICT in Education

Information and Communication Technologies (ICT) are like digital helpers, which are part of almost every aspect of our lives. In education, ICT means using digital tools to make teaching and learning more interesting. For this, you can imagine smart whiteboards, online study websites, fun learning apps, and computer simulations used in schools and at home. The education here covers all the aspects of student learning within the classroom and outside including the information gathered informally in the company of their family members using technology.

We see that the use of ICT takes us Beyond the Classroom. The ICT isn't just for the classroom; it's for everywhere in school and outside! It helps students explore a world of information, talk to friends from far away, collect homework and share achievements with family members. Parents, teachers, and elder siblings get to be helpful guides, making learning experiences fit each student better, using technology.

It comes to our mind why ICT Matters so much for education. It's not only the trend, but also an important aspect which imparts education. In a time where we can find information so easily, restricting our children to classroom instruction is not sufficient. ICT makes education lively and fun, making children excited to learn.

You may be keen to know the benefits of mixing tech with education. It leads to active Learning as Students don't just listen; they get to do activities like playing educational games and making presentations. The parents and teachers can monitor and ensure equal Personal Progress. All children learn content suitable to their respective age, stage and at their speed, and technology helps this process. Interactive tools, like quizzes, games, wordplay etc. help children and elders know how well they're doing.

On the one hand, technology facilitates the education process, by providing a lot of scope for content for personalised learning, but on the other, we see that the availability of technology to all households and in all schools is an issue. This creates a digital divide, which can be filled if the education process is properly planned by making the devices accessible to all the stakeholders. If the devices are made available then the availability of content and identification of resources for educational purposes becomes an issue for teachers as well as parents in the context of education. Proper orientation and training are required for all the stakeholders. When technology is used for educational purposes the tools go into the hands of children, and how much of the technology is to be used, what is to be seen and keeping oneself away from distractions becomes essential. Proper monitoring is also required to overcome the learning gaps, which are the results of a lack of awareness. Thereby we can make the ICT work properly for the education of all.

Is ICT a short-lived phenomenon, which is going to vanish after a few years? ICT is going to bring a big, exciting change in teaching, learning, and evaluation. We want every student, teacher and field functionary to be ready for it by learning things with technology.

1.2 Tools for Teaching

In the world of education, the toolbox for teachers goes beyond daily using teaching aids like chalk and duster and is now filled with a mix of amazing tools that can make learning exciting. Here for the sake of convenience, we have listed technological tools into few categories:

1. Hardware: The hardware is physical equipment provided to the schools by the administrators. Here, it is noted that the schools are provided radio, television, computer, projector, internet facility etc. based on the policy of the schools. All such devices are magical doors to the world of information for the teaching-learning process. These devices and their arrangements bring novelty to the classroom and increase motivation and attention.

2. Software: Provision of devices alone is insufficient, as these become only dumb terminals. This is like the provision of a car without the facility of fuelling, which makes the vehicle immovable. In this context, it is interesting to note that there are various educational apps, which are designed to make learning fun and interesting. Audio-visual programmes, games, simulations, and creativity tools suit everyone's unique way of learning. Simple platforms like Google Classroom and Moodle help teachers organise lessons and encourage collaboration online.

3. Online: The internet is like a treasure of knowledge; it provides all sorts of information from across the globe at the click of a button. This sharing of information can be synchronous or asynchronous; the material can be academic, curricular, or co-curricular. Digital libraries, such as Project Gutenberg, offer free e-books, which can be searched by name of author, title of the book, subject, language, category etc. Websites like Khan Academy provide video lessons for different boards, stages, subjects etc. Educational videos on YouTube, when picked wisely, can explain things in exciting ways and show different viewpoints. These are a small number of

resources, which is just the tip of the iceberg, whereas teachers can explore many more content online.

4. Putting it All Together: Like a mother mixes appropriate ingredients while cooking a dish, a teacher attempts to blend all the resources to make the magic happen in the classroom. The process and efforts of mixing tools make learning special for each student. It's like weaving a beautiful tapestry. The trick is to understand what each tool is good at and how they all fit together. Eg. Google Meet helps in online lectures, which can be blended with PowerPoint presentations, and 'pollseverywhere' can be used to test whether the students understand the lecture.

5. Teach Smarter: With this mix of tools, teachers can make learning personal, help students understand things better, and make everyone fall in love with learning. The real trick is to know when and how to use each tool to make lessons engaging and effective. If the tools are appropriately used then the slow learners can be given YouTube links for further clarification and gifted can be assigned additional works.

So, in this digital world, teachers are like magicians with their toolbox, ensuring every student has a unique and exciting learning experience. It's all about using these tools wisely to create the perfect blend of fun and knowledge!

1.3 Pedagogical Approaches

In the world of education, ICT joins forces with various teaching methods, turning classrooms into lively spaces and making learning a hands-on, meaningful adventure. Let's look into some exciting strategies that use technology to empower students:

1. Active Learning:

- Collaborative Learning: Picture students working as a team on cool projects, improving their communication and teamwork skills. Google Workspace Tools like Google Docs, Google Sheets, and Google Slides let students and teachers collaborate in real time, even if they're far apart. There is one more interesting tool viz., Mural etymologically which means a painting or other work of art executed directly on the wall by collaboration in a digital form in online mode. These tools keep students engaged and all collaborate on one particular project eg. a science project. Each of the team members can work on a specific section of the project and a report can be generated in the shortest possible time.

- Gamification: Routine teaching learning can be made interesting by involving games. Gamification is the process of learning where aspects of games are integrated into teaching and learning eg. points, badges, leaderboards etc. This process enhances student participation and engagement as they become very active and respond to the content, which is strengthened by immediate feedback. The schools can utilise games like word search, crossword, fill-in-the-blanks, jeopardy, and memory games. Kahoot! and Minecraft Education Edition, Mambo.IO etc. provide educational games. Most of the games are to be purchased but free versions can be utilised for schools. To understand the the use of game, an example is given as under, Exploring M.A.T.H. Mummy Mayhem students will encounter key concepts in geometry including shape, symmetry, and spatial reasoning. They solve various puzzles like Puzzle 1: 3D Block Jigsaw, Puzzle 2: Symmetry Spotter etc. during the game. This is created in partnership with Cambridge Mathematics (cambridgemaths.org). This is available across all curriculum subjects.

- Flipped Classroom: The flipped classroom reverses the traditional concept of education where teaching and learning take place in the classroom and homework is assigned to practice learned material. In the flipped classroom, the student learns the content at home by watching videos, studying documents (PDF, word processors etc.), quizzes and assignments that are available 24x7. The teacher can record their lessons and students' assignments and keep them online for other students to refer to online as per their requirements. Various platforms like Google Classroom, Flip (formerly Flipgrid), Khan Academy, Moodle etc. can be used for uploading or retrieving the content. Thus, basic content awareness is created at home and classroom time is utilised for discussion on higher-order thinking skills (HOTS).

- Project-Based Learning: Students tackle real-world challenges through group projects, learning research, critical thinking, and presentation skills. Tools like Asana (with a 30-day trial) and Trello keep everything organised.

The use of technology in the field of teaching and learning made it possible to learn various concepts and skills using Project-based learning, where students learn in real-world situations. The project makes the student acquire content knowledge and skills to answer a driving question based on an authentic problem, need, challenge, or concern and thus ensures deeper learning. This approach is student-centred and students try to address real-world problems in collaboration with other team members. This involvement makes students share different aspects of the projects with co-workers with deadlines and monitor progress. The Project-Based Learning technology tool helps in planning, tracking, and collaborating on projects. The tool can be used by administrators (headmasters, resource persons), teachers, and learners. These tools help in organising tasks, Tracking progress, Communicating with the team, Monitoring progress, automating workflows, Streamlining reports, and tracking work in real time. This can be done using various tools like Asana which is available for trial for 30 days. However, project plans can be developed and monitored through spreadsheets or word processors. Trello workspace is also available for testing and use.

2. Blending Tech with Traditional Learning:

- Blended Learning: The blended learning model is advantageous as it combines face-to-face and virtual learning. It is the teacher who decides what type of face-to-face mode and how much and what type of online learning facility will be provided. To make the teaching learning effective it is expected that the teacher needs to be aware of the content and resources that are useful for their learners. Online quizzes and interactive exercises make learning personal, while face-to-face discussions build connections and teamwork.

3. Customising Learning: Differentiated Instruction: The traditional teaching in the classroom addresses all the students. There are individual differences among students based on their intelligence, learning abilities, styles, experiences etc. and thereby their requirements and achievements also differ. Hence, there is a need for individualised, customised and differentiated learning, which can only be possible by deploying and employing technology. The differentiated instruction can tailor the lessons to meet the needs, interests and strengths of the students. Simple adjustments like change of tone, pace, brightness, and sound can be made to any computer or mobile which suits learners with different requirements. Platforms like Knewton adjust difficulty based on performance, and digital resources like audiobooks support students with varying reading abilities.

The key to rolling ICT in teaching-learning is to match technology with teaching goals and what students need. These strategies aren't one-size-fits-all; smart integration lets teachers create exciting, engaging classrooms where students become more interested. The success depends on how you as a teacher mix and match these tools to create the perfect learning blend!

1.4 Integrating Across the Curriculum

The teaching of various subjects in the school is not made in isolation, all subjects form a curriculum which is transacted in the school. The technology has to be integrated in all subject areas so that wholesome learning is possible. The following paragraphs discuss the integration of technology across the curriculum.

1. Science:

- Virtual Labs: The budding of flowers, the dissection of a frog, eruption of a volcano can be shown in the classroom to all by giving a Virtual Reality presentation.

- Data Analysis Tools: Analyse real-world scientific data using programs like Excel or Google Sheets, fostering critical thinking.

- Interactive Timelines: Explore the history of scientific discoveries with platforms like Timetoast, visualising connections and advancements. You can visit to see the timeline of W. Sheakspeare

2. Mathematical Adventures:

- Math Games and Puzzles: Apps like Prodigy (free) and DragonBox (A Kahoot! company) make math concepts like fractions and algebra engaging.

- Geometric Visualization Tools: Interactively explore shapes and spatial relationships with software like Tinkercad, boosting geometric understanding.

- Problem-Solving Simulations: Solve real-world problems with tools like GeoGebra and NetLogo, optimising traffic flow or managing resources.

3. Language Exploration:

- Interactive Storytelling Platforms: Create collaborative digital stories or poems with tools like Book Creator and Story Jumper, boosting creativity and writing skills.

- Online Dictionaries and Translation Tools: Explore language nuances and improve communication skills with resources like Merriam-Webster's online dictionary and Babbel. Tools like Google Translate not only translate the content but also helps in conversation.

- Language Learning Apps: Gamify language acquisition with apps like Duolingo and Memrise, making learning languages fun and engaging.

4. Historical Journeys:

- 3D Historical Tours: Explore ancient civilizations or historic landmarks through virtual reality experiences, bringing the past to life. Eg. Virtual Library, Historic VR (Sword), Google Arts and Culture

- Primary Source Analysis Platforms: Analyse historical documents, photographs, and artefacts with tools like Zoho Projects and Padlet, fostering critical thinking.

- Collaborative Timelines and Simulations:

- Create interactive timelines to visualise historical events or simulate scenarios, enhancing understanding and engagement.

These examples are just the beginning; the possibilities are endless. The key is to identify learning objectives and choose the right technology. By creating engaging and interactive learning activities, ICT can transform subjects, turning them from static concepts into dynamic explorations that ignite curiosity and a love for learning in every student. The journey is as exciting as the destination!

1.5 Assessing and Evaluating Learning

The discussion in the above paragraphs has indicated that the classrooms can be made interesting by the involvement of technology. This involvement also gives a provision to test and evaluate the students by incorporating technology, so that records can be maintained.

1. Assessing Student Learning:

The foremost assessment is about student learning, which is done by following ways using technology.

- Interactive Quizzes and Polls: Platforms like Kahoot! and Mentimeter help in real-time assessment of students, when they get immediate feedback to encourage their participation.

- E-portfolios: The digital creations, presentations, and projects, give a holistic view of the student's progress and also help to build their e-portfolios.

- Peer and Self-Assessment Tools: The students collaborate to learn and evaluate their self-learning progress by using peer feedback. In this process they also make self-reflection.

- Creative Expression: Digital storytelling, simulations, or artistic creations, cater to diverse learning styles and talents where students' creative expression is ensured.

2. Tools and Strategies for Formative and Summative Assessment:

The assessment for learning and assessment of learning are important aspects which are done in the following ways.

- Formative Assessment: Online quizzes, learning management system analytics, and real-time feedback tools help to monitor progress, adjust instruction, and address learning gaps during learning.

- Summative Assessment: Technology-enhanced projects, interactive presentations, or digital essays help evaluate overall learning outcomes and mastery of concepts, which can be tested after the completion of learning.

- Blended Assessment: Traditional methods like written tests with technology-based activities like simulations or digital portfolios are used for a comprehensive evaluation ensuring the blending of old and new ways of testing.

3. Evaluating the Effectiveness of ICT Integration:

The learning achievements of students and their constant progress are assessed by the above two techniques, it is essential to evaluate the effectiveness of technology. Following are the techniques adopted

- Student Feedback: Student engagement, learning progress, and perceived effectiveness of technology integration are gathered through surveys, interviews, and focus group discussions.

- Teacher Reflection: Regular self-reflection on lesson planning, technology use, and student outcomes helps gauge the impact of ICT on teaching and learning.

- Data Analysis: Track student performance data from online quizzes, LMS activities, and digital portfolios to identify trends and measure the impact of technology on learning outcomes.

The digital classroom is an evolving landscape; assessments need to be as dynamic as the learning environment. By embracing creative and tech-infused assessment methods, educators can ensure a holistic understanding of student progress and the true impact of technology on the educational journey. The quest for better learning experiences continues!

1.6 Professional Development of Educators

The classroom teachers are products of bygone teacher training programmes. Innovative technologies have emerged since their training which are gradually implemented in school education in India and students are taught to meet the challenges of the future world. This is an opportunity for teachers to learn and for reputed national institutions like NCERT to arrange training of in-service training to bridge the gap. The following are the important points to be kept in mind.

1. Importance of Teacher Training in ICT Integration:

Teachers play an important role in the education of the children. They shape the teaching and learning process. Hence, they must be trained in new technologies.

- Empowered Educators: Technology is a potent tool for personalised learning and engaging activities. Trained teachers can harness their potential to enhance their teaching and accommodate diverse learning styles.

- Confident Classrooms: Teachers with strong ICT skills feel more confident and motivated to infuse technology into their lessons, creating dynamic and engaging learning environments.

- Future-proofed Learning: Equipping teachers with digital literacy skills ensures they can guide students through the ever-evolving digital landscape, fostering essential 21st-century skills.

2. Techniques for Developing Digital Literacy Skills in Teachers:

Knowing about the technology is important but how to use the technology in your classroom is also important. This is possible by constantly looking into the opportunities and scope which are seen in the following paragraphs.

- Hands-on Workshops: Immersive workshops are to be arranged that let teachers explore software, hardware, and online resources firsthand can effectively build practical skills and confidence. The training of KRPs by RIE in January and February 2024 is one such example.

- Peer Coaching and Mentoring: Pairing experienced teachers with less tech-savvy colleagues fosters a supportive learning environment and encourages knowledge sharing. Parents and grandparents learn about mobile use from young children is an example.

- Online Courses and Tutorials: Providing access to flexible, self-paced online learning opportunities allows teachers to acquire new skills at their convenience. Women learning new dishes and homemaking in their leisure time is an example of such tutorials.

- Collaborative Learning Communities: Encouraging teacher-led clubs or forums dedicated to technology exploration and problem-solving fosters collective learning and support. There are many WhatsApp, and Facebook groups where teachers share their technology usage and form learning communities.

3. Resources and Opportunities for Professional Development:

It is important to know what resources are available for the professional development of teachers for the use of ICT in teaching and learning. The following content delves into the same.

- Educational Technology Organizations: The NCERT, SCERTs, DIETs, and BRCs offer opportunities by conducting training, workshops, conferences and online learning resources which constantly help in the professional development of teachers.

- School-based Initiatives: Schools can allocate budgets for ICT training programs, provide teachers with time during school hours to explore technology, and create support networks.

- Government and Non-profit Programs: Many government and non-profit organizations offer grant funding, scholarships, and professional development programs specifically for ICT integration in education.

A digitally skilled educator translates to enriched learning experiences for students. By investing in ongoing professional development, schools create an environment where teachers confidently use technology, shaping a future-ready generation. The journey towards digital literacy is a collaborative effort that transforms classrooms into dynamic hubs of knowledge and exploration.

1.7 Challenges and Ethical Considerations

While ICT brings many advantages to education, it also poses substantial challenges and ethical considerations that demand attention for fair and responsible integration.

1. Digital Divide and Access to Technology:

- Unequal Access: Disparities in device access, internet connectivity, and technical support can widen educational gaps, leaving some students on the wrong side of the digital divide.

- Addressing the Gap: Targeted government initiatives, public-private partnerships, and community-based programs are essential to ensure that all students have access to necessary infrastructure and resources.

2. Data Privacy and Security Concerns:

- Privacy Risks: Collecting and storing student data online raises concerns about privacy violations, hacking, and potential misuse of information.

- Ensuring Protection: Implementing robust data security protocols, clear consent policies, and transparent data management practices are crucial to protecting student data ethically.

3. Promoting Responsible and Ethical Use of Technology:

- Technology-related Challenges: Overreliance on technology can lead to attention issues, digital addiction, and cyberbullying.

- Fostering Digital Citizenship: Lessons on online safety, responsible internet use, and critical thinking skills are vital to empower students to navigate the digital world responsibly.

4. Strategies for Ethical ICT Integration:

- Equity-focused Technology Policies: Prioritise allocating resources and support to students with limited access, ensuring an inclusive digital learning experience.

- Data Governance and Transparency: Implement clear data collection and usage policies, involving parents and students in decision-making processes concerning their data.

- Digital Literacy and Cyber Safety Education: Equip students with skills to critically evaluate online information, protect their privacy, and behave responsibly in the digital environment.

- Teacher Training and Ethical Framework: Prepare teachers to identify and address ethical concerns related to ICT use, setting clear expectations and promoting responsible technology practices in the classroom.

As we embrace the benefits of ICT in education, it's crucial to address the challenges ethically. By implementing targeted strategies and fostering a culture of responsible technology use, we create an environment where the advantages of technology are maximised while ethical considerations are diligently managed. Balancing innovation with responsibility ensures that ICT integration truly serves the best interests of every student.

1.8 Trends in ICT

The future of education is set to be influenced by cutting-edge technologies, propelling learning experiences beyond traditional methods and classroom confines. The following paragraphs discuss the same.

1. Emerging Technologies and their Impact:

- Artificial Intelligence (AI): AI-powered tutors will personalise learning journeys, provide real-time feedback, adapt to individual needs, and offer targeted support. Chatbots like Bard, ChatGPT can address student queries, and automated grading can free up teacher time for deeper engagement.

- Virtual Reality (VR) and Augmented Reality (AR): Immerse students in simulated environments, from exploring the pyramids of Egypt to dissecting virtual frogs. AR can overlay digital information onto the real world, enhancing science labs, history lessons, and language learning.

- Big Data and Analytics: Analyse student data to identify learning gaps, predict potential challenges, and tailor instruction accordingly. This data-driven approach allows for proactive intervention and personalised learning pathways.

2. Personalised Learning and Adaptive Learning Technologies:

- Adaptive Learning Platforms: Tailor learning content and activities to each student's pace, strengths, and weaknesses, ensuring individual mastery and eliminating the one-size-fits-all approach.

- Microlearning: Deliver bite-sized, focused learning modules that cater to shorter attention spans and allow for flexible learning on the go. Gamification elements like points, badges, and leaderboards can further boost engagement and motivation.

- Learning Management Systems (LMS): These platforms evolve from mere content repositories to dynamic hubs for personalised learning. Students can access resources, track progress, collaborate with peers, and receive individual feedback, creating a centralised learning ecosystem.

Technology is a tool, not the ultimate goal. The primary focus should be on developing critical thinking skills, fostering collaboration, and nurturing a love for learning. As we navigate these emerging trends, it's crucial to ensure equitable access, ethical considerations, and responsible integration. Bridging the digital divide and harnessing technology's true potential can enrich and empower every student's learning journey. The journey is as important as the destination!

1.9 Conclusion

ICT has the potential to be a valuable tool for teaching and learning. New technologies have to be explored, the schools have to be equipped with gadgets, and teachers and students are to be trained about the relevant ICT and use of ICT. The pedagogical approaches and evaluation procedures are to be modified. There is no end to the use of technology, it is just the beginning and teaching learning has a lot of scope for the use of ICT. It is important to use ICT thoughtfully and intentionally to maximise its benefits.

Resources for ICT in Education

There are various resources available, which are free and with registration that can be accessed to make teaching and learning effective.

Websites & Educational Platforms:

- **Educational Technology and Mobile Learning (Edutopia):** A rich resource for educators, offering practical strategies, lesson ideas, and technology reviews for integrating ICT across diverse subject areas. Visit Technology integration section and refer to the videos.
- **Common Sense Education:** Provides K-12 digital citizenship resources, lesson plans, and tools to empower students to be safe, responsible, and ethical users of technology. Students may not create an account on Common Sense Education. Accounts are to be created by educators who are above 18 or older using Google or any other email account. This requires filling in some more information to create a profile and then an account is created. Use the Professional Development tab from the window to access relevant materials. Eg. Media Balance is important presents a song where the necessity of having a balance between digital devices and physical activities is presented in the form of an interesting song that may create interest among students and improve habits. You can access “Apps and Websites for Learning” from the tab based on various filters which is useful as an educator.

- **Khan Academy:** A global learning platform offering free, high-quality educational videos, exercises, and practice problems in math, science, humanities, and more. The learning is personalised, the content is trusted, and the website has tools which empower teachers. The content is available for various grades from classes 1-12 and for the Indian context, the content is available for various boards like Punjab, Assam, Uttar Pradesh, Odisha, Maharashtra, and NCERT. Eg. You can refer to the content of class 9 Physics "Unit 3: Gravity"
- **Kahoot!:** Kahoot! is a Norwegian online game-based learning platform. It has learning games, also known as "Kahoots", which are user-generated multiple-choice quizzes that can be accessed via a web browser or the Kahoot! App. A gamified learning platform that allows teachers to create quizzes and polls to make learning interactive and engaging for students. You can create an account as a Professional, Teacher, Student, Family & Friends and create a profile using your online accounts like Google, Microsoft, Apple etc. The account can be free or paid for an individual, team or campus and for exercise you can use a free account for familiarity with the software. "Kahoot!+ Max for Higher ed educators" is the premium facility which provides facility for Teacher essentials, Math games, Collaboration set, Student-led learning set, Discussion set, Premium content set, Customization set, Assessment set, Precision set, Teaching set, Engagement set, Feedback set, Review set, Creation set, Player limit. The paid versions help to build 21st-century skills, incorporate formative assessment, boost engagement and collaboration, introduce new topics, reinforce learning, and assess existing knowledge.
- Kahoot! is a tool that delivers and presents questions to students. It is set up as a game that students can play either individually or in groups. Instructors provide students with multiple-choice questions, which are projected on a classroom screen.
- **Moodle:** A popular open-source learning management system used by schools and universities around the world to create online courses, manage assignments, and facilitate collaboration.
- MoodleCloud's cost-effective Standard Plans come with features that enable you to create tests, deliver learning content, and monitor learner progress, with self-service support for seamless troubleshooting.
- It is appropriate to know why Moodle is to be used by the Educators. This is because as an educator you can improve your teaching, training and learner outcomes with a feature-rich learning platform that saves educators' time and provides more active learning experiences. Using the Moodle platform you can deliver content and tasks in a range of formats for different learning preferences, enable social learning and learner collaboration, keep learners updated on course requirements and deadlines, create tests and assessments, track, analyse and report on learner progress, creating learning pathways and programs of multiple courses. The educators who use Moodles are supported by online resources from the same website by studying and interacting in Forums, Documentation, Download, Demo, Trackers, Moodle Community, Moodle Net, Moodle Academy, and Moodle Plugins. Login here
- **Google Classroom:** A free tool for teachers to organize assignments, share resources, and communicate with students in a paperless, online environment.

- This is a place where teaching and learning come together.
- Google Classroom helps you as an educator to create engaging learning experiences so that you can personalize, manage, and measure these experiences. Classroom is part of Google Workspace for Education, which empowers your institution with simple, safer, collaborative tools. This means you can log in using your Google Account using Google Docs, Sheets, Slide, Images, PDF, YouTube, forms, calendar, Meet, translate, email, chat, maps, forms etc. You can create a classroom, add teachers, enroll students, and share classes, and calendars. The students can comment or tag comments, give assignments, and feedback in addition to taking classes. The educators can create assignments, quizzes, and questions, share material, reuse posts and declare topics. Log in and try
- **Code.org:** Introduces students of all ages to coding through engaging games, tutorials, and activities, fostering computational thinking and problem-solving skills.
- This is started with a motto "Learn computer science. Change the world." This has 80 Million students, 280 Million Projects and 2 Million Teachers. You can create an account by visiting https://studio.code.org/users/sign_in using your account. Coding is an important skill required for all students from K-12 for which programming modules are present and we can practice coding using the same. Eg. a student can look into the given code and draw a suggested pattern reset the coding, run to look into the result and share the result through a QR code to others using the share button. Try out
- **TED-Ed:** Animated educational videos on a wide range of topics, perfect for sparking curiosity and engaging students in deeper learning.
- TED-Ed provides a platform to Discover, Create, and Get Involved in the project which is meant to feed the students' curiosity by providing everything they need to spark and celebrate their ideas. You can log in using your email credentials and Create customized lessons for your students, Inspire your students to share their big ideas, and Share YOUR big idea in a TED-style talk, Eg. look into a lesson How to get motivated even when you don't feel like it. The video is followed by MCQ to 'Think', learn more in the form of 'Dig Deeper', and undergo guided discussion using 'Discuss'.
- **Flip (formerly Flipgrid):** A video discussion platform that allows students to record and share short video responses to prompts, fostering active participation and collaboration.
- You can sign into the website using this link using your email credentials and create a profile. The home page of the website informs that you can share videos to express yourself and learn together in a safe space. It further asks that if you're an educator, you can create a group or else if you're a student, then it asks to enter your join code. You have to give access to your camera and microphone to record video from the browser in online mode.

Books & Articles:

- **"Teach Like a Pirate" by Dave Burgess:** Provides practical strategies for making lessons more engaging and memorable using technology, humour, and storytelling.

- **"The Innovator's Mindset" by Ken Robinson:** Encourages educators to embrace creativity, experimentation, and risk-taking to foster innovation and prepare students for the future.
- **"Digital Leadership in a Changing World" by Eric Sheninger:** Offers insights and strategies for school leaders to effectively integrate technology into their schools and achieve positive outcomes.
- **"The EdTech Bubble" by Audrey Watters:** A critical analysis of the hype surrounding educational technology, advocating for thoughtful integration and focus on pedagogy over tools.
- **"A Framework for 21st Century Learning" by The Partnership for 21st Century Skills:** Defines essential skills and knowledge needed for success in the 21st century, emphasising the role of technology in developing these skills.

Organizations & Initiatives:

- **International Society for Technology in Education (ISTE):** A global organization dedicated to advancing the use of technology in education.
- **UNESCO ICT in Education:** A program within UNESCO that works to promote the effective use of ICT in education around the world. Visit https://www.unesco.org/en
- **CIET, NCERT:** The Central Institute of Educational Technology (CIET) is a constituent unit of the National Council for Educational Research and Training (NCERT). CIET's primary goal is to improve the quality of education at the school level by using mass media, such as radio, TV, films, satellite communications, and cybermedia. The institute takes up research, training, design, production, and dissemination of e-contents and for students, teachers, teacher educators, and parents, build capacities of teachers/educators.

Pedagogy technology integration through Web 2.0 technology

- Dr. Sanjay Kumar Pandagale

Introduction

Today's world is a world of technology and education is not indifferent to it. We always tell our teachers to use ICT in education. Use of ICT in education is depends on availability of hardwares/softwares and the knowledge of using these hardwares/softwares. It can be said that the first part related to infrastructure is beginning to reach to the schools due to intervention of SSA and ICT@schools project. However, there is a need to concentrate on second part related to effective use of ICT in education. Furthermore, teachers have often been provided with inadequate training for this task. Many approaches to teachers' professional development offer a one size-fits-all approach to technology integration when, in fact, teachers operate in diverse contexts of teaching and learning.

Faced with these challenges, how can teachers integrate technology into their teaching? An approach is needed that treats teaching as an interaction between what teachers know and how they apply what they know in the unique circumstances or contexts within their classrooms. There is no "one best way" to integrate technology into curriculum. Rather, integration efforts should be creatively designed or structured for particular subject matter ideas in specific classroom contexts. Honoring the idea, that teaching with technology is a complex, ill-structured task; we propose that understanding approaches to successful technology integration requires educators to develop new ways of comprehending and accommodating this complexity.

At the heart of good teaching with technology are three core components: content, pedagogy, and technology, plus the relationships among and between them. The interactions between and among the three components, playing out differently across diverse contexts, account for the wide variations seen in the extent and quality of educational technology integration. These three knowledge bases (content, pedagogy, and technology) form the core of the technology, pedagogy, and content knowledge (TPACK) framework. An overview of the framework is provided in the following section, though more detailed descriptions may be found elsewhere (e.g., Koehler & 2008; Mishra & Koehler, 2006). This perspective is consistent with that of other researchers and approaches that have attempted to extend Shulman's idea of pedagogical content knowledge (PCK) to include educational technology. (A comprehensive list of such approaches can be found at http://www.tpck.org/.)

Nowadays with the invention of web 2.0 technology, this is also not a big issue. Web 2.0 technology opened the doors to create potential multimedia content at various platforms easily and free of cost.

Objectives

After going through the present module, the teachers will-

- Know about the web 2.0 technologies in general and web 2.0 technologies in education in particular,
- Know key web 2.0 services in education,
- Develop web 2.0 technology integrated lesson plan.

What is web 2.0 technology?

The term Web 2.0 was coined in 1999 to describe web sites that use technology beyond the static pages of earlier web sites. It is closely associated with Tim O'Reilly because of the O'Reilly Media Web 2.0 conference, which was held in late 2004. A Web 2.0 site may allow users to interact and collaborate with each other in a social media dialogue as creators of user-generated content in a virtual community, in contrast to websites where people are limited to the passive viewing of content. Examples of Web 2.0 include social networking sites, blogs, wikis, video sharing sites, hosted services, etc.

Web 2.0 websites allow users to do more than just retrieve information. By increasing what was already possible in "Web 1.0", they provide the user with more user-interface, software and storage facilities, all through their browser. This has been called "network as platform" computing. Major features of Web 2.0 include social networking sites, user created web sites, self-publishing platforms, tagging, and social bookmarking. Web 2.0 offers all users the same freedom to contribute.

Web 2.0 technology in education

Web 2.0 technologies provide teachers with new ways to engage students, and even allow student participation on a global level. By allowing students to use the technology tools of Web 2.0, teachers are giving students the opportunity to share what they learn with peers. Web 2.0 calls for major shifts in the way education is provided for students. One of the biggest shifts that Will Richardson points out in his book *Blogs, Wikis, Podcasts, and Other Powerful Web Tools for Classrooms* is the fact that education should be collaboratively constructed. This means that students, in a Web 2.0 classroom, are expected to collaborate with their peers. By making the shift to a Web 2.0 classroom, teachers are creating a more open atmosphere where students are expected to stay engaged and participate in class discussions. In fact, there are many ways for educators to use Web 2.0 technologies in their classrooms.

Key Web 2.0 services/applications

There are a number of Web-based services and applications that demonstrate the foundations of the Web 2.0 concept, and they are already being used to a certain extent in education. These are not really technologies as such, but services (or user processes) built using the building blocks of the technologies and open standards that underpin the Internet and the Web. These include blogs, wikis, multimedia sharing services, content syndication, podcasting and content tagging services. Many of these applications of Web technology are relatively mature, having been in use for a number of years, although new features and capabilities are being added on a regular basis. It is worth noting that many of these newer technologies are concatenations, i.e. they make use of existing services. In the first part of this section, we introduce and review these well-known and commonly used services with a view to providing a common grounding for later discussion.

NB * indicates an open source or other, similar, community or public-spirited project.

- **Blogs**

The term web-log, or *blog*, was coined by Jorn Barger in 1997 and refers to a simple webpage consisting of brief paragraphs of opinion, information, personal diary entries, or links, called *posts*, arranged chronologically with the most recent first, in the style of an online journal (Doctorow *et al.*, 2002). Most blogs also allow visitors to add a *comment* below a blog entry.

Well-known or education-based blogs:
http://radar.oreilly.com/
http://www.techcrunch.com/
http://www.instapundit.com/
http://blogs.warwick.ac.uk/*
http://jiscdigitisation.typepad.com/jisc_digitisation_program/*

Software:
http://wordpress.org/*
http://www.sixapart.com/typepad/
http://www.blogger.com/start
http://radio.userland.com/
http://www.bblog.com/

Blog search services:
http://technorati.com/
http://www.gnosh.org/
http://blogsearch.google.com/
http://www.weblogs.com/about.html

This posting and commenting process contributes to the nature of blogging (as an exchange of views) in what Yale University law professor, Yochai Benkler, calls a 'weighted conversation' between a primary author and a group of secondary comment contributors, who communicate to an unlimited number of readers. It also contributes to blogging's sense of immediacy, since 'blogs enable individuals to write to their Web pages in journalism time – that is hourly, daily, weekly – whereas the Web page culture that preceded it tended to be slower moving: less an equivalent of reportage than of the essay' (Benkler, 2006, p. 217).

Each post is usually 'tagged' with a keyword or two, allowing the subject of the post to be categorized within the system so that when the post becomes old it can be filed into a standard, theme-based menu system. Clicking on a post's description, or tag (which is displayed below the post), will take you to a list of other posts by the same author on the blogging software's system that use the same tag.

- **Multimedia sharing**

One of the biggest growth areas has been amongst services that facilitate the storage and sharing of multimedia content. Well known examples include YouTube (video) Flickr (photographs) and Odeo (podcasts). These popular services take the idea of the 'writeable' Web (where users are not just consumers but contribute actively to the production of Web content) and enable it on a massive scale. Literally millions of people now participate in the sharing and exchange of these forms of media by producing their own podcasts, videos and photos. This development has only been made possible through the widespread adoption of high quality, but relatively low cost digital media technology such as hand-held video cameras.

Well known photo sharing services:
http://www.flickr.com/
http://www.ourpictures.com
http://www.snapfish.com/
http://www.fotki.com/

Well known video sharing services:
http://www.youtube.com/
http://www.getdemocracy.com/broadcast/ *
http://eyespot.com/
http://ourmedia.org/ *
http://vsocial.com
http://www.videojug.com/

Well known podcasting sites:
http://btpodshow.com/
http://www.audblog.com/
http://odeo.com/
http://www.ourmedia.org/ *
http://connect.educause.edu/ *
http://juicereceiver.sourceforge.net/index.php
http://www.impala.ac.uk/ *
http://www.law.dept.shef.ac.uk/podcasts/ *

- **Audio blogging and Podcasting**

Podcasts are audio recordings, usually in MP3 format, of talks, interviews and lectures, which can be played either on a desktop computer or on a wide range of handheld MP3 devices. Originally called audio blogs they have their roots in efforts to add audio streams to early blogs (Felix and Stolarz, 2006). Once standards had settled down and Apple introduced the commercially successful iPod MP3 player and its associated iTunes software, the process started to become known as podcasting. This term is not without some controversy since it implies that only the Apple iPod will play these files, whereas, in fact, any MP3 player or PC with the requisite software can be used. A more recent development is the introduction of video podcasts (sometimes shortened to vidcast or vodcast): the online delivery of video-on-demand clips that can be played on a PC, or again on a suitable handheld player (the more recent versions of the Apple iPod for example, provide for video playing).

A podcast is made by creating an MP3 format audio file (using a voice recorder or similar device), uploading the file to a host server, and then making the world aware of its existence through the use of RSS (Rich Site Summary). This process (known as *enclosure*) adds a URL link to the audio file, as well as directions to the audio file's location on the host server, into the RSS file (Patterson, 2006).

Podcast listeners subscribe to the RSS feeds and receive information about new podcasts as they become available. Distribution is therefore relatively simple. The harder part, as those who listen to many podcasts know, is to produce a good quality audio file. Podcasting is becoming increasingly used in education (Brittain *et al*., 2006; Ractham and Zhang, 2006) and recently there have been moves to establish a UK HE podcasting community.

- **Tagging and social bookmarking**

A tag is a keyword that is added to a digital object (e.g. a website, picture or video clip) to describe it, but not as part of a formal classification system. One of the first large-scale applications of tagging was seen with the introduction of Joshua Schacter's del.icio.us website, which launched the 'social bookmarking' phenomenon.

Social bookmarking systems share a number of common features (Millen *et al*., 2005): They allow users to create lists of 'bookmarks' or 'favorites', to store these centrally on a remote service (rather than within the client browser) and to share them with other users of the system (the 'social' aspect). These bookmarks can also be tagged with keywords, and an important difference from the 'folder'-based categorization used in traditional, browser-based bookmark lists is that a bookmark can belong in more than one category. Using tags, a photo of a tree could be categorized with both 'tree' and 'larch', for example.

Examples of tagging services:
http://www.connotea.org/
http://www.citeulike.org/*
http://www.librarything.com/
http://del.icio.us/
http://www.sitebar.org
http://www.furl.net/index.jsp
http://www.stumbleupon.com/ http://www.blinklist.com/
http://www.digg.com/
http://www.rawsugar.com
http://del.icio.us/elearningfocus/web2.0 *

The concept of tagging has been widened far beyond website bookmarking, and services like Flickr (photos), YouTube (video) and Odeo (podcasts) allow a variety of digital artifacts to be socially tagged. For example, the BBC's Shared Tags project is an experimental service that allows members of the public to tag BBC News online items. A particularly important example within the context of higher education is Richard Cameron's

CiteULike, a free service to help academics to store, organize and share the academic papers they are reading. When you see a paper on the Web that interests you, you click a button and add it to your personal library. CiteULike automatically extracts the citation details, so you do not have to type them in. This tool was used during the research for this report.

http://www.adaptcms.com/
http://b2evolution.net/
http://www.bedita.com/
http://www.cmsmadesimple.org/
http://www.cmsimple.org/
http://drupal.org/
http://www.joomla.org/
http://www.mamboserver.com/
http://www.tcexam.org/

The idea of tagging has been expanded to include what are called *tag clouds*: groups of tags *(tag sets*) from a number of different users of a tagging service, which collates information about the frequency with which particular tags are used. This frequency information is often displayed graphically as a 'cloud' in which tags with higher frequency of use are displayed in larger text.

- **Wikis**

A *wiki* is a webpage or set of webpages that can be easily edited by anyone who is allowed access (Ebersbach *et al*., 2006). Wikipedia's popular success has meant that the concept of the wiki, as a collaborative tool that facilitates the production of a group work, is widely understood. Wiki pages have an edit button displayed on the screen and the user can click on this to access an easy-to-use online editing tool to change or even delete the contents of the page in question. Simple, hypertext-style linking between pages is used to create a navigable set of pages.

Examples of wikis:
http://wiki.oss-watch.ac.uk/*
http://wikieducator.org/Main_Page
http://wikispaces.com/
http://wiki.cetis.ac.uk/CETIS_Wiki*
http://en.wikipedia.org/wiki/Main_Page*
http://www.ch.ic.ac.uk/wiki/index.php/Main_Page
http://www.wikihow.com

Software: http://meta.wikimedia.org/wiki/MediaWiki*
http://www.socialtext.com/products/overview
http://www.twiki.org/http://uniwakka.sourceforge.net/HomePage

Online notes on using wikis in education:
http://www.wikiineducation.com/display/ikiw/Home*

Unlike blogs, wikis generally have a *history* function, which allows previous versions to be examined, and a *rollback* function, which restores previous versions. Proponents of the power of wikis cite the ease of use (even playfulness) of the tools, their extreme flexibility and open access as some of the many reasons why they are useful for group working (Ebersbach *et al*., 2006; Lamb, 2004).

- **Social Networking**

Professional and social networking sites that facilitate meeting people, finding like minds, sharing content—uses ideas from harnessing the power of the crowd, network effect and individual production/user generated content. Nowadays Facebook is very popular in India as well as in other countries also.

Professional networking:
http://www.siphs.com/aboutus.jsp
https://www.linkedin.com/
http://www.zoominfo.com/

Social networking:
www.myspace.com
www.facebook.com
http://fo.rtuito.us/
https://twitter.com/
http://www.spock.com/
http://www.flock.com/
http://www.bebo.com/

- **CMS**

A **Content Management System (CMS)** is a computer program that allows publishing, editing and modifying content as well as maintenance from a central

interface. Such systems of content management provide procedures to manage workflow in a collaborative environment. These procedures can be manual steps or an automated cascade. The first content management system (CMS) was announced at the end of the 1990s. This CMS was designed to simplify the complex task of writing numerous versions of code and to make the website development process more flexible. CMS platforms allow users to centralize data editing, publishing and modification on a single back-end interface. CMS platforms are often used as blog software.

The core function of content management systems is to present information on web sites. CMS features vary widely from system to system. Simple systems showcase a handful of features, while other releases, notably enterprise systems, offer more complex and powerful functions. Most CMS include Web-based publishing, format management, revision control (version control), indexing, search, and retrieval. The CMS increments the version number when new updates are added to an already-existing file. A CMS may serve as a central repository containing documents, movies, pictures, phone numbers, scientific data. CMSs can be used for storing, controlling, revising, semantically enriching and publishing documentation.

- **Document sharing and self-publishing platform**

The expansion of the Internet in recent years has provided web users with a robust platform for content sharing -- whether it be files, documents, music or videos, among others. Like never before, the Internet has provided professionals and everyday users alike with the ability to send and receive information quickly and easily.

http://www.calameo.com/
http://www.slideshare.net/
http://www.scribd.com/
http://www.docuter.com/
http://www.wepapers.com/
https://www.zoho.com/rip/zohoshare-eof.html
http://www.edocr.com/

- **Free websites**

Although the modern Internet community is moving towards social networks and clouds, there is still some space for **traditional free web hosting** that enables to publish a *custom web page*, or *custom blog*, or other *"manually" build website* on the web at absolutely no cost.

http://www.webs.com/
http://www.wix.com/
http://www.biz.nf/
http://www.freehostingeu.com/
http://www.biz.ly/
http://www.freehostia.com/index2.html
http://byethost.com/
http://www.x10hosting.com/
https://www.yola.com/pricing?cid=CJ20035

- **The 5E Approach to Constructivist Learning ***

The Biological Science Curriculum Study (BSCS), a team whose Principal Investigator is Roger Bybee developed an instructional model for constructivism, called the "Five Es". The 5Es represent five stages of a sequence for teaching and learning: *Engage, Explore, Explain, Extend* (or *Elaborate),* and *Evaluate. The details are given below:*

Engage

This stage should stimulate curiosity and activate prior knowledge of student. The activity should be a problem or an event that raises questions and motivates students to discover more about the concept. Specifically this stage helps in:

1. Make connections between past and present learning experiences
2. Anticipate activities and focus students' thinking on the learning outcomes of current activities. Students should become mentally engaged in the concept, process, or skill to be learned.
3. Gives an opportunity for teacher to understand misconception of students

Explore

Students need the opportunity to actively explore the concept in a hands-on activity. This establishes a commonly shared classroom experience and allows students to share ideas about the concept. This phase of the 5 E's provides students with a common base of experiences. They identify and develop concepts, processes, and skills. During this phase, students actively explore their environment or manipulate materials.

Explain

This phase of the 5 E's helps students explain the concepts they have been exploring. They have opportunities to verbalize their conceptual understanding or to demonstrate new skills or behaviors. Teachers use questioning strategies to lead students' discussion of information discovered during the Explore stage. This phase also provides opportunities for teachers to introduce formal terms, definitions, and explanations for concepts, processes, skills, or behaviors.

Elaborate

This phase of the 5 E's extends students' conceptual understanding and allows them to practice skills and behaviors. Through new experiences, the learners develop deeper and broader understanding of major concepts, obtain more information about areas of interest, and refine their skills. Students are encouraged to apply, extend, and enhance the new concept and related terms during interaction with the teacher and other students.

Evaluate

This phase of the 5 E's encourages learners to assess their understanding and abilities and lets teachers evaluate students' understanding of key concepts and skill development. The teacher must create a quality assessment to gauge the learner's understanding of the topic. The students must also be able to reflect on their own understanding and progress.

A Sample Web 2.0 Integrated Constructivist Learning Plan *

Based on the discussions above, a sample constructivist learning plan is designed using the 5E model is given below. The unit is based on the content of NCERT science textbook for class IX. The topic is poultry farming under the larger unit of animal husbandry and is suitable for any secondary school class level. There are many technology-integrated activities suggested

under each phase of the model and the facilitator can choose and direct the learning based on the available time and resources.

The main purpose of learning this topic is to make the learner aware of the poultry farming practices and its importance. The learner is also encouraged to explore the poultry farming practices in different regions of the world and the current status of poultry farming in the country. This unit is also expected to give them many answers to the problem of bird flu, which is very common in today's context. The learning environment created through various phases of this model encourages the learner to use varieties of web 2.0 tools. The learning environment provides the information that learners need to understand poultry farming and related concepts through text documents, graphics, sound, video and animation resources, which can be accessed through the World Wide Web. The learners are also provided with various collaborative tools such as e-mail, chat, forum, wiki, blog etc. to form learning communities to negotiate and co-construct meaning about the concepts through these tools.

Web 2.0 Mediated Constructivist Learning Design *

Area: Animal Husbandry- Poultry Farming

5E Approach

Class IX

Engage

Engaging Activities for the Topic

- View the *online streaming* video on poultry farming from http://www.youtube.com/watch?v=aJ7rrHYmFiQ
- Collaborative *digital concept map* on egg/poultry farming–mind map- use freemind (offline), bubbl(online) http://www.bubbl.us/index
- Questions that you want to ask about egg and poultry farm- *online forum* (questions like the following will emerge) http://www.allexperts.com/
- Take a *online webquest* on Bird flu from http://www.mofb.org/WebQuest.aspx/BirdFlu.aspx

Explore

Exploration Activities for the topic

- Take the following *virtual fieldtrip*

1. Online visit to an organic egg farm / virtual trip http://www.exploratorium.com/cooking/eggs/farm/index.html
2. Poultry virtual farm http://sites.ext.vt.edu/virtualfarm/poultry/poultry.html
   - Visit a Poultry Farm. Visit a nearby poultry farm. Take along all types of *digital recording* equipment. Audiotape farm sounds. Videotape farm activities. Photograph farm people, equipment, crops and animals. Show the world a unique farm in your area by adding your own farm website to the Internet.
   - Different poultry birds and stages/process of poultry farming –creating *digital album* – flicker/picasa
   - Understanding poultry farming and poultry birds in different country through:

1. *Online collaboration* through e-pal
2. Viewing and discussion of various *streaming videos* from youtube http://www.youtube.com/watch?v=-kOk8lcn_TQ
3. Through *Google image* search
    - Ask an expert. Have your class *e-mail (or live chat if available)* an expert about question they have about the poultry farm http://www.allexperts.com/ , specifically http://www.allexperts.com/el/Poultry-Farming/ , http://en.allexperts.com/q/Poultry-Farming-3481/index_11.htm
    - ask question on the following *forum sites*

1. http://apps.exploratorium.edu/cgi-bin/yabb2-cooking/YaBB.pl
2. http://www.the-coop.org/cgi-bin/UBB/ultimatebb.cgi
    - View the *webcast* on egg http://www.exploratorium.edu/cooking/webcasts/index.html

Explain

Explain Activities for the Topic

- Students collaborate and develop a *wiki* on poultry farming using wiki space http://www.wikispaces.com/
- *E-News letter* on poultry farming – Microsoft publisher or equivalent open source software
- Plan and design a *digital poultry farm* of your own in groups and share the design
- Discuss the difference in poultry farming in different countries using *discussion board/forum/groups*
- After the visit to the local poultry farm Show the world a unique farm in your area by adding your own farm *website to the Internet*.
- Compare traditional poultry farming with modern poultry farming using *discussion board/forum/groups*
- Collaborative *digital concept map* on poultry farming–mind map- use freemind (offline), bubbl(online) http://www.bubbl.us/index

Elaborate

Elaborate Activities for the Topic

- Making art work using egg egg shell
- They analyse and develop a *social bookmarking* of websites related poultry farming/animal husbandry
- Take a *webquest* on the following

1. Bird flu http://www.mofb.org/WebQuest.aspx/BirdFlu.aspx
2. From egg to chick http://www.mofb.org/webquest/wq23a.htm
3. adventures on aviculture http://www.besd61.k12.il.us/webquests/8th%20Grade/sharp/birds2/studentspage.htm
    - Write a review of a poultry farming website in your *blog*
    - Develop a collaborative *podcasts* on importance of poultry farms and host it in Gcast
    - Conduct a survey of poultry industry in india- *internet search and online survey*
    - Explore the poultry(duck) farming in kerala through *internet and e-mail*

- searching the net and making a *database* of poultry related websites

1. The Coop is dedicated to all the folks around the world that raise, breed or show poultry, waterfowl, gamebirds and related species. http://www.the-coop.org/index.html

Evaluate

Evaluation Activities for the Topic

- Create a *digital portfolio* on poultry farming – develop the portfolio using mahara http://mahara.org/
- Portfolio artifacts
- News letter
- Project report
- Blog posts etc.
- *Online reflective journal* using http://edublogs.org/
- Peer Assessment
- Create *digital rubrics* along with students for assessing the portfolio and other activities using rubistar http://rubistar.4teachers.org/
- Develop *digital checklist* for all other activities they are involved in and products they have created using online free form creator -soho creator (http://www.zoho.com/creator/html-form-builder.html) or googledocs- forms (http://www.google.com/google-d-s/forms/)
- Develop and conduct a traditional multiple choice *online test* using Easy Test Maker http://www.easytestmaker.com/

(* retrieved from http://www.ictmanual.net/index.php/introduction/web20-unit-plan)

Above are the only few examples of web 2.0 technology. There are number of other tools available on the web. Following are the links to find them-
http://pinterest.com/esheninger/web-2-0-tools-for-educators/
http://edudemic.com/2011/11/best-web-tools/
nroer.org.in
coursera.org

Online Education Resources

- Ashok Shaky

Introduction

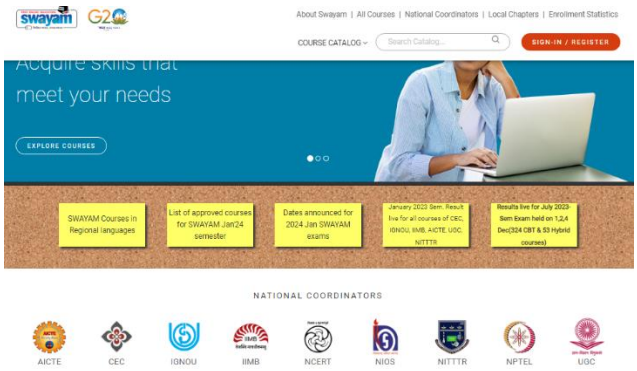
Information and communication technology (ICT) development is bringing new patterns of behaviour to many aspects of society, including university settings. Institutions in higher education mostly use limited forms of ICT-supported learning, such as course management systems, virtual learning environments and web-based applications to deliver curriculum and student support. Some universities provide distance education, and lately some provide video lectures and online courses. Because of the speed and the nature of technological changes, novel ICT technologies are harder to implement in formal learning environments. The official university curriculum is now more oriented towards empowering students' competencies for preparing their own learning environment as well as self-regulation abilities, the setting of learning goals and the acceptance of responsibility. Since universities do not provide fixed e-learning environments, students are expected to be more active and resourceful with regard to the use of ICT to support learning. In this connection, the literature reveals some personal factors in connection with personal innovativeness University students report that the use of ICT is expected of them at university, even though the formal training for such skills is often missing. ICT skills, beneficial for learning purposes, are therefore often developed in informal ways, such as with ICT use for leisure, self-initiated exploratory behaviour and information from peers, family or media .

Types of E-learning Resources

- Digital Print
- Digital Audio
- Digital Video
- Web-based Resources
- E-learning through Web 2.0 tools

SWAYAM

(https://swayam.gov.in/) provides Massive Open Online Courses with 140 universities approved credit transfer feature. Students enrolled in Jan-20 & in total are 26 Lakhs & 1.57 Cr respectably. Total 1900+ courses covering school and higher education.



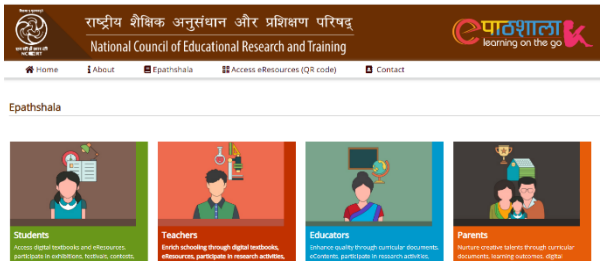
SWAYAMPRABHA *(https://www.swayamprabha.gov.in/)* provides high quality educational programs 24*7 through 32 DTH channels. Around 56,000 total videos have been telecasted covering school & higher education. It has 3+ crores total views on Youtube since inception.

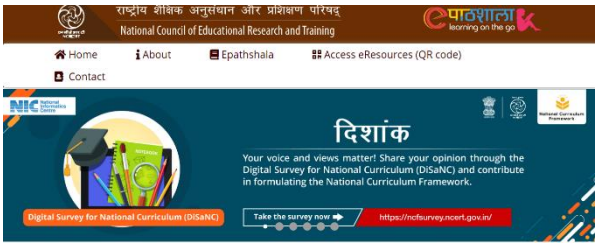
National Digital Library (NDL) ***(https://ndl.iitkgp.ac.in/)*** is a repository of econtent on multiple disciplines from primary to PG levels. It has 4.3 crores content (Text / Audio / Video / Simulation /Graphics), harvested from 250 sources; in 300+ languages. NDL has 55 Lakhs + registered users.

DIKSHA (***https://diksha.gov.in/)*** is a National Platform for Our Teachers & all other learner.

e-Yantra (https://www.e-yantra.org/) provides hands on experience on embedded systems. It has about 380 Lab and made 2300+ colleges benefited

Epathshala ***(http://epathshala.gov.in/)***





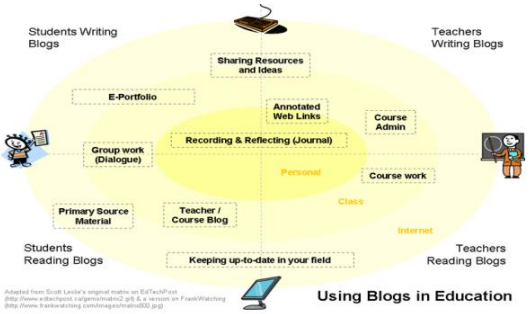
provides Free access of e-books (class I to XII) through website and app.

FOSSEE (**https://fossee.in/**) is acronym for Free/Libre and Open Source Software for Education, which developed, promote open source softwares for education as well as professional use.

Virtual Labs (**http://www.vlab.co.in/**) has developed Web-enabled curriculum based experiments designed for remote – operation. Its 275 labs with 2200+ experiments made 18+ Lakhs students benefitted.

e-gyankosh (http://egyankosh.ac.in/) is a National Digital Repository to store and share the digital learning resources. Its content developed by the Open and Distance Learning Institutions in the country.

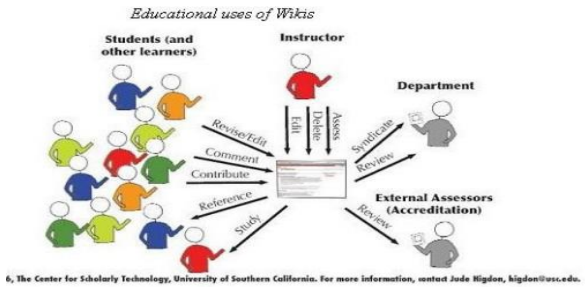
GyanDarshan (http://www.ignouonline.ac.in/gyandarshan/) is a web based TVchannel devoted to educational and developmental needs for Open and Distance Learner.



Educational benefits & uses of web 2.0 tools

Blogs

'Creative interaction with one's own development helps to ensure that new knowledge is incorporated in and integrated with existing knowledge



Wikis

Students can create simple websites without having prior knowledge in HTML programming or current software used for website authoring. A wiki facilitates the ability to interact with an evolving document over time. The authors can see the evaluation of written task and comment on it rather putting comments on final work. Wiki is very useful for tracking and streamlining group projects.

Gyan Vani (105.6 FM Radio) & Gyandhara (web radio)

(http://ignouonline.ac.in/Gyandhara/) Gyan Dhara is an internet audio counselling service where students can listen to the live discussions by the teachers and expertson the topic of the day and interact with them through telephone.

DIKSHA (https://diksha.gov.in/) is a National Platform for Our Teachers & all other learner.

Epathshala (http://epathshala.gov.in/) provides free access of e-books (class I toXII) through website and app.

e-PGPathshala (https://epgp.inflibnet.ac.in/) is a gateway for e-books up to PG, which provides High quality, curriculum based, and interactive content in differentsubjects across all disciplines.

e-ShodhSindhu (https://ess.inflibnet.ac.in/) is a collection of e-journals, e- journal archives and e-books on perpetual access basis. It has 10,000+ e-journals, 31,35,000+ e-books.

Shodhganga (https://shodhganga.inflibnet.ac.in/) is a platform for research students to deposit their Ph.D. theses and make it available to the entire scholarly community in open access

Shodh Shudhhi (PDS) (https://pds.inflibnet.ac.in/) is a Plagiarism Detection Software Encourage original information by preventing plagiarism.

VIDWAN (https://vidwan.inflibnet.ac.in/) is an Expert Database and National Research Network, which has profiles of scientists / researchers and other faculty members working at leading academic institution

Spoken Tutorial (https://spoken-tutorial.org/) is a Tutorial in IT application, which provides self-training in IT fields.

NEAT (https://neat.aicte-india.org/) is an AI adaptive learning portal. This is an initiative for skilling of learners in latest technologies through a PPP model.

SAKSHAT (https://sakshat.ac.in/) is one Stop Education Portal for addressing all the education and learning related needs of students, scholars, teachers and lifelong learners. The

portal provides the latest news, press releases, achievements etc related to Ministry of HRD. So visit SAKSHAT to know the world of online learning.

S.N.	Initiated by	Resource	About	URL
Audio-Video e-content				
1	Ministry of Education	**SWAYAM**	Offers courses from Class 9 to Post Graduation with rich e-learning content in the form of: - e-Tutorial: Audio, Video, Virtual labs etc. - Specially prepared Downloadable e-content - Self-Assessment tools like MCQs, Assignments, Quizzes etc. - Online discussion forum for clearing doubts - Evaluation and certification available at nominal fee	https://swayam.gov.in/
2	Seven Indian Institutes ofTechnology (IITs) and Indian Institute of Science (IISc)	**NPTEL** (National Programme on Technology Enhanced Learning)	- Largest online repository for web and video courses in engineering, basic sciences and selected humanities and social sciences subjects - No pre-requisites, no age limit, no	http://nptel.ac.in/

			entrance criteria to enroll - Certification courses are offered twice a year (Jan-Jun, Jul-Dec)	
3	Consortium for Educational Communication(CEC-UGC)	**Curriculum Classes**	- Offers digital content in 87 UG subjectsas per model syllabi of UGC - Visual, web and text based learning - material - Self-paced learning opportunity	http://cec.nic.in/cec/curriculum_class (YouTube Channel https://www.youtube.com/user/cecedusat)
4	NCERT	**DIKSHA** (Digital Infrastructure for Knowledge Sharing)	- Provides video courses and practice tests for students and teachers of Class I to Class XII - School curriculum based courses prepared by NCERT, CBSE, State boardsetc.	https://diksha.gov.in/
5	National Skill Developmen tCorporation	**e-Skill India**	- Provides online courses across all sectors ranging from Beauty, Agriculture to IT-ITES and BFSI - No pre-requisites, no age limit, no - entrance criteria to enroll - Self-paced, certification	https://www.eskillindia.org/

			Skilling courses	
Digital content: access journals and e-books				
6	Ministry of Education	**National Digital Libraryof India**	- Offers learning content for users from Primary to Post Graduate Levels across all disciplines - Content available in multiple formats (Audio, Video, Web, Dataset, Report, Book, Thesis, Album etc.) - Ease of highly filtered and focused searching	https://ndl.iitkgp.ac.in/
7	NCERT	**e-Pathshala**	- Offers e-textbooks and supplementary books of NCERT for all subjects for classes I to XII in English, Hindi and Urdu - Offers e-Resources like audios, videos, interactive images, maps, question banks etc. in English and Hindi	http://epathshala.nic.in
8	Ministry of Education	**e-PG Pathshala** (executed by UGC)	- A gateway to all Post graduate courses	https://epgp.inflibnet.ac.in/#

			- Offers curriculum based and interactive e-content in 70 subjects across all disciplines of social sciences, arts, fine arts, humanities and natural & mathematical sciences	
9	Ministry of Education	**Sakshat**	One stop education Portal that offers: - Learning content across disciplines in the form of audio-visual tools, web e-books, e-journals etc. - Educational material to learners from - Kindergarten to PhD - Self-Assessment tools like MCQs, Quizzes etc. - Online discussion forum for clearing doubts	https://www.education.gov.in/en/technology-enabled-learning-1
10	Ministry of Education	**e-Kalpa**	- Offers distance e-learning programs on Design - Offers Digital Design Resource - Database including the craft sector	https://www.dsource.in/

Learning Management System- Google Classroom

- Dr. Shruti Tripathi

Introduction

A Learning Management System (LMS) is a software application or online technology designed for the planning, execution, and evaluation of a specific learning process. Primarily utilized for e-learning, the LMS comprises two key components: a server responsible for fundamental functions and a user interface (UI) accessible to instructors, students, and administrators.

Typically, an LMS empowers instructors to create and deliver content, monitor student engagement, and evaluate student performance. Additionally, it may offer interactive features for students, including threaded discussions, video conferencing, and discussion forums.

These systems find applications in various sectors, including businesses, government agencies, and both traditional and online educational institutions. LMSs enhance traditional educational approaches, leading to efficiency gains and cost savings for organizations. A well-designed system facilitates streamlined management of tasks such as user registration and access, content delivery, calendar management, communication, quizzes, certifications, and notifications for instructors and administrators.

Schoology, Kadenze, Canvas, Blackboard, Brightspace are few LMS platforms that are being used for the purpose of education. A very easy and friendly LMS is the Google Classroom. Let us learn about it-

Google Classroom, a free service by Google, revolutionizes the educational landscape by providing a seamless and paperless way to share files, create assignments, grade student work, and foster communication within a digital environment. To access this powerful tool, your school or district must sign up for a G-Suite for Education account, which ensures privacy and protection for students.

Classroom is available to:

- Schools using G Suite for Education
- Organizations using G Suite for Nonprofits
- Individuals over 13 years of age with personal Google Accounts. Age may vary by country.
- All G Suite domains

It's important to note that to access Google Classroom without G-Suite for Education, signing into a Gmail account is required. Once signed in, navigate to https://classroom.google.com to access the platform and explore its features.

Importance of Google Classroom as an LMS

Accessibility

1. **Anytime, Anywhere Learning:** Google Classroom facilitates remote learning, enabling students to access educational materials from anywhere with an internet connection.
2. **Device Compatibility:** It supports various devices, including computers, tablets, and smartphones, promoting flexibility in learning.

Collaboration

1. **Real-time Collaboration:** Google Classroom promotes collaboration through features like real-time document editing and discussion forums.
2. **Teacher-Student Interaction:** It provides a platform for teachers to engage with students, offering feedback and answering questions.

Organization

1. **Centralized Information:** All course materials, assignments, and communication are centralized in one location, simplifying organization for both educators and students.
2. **Efficient File Management:** Google Drive integration allows for easy file sharing, submission, and grading.

Uses of Google Classroom

Course Creation

1. **Setting up a Classroom:** Educators can create a virtual classroom for each course they teach, customizing settings and preferences.
2. **Integration with Google Apps:** Seamless integration with Google Drive, Docs, Sheets, and other apps enhances the teaching and learning experience.

Content Delivery

1. **Uploading Materials:** Teachers can upload lectures, presentations, and reading materials directly to Google Classroom.
2. **Stream for Announcements:** The Stream feature allows educators to make announcements, post updates, and share important information.

Assignments and Assessments

1. **Creating Assignments:** Educators can create various types of assignments, including quizzes, essays, and projects.
2. **Grading and Feedback:** The platform facilitates efficient grading, feedback, and grade tracking.

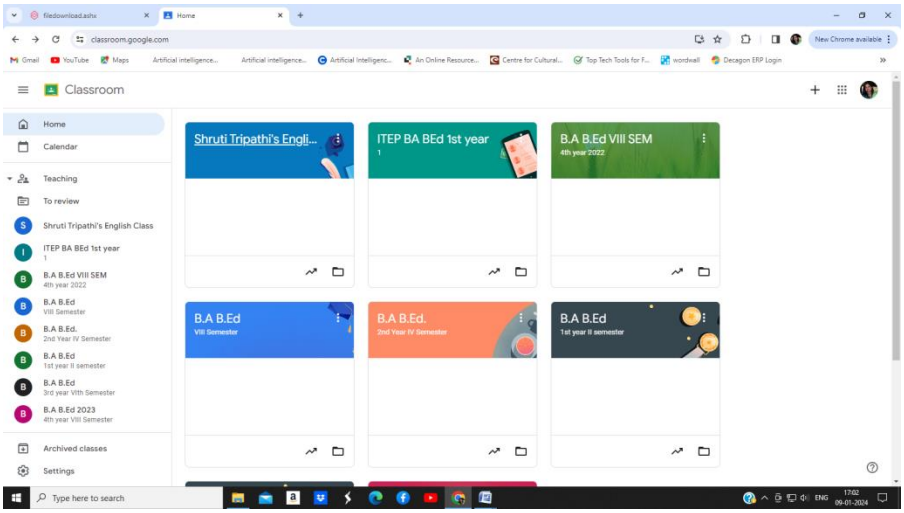
Communication

1. **Discussion Forums:** Google Classroom includes discussion forums for collaborative learning and student engagement.
2. **Private Communication:** Private comments and messaging features enable secure communication between teachers and students.

Steps for Using Google Classroom as an LMS

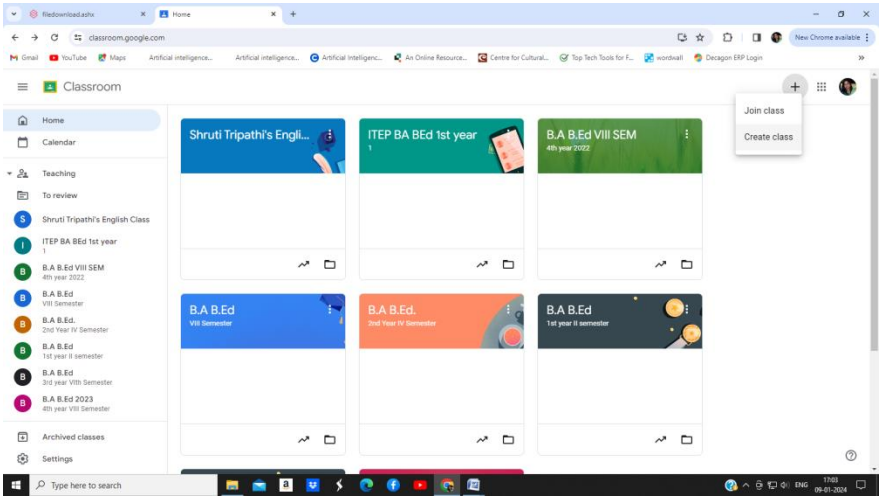
Open up your **internet browser** by clicking on the internet icon. (This could be f**irefox**, **Google Chrome**, **Internet Explorer**, etc., whichever internet explorer you use most often.)

After signing into your Gmail or G-Suite account, use the link https://classroom.google.com to login and the following screen appears.

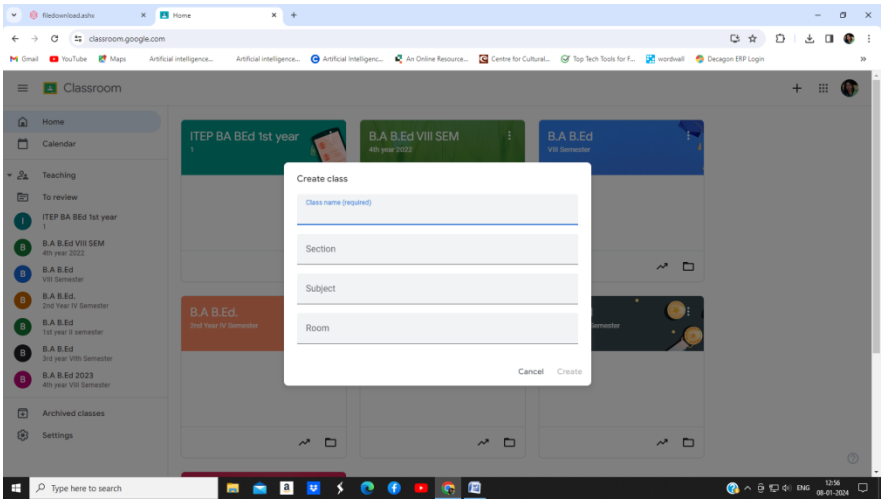


Create a Class

To initiate the process, your first step is to establish a class. Whether it's a single class encompassing a specific subject or multiple classes catering to distinct groups of students, the creation process remains the same. Simply navigate to the top right corner and click on the plus (+) sign. From there, select "Create Class" to set up your desired learning environment.

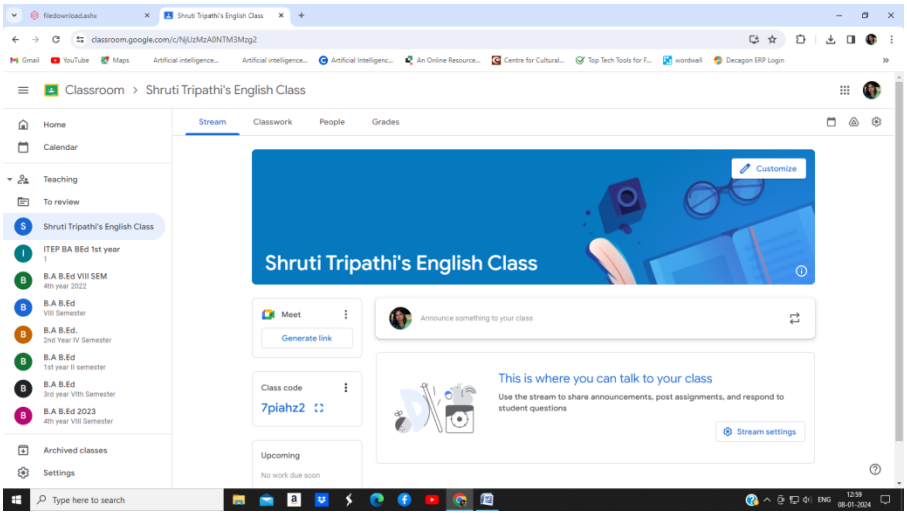


You will then enter the Class Name, Section Subject and Room number but the only required item is Class Name



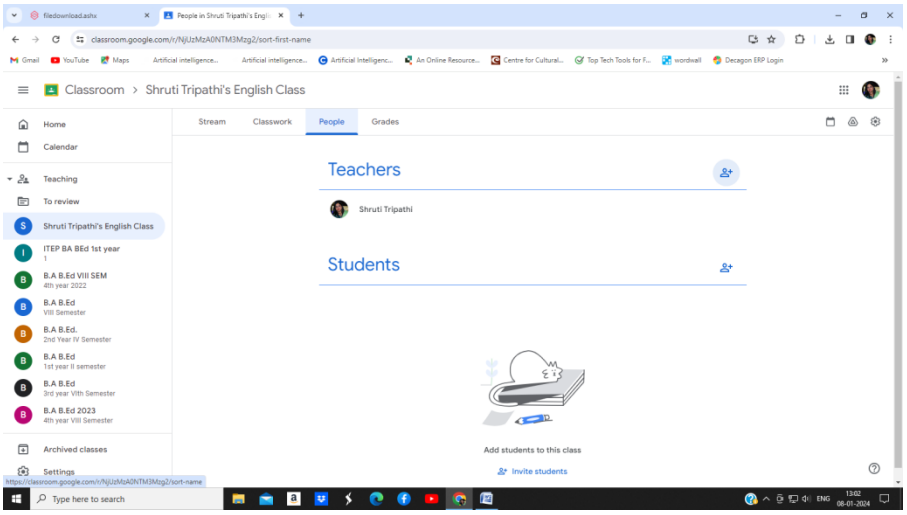
Tip: You could use your personal name for the Class such as Shruti Tripathi's English Class to personalize it for your students.

Click on Create and you are re-directed to the Class page. The Class page looks like this.



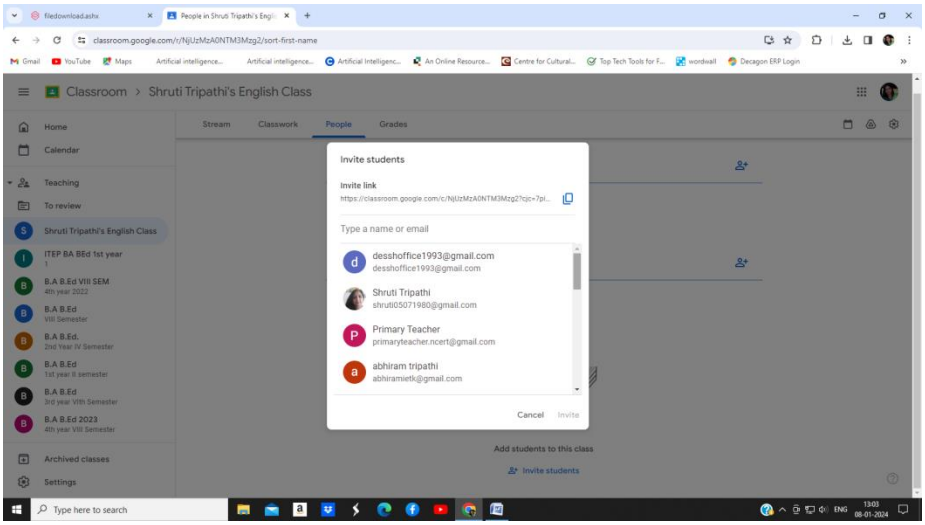
Invite Students to the class

There are various ways to invite and add students to your class.
Click on People to invite students to the class



Click on the Plus sign to invite students to the class or give them the class code

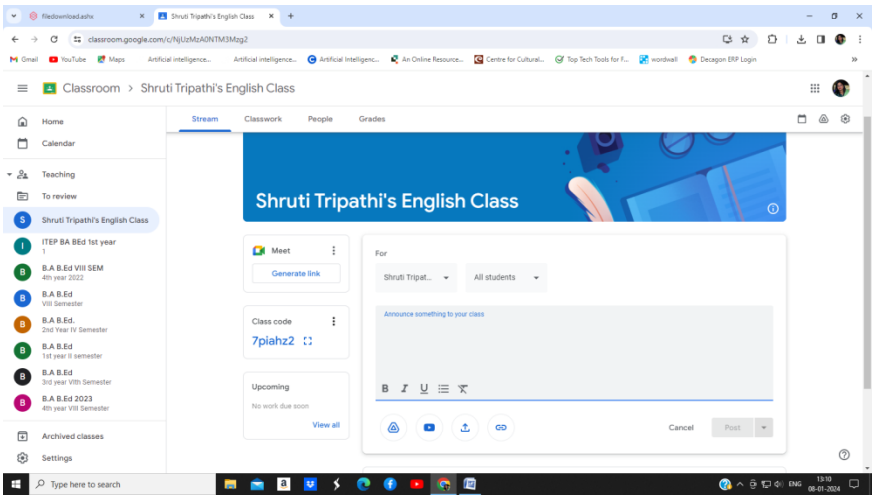
Type in an email address or search for an existing name in your contact list



Students can also join a class on their own. To Join a class, students go to their google classroom, find the class and instead of clicking on the create class option, they will choose the join class option. Enter the class code and select join. Once a student joins a class, it will always remain in their classroom until you remove the student from the class, or you archive the class.

The Stream Tab

Within the Stream Tab, you'll find a comprehensive record of all classroom activities, encompassing teacher announcements, posted assignments, and student comments or posts if permitted. The content is arranged chronologically, with the latest entries positioned at the top. To contribute to the stream, simply click on the "Share something with your class" box, allowing for the seamless posting of announcements or attachments.



You can either type a message to your students or attach files from your computer by clicking on File, or Google Drive, you can add YouTube videos or Links and then post directly to your Stream page.

The Classwork Tab

This is the area where you can create assignments for your students. To create a new assignment, click on the Create button and choose the type of assignment that you want to create. The regular Assignment option is the most open ended so more popular to use. You can

create your own title, type in your own instructions along with attaching any documents, you tube videos etc.

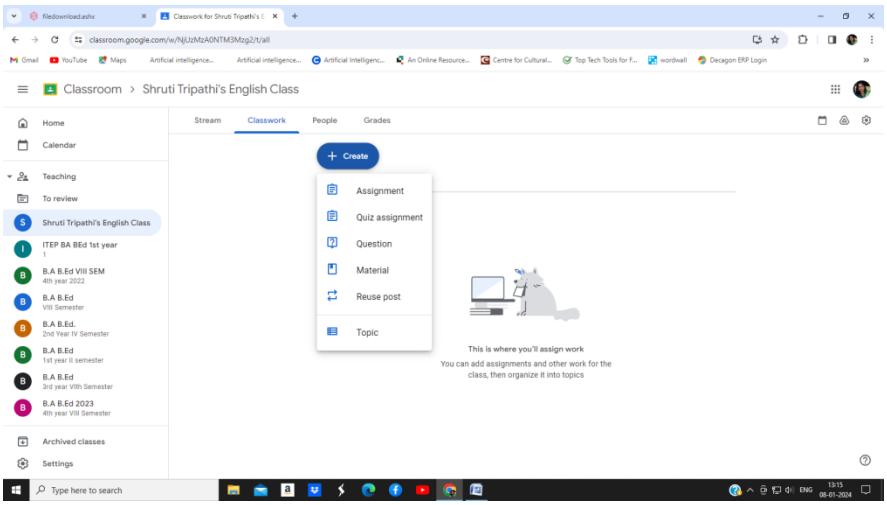
Tip: Why is this different than adding an announcement on the Stream page? Because you can assign a point value to the assignment or have it be ungraded. You can also assign a due date for the assignment and you can create a topic for the assignment. You can post the assignment to go out immediately or to go out on a specific date and time or you can save it as a draft and return to it later.

The quiz assignment will automatically attach a blank Google form that you can use to create a quiz for your students. Click on Blank Quiz to create a new quiz in Google Forms

Note: Under the direction of your instructor, you will learn how to create Quiz questions and grade responses.

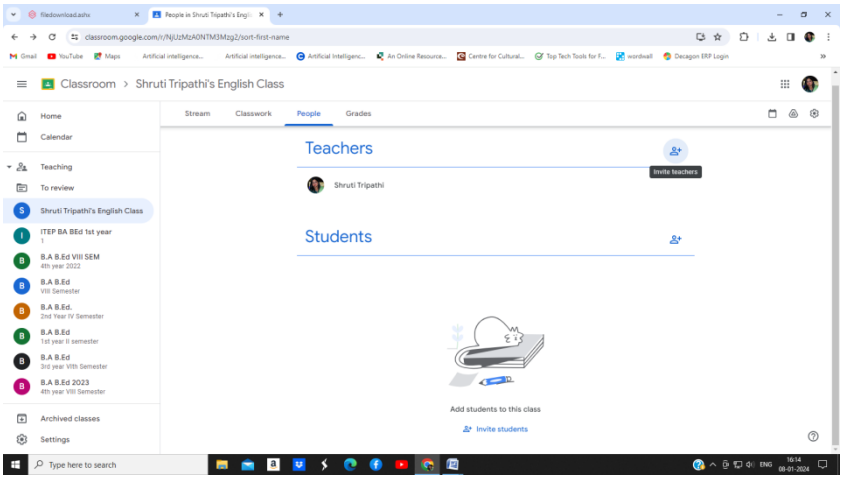
The Question option allows you to pose a question to your students and then have them respond to it. The Material option is a great way to share attachments or materials with your students for example to share digital copies of notes and other resources.

The Reuse Post option allows you to reuse a post that you have already created in another class The Topic option is a great way to organize all your assignments into Topics



The People Tab

The People tab allows you to see all the students and the teachers that you have connected to your class. Follow the same steps that you used to add students to the class to also add teachers to the class for co-teaching or if you want them to have access to your materials. You also can email students, mute students which revokes their ability to post and comment on Google classroom. This can be very handy or remove students from your class if they are no longer in it.

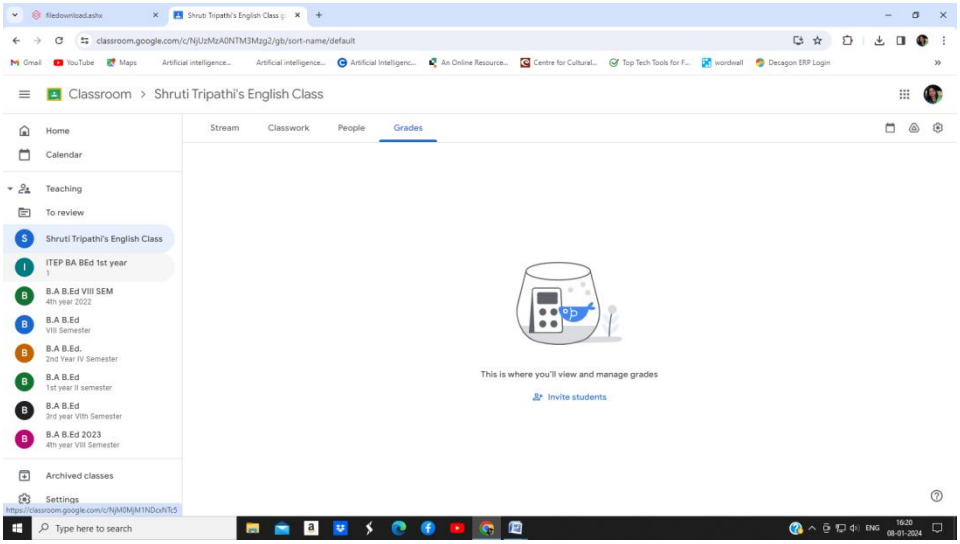


The Grades Tab

This is an online grade book, of all the assignments for all of the students that you have on Google classroom. This is very handy to be able to see student grades all in one place You can also go in and edit any of the grades if you need to, rather than going directly to that assignment. You can also click on any assignment and view student work that was submitted, or you can click on a student and view all of the work that they have submitted for the different assignments.

The Classroom Menu

Click on the Classroom Menu in the top left corner of your screen to see a list of Classes that you are teaching along with a To-do list and a list of Archived classes plus the classroom Settings.

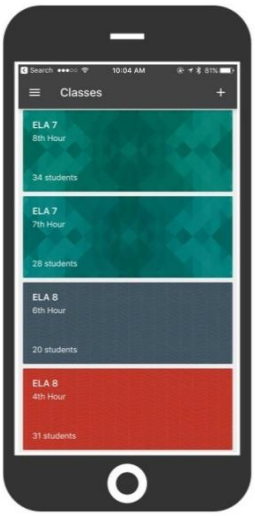


Click on Settings to change your Profile and picture and other Notifications

Class Settings

Access the Class Settings by clicking on the gear icon in the upper right-hand corner of your class page You can edit any information for your class in the Class Details section The General Settings allows you to change settings for the Class Code, Comments and Notifications, change

the Grading system etc. The Grading Settings allow you to control the grading method, add grade categories and show overall grades to students.



Utilize the Mobile App

A mobile App is available for both IOS and Android platforms. The Classroom app lets you stay connected any time. App specific features include the ability to add and edit classes, add and communicate with Students and Upload files, create Video clips, etc.

Conclusion

Google Classroom serves as an invaluable Learning Management System, offering a myriad of benefits for both educators and students. Its accessibility, collaborative features, and organizational capabilities make it a powerful tool in the digital education landscape. By following the outlined steps, educators can effectively utilize Google Classroom to enhance the teaching and learning experience.

Development of E-Content

- Dr. N. C. Ojha

Wide varieties of digital materials, which are of educational significance, are available online. Some of the quality materials which are available free of cost or with minimum restrictions can be used, re-used and modified by teachers and students for their teaching and learning. As textbooks are too expansive, the students are switching from textbooks to digital course materials. These materials provide both teachers and students a greater interactivity and social collaboration. One of the materials which can be designed and developed used, re-used and distributed is e-content.

E-content is becoming popular because of it's flexibility of time, place and pace of learning. E-content includes all kinds of content created and delivered through various electronic media. E-content is available in many subjects and almost all levels of education. It can be used by wide variety learners with diverse needs, different backgrounds, and previous experience and skill levels. It can be shared and transmitted easily and promptly among unlimited number of users around the world. Teachers, students and others get benefited by the use of well designed and developed e-content. It is advantageous to the educational organizations to make their program accessible to their teachers and students on campus, home and other community learning or resource centers. It has a significant implications for open and distance learning institutions.

It encompasses eTexts and digital learning resources. These could be digital textbooks, workbooks, articles, videos, or multimedia. Switching from traditional textbooks to digital course materials is a growing trend in higher education. Advantages for students and faculty include greater interactivity, customizability, and opportunities for social collaboration.

Electronic content (e-content) which is also known as digital content refers to the content or information delivered over network based electronic devices or that is made available using computer network such as internet. According to Oxford dictionary 'e-content is the digital text and images designed to display on web pages'. According to Saxena Anurag (2011) 'E-content is basically a package that satisfies the conditions like minimization of distance, cost effectiveness, user friendliness and adaptability to local conditions'.

Well developed e-content can be delivered many times to different learners. Individual course components i.e. units, lessons and media elements such as graphics and animations can be re-used in different contexts.

The purpose of e-content development is to create an information rich society. Everyone in the society is empowered to create, receive, share and utilize information for their progress. Very well designed, developed and validated e-content will provide access to high quality meaningful digital content and serve as an effective virtual teacher.

E-content design, development and approach will depend upon the nature of the content and the learners. It will also depend on the quality and complexity the learning you wish to create. Various instructional design models are available according to our requirements. Most of the models involve the process of analyzing the learner needs and goals of the instructional material development, development of a delivery system and content, pilot study of the material

developed, implementation, evaluating, refining the materials etc. In designing and development of E-content we have to adopt one of the instructional design models based on our requirements. Before understanding the designing and development of e-content it is essential to understand the meaning of instructional design.

According to Wikipedia '**instructional design** is the practice of creating instructional experiences which make the acquisition of knowledge and skill more efficient, effective and appealing. The process broadly consists of determining the current status of learner understanding, defining the end goal of the instructional material and creating some 'intervention' to assist the transition. This systematic approach provides a step by step process for the analysis of the learners' needs, the design and development of the material'. Most common and popular model used for creating instructional materials is the **ADDIE** model. This abbreviation stands for the five phases involved in the model. They are **analyze, design, develop, implement and evaluate**. This model is initially developed by Florida State University to explain the processes involved in the formulation of an instructional systems development (ISD) program for military inter-service training. ISD was meant for training individuals to do a particular job. This can also be applied to any inter-service curriculum development activity. Originally the model contained several steps under its five original phases (analyze, design, develop, implement and evaluate). Over the years the steps were revised and finally the model itself became more dynamic and interactive.

Analysis: It is the first phase of this model meant for examining the suitability of the e-content to be developed. It is related to analyzing the learning needs, context, learner, task and content. Analyzing the learning needs is identifying the needs from the perspective of different learners, teachers, subject experts, practitioner, policy makers etc. Needs are to be clearly stated.

- **Contextual analysis** is collecting data related to the context of learning such as learning environment. Whether the e-content developed is for the individual or group, formal or informal, facilitated or self-learning etc.
- **Learner analysis** is collecting data related to learners academic levels and attributes such as skills, motivation, visual literacy, language competency, learning styles etc. That is nothing but preparing the learner profile. It helps to know about the learner.
- **Task analysis** is stating the purposes of developing the e-content. Deciding whether that is developed for educating, training, creating awareness, developing skills etc.
- **Content analysis** is nothing but preparing a content outline. Good content comprehension is required before designing and developing content. It includes verifying the content with respect to cognitive appropriateness, factual accuracy, completeness etc. It also includes classifying the content into facts, concepts, principles, processes and procedures.

Design: It is concerned with defining the learning objectives, structuring the content logically, specifying the instructional and evaluation strategies, and preparing for visual and technical design.

- **Learning objectives** are to be defined in clear, realistic and measurable terms. Learning objectives are the statements that describe what the learner will be able to do at the end of the course or program. Learning objectives should specify performance

and communicate their purposes. Prepare a detailed content outline in which content is thoroughly analyzed and logically organized. Content is to be structured logically following simple to complex, known to unknown, concrete to abstract, general to specific etc.

- **Instructional strategies** are to be stated clearly. Depending on the learning style and nature of the content we have to decide the appropriate instructional strategy. Appropriate **media mix** that is combination of audio, video, graphics, animation; simulation etc is to be decided.
- **Learner evaluation strategies** such as practice, computer marked or tutor marked assessments, pre-test, post-test, remedial tests etc are to be specified. We have to decide about the formative and summative assessments. Before developing the content for the selected course review the proposed learning objectives. Make sure that content, assessment tests and exercises match the objectives stated. Provide the information and knowledge required to meet the learning objectives.

Development: It is related to the creation of story board. **Story board** is nothing but scripting the entire course content. The term 'story board' is taken from film production. In a movie it indicates the visual representation of the various scenes. In e-content development the story board describes step by step script of the final outcome of the e-content i.e. story board is created to provide a blue print of the course with each and every detail along with the content notes. The story board is created based on the objectives and instructional strategies. Here the developers create and assemble the content assets and learning objects. **Programming and integration** of all media elements into a cohesive multimedia package are the part of this phase.

Implement: In the implementation phase, materials are distributed to learners. A comprehensive implementation strategy document is developed. This document should cover the course curriculum, learning outcomes, method of delivery in terms of hard ware and soft ware requirements and testing procedures. Ensure that the web site is functional if the material is on the web site.

Evaluation: The evaluation phase consists of two parts i.e. Formative and summative evaluation. Formative evaluation is present in each stage of the ADDIE process. Summative evaluation determines the adequacy of the distributed materials in achieving the course objectives. Material is to be revised at all the stages based on the feedback received.

Learner's Characteristics and needs

Educational audio and video materials are invariably addressed to specific learner groups of conventional or ODL systems. It is, therefore, of utmost importance that audio/video scriptwriters have as much information as possible about their target audiences. In ODL systems where learners are placed at a distance and are scattered and almost invisible, it is all the more important to have such vital information about them, viz. their age, sex, maturity level, attitudes, beliefs and aspirations, socio-economic background, lifestyles, (urban/rural), existing knowledge, skills, language proficiency, vocabulary, likes, dislikes, preferences and information needs. It is also important to know about the context or conditions in which the audio/video programmes will be listened/viewed by these audiences.

Access to and knowledge of this kind of learner profile is very useful for educational audio and video scriptwriters. It gives them greater insight into learners' needs and helps in tackling their

communication problems. Such detailed information about the target audiences is also useful in formulating precise learning objectives and identifying appropriate content and presentation formats for different programmes. Similarly, need assessment studies help in ascertaining the actual needs of the target audiences and identifying suitable programme topics, themes and content areas. Audio and video scriptwriters can certainly develop relevant need-based scripts and programmes if they are familiar with the needs, interests and characteristics of their specific learner groups.

Instructional objectives and programme briefs

Another necessary condition for a scriptwriter to be able to write a meaningful and effective audio or video script is concerned with 'what' and 'why' of a programme or what is generally known as 'programme objectives'. Therefore, the crucial questions that a scriptwriter must ask himself/herself right in the beginning are:

- Why am I writing this script? Or, in other words, what are the instructional objectives I am required to achieve through this programme script?
- What is the precise content to be presented? Does the content really lend itself to audio or video treatment?
- What do I want to happen to my audiences through this particular programme or a series of programmes (in terms of gaining knowledge, information or acquiring certain skills, or influencing their attitudes, habits, behaviors, etc.)?

When analyzed and researched further, these questions get expanded into what we call a 'programme brief' or 'an academic note' or a 'programme outline'. A programme brief is a written, typed or printed statement of intent. It represents a 'road map' that traces the scripting path from the beginning to the end. It serves as a basic document that provides all related content – information, ideas, sources and suggestions – for a proposed audio or video programme at one place. Researchers are scriptwriters can freely draw upon such materials to design their scripts. A programme brief should usually include the following information:

- Series title
- Programme title (working title only)
- Target audience (their characteristics, needs, and entry behavior)
- Programme length or duration
- Programme objectives (stated in behavioural terms)
- Brief content outline (preferably in distinct sequences matched with one or more programme objectives)
- Expected learning outcomes (as reflected from objectives, but more concrete and performance-oriented)
- Suggested treatment and production hints (for each sequence)

Usually, detailed programme briefs are designed jointly by a team consisting of subject experts, instructional designers, researchers, scriptwriters, and media producers. Programme briefs serve as basic reference material for scriptwriters, researchers, producers and evaluators. Programme briefs facilitate the scriptwriters and producers to the given mandate and help them remain on track while developing audio and video scripts and producing final programmes.

Script as the core of the programme

The script is the foundation of any programme whether for stage, radio, film, television or videotape. It is crated and evolved step by step into a carefully designed blueprint that provides

detailed instructions for actors/participants, technicians and producers who finally transform the script into a worthwhile listening experience or a viewable programme. In the ultimate analysis, the script is the 'core' of any educational audio or video programme. In other words, we can say that it is the quality of the script that determines the quality of the programme.

At this point, we may return to the basic questions raised earlier. How are educational audio and radio scripts planned and developed? What is the scripting process like? What are the steps involve in the scriptwriting process?

Undoubtedly, planning and writing educational audio/video scripts is a demanding task. It requires intelligence, imagination, creativity, knowledge of a subject, a deep insight into the nature, attributes and constraints of the medium, its language, grammar and techniques and above all the ability and willingness to work in a team.

The felicity of the language and the skill to convert simple ideas into powerful aural (audio) experiences and/or to transform abstract ideas and concepts into visual illustrations and appropriate analogies, are other important traits of scriptwriters of educational audio and video programmes.

Developing scripts for radio/audio programmes

Writing for radio differs from other forms of writing such as 'writing for print' or 'television'. The reasons are given as follows:

- In radio/audio writing, words are required to be spoken and heard (not required to be read).
- Unlike a television of film viewer, the radio listener only hears the speaker (but does not see him/her).
- The potential listeners, especially those targeted in open schooling and distance learning systems, comprise of all ages and conditions and have vast variations in their levels of understanding, achievement and intelligence. In this case, therefore, the audio/video writer must use the simplest possible language and avoid long, usual and bombastic words and sentences. In other words, it may say that the educational radio/audio writer must learn to:
  - Write for the ear, not the eye,
  - Write for speaking, not for reading,
  - Write in a simple language, using short sentences so that he/she is understood correctly, and not misunderstood.

General guidelines for radio/audio scriptwriting

Writing for educational audio/radio programmes appears to be a rather simple activity. It is, however, not so in actual practice. It is a demanding task that requires a lot of creativity and imagination. Whereas the ways to writing may vary from writer to writer, the process of script development entails a few essential steps, which all writers follow consciously or unconsciously. The general guidelines that we present below will provide you a better insight into the scriptwriting process for radio/audio.

Carry out programme research

Once you have acquainted yourself fully with a particular 'programme brief' or have thoroughly understood the scriptwriter's mandate in terms of general objectives, content, target audience and programme length, your first task is to carry out a thorough research on the given

topic/ content by consulting books journals, experts and other knowledgeable people or subject specialists. You must keep your target audience and programme objectives in focus while selecting appropriate content and authentic information. You must also ensure that your facts are correct and up-to-date. You must double check every bit of information before you put in your script. Always look for some information that may enrich and provide interest to your storyline. Select only the most relevant content, resources and ideas, which match your programme objectives.

Select key ideas

The next step is concerned with the selection of content for the programme. Here, you have focus on the basic content and reduce in to a few key ideas. Put these key ideas in a logical sequence and this will help you define the main focus or the central theme of your program. You will also be able to decide on the weightage and emphases you need to give to different programme objectives.

Make a plan

At this point, you are ready to concretize you presentation strategy. You may choose a special format or combination of formats to put your content in certain style, pace and sequential continuity. You are ready with a detailed story structure or script outline, which is essential designing a draft script.

Write your draft script

While putting your draft script on paper, the most essential rule to follow is to always keep individual listener in focus. That means you must address your writing to one person, not thousands and millions of distance learners. Radio, of course, is a mass medium, yet your was end up in the mind of one person, i.e. the individual listener. Radio writing is, therefore, an intimate, one-to-one talk. It is just 'you' and 'me'. By that reason, you must consciously construct your sentences in 'active voice'.

Think of a good beginning and a good end

Give adequate attention to the beginning of your programme. The first sentence or the open of the programme. The first sentence or the open of the programme must be interesting and should hold the listeners attention. Thereafter, you may follow it with other key points and ideas linking them together in a sequence that you already decided above. Join each sequence by signposts of aural indicators, which will help draw the listener's attention and move from one point to the other.

After you have dealt with all key points in your script, spend some time on finding a good of your programme. In educational radio, it is a good idea to return to the introductory remark end the programme reinforcing the same point. There can be several other interesting way round off our programme. For example, you may choose to leave your listeners with a spy theme, a punch line, a particular action or task. The programme must close on a positive me and in natural way – not in an abrupt, sudden or unnatural fashion. Openings and closing although most difficult to visualize and write certainly make radio programmes a memorable experience for the listeners.

Check and rewrite

Write the draft script in your hand, it is now time to shape the final script. It is the good idea I discuss the draft script with some of your colleagues or media experts to get their reaction

suggestions and incorporate the same in the revised version of the script. Now, read you're to yourself and ask the following type of questions:

- Is the script interesting? (If not, change it.)
- Is it easy to understand? (If not, replace difficult words and expressions with simple and straight ones.)
- Is it accurate and authentic in information and content? Is it free from controversies that may invite criticism or an objection later? (If not, update it.)
- Are there too many facts and details? (If yes, reduce and simplify.)
- Is it logically sequenced? (If not, alter the sequences accordingly.)
- Does the content match with the given objectives? (If not, modify the content.)
- Does it have enough 'signposts' for joining different key points? (If not, add more.)
- Does it begin and end with a punch or memorable sentence? (If not, add think more and modify.)
- Is the language conversational so as to engage the listener in a one-to-one interaction? (Remember that it will be
- Are the sentences and phrases short and simple to understand and speak? (Modify to remove tongue twisters and bombastic words and phrases.)

As you answer the above kind of questions to yourself, you must try to revise, refine and rewrite your script into the final form. One golden rule to test eh quality of your script is to read it out aloud to yourself – speaking reach sentence one, twice, thrice, exactly in the same way you would like it to be heard. In this way, you can modify, rearrange, refine and polish your language and ideas on the basis of your own feedback and judgment. You may add some more attention-catchers in your script, if you find the need to do so at this stage,

The final script, as described above, is ready for recording at this stage. The radio producer will arrange all studio facilities and production resources, crew and artists to produce and record the programme for broadcast or playback.

The educational audio script, in its final form, must indicate all relevant instruction in CAPITAL LETTERS so that these are not mistaken for a 'dialogue to be spoken'. Instruction on the script can also be underlined, as these are not to be spoken by actors or performers. Such instructions must be noted and followed both by the artists and the production crew.

Developing scripts for TV/video programmes

Writing for television or video is a kind of visual scripting. It is just not an activity or coordinating words with pictures in sequential continuity. It requires intelligence, creativity, drawing capability, knowledge of the medium, its nature, language, grammars and techniques.

Television or video is primarily a visual medium. That means it is the visuals or pictures that come first, and are the main carriers of messages. Words do have their place but only in support of the visuals. Many a time, pictures need no words; they speak for themselves and make powerful statements. A TV/video scriptwriter has, therefore, to learn to think in terms of visuals, visual ideas and visual illustrations for ideas.

In television, a writer has to communicate in an entirely new language: in which the writer uses the video camera as his/her and all the different kinds of shots, movement devices, techniques, effects, transitions, dialogues, sounds, noises and even silences as his/her language. Writing

for TV/video is thus quite different from other forms of writing particularly 'writing or print' or 'writing for radio'.

Writing as such is a solitary activity. However, writing for television or video is largely a co-operative effort; a team mode approach. It may be seen as a sort of a continuous dialogue or a constant interaction among the scriptwriter, the researcher, the subject specialist, the producer and other members of the production team. This dialogue or interaction generally begins with a 'programme idea' or a 'programme topic' or a 'theme' around which a video script is proposed to be evolved and continuous up to the end when there is no time left and the programme script has got to be finally produced. While the scriptwriter is the principal architect of the script other team members contribute in many different ways to its instructional effectiveness, authenticity, visual quality, technical perfection and overall embellishment. To put it differently, we can say that video or television scripts are evolved step by step. Creatively, imagination and cooperative effort are the key words in the video scripting process.

Process of TV/video scriptwriting

It is rather difficult to describe what the video scriptwriting process like. Experiences vary from writer to writer and from script to script, and it is very hard to generalize. However, television./video scriptwriting may be seen as consisting of a series of steps or stages or processes which together and often overlap. But the basic pattern of the scripting and programming processes remain almost the same. All TV/video scriptwriters, whether consciously or unconsciously, go through these stages or steps in one way or the other. The sequence and timing of these steps may vary and even overlap in most of the cases.

Major steps of TV/video scriptwriting process

A descriptive presentation of the steps involved in the video scriptwriting process suggested below may be helpful to you. Certainly it is a loose, flexible and arbitrary arrangement. Yet this process framework will give you sufficient insight into the creative activity of TV/video scriptwriting.

Programme ideas

Ideas are basic to any kind of writing, not just television writing. Indeed, all educational TV/video scripts originate with an idea. Once an idea or a theme has been identified, it needs to be analyzed for its possible expansion into a worthwhile visual presentation. If the idea is found to be entertaining, educative and appropriate for the intended audience and suitable for television presentation, it meets the criteria for being 'production worthy'.

Programme brief

Once an idea or a theme or a topic is adjudged as 'production worthy' for TV/video production, it can be further analyzed and expended into a 'programme brief' or an 'academic note'. As already discussed, a programme brief is the first written statement-which forms the basis of an educational video script. It provides a road map to the scriptwriter.

Programme research

A well-designed programme brief delineates the parameters of the proposed video script and enables the scriptwriter to begin the process of programme research. Programme research is the most essential pre-requisite for developing a video script. It is at this initial stage that the scriptwriter must plan and carry out thorough research both on the topic as well as the target audience. He/she should look for suitable visual materials and other interesting and related information on the topic. Not only should she/he consult books, journals, census reports, yearbooks and encyclopaedias hut should also talk to experts and knowledgeable people in that particular field.

At this stage, it is important for the scriptwriter to get to know the target audience well - their background, maturity level, interests, likes, dislikes preferences etc. Such knowledge about the audience enables the scriptwriter to collect, select and organizle1 relevant programme materials and information in a manner most interesting for the viewers. It is not uncommon for writers and researchers interact with small groups of their target audience and know their first-hand experiences and interests on the topic. Some writers do not attach much importance to programme research and tend to skip this step, often claiming, that they already know a lot about the topic and the audience. It is, however, a grave misconception and must be guarded against.

Selection of content

During programme research, the writer is often able to come across a large mass of material and information (both written and verbal) besides pictorial evidence on the programme topic. At this stage, therefore, he/she must go through this mass of materials and select the most relevant material, visual resources and information which match the programme objectives, are relevant to audience needs and interests and are sufficient to cover the given content and fill programme time most appropriately.

To put it conversely, the scriptwriter must eliminate what is not relevant to programme objectives or is not likely to click with the viewers or may go over-their heads, or may even unnecessarily lengthen the programme and increase its information size.

Message planning

Message planning is the most decisive and creative stage of video script development. Here, the scriptwriter explores interesting ways of dishing out his/her programme to the audience. Many options and considerations come into sharp focus and the writer has to design a strategy taking appropriate decisions on each of the following aspects:

- Identifying key teaching concepts or ideas to be highlighted.
- Selecting a suitable format or a combination of formats for presenting the programme.
- Adopting a particular programme style and approach.
- Exploring media possibilities; use of visual examples and analogies, graphics, photographs, reality bites, stock shots, animation, experiments, demonstrations and other resources, both visual and aural.
- Choosing a definite storyline for message presentation: using human characters in the story - men, women, children, presenter, anchor, puppets, cartoon figures, animals, birds etc.

While deciding on the above aspects, as suggested earlier the writer must always keep in view: (i) the nature and requirements of the topic or the subject, (ii) viewers' age, characteristics, needs and interests, (iii) programme objectives, and (iv) a balanced presentation of the given content in an interesting way.

Programme structure and visual treatment

Programme structuring is the creative process of giving the programme a definite shape and form. It is at this stage that the programme begins to unfold its shape or structure with a clear-cut storyline with a beginning, a middle and an end. Here, the scriptwriter must give some thought to such questions as:

- How will the programme begin? (or what will be the first or introductory sequence of the programme?)
- How will the programme end? (or what will be the concluding sequence of the programme?)
- What will be the shape and Order of the sequences that will form the middle part (or the body) of the programme?
- How many sequences will the programme finally contain? And in what order?
- What will be the length, sequence, emphases and amount of educational content of each of the sequences?
- Does the content of each of the sequences contribute to and match the programme objectives set out in the beginning? If yes, to what extent? If .not, how can content and objectives be matched optimally?

While finding solutions to such questions as noted above, the writer must rethink of a good beginning for the programme. Most often, it is the introductory sequence which holds the attention of the audience and keeps their motivation high for receiving the rest of the programme. On the contrary, however, if the beginning is uninteresting and dull, the programme may fail to click with the viewers.

The scriptwriter should also devote some time to think about a good natural ending for the programme. Viewers invariably tend to like and remember for long a programme that ends on a cheerful and satisfying note and provokes them to think and act in the desired way. Rest of the sequences that constitute the middle part or the body of the programme, must also receive writer's attention in the same way - arranging the visual and aural content logically and meshing it with the given objectives.

As the programme structure takes a definite shape, the writer has to work out simultaneously a detailed visual treatment for different sequences of the programme. The visual treatment must provide at each step a full description of:

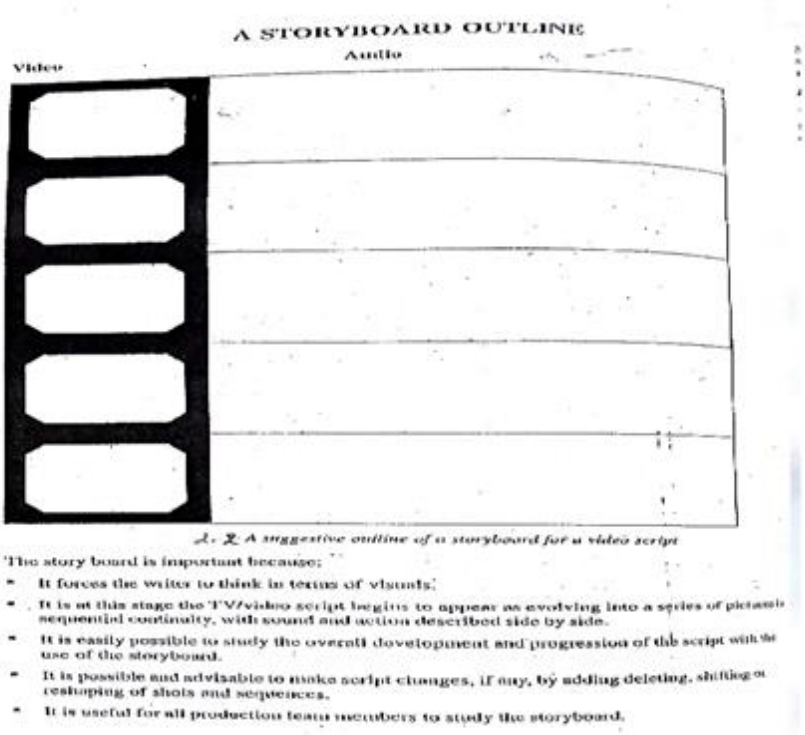
- What will the viewers see?
- What will they hear?
- What will they think?
- How will they feel and react to a particular visual sequence or a part of it?

In this process, the writer must again think of and provide for visual illustration and analogies for abstract ideas and key concepts proposed to be presented in the programme. Different sequences of the script should be arranged in a logical and natural order so that they appear to be evolving from one sequence to the other. The writer must also think of and decide on possible visual and/or aural links or transitions from one sequence to the other. It is very helpful to draw a 'timeline' showing how much time should be devoted to each sequence keeping in view: (i) the coverage of the content, (ii) weightage or emphasis on programme objectives and key teaching points, and (iii) the attention span of viewers. Some scriptwriters, especially those who write for young children, draw up an 'interest curve' or a 'tension chart' to ascertain uninterrupted attention of viewers.

Storyboard making

The storyboard means a detailed, shot-by-shot description of the programme on sheets of paper divided into two vertical columns. The rectangular boxes (3:4) in the left hand column are used for drawing pictures/sketches with shot sums described on each; and the right hand column is used for writing supporting words, sound effects and music, as shown in Figure 2.2.

A STORYBOARD OUTLINE



2. 2 A suggestive outline of a storyboard for a video script

A suggestive outline of a storyboard for a video script

The story board is important because:

- It forces the writer to think in terms of visuals.
- It is at this stage the TV/video script begins to appear as evolving into a series of pictures in sequential continuity, with sound and action described side by side.

- It is easily possible to study the overall development and progression of the script with the use of the storyboard.
- It is possible and advisable to make script changes, if any, by adding deleting, shifting or reshaping of shots and sequences.
- It is useful for all production team militias to study the storyboard.

Some experienced TV Scriptwriters skip the storyboard stage and straightway prepare a draft script. For beginners, however, storyboard Making is immensely useful and is strongly recommended. Let's at this stage describe a little more about a draft script and the final script.

Draft script

The storyboard, when complete, at once road to the preparation of a draft script. The draft script is the first full length script that includes a complete listing and description of all visuals, captions, accompanying commentary, dialogues, actions, movements, music, sound effects and any kind of pre-recorded inserts or audio/video inputs. The draft script must be shared and discussed with all team members, experts as well as the producer to get their reactions and suggestions on various aspects. The scriptwriter must be open to criticism and ideas fur improvement of the Script should be welcomed.

Final script

At the final script stage, the writer incorporates all suggestions made at the stage of the draft script. This stage suggests that the scriptwriter has more or less finally accomplished his/her job. In most cases, he/she hands over the script to the TV producer. As the scriptwriter usually bows out at this stage, the producer and his/het team take over. However, the interaction between the scriptwriter and the producer and other team members must continue up to the point the programme has been finally produced.

From the above description, it may be amply clear that video scriptwriting is a co-operative activity. It is not just a process of writing words and sentences and thinking of pictures to accompany them or vice versa. TV/video scriptwriting is indeed a highly creative process. Video scripts are evolved bit by bit, rather than written. That is why each video programme is unique Milts message, design, format, style and technique. In all cases, however, a video scriptwriter must go through all the stages and processes of script development as described above.

SOURCES

e-Pathshala

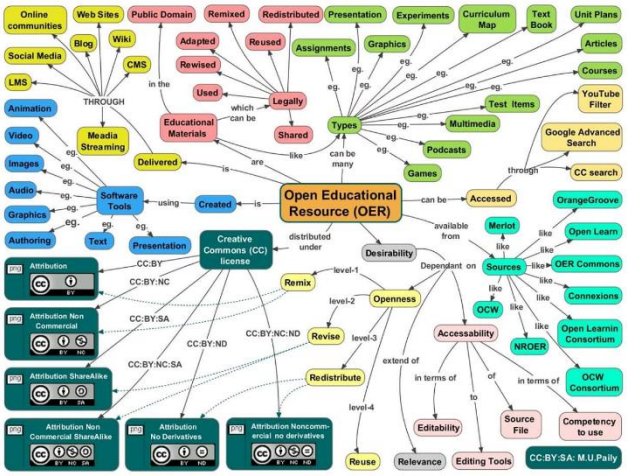
National Repository of Open Educational Resources (NROER)

e-pgpathshala

Gyanpitara

Karnataka Open Educational Resources (KOER)

The Open Educational Resources universitas (OERu)



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Concept and Creation of e-Portfolio

- Mr. Ashok Shaky

An ePortfolio is an electronic portfolio or record of learning acquired from all learning environments – a digitally created and managed archive of acquired skills and knowledge. The term "learning" is used as shorthand for "a body of acquired skills, knowledge and abilities (SKA) resident in either an individual or a community." The term "electronic" is used to imply the use of a computer, particular software or tools, and, often, the Internet.

The ePortfolio is formally defined as "a collection of authentic and diverse evidence, drawn from a larger archive representing what a person or organization has learned over time on which the person or organization has reflected, and designed for presentation to one or more audiences for a particular rhetorical purpose". Therefore, the term ePortfolio is shorthand for two items – the digital archive and the presentation drawn from it. The term ePortfolio is also shorthand for both process and product. ePortfolio tools help creators to identify and reflect on the outcomes of learning experiences. Creators can be individuals, organizations, even businesses – and they can be the receivers/processors as well. The process for creating an ePortfolio is for an individual or a group of individuals to focus on experiences and draw from them statements and evidence of the acquired learning and culture. Explicitly, for ePortfolio experts, the ePortfolio development process includes identification, collection, selection, reflection and presentation of evidence of learning and culture. These are the steps that are followed to create an ePortfolio – archive and/or purpose-driven presentation.

An ePortfolio can be created and used by individuals, communities and/or organizations to archive and share learning and culture acquired from informal, non-formal and formal learning environments; provide evidence or verification of learning in a dynamic, multimedia fashion; manage personal and collective learning to maximize usage and to plan; and showcase or promote particular assets as required. Looking at the history of the ePortfolio, as sweeping generalizations, it has been used in:

- primary and secondary education as a tool for demonstration of learning;
- in higher and post-secondary education for the assessment of learning;
- lifelong learning to enable continuous "reflective" learning and to inventory all types of learning;
- the workplace for the recognition of work experience and workplace training, for recruitment and targeted training, and for career advancement;
- eLearning for Learning Management Systems and Knowledge Management through both online tools and web-based services; and
- Organizational and/ or economic development through asset mapping and quality assurance.

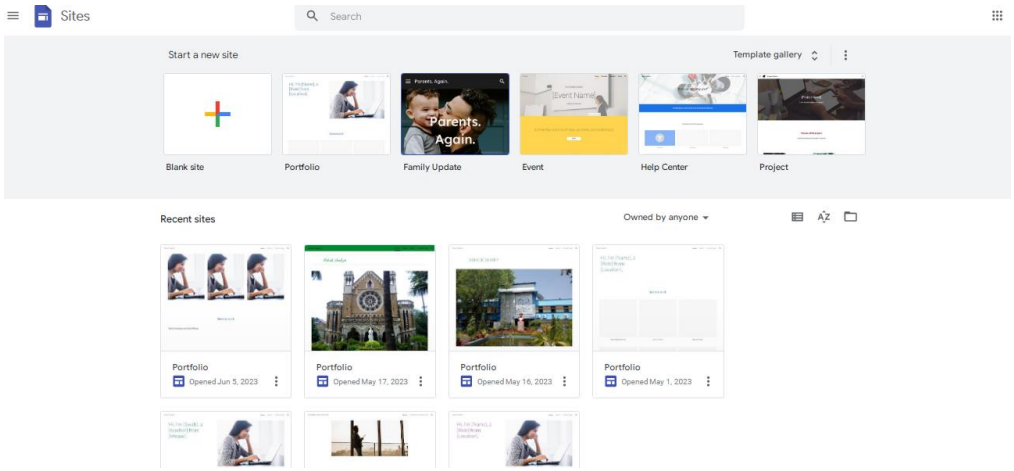
Types of ePortfolios

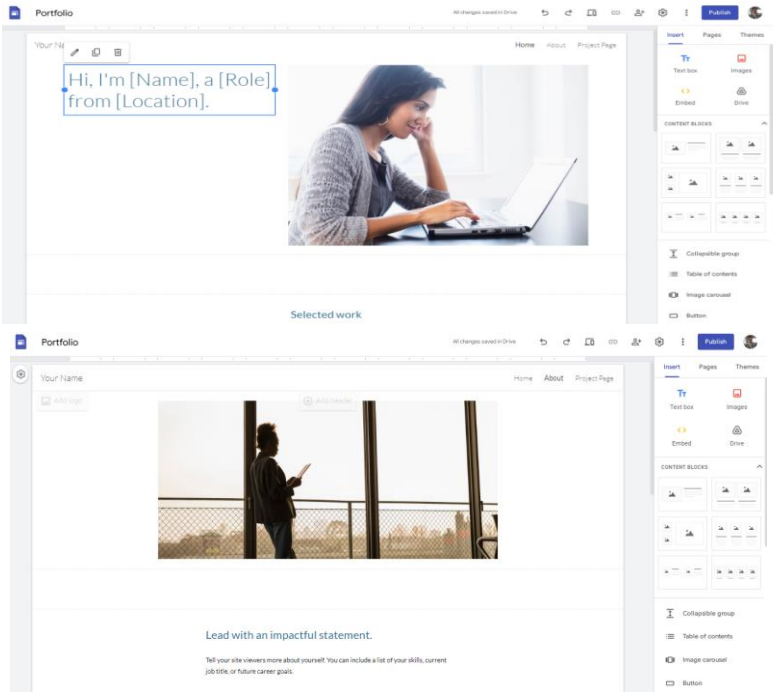
There are three types of ePortfolios – standards-based, showcase, and social networking. Many schools, institutes and training agencies are now requiring students to generate and use ePortfolios. In British Columbia, ePortfolios are used by students to demonstrate and showcase competencies outside the academic curriculum, for example, the competencies required for

active citizenship.2 In other jurisdictions, students create ePortfolios of their learning in academic programs to show progress and achievement in a course or program against stated learning outcomes – matching achievements against standards. In schools and outside school, students comment on each other's work and lives using social networking ePortfolio tools. The most common use of ePortfolio is in the education environment, but all three types have applications in and between employment and learning environments. At it's most simple, an ePortfolio may resemble a personal homepage or an electronic resume, and at its most complex, it may become a person's digital identity. ePortfolio types and applications have been developed from very different perspectives and applications, for example:

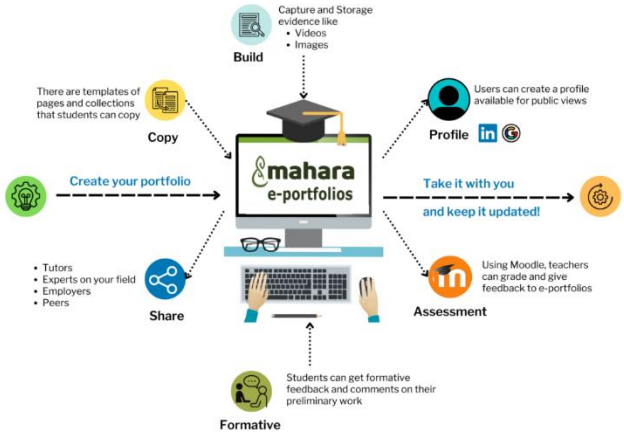
- Digital storytelling tools to record changes, achievements and cultural artifacts by children, families and communities;
- learning assessment tools to demonstrate expected learning outcomes by students of all ages;
- digital inventory tools to assemble and display capabilities, with supporting evidence, by artists, athletes, businesses, agencies or communities;
- Reflective learning tools to promote and support individualized learning through the thoughtful examination of experience;
- Electronic tools for authentic assessment of learning in non-academic areas, workplace experience or informal training;
- Management tools for student information systems and knowledge management systems; • cultural archiving and media exploration by Aboriginal communities;
- Quality assurance tools for comparison of product quality to standards of excellence or professional standards of accreditation.

Development of ePortfolio Using Googlesite





Development of ePortfolio Using Mahara



Assistive Technology in Education

- Dr. Sanjay Kumar Pandagale

Assistive technology is an umbrella term that includes assistive, adaptive, and rehabilitative devices for people with disabilities. It promotes greater independence by enabling people to perform tasks that they were formerly unable to accomplish, or had great difficulty accomplishing, by providing enhancements to, or changing methods of interacting with, the technology needed to accomplish such tasks.

Classification

- Mobility impairment (गतिशीलता हानि),
- Visual impairment (दृष्टि क्षीणता),
- Hearing impairment (श्रवण बाधित),
- Cognitive impairment (संज्ञानात्मक बधिरता)

Mobility impairment

- **Wheelchairs**

Wheelchairs are devices that can be manually or electrically propelled and that include a seating system and are designed to be a substitute for the normal mobility that most people enjoy. Wheelchairs and other mobility devices allow people to perform mobility related activities of daily living, which include feeding, toileting, dressing grooming and bathing.

Visual impairment

Light or Low Assistive tech for individuals with visual impairments include-

- Braille
- Magnifying glasses
- Large print text/books
- Anti-glare paper
- Contrasting text and background colors
- Thick lined paper
- Reading/writing stand
- Optical magnifier
- Highlighters
- Felt tip markers with various thicknesses
- Slant board
- Color filters

Screen readers

Screen readers allow the visually impaired to easily access electronic information. These software programs connect to a computer to read the text displayed out loud.

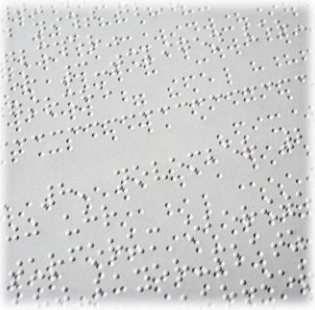
The most popular commercial screen readers include-

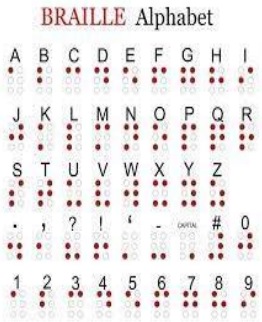
- JAWS
- Window-Eyes
- Supernova Screen Reader
- NVDA
- Thunder
- System Access to Go

MS window screen reader- ctr+win+enter

Braille and braille embossers

Braille is a system of raised dots formed into units called braille cells. People can use their fingers to read the code of raised dots. A braille embosser is a printer for braille. Instead of a standard printer adding ink onto a page, the braille embosser imprints the raised dots of braille onto a page. Some braille embossers combine both braille and ink so the documents can be read with either sight or touch.





Mid Assistive tech for individuals with visual impairments include –

- Large key keyboards
- Keyboards with high contrast
- MP3 players to record lectures/notes
- Light box - used with students to train their visual acuity
- Audio books
- Books in alternative formats
- Portable word processing device
- Large key calculator

Large key keyboard

Mp3 players for the VI person

The device is laid out similarly to a large mobile phone, complete with a numerical keypad and dedicated volume buttons on the side.

High contrast keyboard

Audio books

If you search for audio book websites then you will find number of sites for free audio books. One such site is http://www.loyalbooks.com/

Books in alternative formats

There are several types of alternative formats that books can be displayed in for individuals with a visual impairment. Check out these sites-

- Learning Ally (formerly RFB&D): www.learningally.org
- Bookshare: www.bookshare.org
- LibriVox: www.LibriVox.org
- Project Gutenberg: www.gutenberg.com
- Inkling: www.inkling.com
- Louis Database of Accessible Materials, American Printing House for the Blind: www.loius.aph.org
- National Library Service for the Blind and Physically Handicapped: www.loc.gov/nls/
- Google eBooks: http://books.google.com/ebooks

Light box

A lightbox is a piece of equipment that lights a see through plastic piece of paper. It can also illuminate clear shapes, colors, and objects.

Portable word processing device

A portable word processor, often called a portable keyboard, is a lightweight device that is an alternative to using a laptop for writing. It can be easily transported from class to class and between home and school.

Large key calculator

High Assistive tech for individuals with visual impairments include –

- Screen magnification
- Reading machines
- Video magnifiers
- Refreshable Braille displays
- Braille translation software
- Note taker recognition
- Mobile devices

Screen magnification

- A screen magnifier is a tool that can magnify everything (text, photos, graphics, etc.) on a computer or a mobile device screen.
- Screen magnifiers can sometimes include extra features such as:
  - ✓ Contrasting background and text colors
  - ✓ Mouse pointers and cursors can be enhanced
  - ✓ Some can even do basic screen reading functions
- Most recent computer running Windows, Mac OS or Linux have a screen magnifier built into them.
- Some common screen magnifiers for Windows computers include:
  - ✓ ZoomText
  - ✓ MAGic
  - ✓ Supernova Screen Magnifier
- Start the screen magnification function from the control panel

Reading machines

- A reading machine utilizes a camera or a scanner with Optical Character Recognition (OCR) software.
- Basically it turns a printed document into electronic text.
- This text can then be relayed to a screen to read in large print or read aloud by a screen reader.

Video magnifiers/ CCTV

- A CCTV is an aid that uses magnification and it is made of a camera and a monitor.
- The magnification level is much greater than for a hand magnifier

Refreshable Braille displays

A braille display is used with a screen reader to output screen information in a tactile form.
It consists of a number of cells which have eight pins which can be moved up and down to form braille characters.

Braille translation software

- Braille translation software can be used to convert an electronic document, such as one in Microsoft Word into braille.
- The result can then be printed by an embosser, which is a printer that uses pins to indent the dots onto paper.

Voice Recognition Software

- Voice recognition provides an alternative way to control or input information to a computer or mobile phone.
- You talk to the computer or phone and what you say is interpreted as commands or converted to electronic text.
- Google assistant is the best example.

Digital Accessible Information System (DAISY)

- DAISY is a technical standard for digital audiobooks, periodicals, and computerized text.

- It is designed to be a complete audio substitute for print material and is specifically designed for use by people with "print disabilities", including blindness, impaired vision, and dyslexia.
- Based on the MP3 and XML formats, the DAISY format has advanced features in addition to those of a traditional audio book. Users can search, place bookmarks, precisely navigate line by line, and regulate the speaking speed without distortion.
- It also provides aurally accessible tables, references, and additional information. As a result, DAISY allows visually impaired listeners to navigate something as complex as an encyclopedia or textbook, otherwise impossible using conventional audio recordings.

Hearing impairment)श्रवण बाधित(

- **Captioning**

Captioning allows spoken word on the television to be translated into typed English or other language for the viewer to read.

- **Live Speech Captioning**: in this process, a stenographer types the spoken language as teacher talks and text is displayed on computer monitor.

Cognitive impairment)संज्ञानात्मक बधिरता(

Assistive technology for cognition (ATC) is the use of technology (usually high tech) to augment and assistive cognitive processes such as attention, memory, navigation, emotion recognition, management, planning, and sequencing activity.

- Educational software

Educational software is a software that assists people with reading, learning, comprehension, and organizational difficulties. Any accommodation software such as text readers, notetakers, text enlargers, organization tools, word predictions, and talking word processors falls under the category of educational software.

Other assistive mobile apps

- Google translate
- Microsoft translator
- Speech Texter
- Keep Notes
- TalkBack
- TalkBack Braille Keyboard

Resources

- **Web Resources for Assistive Technology in the Classroom**
  http://www.sc.edu/scatp/ATclassroom.htm

This website offers a variety of resources that can be useful in learning more about assistive technology and its use in the classroom. I have included a few of its listed websites and the description of those websites below. Others may be found by logging on to the address above.

- **The Power of Assistive Technology** by Janet Jendron, South Carolina Assistive Technology Program Overview of the common uses of assistive technology in the classroom.
  http://www.connsensebulletin.com/jendron.html
- **Assistive Technology and Learning Disabilities** by Janet Jendron, South Carolina Assistive Technology Program. This article includes an overview of various hardware, software and low tech tools for students and teachers with a focus on literacy and a mention of available math tools. While there is an emphasis on middle and high school, many of the tools described are useful for elementary school students. http://www.sc.edu/scatp/ld.htm
- **"NEW" Freeware, Shareware and Demo Programs on the Internet.** Reprinted in the ConnSENSE Bulletin (www.connsensebulletin.com) from the Butte, Montana Office of Education, this is a 9/04 document that lists freeware and shareware off the Internet in the following categories: Cursors, Demos, Drawing, Coloring and Creating programs, Educational Games and Programs, E-Text, Graphics, Graphic Organizers, Internet sites, Keyboarding, Math Support, Modification Checklists, Mouse Skills, On-Screen Keyboards, Sign Language, Symbol Support, Text-To-Speech, Tools and Visual Support
  http://www.connsensebulletin.com/freeware05.pdf
  http://www.connsensebulletin.com/freeware.html
  http://www.sc.edu/scatp/ATclassroom.htm
- **The National Center to Improve Practice (NCIP)** was funded by the U.S. Department of Education, Office of Special Education Programs from 1992-1998 to promote the effective use of technology to enhance educational outcomes for students with sensory, cognitive, physical and social/emotional disabilities. The NCIP Library has a wealth of information about technology, disabilities, practice, and implementation. They also offer an outstanding series of video profiles that vividly illustrate how students with differing disabilities use a range of assistive and instructional technologies to improve their learning. Each video, approximately 10 minutes in length, is accompanied by supporting print materials that explore topics more fully. Their online tour of two exemplary early childhood classrooms show practical uses of AT.
  http://www2.edc.org/NCIP/
- **"Web Toolboxes for Educators,"** compiled by Dr. Cheryl Wissick at the USC College of Education, this alphabetical listing of terrific educational resources can serve as a starting point on your search of the Web, provide interactive activities, informational resources, and lessons; and help with the integration of technology in education. One section of this web site would be of particular interest to special educators, with links

for software related to web access, talking word processes, text-to-speech tools, found at
http://www.ed.sc.edu/caw/toolboxsource.html
http://www.ed.sc.edu/caw/toolboxvendors.html

- **Cool Assistive Technology Tools for the Classroom:** Also compiled by Janet Jendron of SCATP. http://www.sc.edu/scatp/cooltools.htm
- The **South Carolina Assistive Technology Program's** Web site is at http://www.sc.edu/scatp
- **Assistive Technology | Helping Challenged Kids Get the Most from Learning** http://www.educationworld.com/a_tech/tech/tech086.shtml
- **Tools for Life: Learning Disabilities Guide** http://www.gatfl.org/LearningDisabilitiesGuide.aspx

This is an excellent website showing how assistive technology can help in the classroom. It is also a good source to help in selecting the specific technology needed for students.

- **Assistive technology for kids with LD: An Overview**

http://www.greatschools.org/special-education/assistive-technology/702-assistive-technology-for-kids-with-learning-disabilities-an-overview.gs This site offers a wealth of information on a variety of assistive technology tools.

- **The Georgia Project for Assistive Technology: Resources** www.gpat.org/

This page offers information on assistive technology definition, devices, legal mandates, considerations, implementation and integration, evaluation, policies and procedures.

- **National AT Advocacy Project** *www.nls.org/natmain.htm*

This site contains a booklet that focuses on the rights of students in public schools to have the help of assistive technology. It is ideal for advocates and others that work with disabled children. It offers a wealth of information concerning IDEA and section 504 and how the law affects the availability and use of assistive technology in the classroom, today.

- **AbilityNet GATE: Global Assistive Technology Encyclopedia** http://abilitynet.wetpaint.com
- **Assistive Technology from Wikipedia** http://en.wikipedia.org/wiki/Assistive_technology
- **Assistive Technology in Education: A Guide for the Delivery of Assistive Technology Services for Students with Disabilities** http://www.atp.ne.gov/techassistdoc.html
- **Hearing Assistive Technology** http://www.asha.org/public/hearing/treatment/assist_tech.htm
- **N_A_T_E_ Network Site** http://www.natenetwork.org/
- Accessibility features of android mobile device
- Web Accessibility Features

H5P Authoring tools

- Ms. Urvashi Shrivastava

H5P makes it easy to **create, share and reuse HTML5 content and applications**. H5P empowers everyone to create rich and interactive web experiences more efficiently - all you need is a web browser and a web site with an H5P plugin. H5P allows you to easily and quickly create rich interactive content on a web page. H5P is a plug-in for existing publishing systems that enables the system to create interactive content like Interactive Videos, Presentations, Games, Quizzes and more!

H5P Content Types

1. Virtual Tour (360)

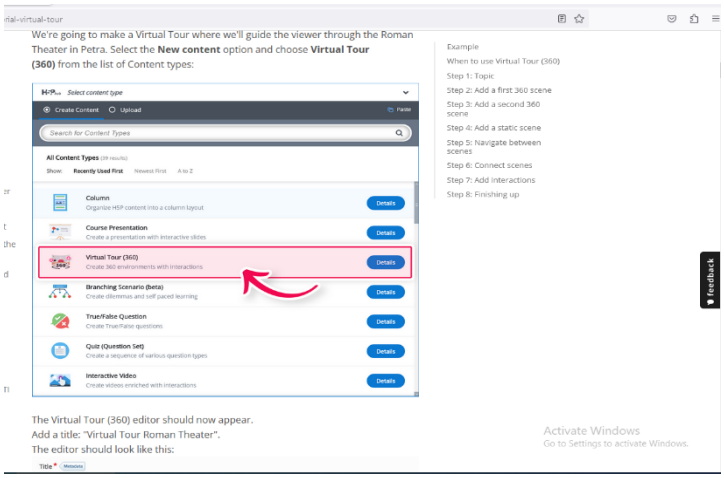
360 (equirectangular) and normal images may be enriched with interactivities like explanations, videos, sounds, and interactive questions. The images may also be linked together to give the user an impression of moving between environments or between different viewpoints within the same environment.

This content type may be used to give a feeling of exploring and learning within a realistic environment. It includes an easy to use drag and drop authoring widget making it easy for everyone to create his or her own virtual tours.

Features

The following H5P content types may be added to a Virtual Tour Scene:

- Text
- Image
- Sound (both for the entire Virtual Tour, per room/scene and as buttons in the scenes.
- Video
- Single Choice Set
- Interactive Summary
- Connections to other scenes

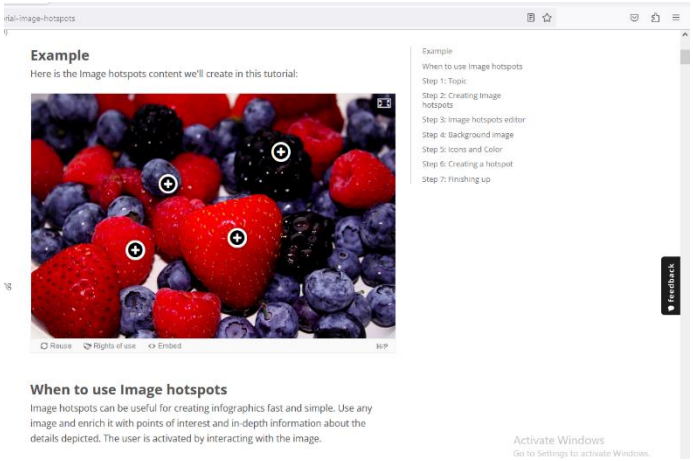


2. Image Hotspots

Image hotspots makes it possible to create an image with interactive hotspots. When the user presses a hotspot, a popup containing a header and text or video is displayed. Using the H5P editor, you may add as many hotspots as you like. The following is configurable:

- The number of hotspots
- The placement of each hotspot, and the associated popup content

- The color of the hotspot



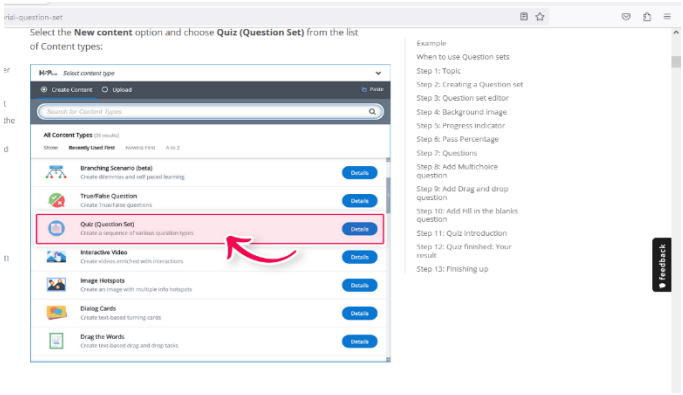
3. Interactive Video

Videos may be enriched with interactivities like explanations, extra pictures, tables, Fill in the Blank and multiple choice questions. Quiz questions support adaptivity, meaning that you can jump to another part of the video based on the user's input. Interactive summaries can be added at the end of the video. Interactive videos are created and edited using the H5P authoring tool in a standard web browser.

Features

The following H5P content types may be added to your video:

- Multiple choice questions with one or more correct answers
- Free text questions
- Fill in the blank questions
- Drag and drop questions
- Interactive summaries
- Single choice question sets
- Mark the word activities
- Drag and drop text
- Images
- Tables
- Labels
- Texts
- Links

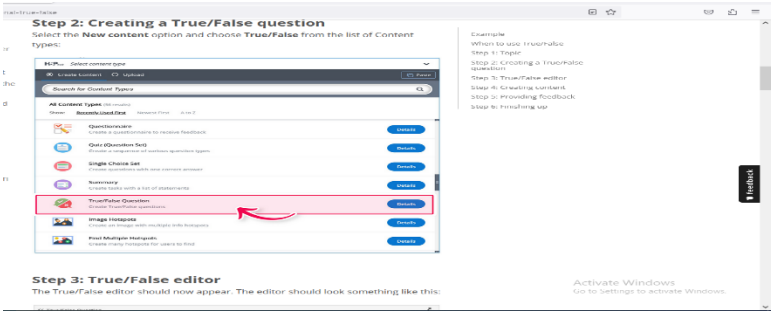


4. Quiz (Question Set)

Question Set is your typical quiz content type. It allows the learner to solve a sequence of various question types. You can combine many different question types like Multichoice, Drag and drop and Fill in the blanks in a Question set. As an author, there are many settings you can use to make it behave just the way you want it to. You may for instance customize the Question set with background images and define a pass percentage for the learner.

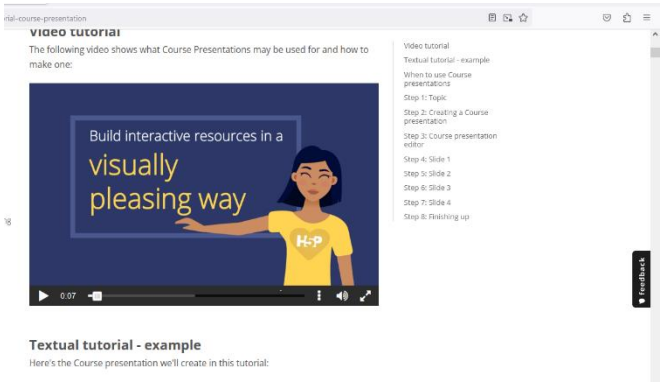
The Question Set also allows you to add videos that are played at the end. One video for success, another if the learner fails the test. This might motivate learners to try again if they fail so that they get to see the success video.

5. **True/False Question**



True/False Question is a simple and straightforward content type that can work by itself or combined into other content types such as Course Presentation. A more complex question can be created by adding an image or a video.

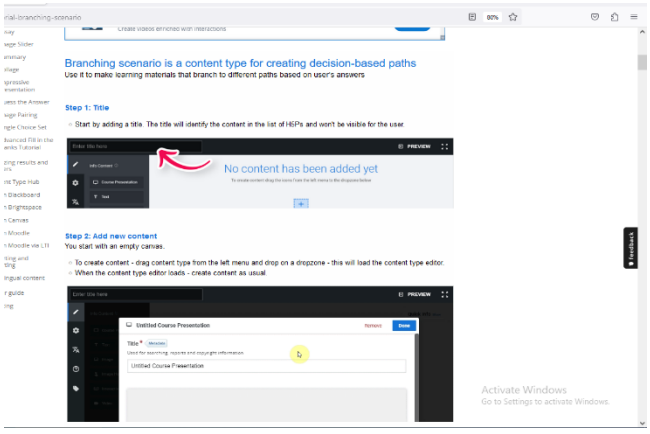
6. Course Presentation



Course presentations consist of slides with multimedia, text, and many different types of interactions like interactive summaries, multiple choice questions and interactive videos. Learners can experience new interactive learning material and test their knowledge and memory in Course Presentations. As always with H5P, content is editable in web browsers, and the Course Presentation activity type includes a WYSIWYG drag and drop based authoring tool.

A typical use of the Course Presentation activity is to use a few slides to introduce a subject and follow these with a few more slides in which the user's knowledge is tested. Course Presentations may however be used in many different ways, including as a presentation tool for use in the classroom, or as a game where the usual navigation is replaced with navigation buttons on top of the slides to let the user make choices and see the consequences of their choices.

7. Branching Scenario



Branching Scenario is a flexible content type that enables authors to present a variety of rich interactive content and choices to learners. Learners make choices that determine the content they will see.

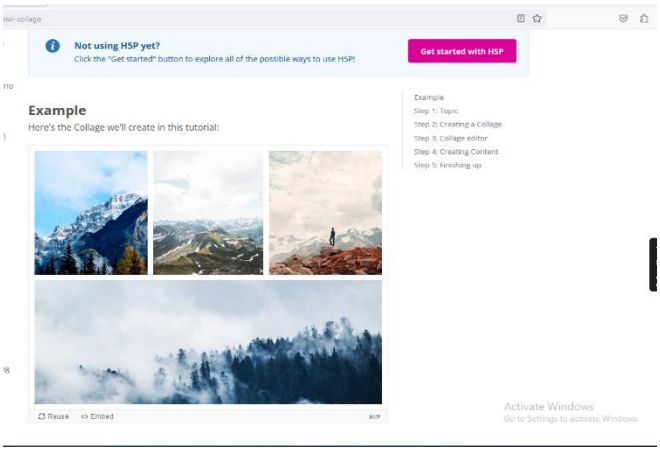
The authoring tool can be used in full screen and allows authors to structure the content as a tree with multiple branches and endings.

8. Collage

The Collage tool allows you to put together beautiful images in a soothing composition. If you want to impress your followers by adding cool image collages to your blog, this is definitely the tool for you!

Choose from 11 layouts and configure:

- image pan and zoom
- image spacing (inner frame size)
- outer frame size
- height of the collage



9. Chart

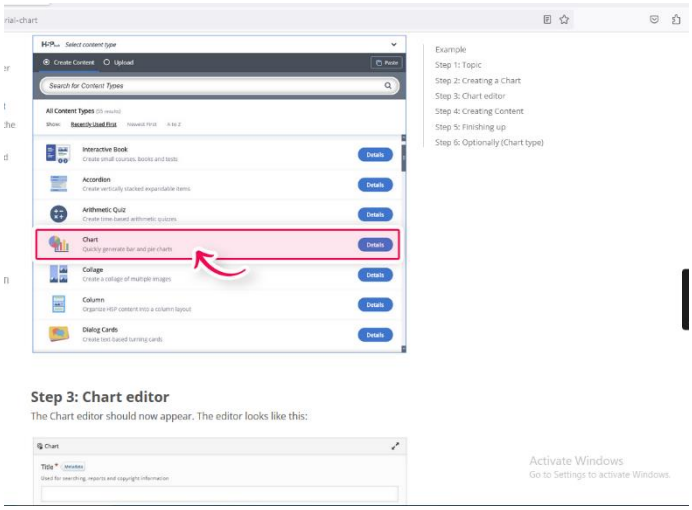
Need to present simple statistical data graphically without creating the artwork manually? Chart is your answer.

Features

- Select between bar and pie chart view
- Add label and value to each data element
- Select background color each data element
- Set font color for each data element

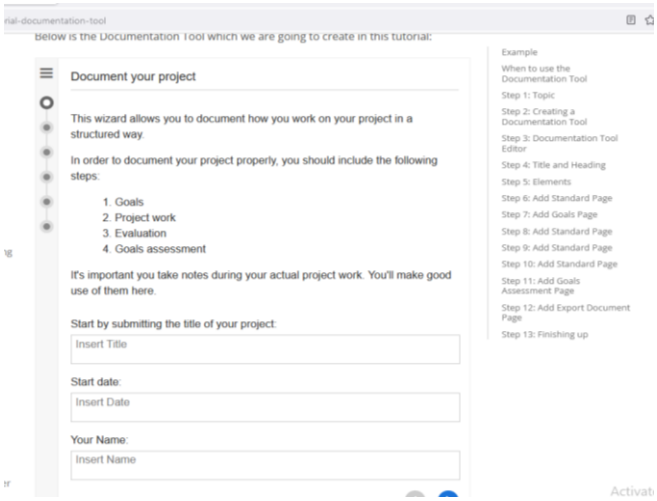
10. Documentation Tool

The documentation tool aims to make it easy to create assessment wizards for goal driven activities. It can also be used as a form wizard.



While editing, the author can add multiple steps to the wizard. In each step, the author can define which content goes into that step. Content can be plain text, input fields, goal definition and goal assessment.

Once published, the end user will be taken through the steps of the wizard. On the last step of the wizard, the user can generate a document with all the input that has been submitted. This document can be downloaded.

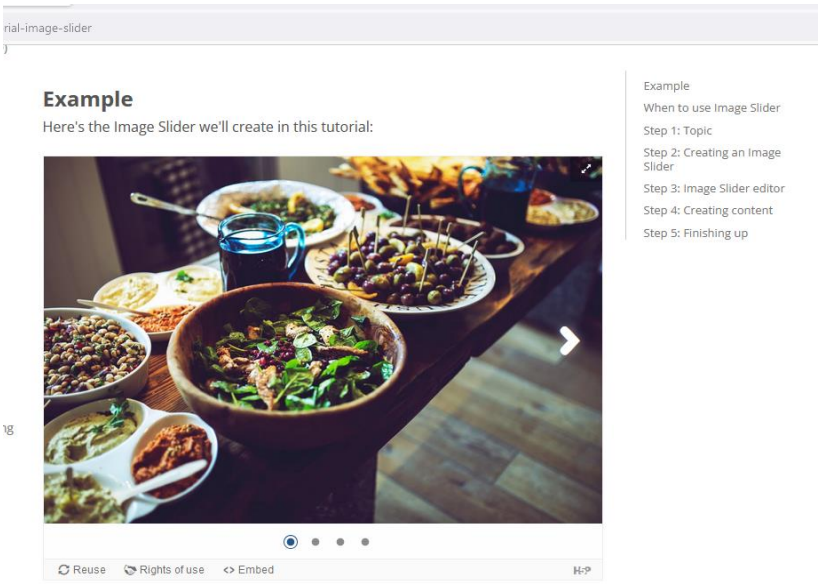


The Documentation tool is fully responsive and works great on smaller screens as well as on your desktop.

11. Image Slider

Description

Present your images in an appealing way with ease. Authors just have to upload images and provide alternative texts for the images.



The next two images are always preloaded so switching between images will usually be snappy with no delay for loading the next image.

Images may be experienced as part of the page or in full-screen mode. When used as part of the page the system will pick a fixed aspect ratio depending on the images being used. Authors may decide to handle aspect ratios differently.

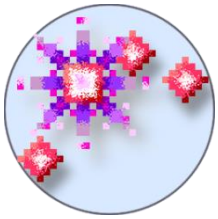
Video-Based Analysis Freeware: Tracker

- Mr. L. S. Chauhan

GENERAL OBJECTIVE

1. To develop data interpretation ability
2. To develop graphical interpretation ability
3. To study given problem of mechanics

INFORMATION ABOUT TRACKER



Tracker is a free video analysis and modelling tool built on the Open Source Physics (OSP) Java framework. It is designed to be used in physics education.

Tracker **video modelling** is a powerful way to combine videos with computer modelling.
Tracker requires Java 1.6 or higher.

Tracker Features

Tracking:

- Manual and automated object tracking with position, velocity and acceleration overlays and data.
- Centre of mass tracks.
- Interactive graphical vectors and vector sums.
- RGB line profiles at any angle, time-dependent RGB regions.

Modelling:

- Model Builder creates kinematic and dynamic models of point mass particles and two-body systems.
- External models animate and overlay multi-point data from separate modeling programs such as spreadsheets.
- Model overlays are automatically synchronized and scaled to the video for direct visual comparison with the real world.

Subjects	Levels	Resource Types
Education Practices	Lower Undergraduate	Instructional Material
Curriculum Development	High School	Activity
Laboratory	Upper Undergraduate	Interactive Simulation
Instructional Material Design		Laboratory
Technology		Model
Computers		Tool
Multimedia		Software
General Physics		Audio/Visual
General		Movie/Animation
Measurement/Units		

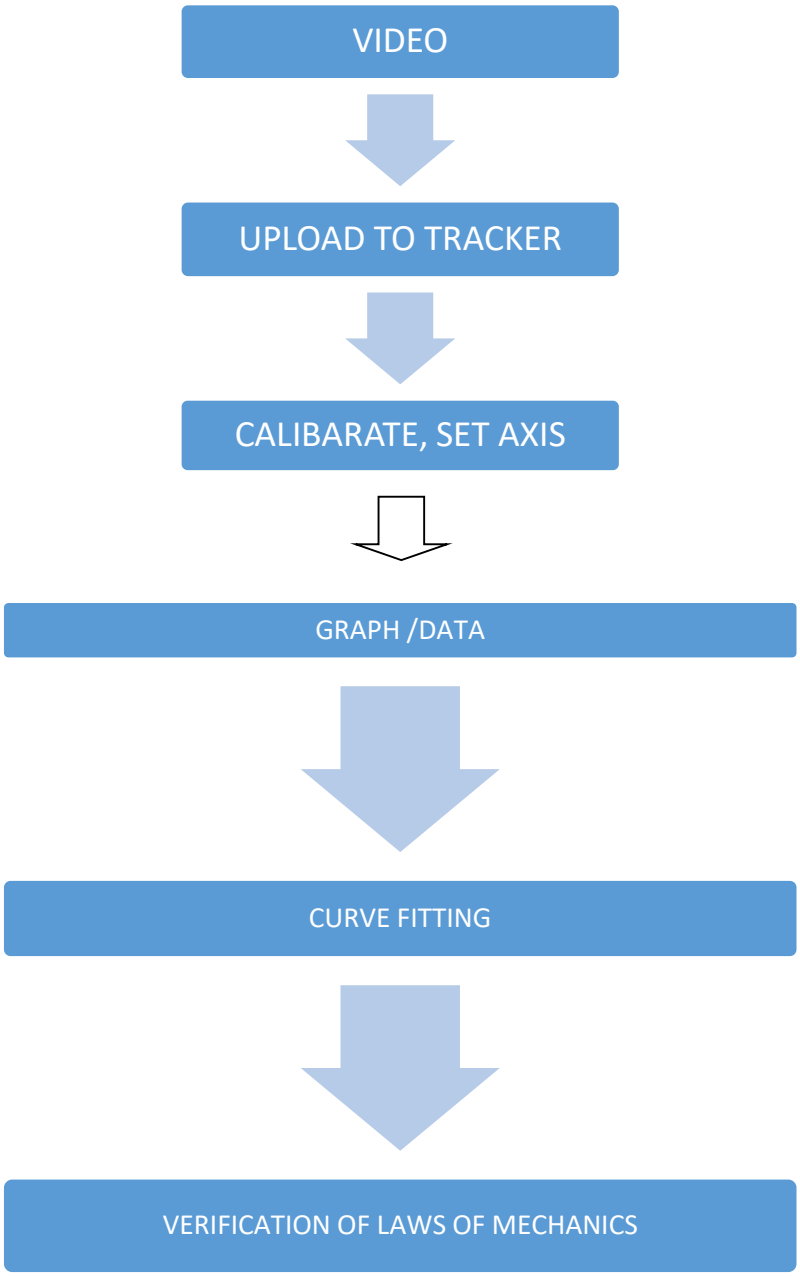
Intended Users	Formats
Learners Educators	

METHODOLOGY

First, we identified some daily life problems/situations like

- Freely falling body
- Two body system attached with a pulley
- Friction between two bodies

Performed the activities in somewhat ideal conditions, recorded and analysed using Tracker:



ACTIVITY 1: FREE FALL

Specific Objective

1. To verify the value of acceleration due to gravity (g) of freely falling body on earth using Tracker.
2. To verify the following equations of motion:
   a) $v = u + gt$
   b) $h = ut + \frac{1}{2}gt^2$

(Where symbols have their usual meaning)

Materials Required

- Object (Ball)
- Camera, stand
- Scale (for calibration)

Theory

Free fall is the motion of any body where gravity is the only force acting upon it.

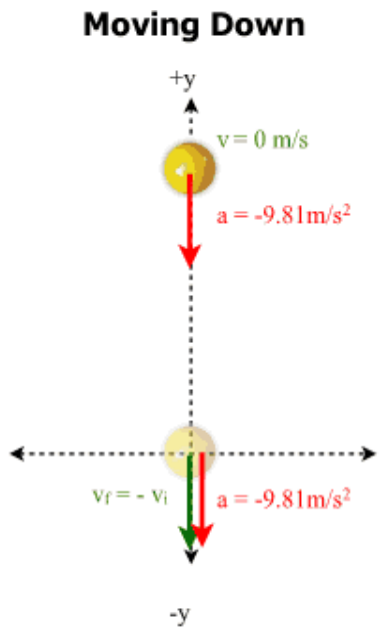


Fig.1: Equations of motion

In mathematical physics, **equations of motion** are equations that describe the behaviour of a physical system in terms of its motion as a function.

The three equations of motion are:

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

$$v^2 - u^2 = 2as$$

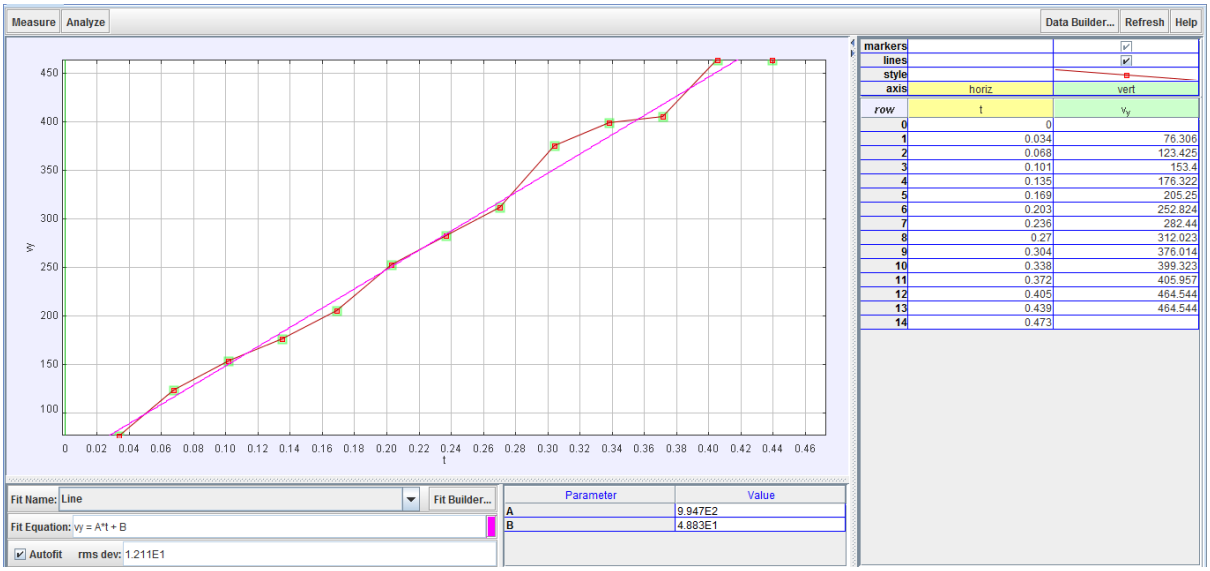
Analysis using Tracker

Fig. 2

Fig. 3

- For first equation of motion

  v = u + gt (here, u = 0)



Graph 1

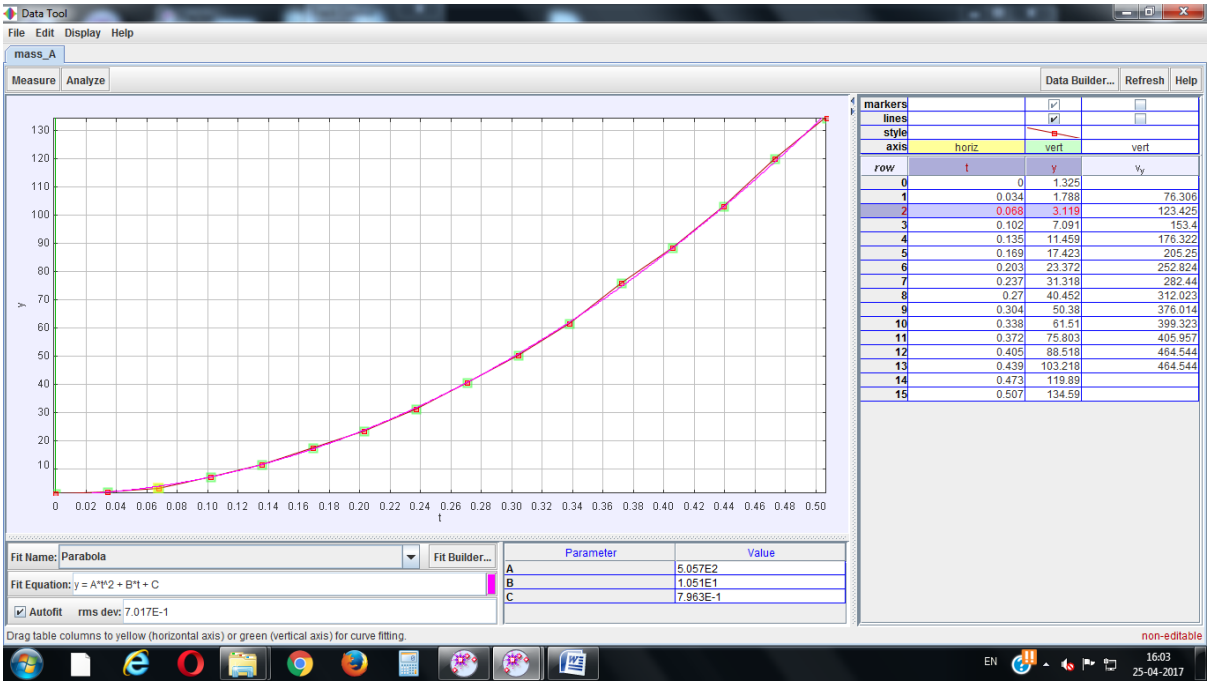
Curve between velocity (v) and time (t) is a straight line and the value of A (=g) = 9.947E2

Result

Clearly, graph satisfies the first equation of motion v = u + gt. In addition, acceleration due to gravity of freely falling body (ball) on earth is **994.7 cm/sec^2.** Theoretical value of g = 980 cm/sec^2. So error = -1.43%

- For second equation of motion

  $h = ut + \frac{1}{2}gt^2$



The graph between y (h) and t is a parabola.

A = 5.05E2, B = 1.051E1

Clearly, the graph satisfies $h = ut + \frac{1}{2}gt^2$.

CONCLUSION

By performing the above-mentioned activities we can say that any daily life situation/problem can be easily and accurately analysed from which laws of physics can be verified.

Advantages of using Tracker

- Gives accurate results
- Shows the deviation between standard and obtained data
- Graph between different parameters can be easily obtained
- With minimum input data it gives maximum output
- Easy to use
- It promotes effective learning
- Saves time
- Creative and interesting

Scope

Tracker is a highly useful software, which has got great utility in various field of physics. We have used it to verify the laws of mechanics but it can also be used in

Optics

To verify Malus law, Snells law, fraunhoffer diffraction, spectroscopy, etc.

- Other areas of **mechanics**
  - Projectile motion
  - Stokes law
  - Rotational motion of bodies
  - Simple harmonic motion, etc.

References:

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- www.physlink.com/reference/frictioncoefficients.cfm
- Paper – Physics Teacher
    1. How to determine centre of mass of bodies by image modelling, Marco Adriano, Paulo Simeao Carvalbo, Marcelo Rodrigues
    2. Dynamics of sliding ladder leaning againt a wall, J B Oliveira, P Simeao Carvalbo, M F Mota
    3. Using tracker to prove SHM, John Kinchin
    4. Time of flight for the bouncing ball experiment, Philip A Maurone
    5. Determination of gravitational acceleration using a rubber ball,G Guercio and V Zanetti

ICT in Mathematics

- Aji Thomas

Information and Communication Technology (ICT) has significantly influenced the teaching and learning of mathematics, transforming the way educators deliver content and how students engage with mathematical concepts. In this section, we explore the specific impact of ICT on mathematics education, examining the benefits, challenges, and emerging trends in this dynamic field.

I. Enhancing Mathematical Understanding:

A. **Interactive Learning Tools:** ICT provides a plethora of interactive learning tools that make abstract mathematical concepts more tangible. Visualization software, graphing calculators, and dynamic geometry applications allow students to explore mathematical ideas in a hands-on and visually intuitive manner.

B. Simulation and Modeling: Simulations and modeling tools help students understand complex mathematical phenomena. Whether exploring mathematical functions, solving real-world problems, or simulating mathematical scenarios, students can develop a deeper appreciation for the practical applications of mathematical concepts.

C. Virtual Manipulatives: Digital manipulatives, such as virtual algebra tiles or geometric shapes, enable students to manipulate and explore mathematical concepts in a virtual environment. These tools provide a bridge between abstract mathematical ideas and concrete, tangible representations.

II. Personalized Learning in Mathematics:

A. Adaptive Learning Platforms: ICT facilitates adaptive learning platforms that tailor mathematical instruction to individual student needs. These platforms use algorithms to assess a student's proficiency level and dynamically adjust the difficulty and pace of the content, ensuring a personalized learning experience.

B. Online Assessments and Feedback: Digital platforms allow for real-time assessments and immediate feedback on students' mathematical performance. This not only helps identify areas of improvement but also enables educators to provide timely and targeted support to individual students.

III. Collaborative Mathematics Learning:

A. Online Collaboration Tools: ICT promotes collaborative learning in mathematics through online platforms, discussion forums, and collaborative document editing. Students can work together on mathematical problems, share insights, and engage in discussions, fostering a sense of community and collective problem-solving.

B. Virtual Classrooms: Virtual classrooms powered by video conferencing and collaboration tools facilitate remote learning in mathematics. These platforms enable real-time interaction

between students and teachers, fostering a collaborative and interactive online learning environment.

IV. Addressing Math Anxiety:

A. Gamification of Mathematics: Educational games and gamified applications make learning mathematics enjoyable and less intimidating. Through interactive challenges, puzzles, and competitions, students can develop their mathematical skills in a stress-free and engaging manner.

B. Multimedia Content: The integration of multimedia content, including videos, animations, and interactive simulations, helps break down complex mathematical topics into more digestible and visually appealing formats. This approach can alleviate anxiety and enhance understanding.

V. Challenges in Integrating ICT into Mathematics Education:

A. Teacher Training: Effective integration of ICT in mathematics education requires well-trained educators. Teachers must be proficient in using digital tools, software, and online platforms to create a conducive learning environment.

B. Access to Technology: Disparities in access to technology can hinder the equitable implementation of ICT in mathematics education. Schools with limited resources may struggle to provide students with the necessary devices and connectivity.

C. Technological Infrastructure: The availability and maintenance of a robust technological infrastructure, including high-speed internet and up-to-date devices, are essential for the successful integration of ICT in mathematics education.

VI. Emerging Trends in ICT in Mathematics Education:

A. Artificial Intelligence (AI) in Mathematics: AI-powered tools can provide personalized recommendations for mathematics practice, offer instant feedback, and even assist in solving complex mathematical problems. These applications augment traditional teaching methods and support individualized learning.

B. Virtual Reality (VR) for Mathematical Exploration: Virtual reality offers immersive experiences for exploring mathematical concepts in three-dimensional spaces. VR applications in mathematics education can enhance spatial reasoning and provide students with a unique perspective on mathematical structures.

C. Data Analytics for Educational Insights: The use of data analytics allows educators to track students' progress, identify areas of difficulty, and tailor instructional strategies accordingly. Analyzing data from digital platforms can inform evidence-based decision-making in mathematics education.

VII Some Essential Software in Mathematics Education:

1. PhET Interactive Simulations:

Overview: PhET Interactive Simulations is a collection of free, online math and science simulations developed by the University of Colorado Boulder. It provides a range of interactive, animated simulations that cover various topics in mathematics, physics, chemistry, biology, and more.

Key Features:

1. **Interactivity:**
    - PhET simulations are highly interactive, allowing students to manipulate variables and observe the real-time effects on the simulation. This hands-on approach promotes active learning.
2. **Diverse Subjects:**
    - The simulations cover a broad spectrum of subjects, including mechanics, electricity, waves, quantum mechanics, and mathematics. In the context of mathematics, PhET offers simulations for algebra, calculus, geometry, and statistics.
3. **Accessibility:**
    - PhET simulations are freely available online, making them accessible to educators, students, and learners worldwide. The platform supports multiple **languages.**
4. **Teacher and Student Resources:**
    - PhET provides supporting materials for teachers, including lesson plans, teacher guides, and interactive activities. Students can also use the simulations for self-directed learning**.**
5. **Real-World Applications:**
    - The simulations often incorporate real-world scenarios, helping students see the practical applications of mathematical concepts**.**

Educational Benefits:

- **Concrete Visualization:** PhET simulations provide concrete visualizations of abstract mathematical concepts, making them more accessible and engaging.
- **Active Learning:** Students actively engage with the simulations, fostering a deeper understanding of mathematical principles through exploration.
- **Experimentation:** PhET allows students to experiment with different scenarios and observe the outcomes, promoting a hands-on approach to learning.

2. GeoGebra:

Overview: GeoGebra is a dynamic mathematics software that integrates geometry, algebra, statistics, and calculus. It is designed for learning and teaching mathematics at various levels, from primary school to university.

Key Features:

1. **Dynamic Interface:**

- GeoGebra offers a dynamic and interactive interface that allows users to explore mathematical concepts in real-time. Changes to parameters instantly reflect on the visualizations.

2. **Integration of Mathematical Areas:**
   - The software seamlessly integrates geometry, algebra, statistics, and calculus, providing a versatile tool for educators and students across different mathematical disciplines.

3. **Multiplatform Support:**
   - GeoGebra is available on multiple platforms, including desktop applications for Windows, Mac OS, and Linux, tablet apps for Android, iPad, and Windows, as well as a web application based on HTML5 technology.

4. **Educational Resources:**
   - GeoGebra offers a rich database of ready-made examples, technical documentation in multiple languages, and a community where users can share resources and insights**.**

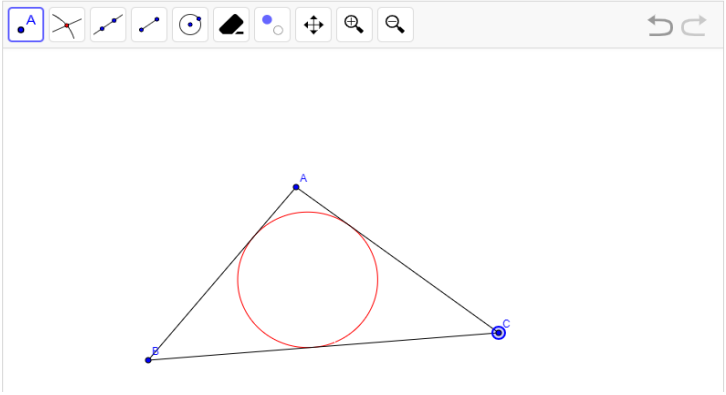
5. **Dynamic Objects:**
   - All objects in GeoGebra are dynamic, allowing users to visualize changes and explore mathematical relationships dynamically.

Educational Benefits:

- **Versatility:** GeoGebra caters to a wide range of mathematical topics, making it a versatile tool for educators teaching different subjects.
- **Real-Time Exploration:** The real-time manipulation of geometric and algebraic objects enhances students' exploration and understanding of mathematical concepts.
- **Integration of Technology:** GeoGebra seamlessly integrates technology into mathematics education, promoting digital literacy and computational thinking.
- **Publication and Collaboration:** GeoGebra allows users to publish their work on the web, fostering collaboration and sharing of mathematical explorations**.**

Interface:

GeoGebra's interface is designed with clarity and functionality in mind. It includes several views such as algebraic, geometric, spreadsheet, CAS (Computer Algebra System), protocol design, and command line. These views are interconnected, ensuring that changes made in one view are reflected appropriately in others. The dynamic nature of GeoGebra allows for the exploration of mathematical concepts through various representations.



Examples:

Example 1: Constructing a Circle on a Triangle Suppose we

want to construct a circle inscribed in a triangle using GeoGebra (Figure 1). By leveraging GeoGebra's dynamic geometry tools, we can visualize and manipulate the construction, providing a more engaging and interactive exploration of geometric concepts.

Example 2: Understanding the limit concept: Limits play a fundamental role in calculus, providing a way to describe and analyse the behaviour of functions as they approach a certain point. While the mathematical definition involves precision, visualizing limits can enhance comprehension, especially for learners new to the concept. In this article, we leverage GeoGebra, a dynamic mathematics software, to create an interactive exploration of limits through the inscribing of polygons within a circle.

GeoGebra as a Dynamic Tool:
GeoGebra's versatility in integrating geometry and algebra makes it an ideal platform for exploring mathematical concepts visually. Its dynamic interface allows users to manipulate geometric shapes, parameters, and equations in real-time, providing a hands-on experience that aids in understanding abstract ideas.

The Visual Concept: Inscribed Polygons in a Circle:
To visualize limits, we choose the concept of inscribing polygons inside a circle. The idea is to start with a simple polygon, such as a triangle, inscribed within a circle. As we increase the number of sides in the polygon, we observe how the shape approaches the circle more closely. This gradual approach of refining the polygon provides an intuitive representation of the limit concept.

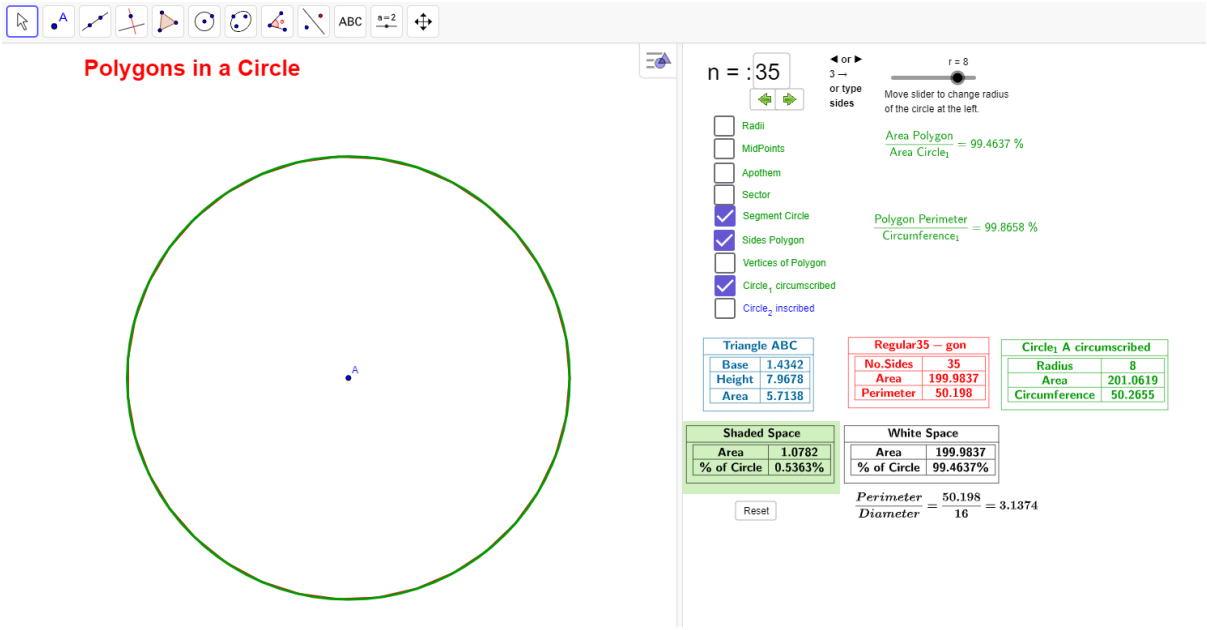
GeoGebra Construction Steps:

1. **Create a Circle:**
    - Begin by using GeoGebra's circle tool to create a circle. This will serve as the boundary within which the polygons are inscribed.

2. **Inscribe a Polygon:**
    - Inscribe an initial polygon, such as a triangle, within the circle. Utilize GeoGebra's polygon tool to construct the shape.

3. **Increase Polygon Sides:**
    - Duplicate the polygon and gradually increase the number of sides. GeoGebra allows users to dynamically adjust the number of sides, providing a real-time visual transformation of the shape.

4. **Observe Convergence:**
    - As the number of sides increases, observe how the inscribed polygon approaches the circle. The visual convergence of the polygon towards the circle illustrates the concept of a limit.



Interactive Exploration:
Encourage students to actively engage with the GeoGebra model. They can experiment by changing the number of sides in the inscribed polygon and observe how the shape evolves. This interactive exploration fosters a deeper understanding of how the polygon approaches the circle and visually demonstrates the concept of a limit.

Mathematical Insights:
While the visual exploration provides an intuitive understanding, it is essential to connect it with the mathematical definition of limits. Discuss how, in calculus, the limit represents the behavior of a function as the input approaches a specific value. Relate the visual convergence of the inscribed polygon to the concept of a limit in a mathematical context**.**

Educational Benefits:

1. **Intuitive Understanding:**
   - The visual representation of limits through inscribed polygons offers an intuitive understanding, making the concept more accessible to students.
2. **Dynamic Exploration:**
   - GeoGebra's dynamic environment allows for real-time manipulation and observation, enabling students to actively explore and experiment with the concept.
3. **Connection to Calculus:**
   - The visual exploration serves as a bridge between geometry and calculus, helping students connect the idea of limits to their studies in calculus.
4. **Engagement and Retention:**
   - The interactive nature of the GeoGebra model enhances student engagement and retention, fostering a positive learning experience.

Visualizing limits through the inscribing of polygons inside a circle using GeoGebra provides a dynamic and interactive approach to understanding this fundamental calculus concept. The

exploration allows students to actively engage with the material, fostering a deeper comprehension of limits. This visual representation serves as a valuable supplement to traditional mathematical explanations, making the concept more tangible and memorable for learners. As technology continues to play a crucial role in education, leveraging tools like GeoGebra enhances the learning experience and promotes a deeper understanding of mathematical concept.

GeoGebra emerges as a valuable tool in overcoming challenges in teaching mathematics by providing an interactive and dynamic learning environment. The examples presented illustrate how GeoGebra can be utilized to construct, solve, and visualize mathematical problems, with a specific focus on Projectile Motion. As technology continues to play a pivotal role in education, GeoGebra stands as a powerful resource for educators seeking to enhance the learning experiences of students in mathematics.

Conclusion:

PhET Interactive Simulations and GeoGebra stand out as essential software tools in mathematics education, complementing traditional teaching methods and providing interactive, dynamic, and engaging learning experiences. Their unique features contribute to the development of a deeper understanding of mathematical concepts and promote active learning in the digital age.

GeoGebra emerges as a valuable tool in overcoming challenges in teaching mathematics by providing an interactive and dynamic learning environment. The examples presented illustrate how GeoGebra can be utilized to construct, solve, and visualize mathematical problems, with a specific focus on Projectile Motion. As technology continues to play a pivotal role in education, GeoGebra stands as a powerful resource for educators seeking to enhance the learning experiences of students in mathematics.

ICT for Language and Social Science

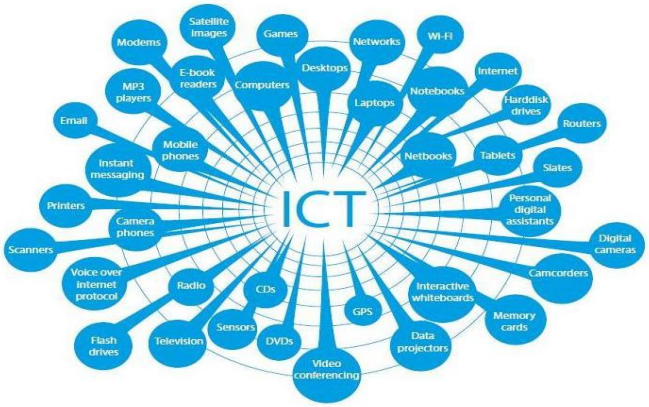
- Dr. Shruti Tripathi

Introduction

The 20th century marked an era where power was synonymous with possessing weapons. However, in the 21st century, it is increasingly evident that the true source of power lies in knowledge and skills, surpassing the traditional dominance of weapon-based strength. The relentless progress in science and technology has brought about a transformative shift in the lifestyles of people worldwide.

The acronym 'ICT,' denoting Information and Communication Technologies, encompasses a multitude of technologies facilitating information reception and communication exchange. Global economic strategies, coupled with advancements in ICT, have rejuvenated communication tools in the 21st century. Terms like digital literacy, e-literacy, screen literacy, multimedia literacy, information literacy, and ICT literacy encapsulate the skills required by students and educators in this digital age.

In the contemporary world, swift and timely communication is indispensable. In this context, modern technologies and internet tools have become indispensable. Email, blogs, e-groups, smart mobile phones (serving not only for calls and texts but also for social networking), and websites are likened to the lifeblood and oxygen of communication.



The boundaries of learning have transcended traditional classroom settings. New terms have emerged to describe these innovative learning approaches, such as M-learning (mobile learning) and U-learning (ubiquitous learning). This paradigm shift underscores the pivotal role that knowledge and technology play in shaping the dynamics of the 21st-century communication landscape.

This module discusses about web tools for ICT integration in Language and Social Science that can be utilized for enhancing the process of knowledge transaction in the classroom and beyond it. There are many applications that a teacher may learn under the broad area of ICT skills. Brief idea about various applications under the broad area of ICT skills are given below.

Flippity

Flippity serves as a versatile hub offering a diverse array of functions, catering to the needs of educators. It presents teachers with a comprehensive suite of digital activities and tools, encompassing practical classroom utilities like the Random Name Picker, Badge Tracker, Leaderboard, Fun with Fonts, Progress Indicator, Word Cloud, and Tournament Bracket. Additionally, it includes knowledge-building tools such as Flash Cards, Quiz Show, Virtual Breakout, and Typing Test, along with entertaining mini-games like Matching Game, Connecto Game, Bingo, Crossword Puzzle, Word Scramble, Word Search, Snowman, WordMaster, and MadLibs.

Flippity proves valuable in supporting assessment, knowledge acquisition, and learner-centric experiences. Assessment tools like Quiz Show and Virtual Breakout aid in gauging comprehension, while the Self-Assessment tool allows students to reflect on their feelings post-assignment. Knowledge-centered tools, such as Flash Cards, Timeline, Typing Test, and Spelling Words activities, contribute to enhancing understanding. Learner-centered tools like Manipulatives and Word Cloud, or activities that encourage students to create content themselves (e.g., MadLibs or Crossword Puzzle), further emphasize a learner-centric approach.

By consolidating such a diverse range of programs within a single platform, Flippity simplifies the process of exciting and engaging learners through user-friendly tools.
https://www.flippity.net/

Vocaroo

Vocaroo stands out for its simplicity and user-friendly interface, offering a hassle-free experience. Users can access the tool directly without the need for an account login. The audio files generated on Vocaroo can easily be shared by providing a link on blogs, websites, and various social networking platforms. Typically, recordings remain accessible for a few months, usually around three months.

The convenience extends further as Vocaroo provides a widget that can be seamlessly embedded on other websites. This feature allows, for instance, students to record voice messages directly from your class website, eliminating the need for additional logins or complex HTML knowledge. Moreover, Vocaroo supports the downloading of recordings in various formats, such as mp3, Ogg, flag, and wav, providing flexibility for users based on their preferences.
https://vocaroo.com/

iSL collective

iSL Collective stands as an invaluable resource for educators and learners in the realm of English as a Second Language (ESL). Functioning as a collaborative platform, iSL Collective provides a vast repository of teaching materials, worksheets, and lesson plans contributed by educators globally. This diverse collection spans various aspects of language learning, encompassing grammar, vocabulary, speaking, listening, reading, and writing. The platform's user-friendly interface facilitates seamless navigation, enabling teachers to find and download materials tailored to their students' needs. What sets iSL Collective apart is its emphasis on user contributions, fostering a community-driven approach to ESL education. Educators can share their own creations, providing a wealth of diverse and culturally relevant resources. The platform's adaptability to different proficiency levels and the option for customization make it a versatile tool for educators catering to a broad spectrum of learners. Additionally, iSL Collective's commitment to open access ensures that many resources are available for free, promoting inclusivity and accessibility. While the platform offers a plethora of ready-made materials, it also encourages teachers to modify and adapt resources to suit their specific teaching objectives. Whether it's reinforcing grammar rules, enhancing vocabulary, or facilitating engaging language activities, iSL Collective emerges as a dynamic hub that not only supports ESL educators in their teaching endeavors but also fosters a collaborative global community dedicated to enhancing language education for learners worldwide.
https://en.islcollective.com/

Flip

Flip, formerly recognized as Flipgrid, proves to be an invaluable tool in the field of education, catering to those seeking to incorporate video-based interactivity both within and beyond the traditional classroom setting.

At its core, Flip functions akin to a private social media platform, facilitating the exchange of videos between teachers and students. Notably, it is designed with a robust privacy framework, enabling complete control over privacy settings and the option to organize video creation based on subjects.

Teachers can initiate the interaction by posting a video accompanied by text, emojis, and other elements. Students, in turn, can respond with their own videos, establishing a dynamic space for nuanced communication. This setup fosters an environment conducive to engagement, particularly benefitting students who may be less assertive. Additionally, Flip provides a secure platform for expressing opinions and delving into discussions on a spectrum of topics.
https://info.flip.com/

Crossword Labs

Crossword Labs stands as a complimentary web-based solution for constructing, printing, sharing, and solving crossword puzzles at no cost. Users simply input a title and the words they want to incorporate, leaving the rest to the application. The tool accommodates puzzles in multiple languages and offers a repository of pre-made crossword puzzles on diverse topics. Crossword Labs emerges as a straightforward and efficient platform for crafting diverse crossword puzzles, making it an excellent resource for students looking to enhance their vocabulary skills.
https://crosswordlabs.com/

LyricsTraining

LyricsTraining stands out as an innovative language-learning tool that taps into the power of music to enhance language proficiency. Designed for learners of diverse linguistic backgrounds, the platform transforms song lyrics into interactive language exercises. Users can select songs from a wide array of genres and difficulty levels, turning the process of learning into an engaging and enjoyable experience. As the music plays, lyrics are presented with strategically omitted words or phrases, challenging learners to fill in the blanks in real-time. This approach synchronizes language comprehension with the rhythm of the song, providing a dynamic and immersive learning environment.

One of LyricsTraining's notable features is its versatility, catering to users of all ages. Whether individuals are learning English as a second language or seeking to improve proficiency in another language, the platform adapts to varying linguistic goals. The extensive catalog of songs spans different genres, ensuring users can choose music that aligns with their preferences. Beyond individual learners, LyricsTraining serves as a valuable resource for educators. Teachers can integrate music-based lessons into their curriculum, creating a dynamic and interactive classroom environment. The platform allows educators to customize exercises according to the linguistic objectives of their students, promoting collaborative learning.
https://lyricstraining.com/

Wizer.me

Wizer.me emerges as a versatile and interactive digital worksheet platform, revolutionizing the way educators create, share, and assess learning materials. This user-friendly tool empowers teachers to design engaging and multimedia-rich assignments, incorporating a variety of question types, videos, images, and interactive elements. With a focus on personalized learning, Wizer.me allows educators to tailor assignments to meet the unique needs of individual students or entire classes. Furthermore, the platform supports real-time feedback, enabling teachers to assess progress promptly and provide targeted guidance. Students, in turn, benefit from an intuitive interface that encourages active participation and a deeper understanding of the subject matter. Wizer.me also facilitates easy collaboration, as teachers can share their created worksheets within the Wizer.me community or on various learning management systems. As education continues to evolve in the digital age, Wizer.me stands at the forefront, offering a dynamic and adaptive tool that enhances the educational experience for both teachers and students, fostering creativity, engagement, and effective learning outcomes.

https://app.wizer.me/

WordArt

WordArt is a dynamic and creative tool that transforms ordinary text into visually striking word clouds, adding a unique dimension to presentations, graphics, and projects. This user-friendly platform allows individuals to input text, customize font styles, colors, and layouts, and generate visually appealing word clouds effortlessly. WordArt is versatile, making it suitable for various purposes such as brainstorming sessions, educational materials, social media graphics, and more. Users can manipulate the appearance of the word cloud to emphasize specific words or themes, providing a visually engaging representation of textual content. The ability to adjust the shape, orientation, and arrangement of words adds a layer of customization, enabling users to create aesthetically pleasing and meaningful designs. Whether utilized by educators to visualize key concepts, by businesses for marketing materials, or by individuals for creative projects, WordArt serves as a valuable tool for expressing ideas in a visually compelling manner. Its intuitive interface and diverse customization options make it accessible to users of all skill levels, making the process of transforming text into captivating visual representations both enjoyable and effective.

https://wordart.com/

ClassroomScreen

ClassroomScreen proves to be a versatile and user-friendly tool that has transformed the dynamics of classroom management and engagement. Serving as a digital Swiss Army knife for educators, ClassroomScreen consolidates a variety of essential features into a single, accessible interface. With customizable widgets for timers, noise level monitors, random name pickers, and virtual dice, among others, teachers can seamlessly organize and optimize their instructional time. The tool provides a visual and interactive element to maintain student focus and participation. The simplicity of ClassroomScreen's design ensures that teachers, regardless of their technological expertise, can effortlessly incorporate it into their daily routines. The platform fosters a dynamic and interactive classroom environment by allowing educators to adapt quickly to various teaching scenarios. Whether it's setting a countdown for an activity, managing noise levels, or randomly selecting students for participation, ClassroomScreen empowers teachers to enhance the structure and engagement within their classrooms. The collaborative features, such as the drawing and typing options, enable educators to illustrate

concepts, annotate ideas, and provide instant feedback. This digital whiteboard aspect of ClassroomScreen enhances the interactive and visual aspects of lessons. As education continues to evolve, ClassroomScreen stands as a testament to the effectiveness of streamlined tools in creating an efficient, engaging, and well-managed classroom experience for both educators and students alike. Its intuitive design and diverse functionalities make it an invaluable asset for educators seeking to leverage technology for enhanced classroom interaction and management.
https://classroomscreen.com/

Conclusion

In conclusion, the module on Information and Communication Technology (ICT) for Language and Social Science has provides a comprehensive exploration of the transformative impact technology can have on these disciplines. Through an in-depth examination of digital tools and platforms, educators and learners alike can gain insights into leveraging technology to enhance language skills, foster collaboration, and deepen understanding in social science contexts. The integration of ICT tools, ranging from language-learning platforms to interactive social science simulations, showcases the potential for innovative and engaging pedagogical approaches. As we navigate an increasingly digital and interconnected world, this module serves as a valuable guide, emphasizing the importance of adapting to technological advancements to enrich both language education and the study of social sciences. By embracing the possibilities offered by ICT, educators can inspire a new generation of digitally literate and socially conscious learners, equipped with the skills necessary to thrive in the dynamic landscape of language and social science studies.

स्कूल भूगोल शिक्षण में भू-स्थानिक प्रौद्योगिकी

- डॉ. एस. सेबू

सीखने का उद्देश्य

- प्रौद्योगिकी ज्ञान प्रदान करना
- विभिन्न भू-स्थानिक प्रौद्योगिकी ज्ञान का उपयोग करने के लिए
- शिक्षकों को शिक्षण-अधिगम प्रक्रिया में प्रौद्योगिकी को एकीकृत करने में सक्षम बनाना

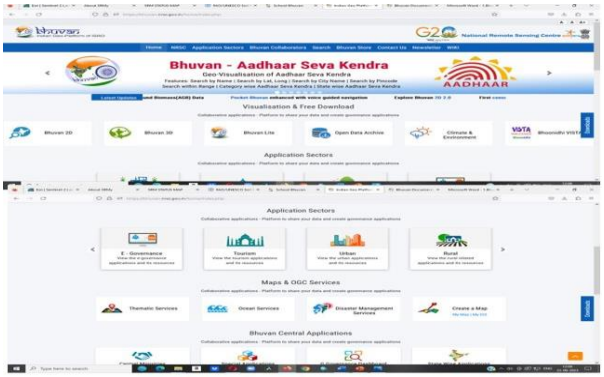
भू-स्थानिक प्रौद्योगिकी आज कई क्षेत्रों में उपयोग की जाने वाली एक उभरती हुई तकनीक है। भू-स्थानिक प्रौद्योगिकी विभिन्न उच्च तकनीक प्रणालियों और उपकरणों के उपयोग का वर्णन करती है जो विभिन्न प्रकार के स्थान-आधारित डेटा का अधिग्रहण, विश्लेषण, प्रबंधन, भंडारण या कल्पना करते हैं। भू-स्थानिक प्रौद्योगिकी में भौगोलिक सूचना प्रणाली (जीआईएस), रिमोट सेंसिंग और ग्लोबल पोजिशनिंग सिस्टम (जीपीएस) शामिल हैं।

भू-स्थानिक प्रौद्योगिकी भूगोल शिक्षकों को अपने कक्षा शिक्षाशास्त्र में प्रौद्योगिकी को एकीकृत करने के लिए पर्याप्त अवसर प्रदान करती है।

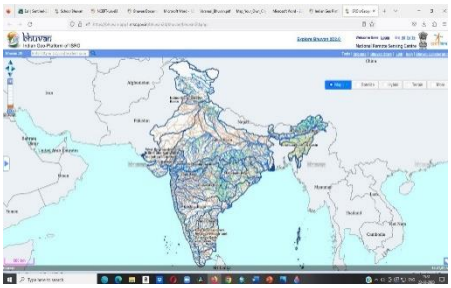
भुवन क्या है?

भुवन भारतीय अंतरिक्ष अनुसंधान संगठन (इसरो) का एक जियोपोर्टल प्लेटफॉर्म है, जिसे वर्तमान में **यूआरएल http://bhuvan.nrsc.gov.in** के माध्यम से होस्ट किया गया है, जिसमें व्यापक सेवाओं की मेजबानी की गई है, जिसमें मल्टी-डेट, मल्टी-प्लेटफॉर्म, मल्टी-सेंसर सैटेलाइट डेटा, विषयगत मानचित्र प्रदर्शन, क्वेरी और विश्लेषण, मुफ्त डेटा डाउनलोड और उत्पाद, वास्तविक समय आपदा सेवाओं, क्राउडसोर्सिंग के लिए ऐप और विविध भू-स्थानिक अनुप्रयोगों का विज़ुअलाइज़ेशन शामिल है। प्लेटफॉर्म इंटरैक्टिव उपयोग के लिए कई भाषाओं के उपयोग का भी समर्थन करता है। अंग्रेजी के अलावा, भुवन अब हिंदी, तमिल और तेलुगु में उपलब्ध है और सभी प्रमुख भारतीय भाषाओं में विस्तार करने की दिशा में काम कर रहा है। भुवन दैनिक आधार पर नए अनुप्रयोग और सेवाएं प्रदान कर रहा है, जिसमें विशेष उत्पाद और अभिनव विज़ुअलाइज़ेशन क्षमताएं शामिल हैं।

चलो भुवन से शुरू करते हैं।

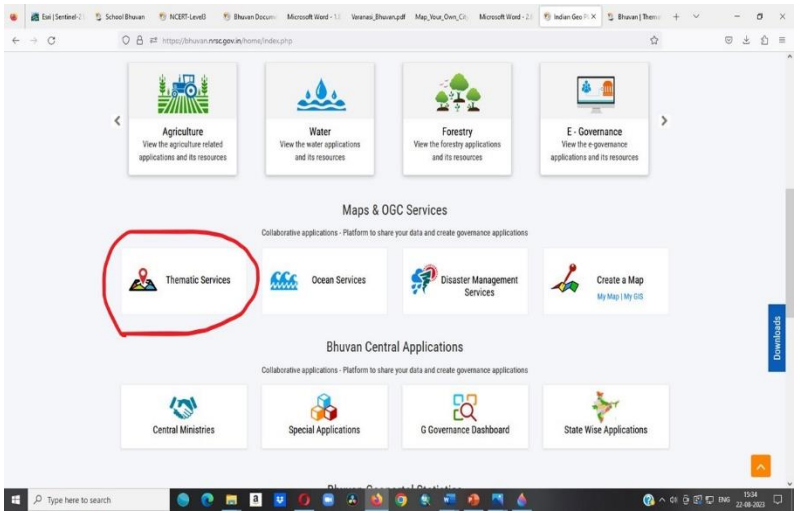


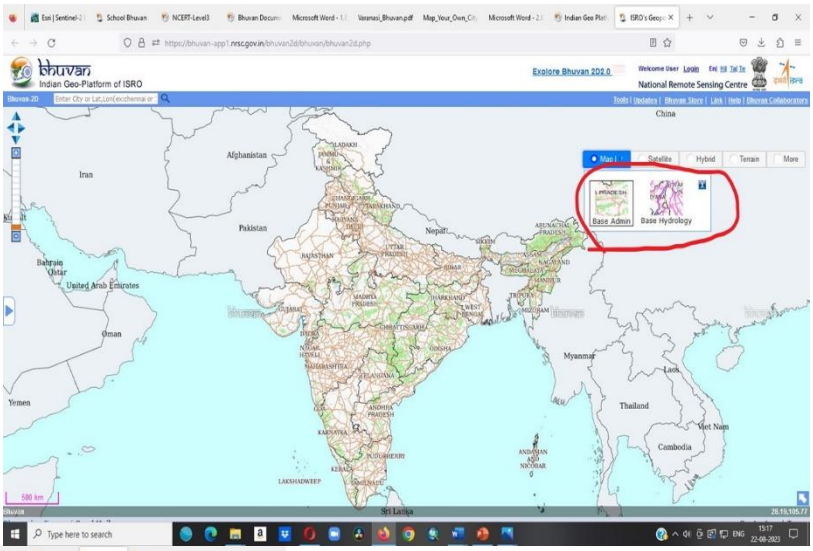
यदि आप "भारत: भौतिक पर्यावरण" पढ़ा रहे हैं, तो अपने छात्रों को दृश्य चित्र दिखाने के लिए भुवन 2 डी पर जाएं। भुवन 2 डी पर क्लिक करें। दाएं कोने में, आपके पास भाषा बदलने का विकल्प है।

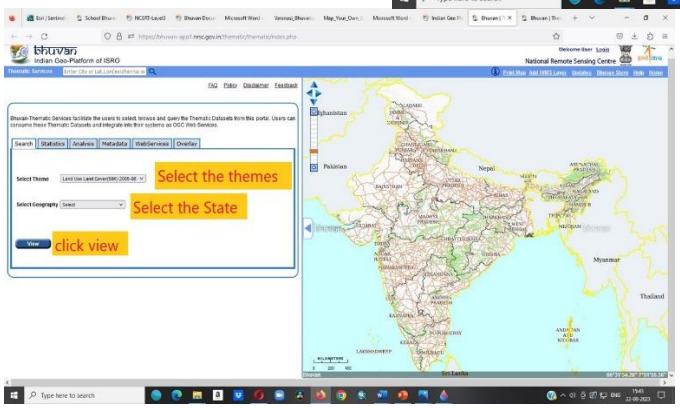


बेस हाइड्रोलॉजी पर क्लिक करने से भारत का ड्रेनेज सिस्टम दिखाई देगा। इसी तरह, कक्षा की आवश्यकता के अनुसार, शिक्षक अन्य विकल्पों जैसे उपग्रह, हाइब्रिड, इलाके और बहुत कुछ पर क्लिक कर सकते हैं।

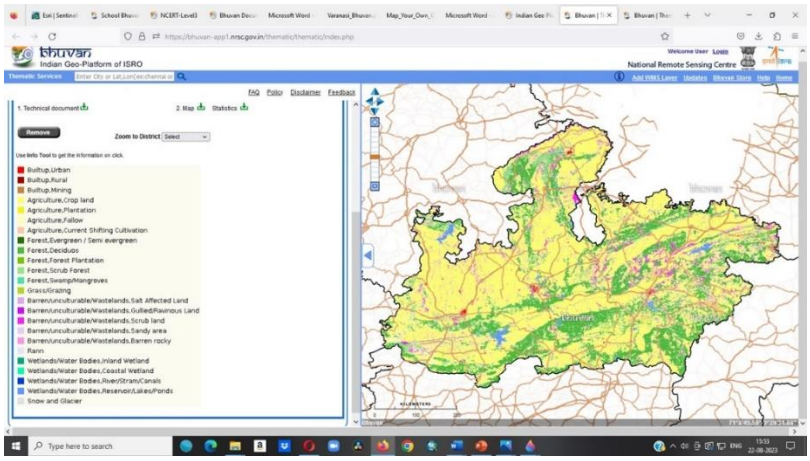
विषयगत सेवा उपयोगकर्ताओं को विषयगत डेटासेट जैसे लैंडयूज लैंड कवर, भूमि क्षरण, शहरी भूमि उपयोग आदि का चयन करने, ब्राउज़ करने और क्वेरी करने की सुविधा प्रदान करती है।

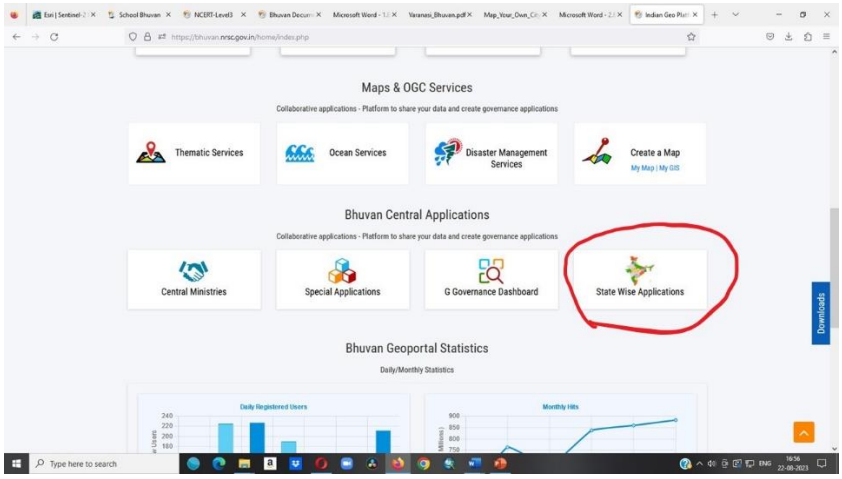




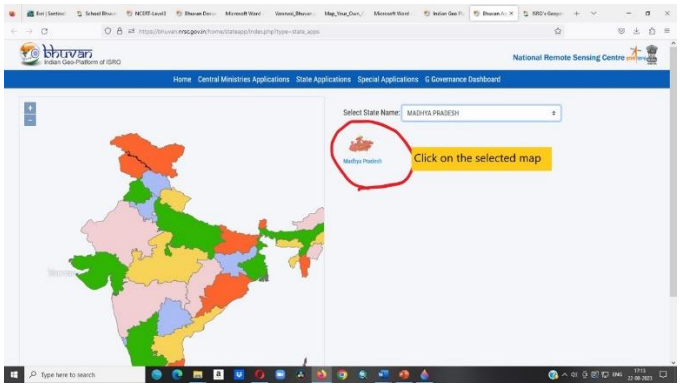


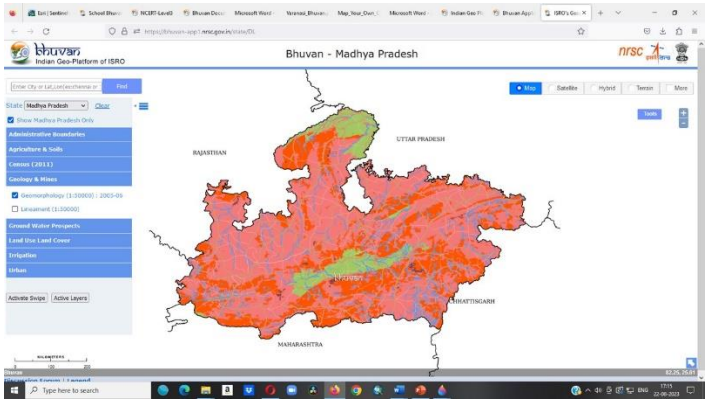
उदाहरण के लिए, यदि आप मध्य प्रदेश की भू-आकृति विज्ञान दिखाना चाहते हैं, तो राज्य का चयन करें।





कृषि और मिट्टी, भूविज्ञान और खान, भूजल की संभावनाएं, और भूमि उपयोग भूमि कवर डेटा देखने के लिए राज्यवार आवेदन पर क्लिक करें।



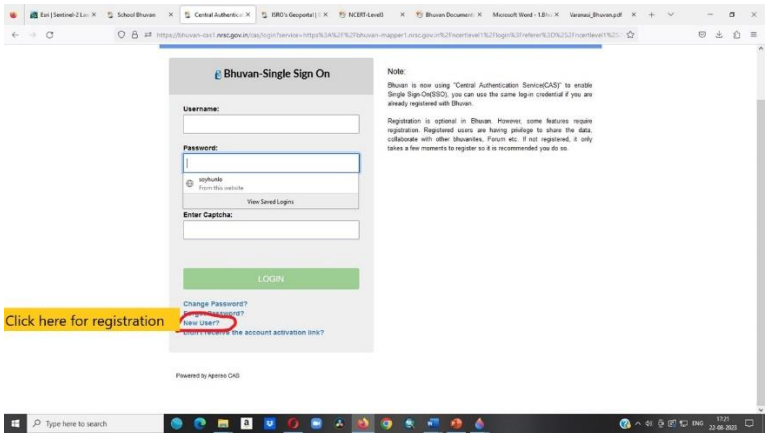


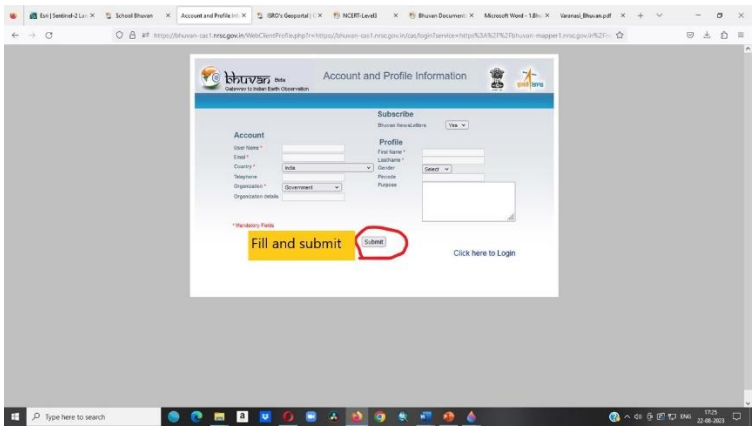
स्कूल भुवन

स्कूल भुवन पोर्टल देश के प्राकृतिक संसाधनों, पर्यावरण और सतत विकास में उनकी भूमिका के बारे में छात्रों के बीच जागरूकता लाने के लिए मानचित्र-आधारित शिक्षा प्रदान करता है।

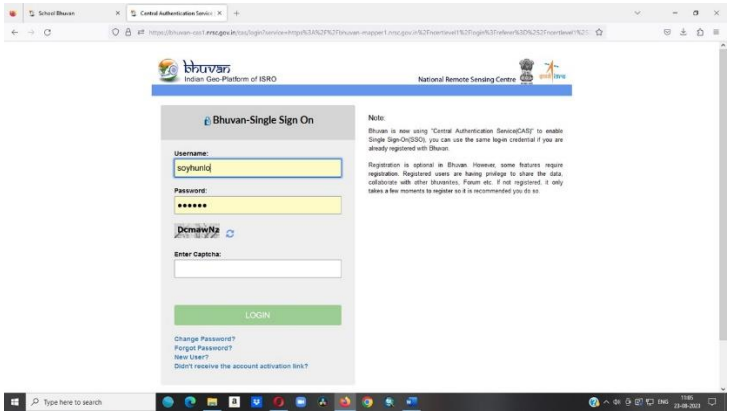
चलो स्कूल भुवन का पता लगाते हैं

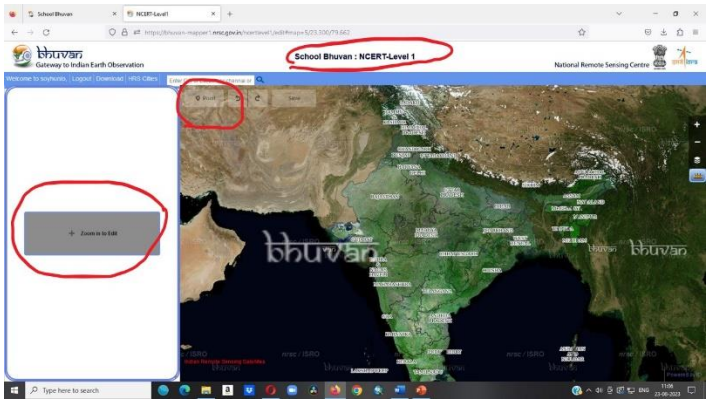
सबसे पहले, आपको पोर्टल में पंजीकरण करना होगा।

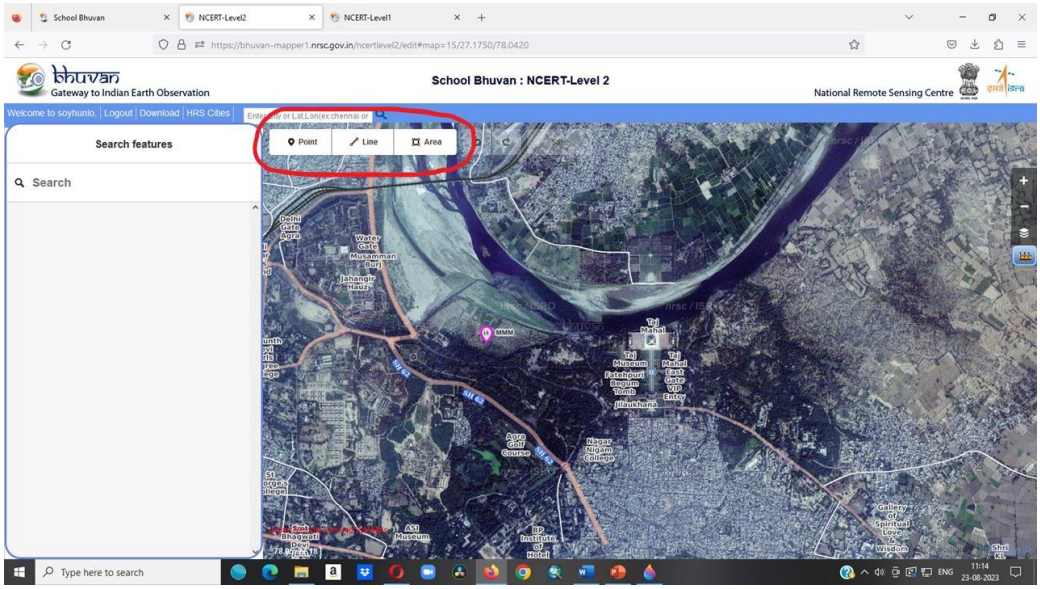


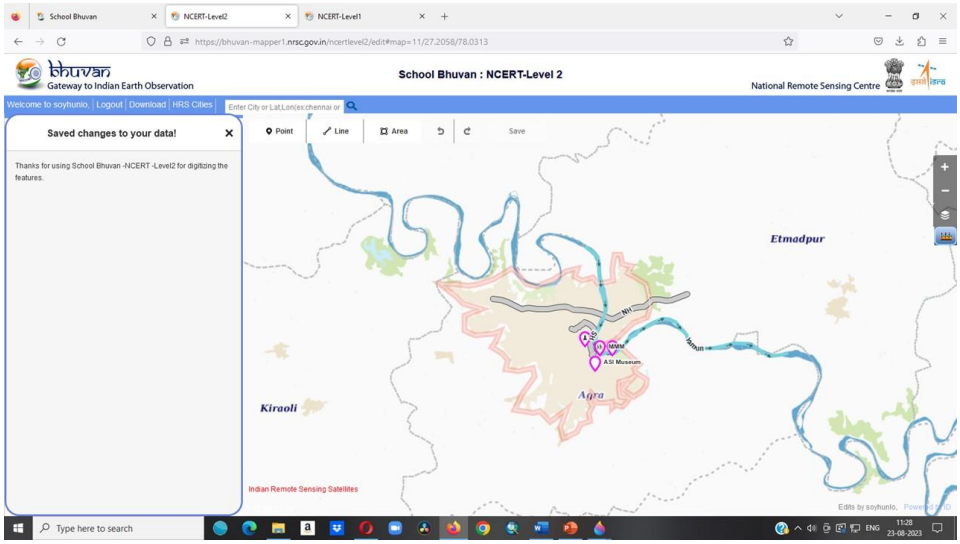


रजिस्टर होने के बाद आप लॉगिन कर सकते हैं।

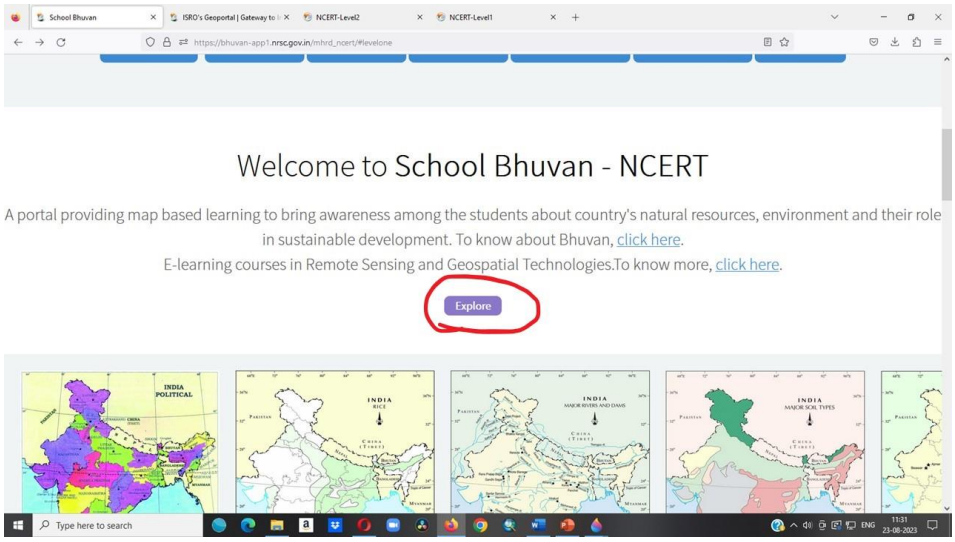




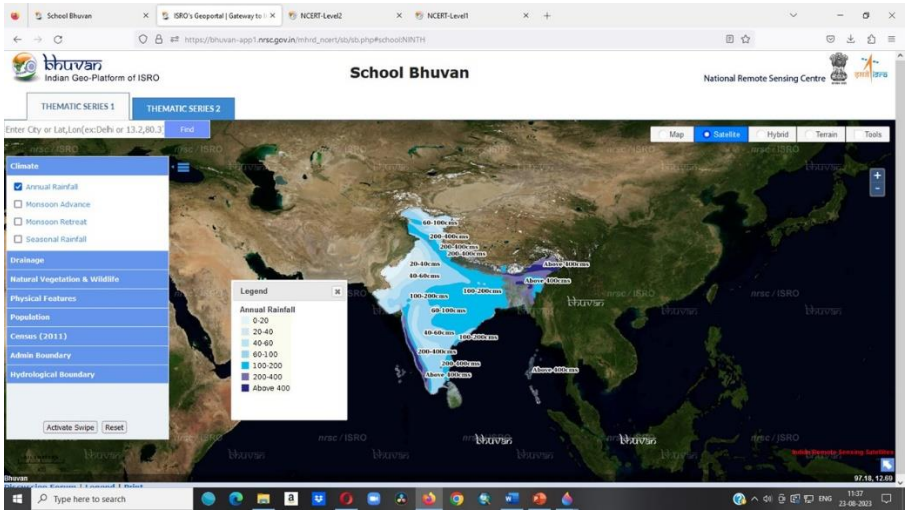




विषयगत 1 और विषयगत 2 का पता लगाने के लिए अन्वेषण पर क्लिक करें। विषयगत 1 जलवायु, जल निकासी, प्राकृतिक वनस्पति और वन्यजीव, भौतिक विशेषताओं, जनसंख्या, जनगणना (2011), प्रशासन सीमा, हाइड्रोलॉजिकल सीमा से संबंधित है। विषयगत 2 कृषि, पारंपरिक ऊर्जा स्रोत, उद्योग, खनिज, बिजली संयंत्रों, मिट्टी, परिवहन और जल संसाधन से संबंधित है।



उदाहरण आप जलवायु के तत्व दिखाना चाहते थे, जलवायु अनुभाग और वार्षिक वर्षा पर क्लिक करें। इसी तरह आप अन्य अनुभाग में एक ही चरण का पालन कर सकते हैं।



सीखने के परिणाम

i) प्रौद्योगिकी-एकीकृत शिक्षाशास्त्र हमेशा प्रकृति में दिलचस्प और इंटरैक्टिव है। यह शिक्षार्थियों को भौगोलिक संस्थाओं के स्थानिक वितरण को समझने में सक्षम बनाता है जो भौगोलिक पूछताछ और महत्वपूर्ण सोच को बढ़ावा देते हैंप्रौद्योगिकी-एकीकृत शिक्षाशास्त्र सूचना की एक विस्तृत श्रृंखला और अप-टू-डेट सांख्यिकी प्रदान करता है जो सूचना साक्षरता को बढ़ावा देता है।

ii) प्रौद्योगिकी-एकीकृत शिक्षाशास्त्र शिक्षार्थियों को लोगों और उनके सांस्कृतिक वातावरण को सीखने और समझने में सक्षम बनाता है जो सामाजिक कौशल को बढ़ावा देता है।

iii) प्रौद्योगिकी-एकीकृत शिक्षाशास्त्र शिक्षार्थियों को अपने निर्णय लेने के कौशल में सुधार करने में मदद करता है जो सहयोग कौशल और नेतृत्व कौशल को बढ़ावा देता है।

iv) प्रौद्योगिकी-एकीकृत शिक्षाशास्त्र शिक्षार्थियों को डिजिटल वातावरण को समझने में मदद करता है जो प्रौद्योगिकी साक्षरता को बढ़ावा देता है।

Video and Audio Editing Tools

- Ms. Urvashi Shrivastava & Mr. Ashok Shaky

About Audacity

Audacity is a free, open-source audio editor and recorder that can be used on several operating systems including Windows and MAC. The Audacity project was started nearly 20 years as part of a research project at Carnegie Mellon University. This tool developed by Mazzoni and Dannenberg was initially released as an open-source audio editor in May 2000.

Open-source software means that the source code is available for individuals to study, change, use, and distribute. Currently, the tool is distributed the terms of the GNU General Public License (GPL) and maintained by a team of global volunteers.

As a free software, you can install Audacity on any personal or work (with appropriate permissions) device for personal, commercial, or educational use. For other terms and conditions regarding the reselling and rebranding of Audacity, visit their site at https://www.audacityteam.org/about/license/.

Download Audacity

Currently, Audacity is only available as a 32-bit application that can be used on a 32-bit and 64-bit system. In order to use Audacity on your Windows, MAC, or GNU/Linux device, you must download the software. You also have the option of building Audacity yourself utilizing the source code.

Safe Downloading & Access Links

Prior to downloading the software, visit Audacity's safety when downloading page where you can access their checksum list for insuring that the download file is correct:

https://www.audacityteam.org/download/online-safety-when-downloading/

Click the following links adjacent to your operating system to download the software. Please note that GNU/Linux is source code for those advanced users desiring to build their Audacity, rather than simply download the software.

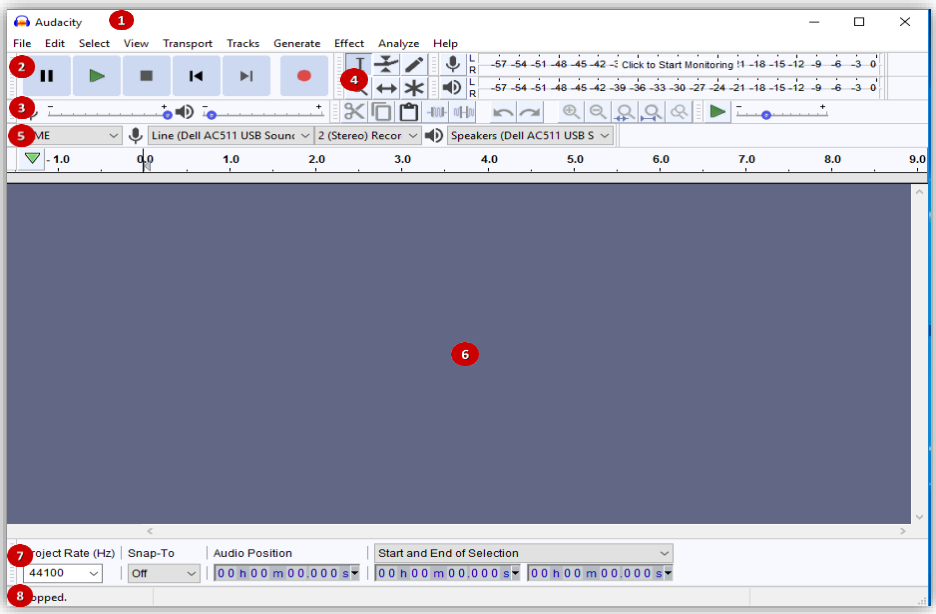
Audacity for **Windows**	https://www.audacityteam.org/download/windows/
Audacity for **MAC OS X/macOS**	https://www.audacityteam.org/download/mac/
Audacity for **GNU/Linux** (source code)	https://www.audacityteam.org/download/mac/

Navigating the Audacity Interface

Now that you've installed Audacity, you will want to familiarize yourself with the interface. Please read descriptions of the key components below.

Menu Bar: access to commands such as file upload, creating new audio, and processing audio.

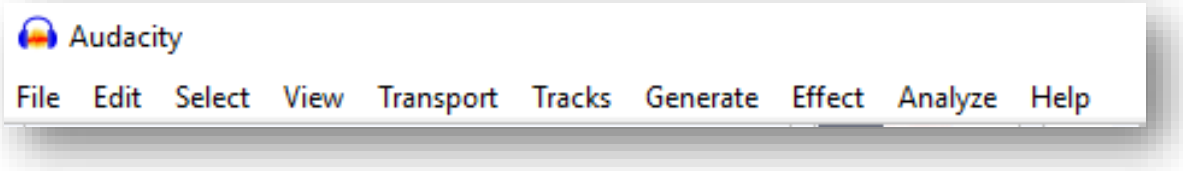
1. **Transport Toolbar:** buttons for controlling playback, recording, and moving projects.
2. **Mixer Toolbar:** can be used to adjust the volume for recording and playback.
3. **Tools Toolbar:** enables you to manage tasks such as zooming, time-shifting, and adjusting volume.
4. **Device Toolbar:** select your device for recording and playback.
5. **Track Display Area:** the project window, acts as a visual display area for audio tracks.
6. **Selection Toolbar:** use to control project rate and manipulate time.
7. **Status Bar:** displays message about recording/playback, indicates where mouse is hovering, shows hints.



Getting Started with Audacity- Audacity can be used to import and record audio files. This is a quick guide to the basic tasks of:

- Importing and recording audio
- Selecting audio to edit
- Editing your audio
- Saving your Audacity project
- Exporting your audio to MP3 or other audio file

Prior to performing these tasks, it is helpful to have an understanding of the menu bar commands in Audacity. The image below is the **menu bar** as it appears in Windows.



Command	What it provides…
File	Contains commands for creating, opening, importing, and exporting Audacity files
Edit	Basic editing commands: Undo, Delete, Duplicate, Paste
Select	Enables you to select specific parts of the audio track
View	Allows you to zoom in on track details and view track history

Transport	Commands include Play, Stop, Record, and Scrubbing
Tracks	Commands are for creating and removing, mixing, muting, aligning, sorting tracks
Generate	For audio creation using noise, silence, or tones-includes rhythm track, risset drum
Effect	Commands to apply effects to audio such as fade, reverse, bass, and echo
Analyze	Tools for finding out details in your audio including silence detection
Help	Commands to access Audacity manuals, screenshots, and diagnostic resources

Importing Audio

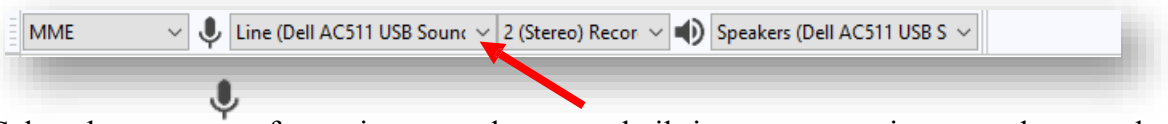
Import simply means adding new content to an Audacity project. Audacity can import and play a variety of audio formats including **AIFF, AU, FLAC, MP2, MP3, OGG Vorbis** and **WAV** in Windows, as well as **M4A** and **MOV** files from Apple devices.

To edit files **for a *new* project**, you can either drag the files into the project window or click **File** in the menu bar and choose **Open** to select your audio file.
If you want to add files to a ***current* project**, click **File** and choose **Import** and then select Audio type.

Recording Audio

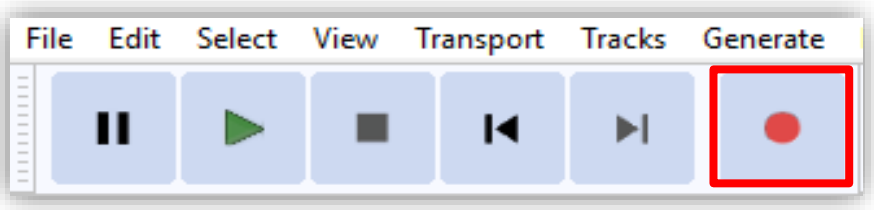
It is advisable that when recording with Audacity that you close all other applications. This can help minimize technical issues such as recording ticks. First, you will need to select your recording device.
Be mindful that bad audio can distract from the message that you are attempting to send. An external mic with noise cancellation is strongly suggested in order to enhance the quality of your recording.

First, select your device using the **Device Toolbar**.



1. Select the menu for options to select your built-in computer mic or another attached device which you will use for recording. Next to the mic options is the Recording Channels feature. Channel refers to the number of signals used by the microphone driver. If your device is mono, Select 1 (Mono). If the device is stereo, select 2 (Stereo). Refer to your mic property settings for more information if you are not sure which channel to select.

2. Next, use the playback menu to select your playback device. The playback device is not separate from the selected recording device and the appropriate device should appear by default. After selecting your device, you can monitor your voice level and adjust as needed. The playback sound can be adjusted using the right-hand slider on the Mixer Toolbar. Adjust the *recording* volume with the left slider.
3. Press the Record button in the Transport Toolbar to start recording.



When you are done recording, press the stop button.

Tip: Export the audio so that you have an original copy prior to editing. To do so, click File, then Export and Export Audio and select to WAV or AIFF.

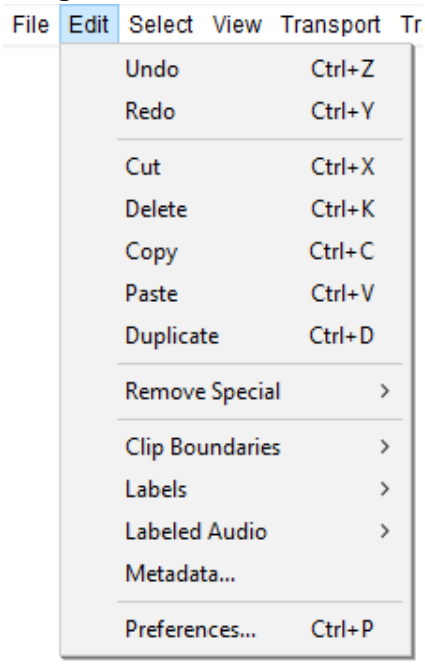
Selecting Audio to Edit

Using your **mouse to select** parts of the track to edit will facilitate smoother editing. First, make sure that **the Selection tool** from the Tools Toolbar is still highlighted blue (by default). If not, click the I in the toolbar. Then, use your mouse to left click anywhere inside the audience track to edit. A hand icon will appear, pointing to a vertical selection line. By dragging this line, you can **move the selection boundary** and pick a portion of the track. Release your mouse when done isolating your selection to start editing.

You can also select the entire track by using the Select command from the Transport Toolbar. Choose Select > All or the shortcut Ctrl + A.

Editing Your Audio

Editing actions that are commonly used can be found in the Edit menu. In addition to edits such as cutting and pasting you may want to add additional effects using the Effects menu.



To edit a file, select the region you want to edit by left-clicking in the track and then by dragging the shaded area. If you do not select a portion of the audio, Audacity will select *all* of the audio track displayed in the project window by default.

About common editing menu options

Undo-undoes the last editing operation you performed to your project

Redo-redoes editing operations that were undone; if you perform a new edit, you cannot redo operations that were undone

Cut-removes selected audio data and labels and copies them to the clipboard

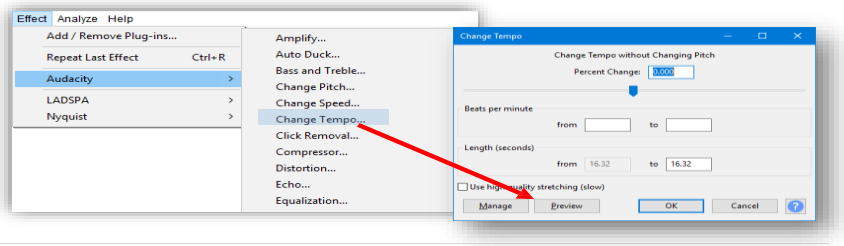
Delete-removes selected audio and labels without copying them to the clipboard

Copy-copies the audio data to the clipboard without removing it from project

Paste-pastes audio data which has been cut or copied to the clipboard; inserted at cursor point,

or replaces selection

Duplicate-creates a new track containing only the current selection as new clip



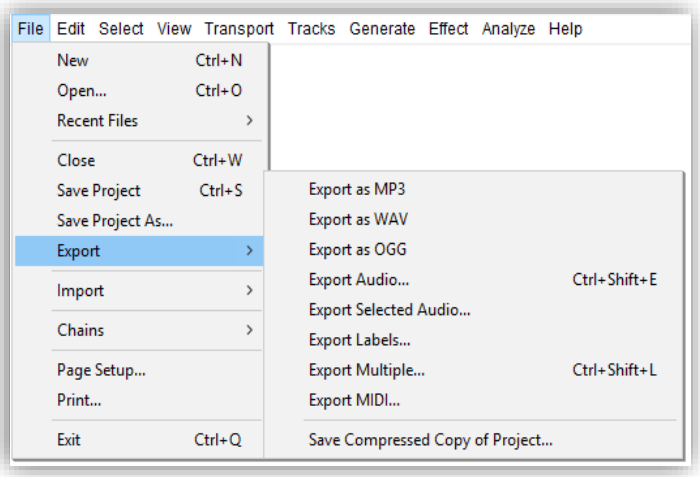
Choosing Effects

To apply effects, you will first need to left-click within the track to select the audio. Next, click the **Effects** menu and choose an effect. Lastly, set the parameters for the effect and select the Start Playback or Preview button to preview. When you are satisfied with the effect press OK to apply it to your audio.

Saving and Exporting Audacity Projects

Saving Your Audacity Project

To continue *editing* your audio file in Audacity with other tracks, you will need to save an Audacity Project. Click the File button on the Transport tool and select **Save Project**. The file will save as an .aup project file and a _data folder containing the actual audio.



This saves or updates the .aup file and _data folder. Saving a project lets you save unfinished work and reopen it later in Audacity exactly as it was and with all your edits and recorded tracks still in place.

Please note that .aup files cannot be opened by other programs and must be kept together in the folder as created by Audacity. Please do not rename or move files as you may not be able to reopen them in Audacity for further edits.

You can also select the **Save Project As** option for saving an empty project or for saving an existing project with a new name. According to Audacity developers, Save Project As is also the safe and *recommended* way to make a copy of a project with a new name or in a different location which can serve either as a single backup copy, or as one of several incremental copies of the project.

Exporting Your Audacity Project

To *share* your audio or to hear your audio in other applications, you will need to Export the files from Audacity. Available formats in Audacity include WAV and Ogg Vorbis.

One of the most commonly shared formats is MP3. However, in order to export as MP3s, you will need to have Lame MP# encoder installed on your device. In addition, for other formats including MP4, WMA, and AMR, you will need FFmpeg library.

Access guide for installing these tools at:
https://manual.audacityteam.org/man/faq_installation_and_plug_ins.html#lame
To export a file, select File and then Export and choose among these options:

- Export as Audio (MP3, WAV)-choose the file format you want to export in the dropdown menu
- Export Selected Audio-to export only selected audio
- Export Multiple-to export multiple files at the same time

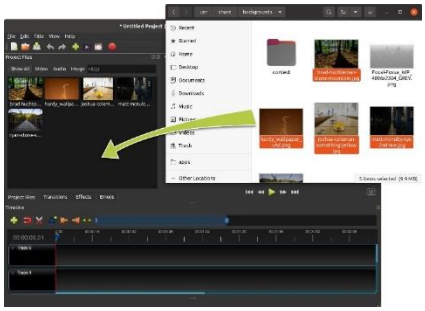
OpenShot Video Editor

OpenShot Video Editor is an award-winning, open-source video editor, available on Linux, Mac, Chrome OS, and Windows. OpenShot can create stunning videos, films, and animations with an easy-to-use interface and rich set of features.

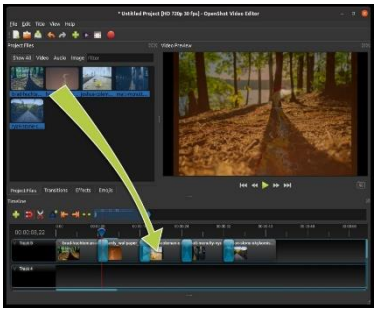
Basic Terminology

To help understand the steps below, here are some definitions of a few basic terms used in this tutorial.

Term	Description
Project	A **project** includes references to all the video files and edits (animations, titles, etc. . .), saved in a single file.
Timeline	The **timeline** is an editing user interface that represents edits and clips on a horizontal ruler. Time progresses from left to right.
Track	A separate **layer** on the timeline, which can hold clips. A timeline is made up of many tracks, stacked vertically.
Clip	A **trimmed** portion of video, audio, or both positioned on a track, and at a specific position in time. When files are dropped on the timeline, they are represented as a Clip.
Transition	A method to **blend** two images. Transitions can take many forms, including cuts, dissolves, and wipes.



Step 1 – Import Photos & Music

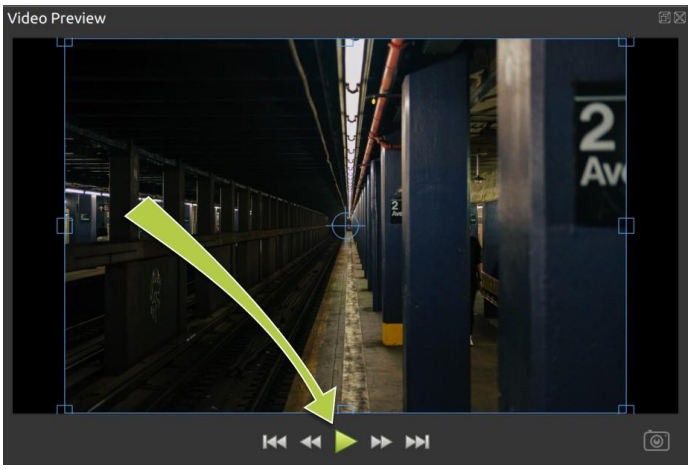


Before we can begin making a video, we need to import media files into OpenShot. Most video, image and music file formats will work. Drag and drop a few videos or images and a music file from your Desktop to OpenShot. Be sure to drop the files where the arrow in the illustration is pointing to.

Step 2 – Add Music to Timeline

Step 3 – Preview your Project

To preview what our video looks & sounds like, click the *Play* button under the preview window. You can also pause,rewind, and fast-forward your video project by clicking the corresponding buttons.



Step 4 – Export your Video

Once you are satisfied with your slideshow video, the next step is to export your video. This will convert your OpenShot project into a single video file, which will work on most media players (like VLC) or websites (like YouTube, Vimeo, etc.). Click the Export video icon at the top of the screen (or use the File menu> Export video). Choose one of the many preset export options and click the Export Video button.

How to Create and Analyse Google Forms

- Dr. Ganga Mahto

Introduction

Google Forms is a powerful and user-friendly tool that allows individuals and organizations to create online surveys and forms. Whether you're collecting feedback, conducting research, or organizing an event, Google Forms provides a versatile platform for gathering and analyzing data. In this comprehensive guide, we will explore the various features of Google Forms, step-by-step instructions on creating forms, customization options, and strategies for analyzing collected data. Additionally, we will include screenshots to provide visual guidance throughout the process.

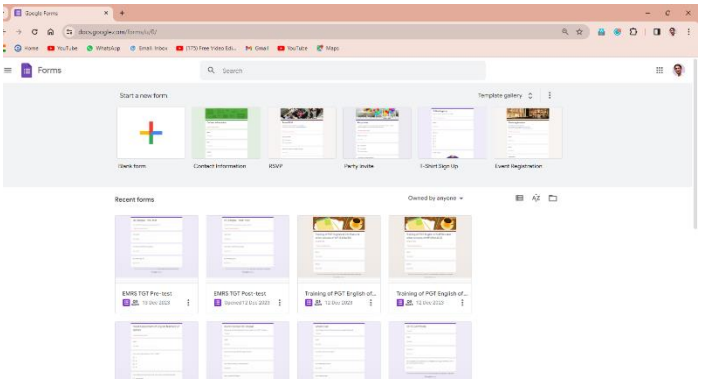
1.1 Overview of Google Forms

Google Forms is a free online survey tool developed by Google. It allows users to create customizable forms and surveys quickly. Users can design forms for various purposes, such as event registrations, customer feedback, academic research, and more. Google Forms automatically stores responses in a connected Google Sheets spreadsheet, making it easy to analyze and visualize collected data.

1.2 Accessing Google Forms

To access Google Forms, you need a Google account. Visit https://docs.google.com/forms/u/0/ and sign in with your Google credentials. If you don't have an account, you can create one for free.

1.3 Interface Overview



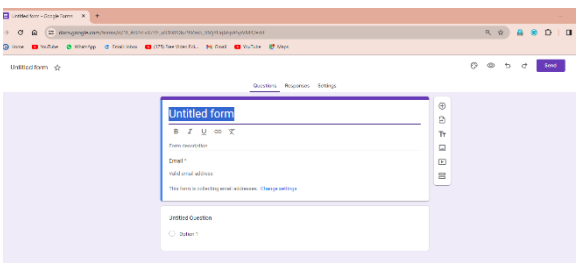
Upon accessing Google Forms, you'll encounter a clean and intuitive interface. The main components include the toolbar, form canvas, and form settings. The toolbar contains options to add questions, change the form theme, and preview the form. The form canvas is where you design your form, and the form settings allow you to configure various aspects such as form title, description, and more.

2. Creating a Basic Form

You may start creating the form by clicking the + tab which says “Blank form.”

2.1 Form Title and Description

When creating a form, start by giving it a descriptive title and, if needed, a brief description. The title should provide a clear indication of the form's purpose, and the description can offer additional context or instructions for respondents.



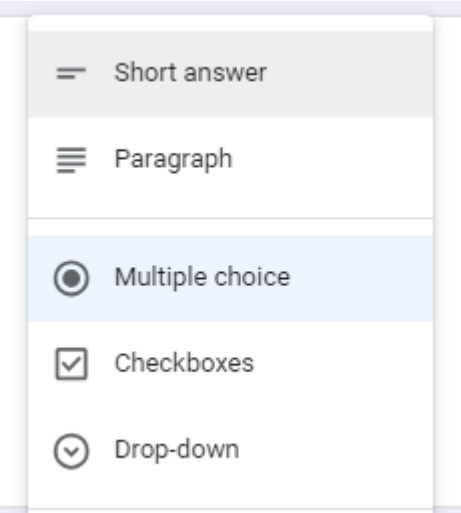
Click on the form title at the top, and a pop-up window will appear.

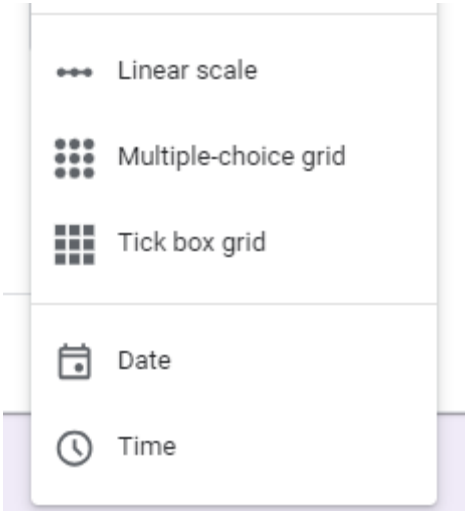
Enter the desired title and description.

Click "OK" to save your changes.

2.2 Adding Questions

To gather information, add questions to your form. Google Forms supports various question types, including multiple-choice, short answer, paragraph, and more.





Click on the "+" button in the toolbar.

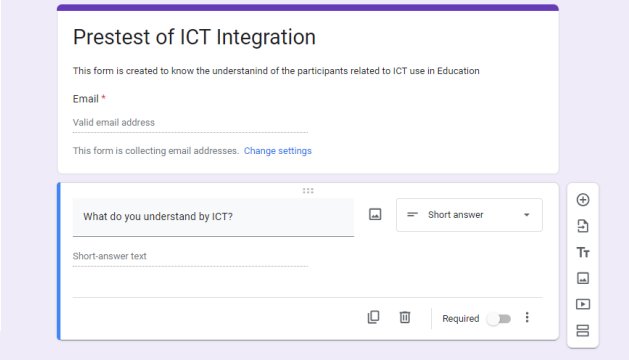
Select the question type from the options.

Enter the question text and customize options as needed.

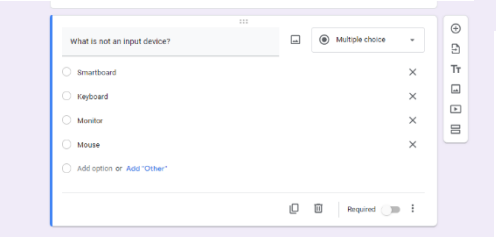
2.3 Types of Questions

Google Forms offers a variety of question types to suit different data collection needs. Some common question types include:

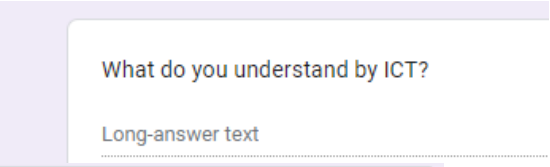
Short Answer



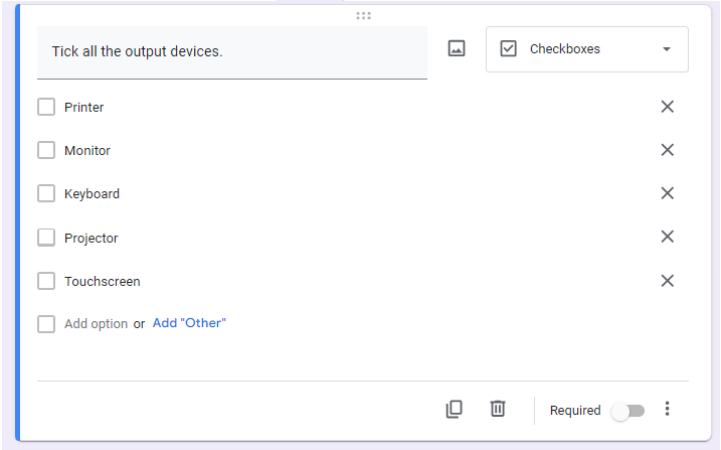
Multiple Choice



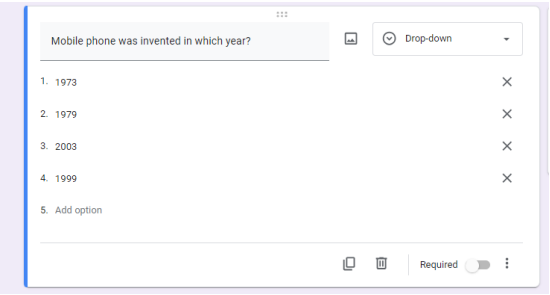
Paragraph



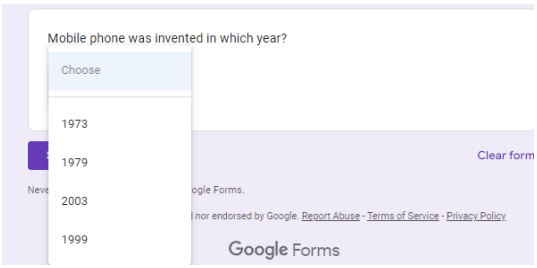
Checkbox



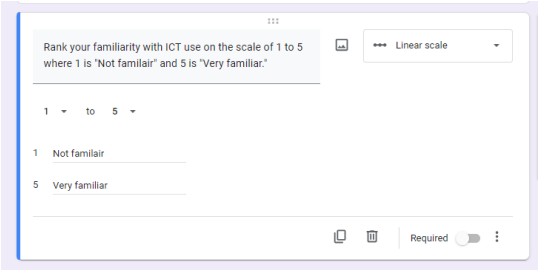
Dropdown



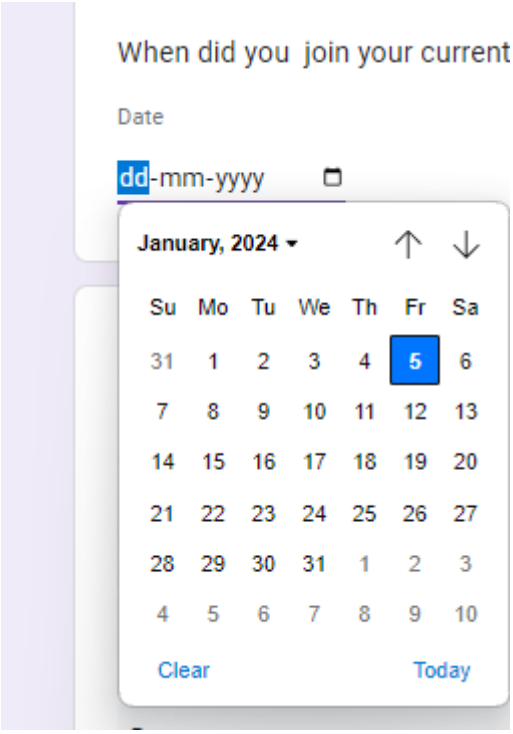
This is how the drop-down question will appear for the receivers.



Linear Scale

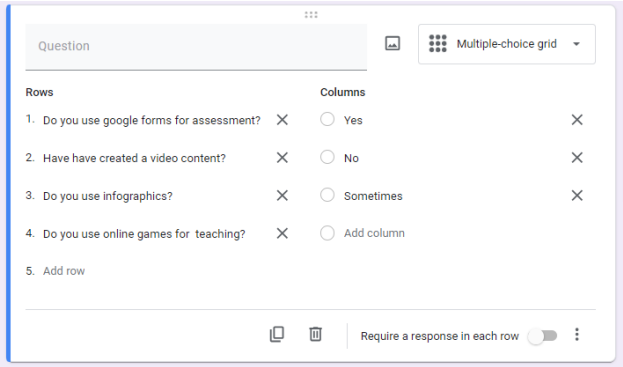


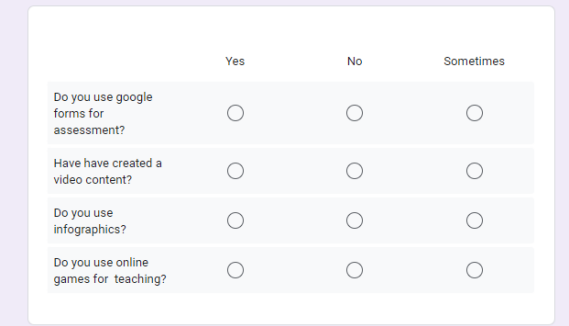
Date and Time



Multiple Choice Grid

This is how the multiple-choice grid question will appear for the receivers.

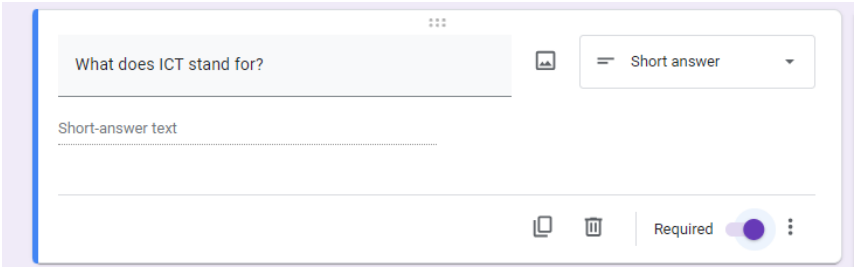




Experiment with these question types based on the type of information you want to collect.

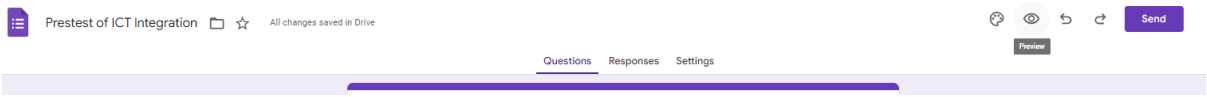
2.4 Required Questions

Designate questions as required to ensure respondents provide essential information. Toggle the "Required" switch when adding or editing a question.



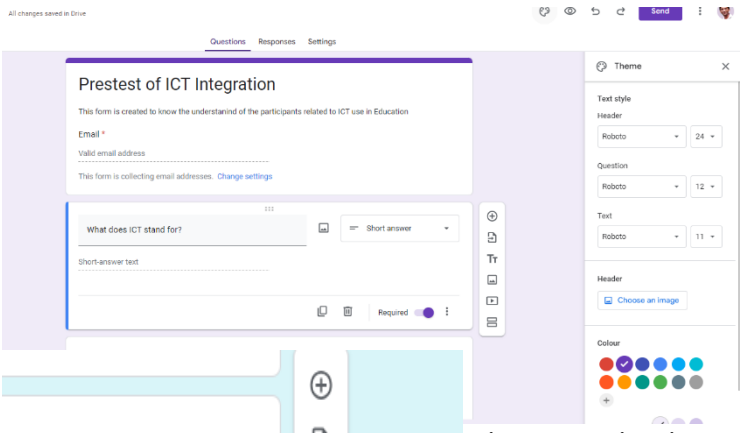
2.5 Previewing the Form

Before sharing the form, preview it to ensure everything appears as intended. Click on the eye icon in the toolbar to enter preview mode.



3. Advanced Form Customization

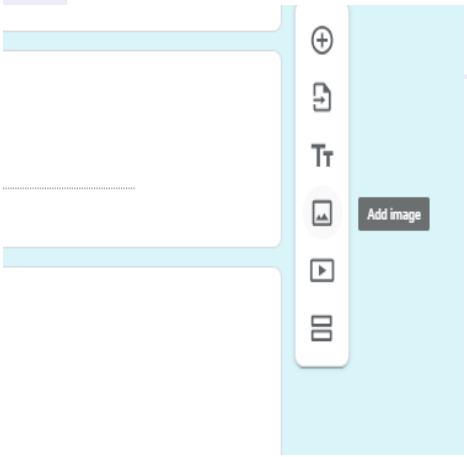
3.1 Theme Customization

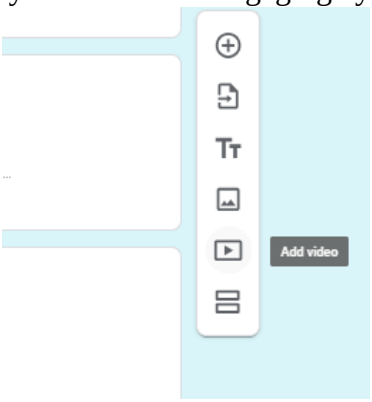


Enhance the visual appeal of your form by customizing its theme. Click on the palette icon in the toolbar to access theme options. Experiment with colors, fonts, and background images to create a personalized look.

3.2 Adding Images and Videos

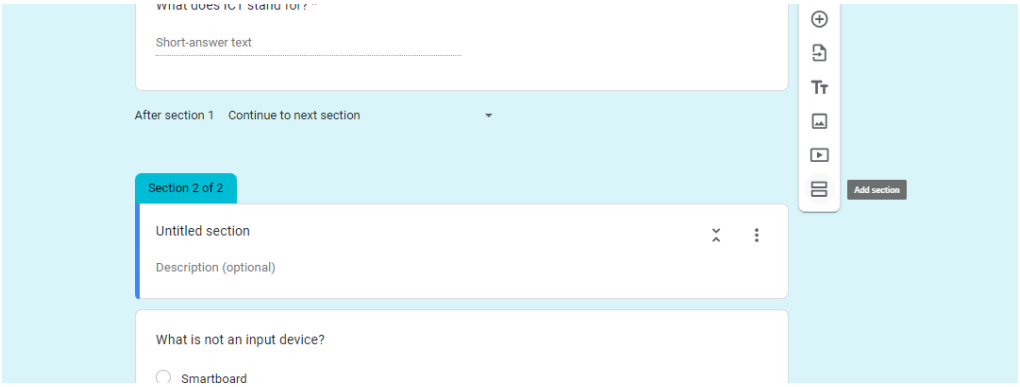
Make your form more engaging by incorporating images and videos. Use the image and video icons in the toolbar to upload media from your computer or link to online content.





3.3 Section Breaks

Organize your form into sections for a more structured experience. Add section breaks to group related questions together and provide context to respondents.

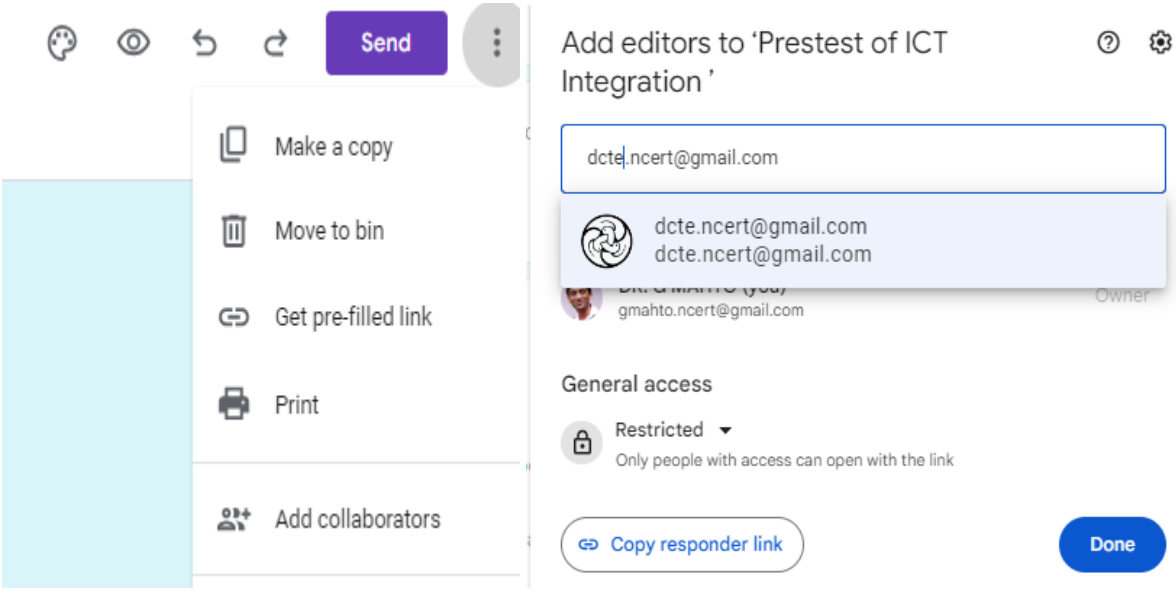


For longer forms, consider breaking them into multiple pages. Use the page break option to create a seamless navigation experience for respondents.

4. Collaboration and Sharing

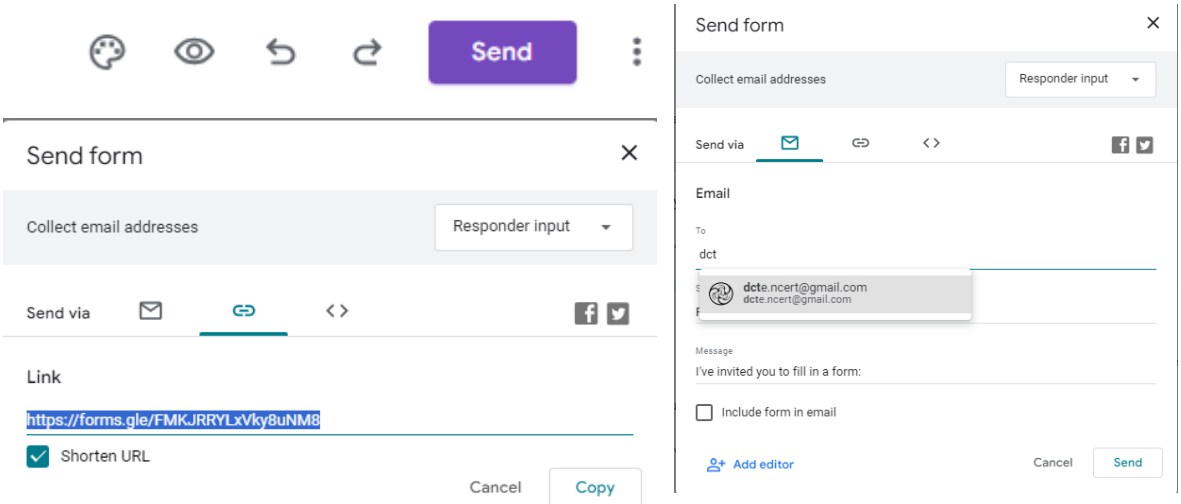
4.1 Collaborative Editing

Google Forms supports real-time collaborative editing, allowing multiple users to work on a form simultaneously. Share the form with collaborators and see edits in real-time.

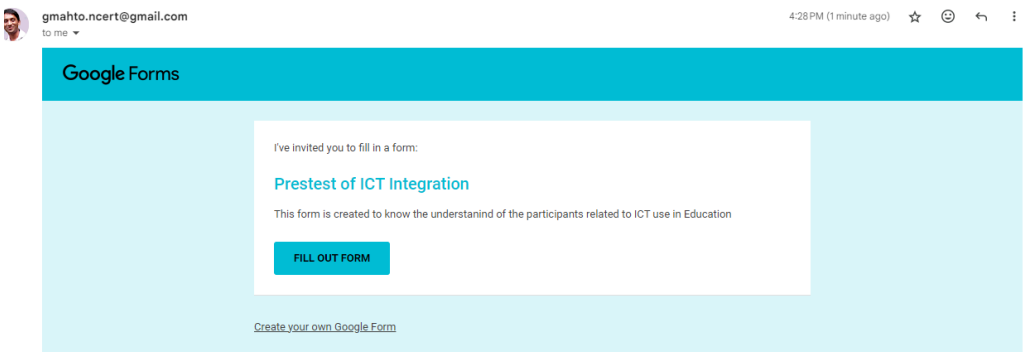


4.2 Sharing Options

Once your form is ready, share it with respondents. Click on the "Send" button in the top-right corner to access various sharing options, including email, link, and social media.

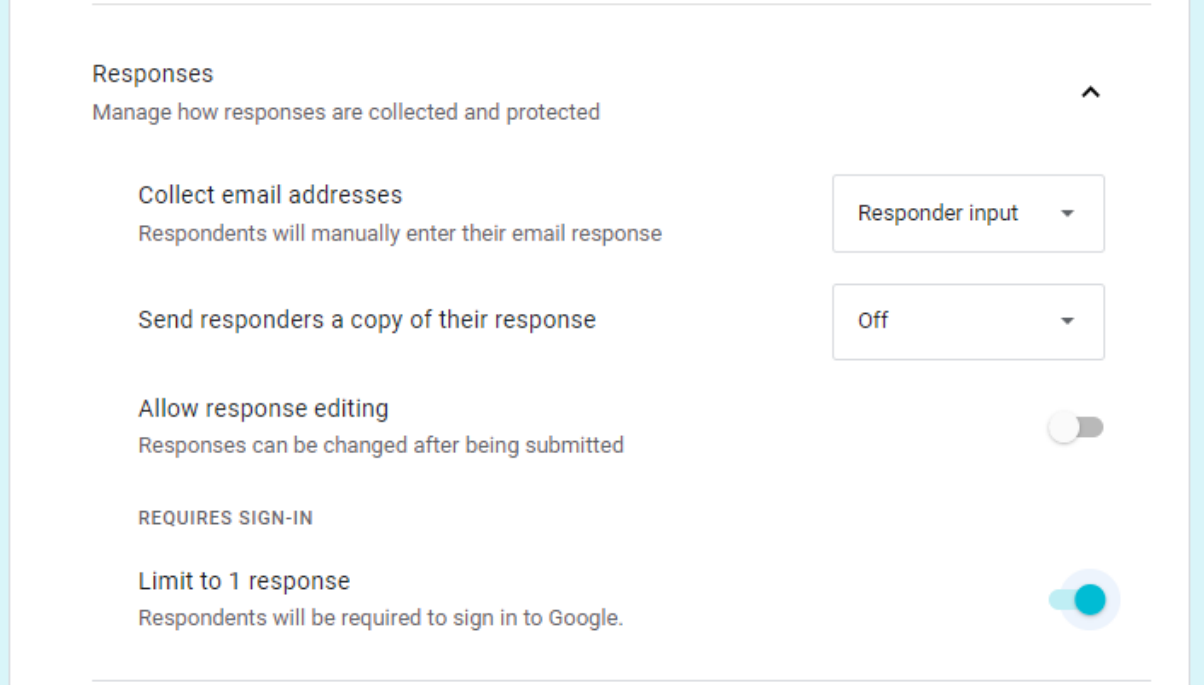


This is how the received forms will appear to the receivers.



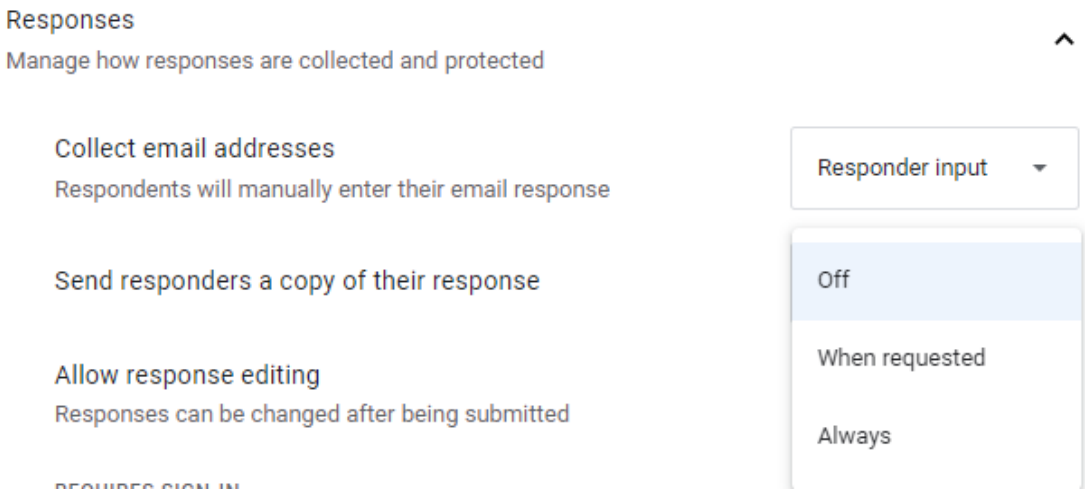
4.3 Collecting Responses

Choose how respondents submit their answers. Google Forms supports online responses, email collection, and even allows you to limit responses to one per person.



4.4 Response Notifications

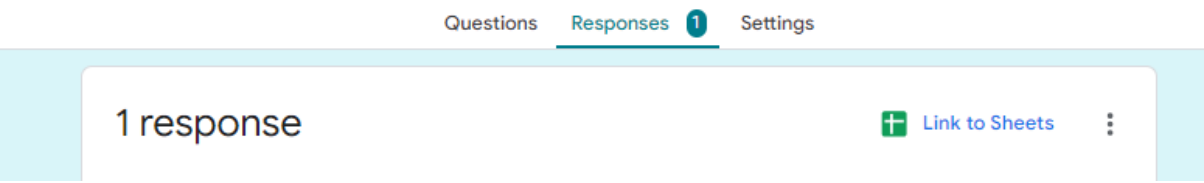
Receive email notifications whenever someone submits a response. Enable response notifications in the form settings to stay informed about new submissions.



5. Data Analysis and Reporting

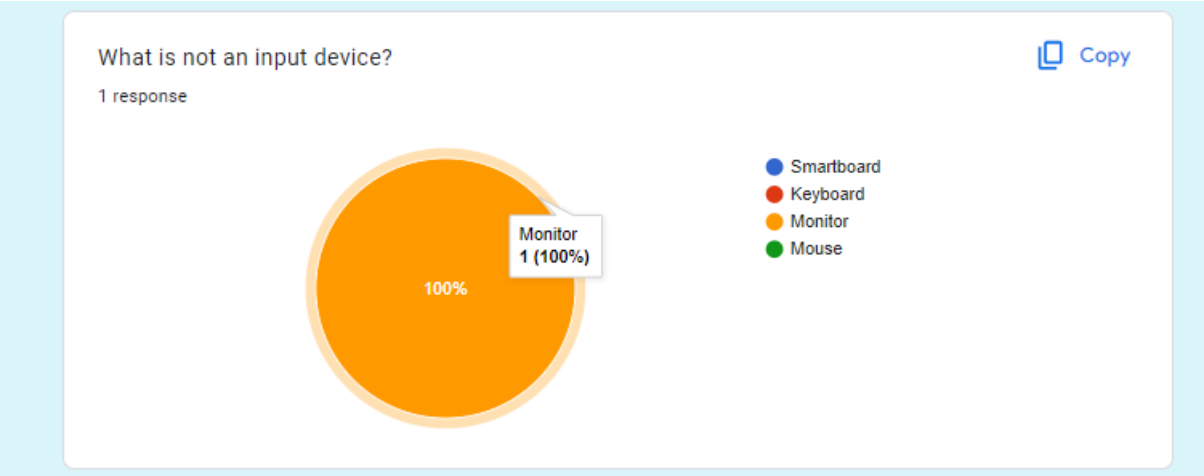
5.1 Viewing Responses

Access responses directly within Google Forms. Click on the "Responses" tab to view a summary of collected data.



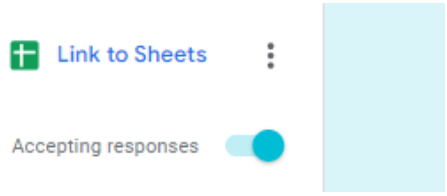
5.2 Summary of Responses

Review a summary of responses, including charts and graphs for visual analysis. Google Forms automatically generates visualizations to help you interpret the data.



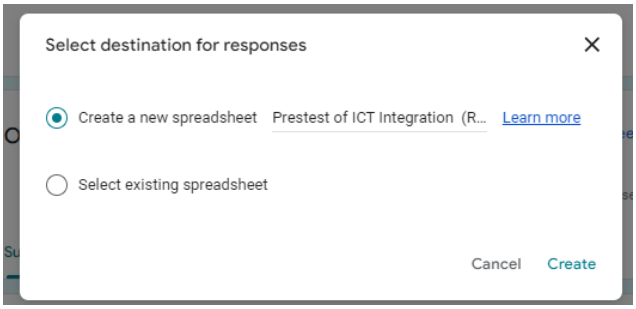
5.3 Downloading Responses

For more in-depth analysis, download responses as a spreadsheet. Click on the Sheets icon to create a linked Google Sheets document or download responses as a CSV file.



5.4 Integrating with Google Sheets

Leverage the power of Google Sheets for advanced data manipulation and visualization. The linked spreadsheet updates in real-time as new responses come in.



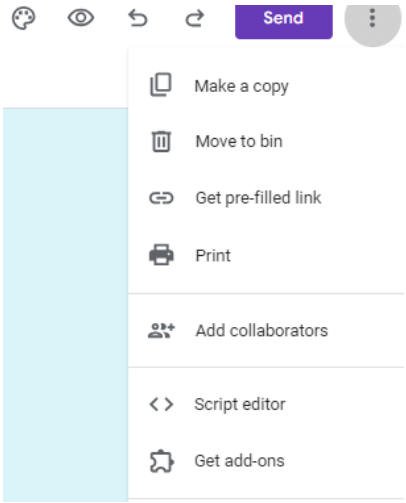
6. Advanced Features and Add-ons

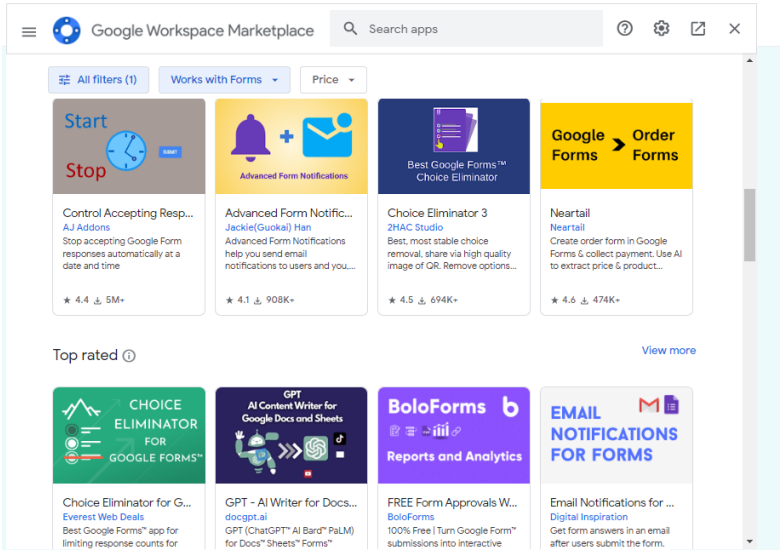
6.1 Add-ons Overview

Extend the functionality of Google Forms with add-ons. Add-ons are third-party tools that enhance form capabilities, such as advanced question types, data validation, and more.

6.2 Popular Google Forms Add-ons

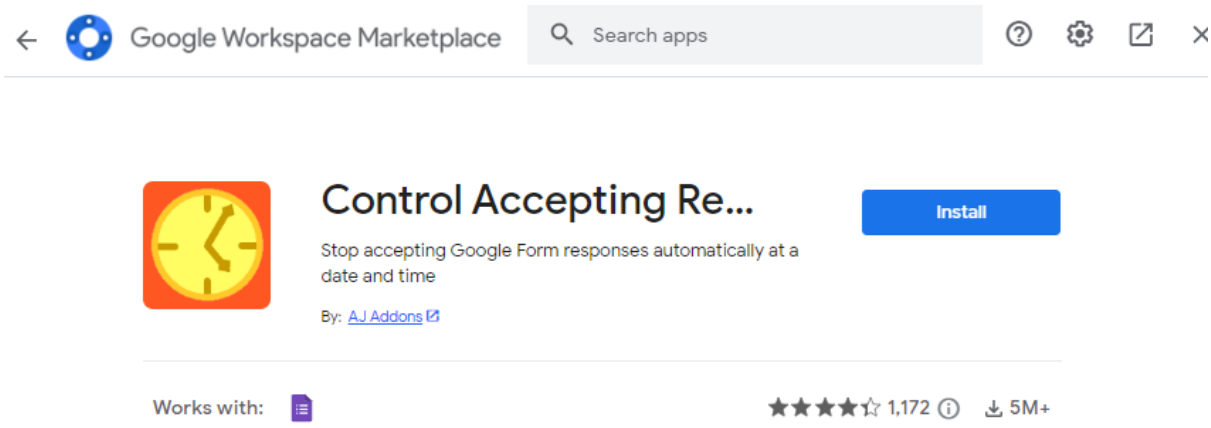
Explore popular add-ons like Form Publisher, FormLimiter, and Choice Eliminator. These add-ons offer advanced features such as document merging, response limiting, and dynamic answer choices.





6.3 Installing and Managing Add-ons

Learn how to install add-ons from the Google Workspace Marketplace. Access the "Add-ons" menu in Google Forms to manage installed add-ons and explore new ones.



7. Best Practices and Tips

7.1 Designing Effective Forms

Follow best practices for designing effective forms. Use clear and concise language, organize questions logically, and consider the respondent's experience throughout the survey.

7.2 Ensuring Accessibility

Create forms that are accessible to a wide audience. Utilize accessible design principles, such as providing alternative text for images and ensuring keyboard navigation.

7.3 Data Security and Privacy

Prioritize data security and privacy. Google Forms adheres to Google's robust security measures, but it's essential to be mindful of the information collected and how it's used.

7.4 Tips for Analyzing Data

Implement effective strategies for analyzing collected data. Use filters and pivot tables in Google Sheets to uncover trends and insights hidden within the responses.

8.2 Additional Resources and Support

You may watch the following videos for review and more information

English: https://www.youtube.com/watch?v=BtoOHhA3aPQ

Hindi: https://www.youtube.com/watch?v=bPGyesmwNQ0

Conclusion

Google Forms is a versatile and accessible tool for creating online surveys and forms. This comprehensive guide has covered the basics of creating a form, advanced customization options, collaboration and sharing features, data analysis techniques, and tips for optimizing the form creation process. By following this guide, users can harness the full potential of Google Forms to collect and analyze data effectively. Whether you're a student, researcher, or professional, Google Forms provides a user-friendly platform for gathering valuable insights from your audience.

References

https://docs.google.com/forms

Online Assessment Tools

- Ms. Swati Yadav

An online assessment may be defined as an evaluation of a person's abilities, behaviours and/or characteristics. This test is conducted over the Internet by using available web technologies.

An assessment may set out with clear objectives such as:

- To test the knowledge or learning of a candidate.
- To select suitable candidates from a huge pool of applicants.
- To identify the strengths and weaknesses of the test taker.
- To identify specific personality and character traits.
- To provide clues in career counseling and identify the suitable training, job or career for the test taker.

Online assessments are becoming quite popular and are being used quite extensively in various sectors including education, government and corporate companies.

Why choose Online Assessment over Traditional Assessment?

An online assessment gives you the advantage of speed and accuracy when compared with a traditional assessment method. The robust online tools eliminate any chances of malpractice and guarantee a positive evaluation.

Many institutions are relying on the online assessment for various reasons that are as follows:

- Online assessment saves lots of time and money.
- Ensures consistency in the exam session.
- It is accurate and secure.

Online Assessment in Education

The educational sector has been able to streamline their examination processes with online assessments, be it tests preparation, campus recruitment, entrance exams, or semester exams.

How can Online Assessment be helpful for students?

Online assessment helps students in a plenty of ways from improvement in learning skills to enhance students engagement. These assessments are carried out using an online assessment platform that makes the assessment conducting process incredibly simpler and productive. Here are a few benefits of online assessment, which is helpful for students that are as follows:

- Students can give exams on any device.
- It is quick to mark answers
- It offers quick feedback
- Offers friendly environment
- Students can give exams from anywhere and anytime.

As the field of education has moved more toward relying on education technology (or EdTech), institutions have encouraged teachers to increase their use of technology in the classroom.

What Online Assessment Tools can do?

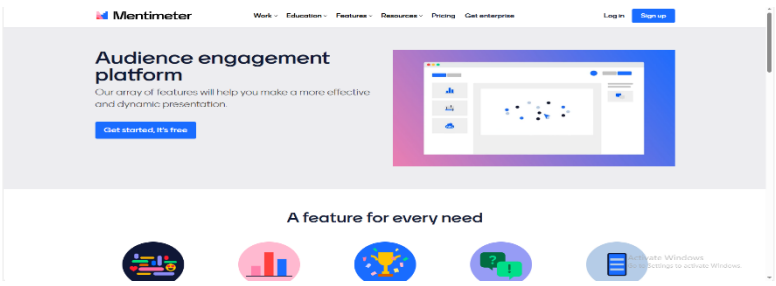
Teachers can use them to test students, gauge performance, organize unique activities, and encourage discussion. Here are some other ways to use these tools:

- Assign and grade homework.
- Conduct interviews (either with students or as an activity to assign students).
- Assess oral reports.
- Assess long-form writing assignments (term papers, essays, free writing).
- Record instructor observations.
- Distribute classroom surveys.
- Create and map curricula.
- Develop rubrics and conduct qualitative student assessments.
- Conduct focus groups.
- Create and evaluate student portfolios.

Some Online Assessment Tools

1. Kahoot	5. Google Forms	9. ProProfs	13. Plickers
2. Mentimeter	6. Pear Deck	10.Coggle	14. ClassMarker
3. Socrative	7. Rubistar	11. Edulastic	15. Quizalize
4. Quizlet	8. EDpuzzle	12. Padlet	16. Gimkit

1. Mentimeter



Mentimeter is great for gauging the understanding of the whole class and targeting outliers during formative assessment. It's also a valuable tool for tapping into the affective side of learning, including student motivation. "Mentimeter allows everyone to ask questions, to get clarification or a clearer understanding on subjects resulting in a more fulfilling learning experience."

2. Pear Deck

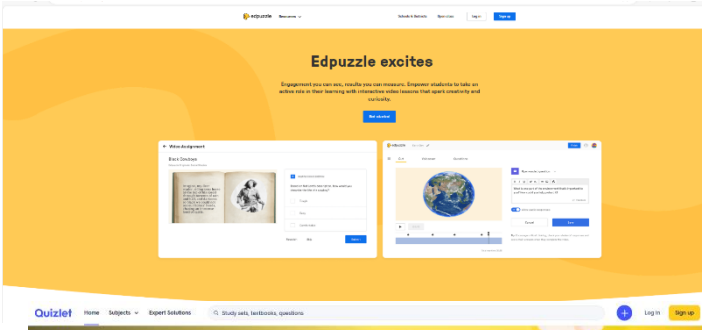
Pear Deck is a formative assessment tool that is a way to spruce up your existing slideshows and lectures. It's an extension for Google Slides that incorporates questions and activities into presentation material so that formative assessment doesn't have to slow down during a lecture.

3. Kahoot

This is the "fun one," with bright colors and music. There are countless existing quizzes and games on Kahoot already, so you can probably find something to meet your needs without starting from scratch.

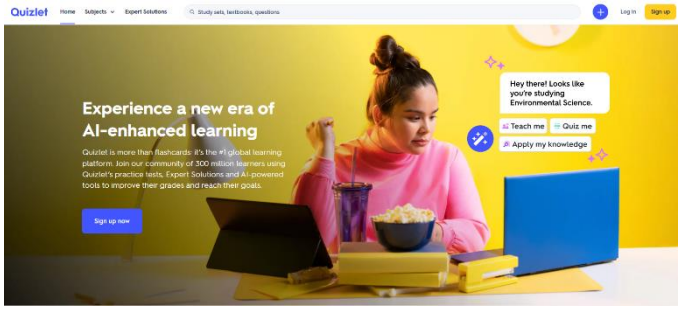
4. Edpuzzle

Edpuzzle is a tool that is perfect for assessment in a flipped-classroom setting or for video-based homework. You can assign a video (either your own or from the web) and offer questions and tips while the video is playing. The result is an interactive experience for the student and a clear understanding of students' knowledge and mastery for the teacher.



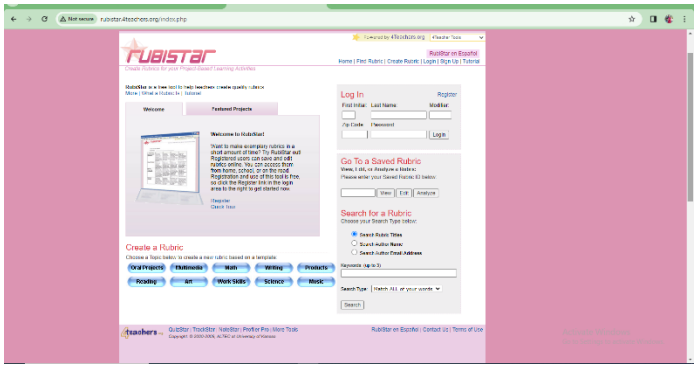
5. Quizlet

Quizlet is a tool based on the flashcard design, with 1-to-1 words and definitions to help students memorize essential info. Plus, it has many different ways to drill the material, including in-class competitions and games. There are many existing sets, so you probably won't have to start from scratch when building the vocab lists.



6. Rubistar

Rubistar is a simple online rubric generator where students and teachers can either choose from pre-made rubrics or design their own. You can create a rubric without creating an account, or sign up for easier access to all the content.



KAHOOT

First, what is Kahoot? Kahoot is a game-based learning platform used by millions of people around the world every day to discover, create, play and share learning games. It makes learning fun and engaging for students and teachers, businesses, families and friends.

At school, Kahoot can be used for any subject, any age, and with any device - students don't even need to register for an account. You can use Kahoot both when teaching in class, for distance learning and in a blended learning format. Millions of teachers use Kahoot to…

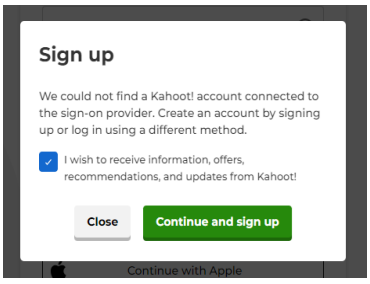
- Introduce new topics
- Review content at class and home
- Engage students via distance learning
- Run formative assessment

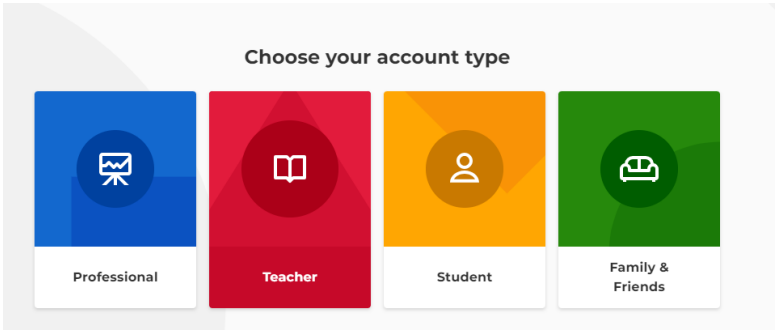
- Teach interactive lessons
- Break the ice and reward the class
- Collect student opinions
- Foster creativity and teamwork
- Engage colleagues with professional development

How to create a Kahoot account?

To get started with Kahoot as a teacher, you need to register for an account. Note that students don't need accounts in order to play kahoots.

1. Go to kahoot.com and click Sign up.
2. Choose Teacher as your account type.
3. Specify whether you work in a school, a higher education institution, or in school administration.
4. If you'd like to sign up with an email, type your email address and a secure password you'd like to use. Alternatively, you can sign up with your existing Google, Microsoft or Apple accounts and use those credentials to log in to Kahoot later.
5. Choose a plan: you can use Kahoot for free, or upgrade to one of our premium plans to unlock additional features. You can decide to upgrade at any time!
6. Fill out some additional information in the welcome screen so we can better customize the Kahoot experience for you.
7. Voila, you're a registered Kahoot user! Shortly, you'll receive a welcome email with some tips to get started.

1. 

2. 

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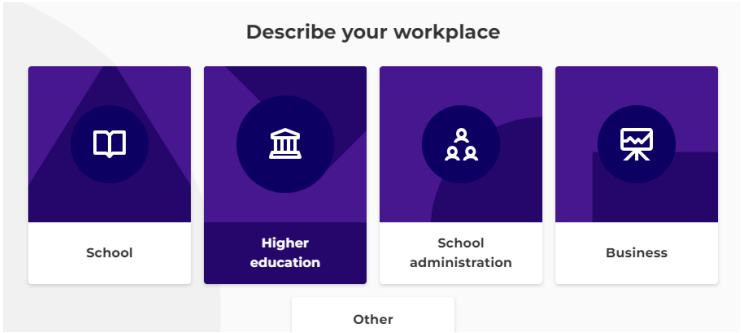

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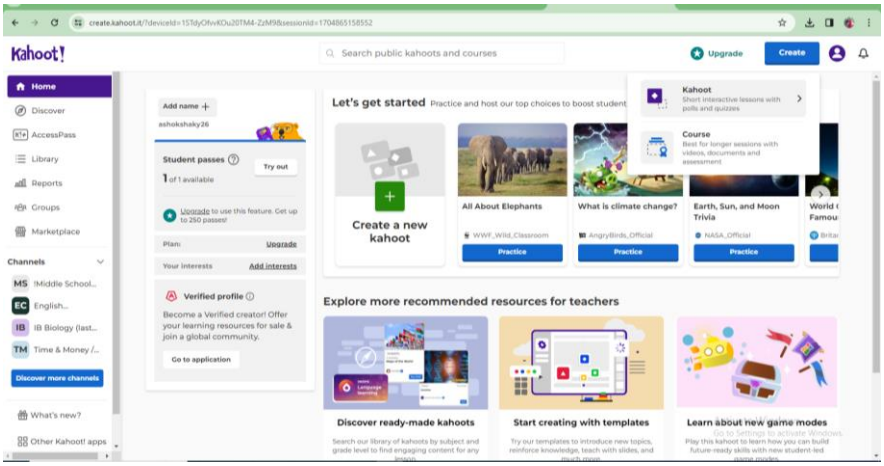


How to host a kahoot live in class?

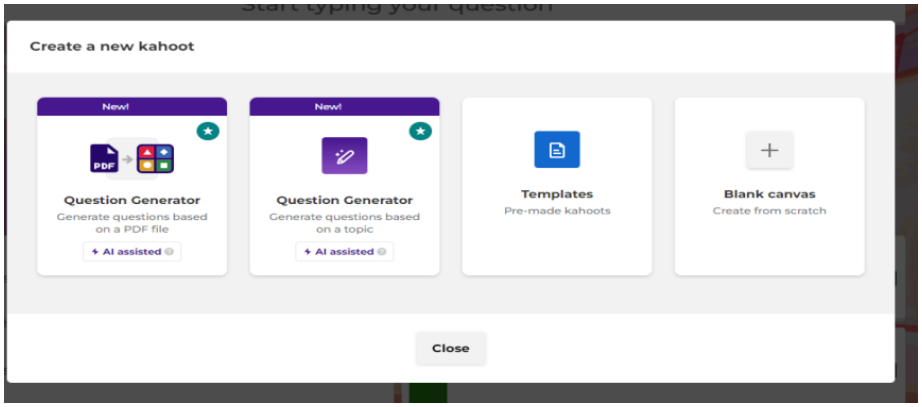
When playing live in class, kahoots are displayed on a shared screen everyone in the classroom can see. Students join in and answer using their own device with an internet connection - for example, a tablet or computer.

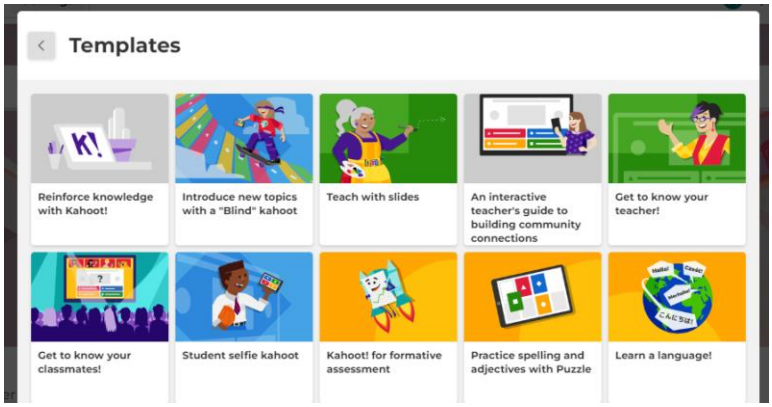
1. Open a kahoot you'd like to host for your students, click Play and choose Teach.
2. Adjust game options - for example, randomize the order of questions, or enable our friendly nickname generator to avoid inappropriate nicknames. Choose whether students play individually (Classic mode) or in Team mode.
3. By default, questions are displayed on a shared screen, while students tap answer tiles on their devices. If you'd like students to see questions and answer alternatives on their devices (for example, if you have a large classroom or students are joining remotely), toggle this setting on: Show question and answers on players' devices.
4. A unique Game PIN will be displayed at the top of the screen. Students enter this PIN to join the live kahoot in the Kahoot app or at kahoot.it in their browser.
5. Click Start once you can see all the players' nicknames in the "lobby". During playing you can use the spacebar or your mouse to go to the next question.
6. After the kahoot, you can always find and assess results in the Reports section.

How to create a kahoot?

1. Log in to your Kahoot account. Click Create and choose New kahoot.
2. Start typing your first quiz question. Add answer alternatives and mark the correct answer(s).
3. Tune the timer and points depending on the complexity of the question.

4. Add an image by uploading it from your computer or choosing one from our image library. You can also embed a YouTube link or add audio to the question (requires an upgrade).
5. Click Add question on the left-hand side. With a free Kahoot account, you can add multiple-choice quiz, true or false questions, and classic slides. With an optional upgrade to one of our paid plans, you can add these advanced question types:
    - Puzzle: students need to arrange answers in the correct order
    - Poll: gather feedback or do a quick pulse-check during a lesson
    - Advanced slide layouts: teach a topic or provide more context
    - Type answer: students need to type a short text answer
    - Open-ended question (available in Kahoot EDU): gather student opinions as text answers up to 250 characters
    - Word cloud (available in Kahoot EDU): collect short free-form poll responses that will be visualized as a word cloud.
    - Brainstorm (available in Kahoot EDU): gather, discuss and vote on ideas. All changes will be automatically saved as you go!
6. After you've added questions, click Settings above to add a catchy title, fill out summary details and add a cover image. Hit Done!

1. 

2. 

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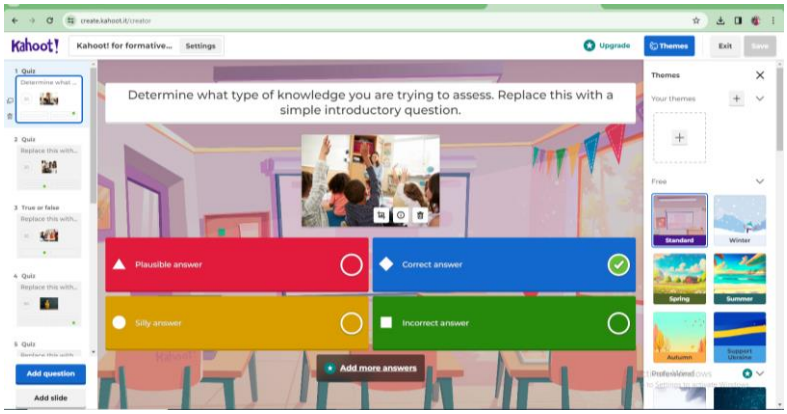
Kahoot!
Kahoot! for formative...
Settings
Upgrade
Themes
Exit
Save
Determine what type of knowledge you are trying to assess. Replace this with a simple introductory question.
Plausible answer
Correct answer
Silly answer
Incorrect answer
Add more answers
Add question
Add slide
Themes
Your themes
Free
Standard
Winter
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Summer
Autumn

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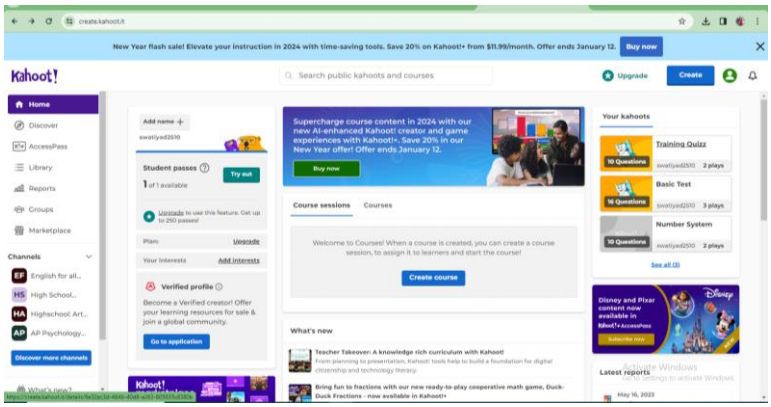
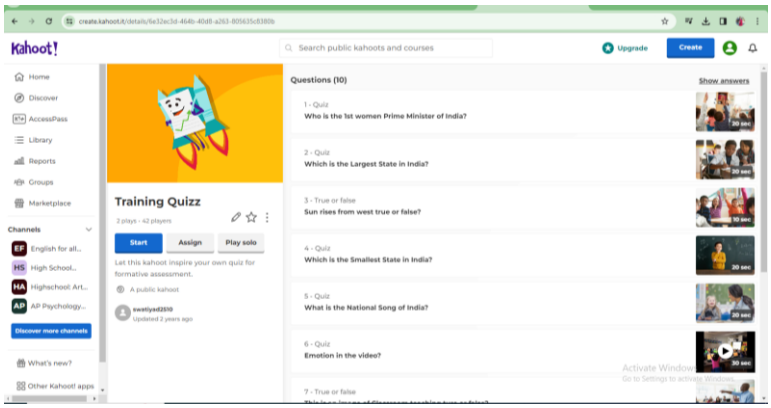
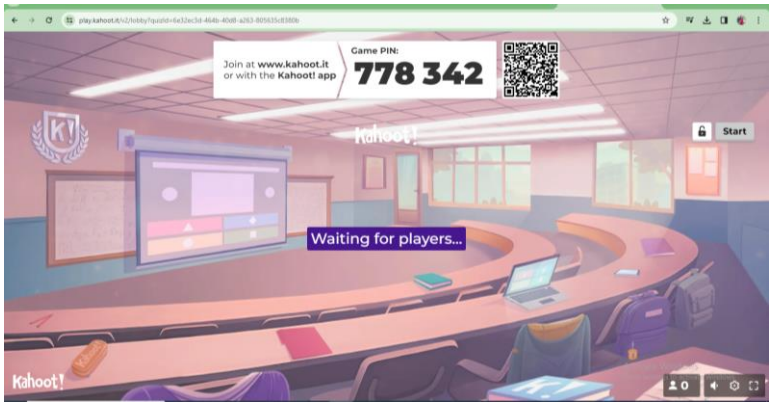

New Year flash sale! Elevate your instruction in 2024 with time-saving tools. Save 20% on Kahoot!+ from $11.99/month. Offer ends January 12.
Buy now
Kahoot!
Search public kahoots and courses
Upgrade
Create
Home
Discover
AccessPass
Library
Reports
Groups
Marketplace
Supercharge course content in 2024 with our new AI-enhanced Kahoot! creator and game experiences with Kahoot!+. Save 20% in our New Year offer! Offer ends January 12.
Buy now
Your kahoots
Training Quizz
Basic Test
Number System
Course sessions
Courses
Create course
What's new
Latest reports

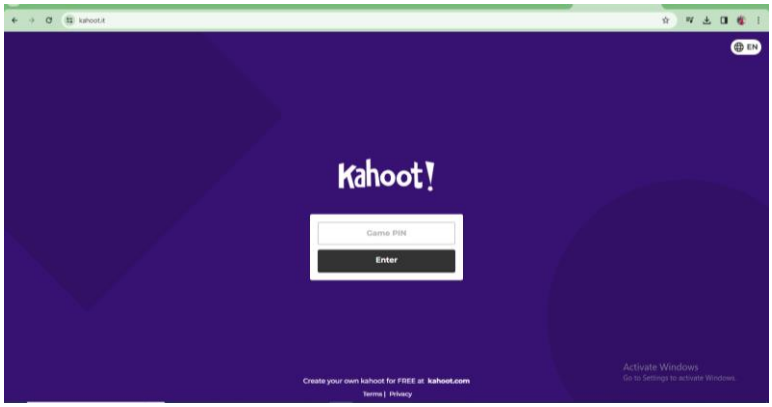
5.


Kahoot!
Search public kahoots and courses
Upgrade
Create
Training Quizz
Start
Assign
Play solo
Questions (10)
Show answers
1 - Quiz
Who is the 1st women Prime Minister of India?
2 - Quiz
Which is the Largest State in India?
3 - True or false
Sun rises from west true or false?
4 - Quiz
Which is the Smallest State in India?
5 - Quiz
What is the National Song of India?
6 - Quiz
Emotion in the video?

6.


Kahoot!
Upgrade
Select mode for
Training Quizz
Classic mode
Start
Up to 10 players
Interactive presentation
Assessment
Bring friendly competition to this kahoot. Players go head-to-head and compete for a top spot on the podium. Players who answer the quickest and get the most correct answers will have higher scores.
Classic mode
Winter Holidays mode
Team mode
Robot Run
The Lost Pyramid
Submarine Squad
Cosmic Conquest
Color Kingdoms

7. 

8. 

How to assess learning results with Kahoot Reports?

With Kahoot reports, you can capture useful instructional insights for formative assessment. Learn how to use reports to assess learning and better target your further instruction - which is especially important for distance learning when you're interacting with students remotely.

How to find reports After you've hosted a game live or assigned a student-paced challenge, go to the Reports section in the top navigation bar and find the report you need. High-level summary of kahoot results The Summary section presents various actionable insights in a neat, visual way:

- All the key stats - how many students played, how many questions there were, etc.
- Which questions were the most difficult and might need reteaching.
- Which players need help based on their game results?

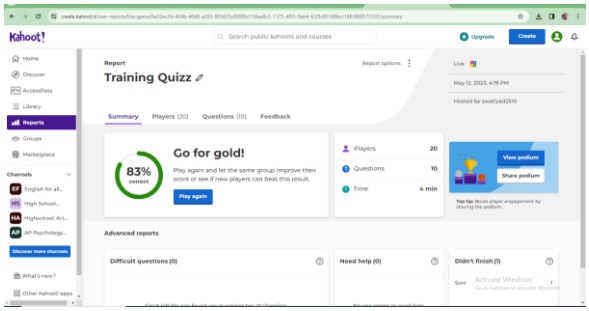
Deeper dive into analytics In the Question view you can identify where exactly key challenges occur. Be sure to look at:

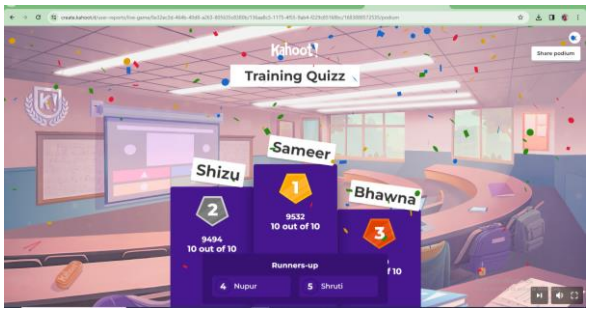
- The correct overall percentage of the question
- How long it took (in seconds) for students to answer When you come across a question that was answered more incorrectly, immediately check to see if multiple students were picking the same wrong answer.

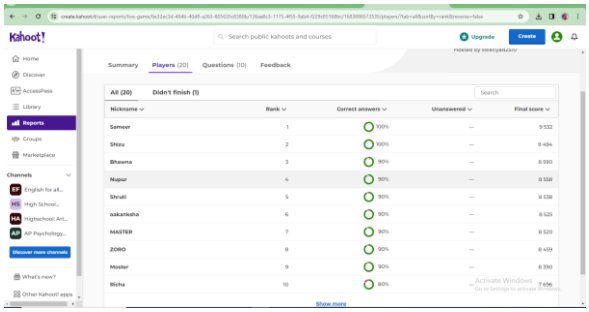
Look at the Player view to check which student (via their nickname) is answering incorrectly. How long are they taking to answer?

If they are answering faster than their peers and making errors, you may need to focus on their lack of attention. If there were 3 or more difficult questions in a game, you can generate a new kahoot with them to reinforce learning, power up content review and prep for exams.

A question is labelled as difficult if less than 35% of students answered it correctly.

1. 
Kahoot!
Training Quizz
Summary
Players (20)
Questions (10)
Feedback
Go for gold!
83%
correct
Play again
Players 20
Questions 10
Time 4 min
View podium
Share podium
Advanced reports
Difficult questions (0)
Need help (0)
Didn't finish (1)

2. 
Kahoot!
Training Quizz
Share podium
Shizu
Sameer
Bhawna
2
9494
10 out of 10
1
9532
10 out of 10
3
Runners-up
4 Nupur
5 Shruti

3. 
Kahoot!
Summary
Players (20)
Questions (10)
Feedback
All (20)
Didn't finish (1)
Nickname
Rank
Correct answers
Unanswered
Final score

Google Collaborative Tools

Mr. Ashok Shaky

Introduction

Higher education has a definite and challenging role in shaping the students to adapt the online technologies in their learning process. Internet has become the backbone of the modern education system. Internet provides opportunities for students to develop proactive approach towards their learning. Cloud Computing relies on sharing computing resource. Google Docs is one of many cloud computing document-sharing services. It is important for students to see the power of collaboration through cloud and to learn the rules about collaborative with each other in doing their team activities. Collaborative tool helps the students to do group work with their team members from anywhere, anytime and on any device with the help of internet to complete the tasks. It also enhances the educational experience of the students. Google Docs allows student to create, format text documents, slides, sheets and forms collaboratively with their team. The objective of this paper is to implement the Google Docs, an online collaborative tool for doing academic activities such as group assignment, seminar, review presentation, documentation and dataset preparation. Cloud computing is latest trend in IT world. It is an Internet-based computing, whereby shared resources, software and information, are provided to computers and other devices on-demand. This technology has the capacity to admittance a common collection of resources on request. The development of the Amazon played vital role by making modern data centres. In 2007 Google, IBM and many remarkable universities and companies adopted it. In addition, in 2008 Gartner highlighted its characteristics for customer as well service providers specified in.

Cloud computing enables companies to consume compute resources as a utility as discussed in. Three of the main benefits of cloud computing includes:

1. Self-service provisioning: End users can spin up computing resources for almost any type of workload on-demand.
2. Elasticity: Companies can scale up as computing needs increase and then scale down again as demands decrease.
3. Pay per use: Computing resources are measured at a granular level, allowing users to pay only for the resources and workloads they use.

Cloud computing provides Software as a Service, Platform as a Service, Infrastructure as a Service on-demand specified in. Software as a service (SaaS) is a cloud- based applications that run on distant computers “in the cloud”. It can be owned and operated by users’ computers via the Internet.

Collaborative learning is essentially people working together to solve a problem. Collaboration tools can route works through a process, distribute tasks to involved team member, and help to coordinate activities.

Document sharing and comments provide students with opportunities to work on the document online. Since Docs are stored online, students can work at college and at home from any computer with an internet connection. The online collaborative tool assists

in basic project management activities, assignments, creative drawings for presentation, remote presentation, enabling groups to modify output in real time.

Google Drive is a file storage and synchronization service created by Google. It allows students to store files in the cloud, share files, and edit documents, spreadsheets, and presentations with collaborators.

Google Docs includes four major options: Google Documents, Google Spreadsheets, Google Presentations, and Google Drawing, which all share similar functions. There are also tools to compare any two versions of a document specified in

Google Docs is a productive tool where learning activities can be designed differently and creatively. For instance, an instructor might post a text, intentionally replete with errors, for learners to correct. Likewise, learners can easily peer-edit, as this program leaves an editing trail.

The activities such as document creation, project review report, seminar presentation and other tasks were implemented in Google Docs. The files that are created in Google Docs are saved in Google Drive.

Implementation of Google Docs

Sharp (2009) suggests that this collaborative editing tools allow a group of individuals to edit a document simultaneously while they can view the changes made by others in real time.

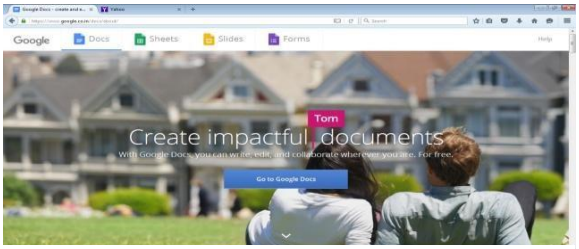


Fig.1 Home Page of Google Docs

Choose the documents, slides, forms and sheets to be collaborated in Google Docs using Gmail account.

Google Docs lends itself to collaborative academic activities with multiple team members work together in real time located at diverse location.

All Team members can see who made specific document changes and when those alterations were done, as the documents are stored online design the document collaboratively. For sharing dynamic data by different members in cloud, it is necessary to register before they want to view the shares data.

The students can prepare their presentations for seminar, project review and other relevant task using Google Slides.

In Google Sheets, the student can prepare data set for Research, perform mathematical functions and can represent graphically.

Google Drawings will be helpful for the students to perform image-processing techniques and other graphics manipulation demonstrated in this paper. This online collaborative tool is especially useful for students to enhance the learning skills, developing the attitude of sharing among team members to achieve a common task seated at different location by using diverse devices.

Finally, one area of application we hope to exploit in future is the use of Google Docs as a

tool for academic research.

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Training of KRPs of DIET on Integration of ICT in Teaching Learning Process

PAC No. 23.22 (February 19-23, 2024)

Programme Coordinator
Dr. Sanjay Kumar Pandagale

Regional Institute of Education, Shyamla Hills, Bhopal
National Council of Educational Research and Training

NAAC Accredited A^{++} Institute

Foreword

Use of ICT in education is an emerging need of the time. Keeping this emerging concern in view, SSA also emphasized on the importance of use of ICT in education. The MHRD has undertaken a programme entitled ICT@schools. Recently, MHRD launched a national repository on open educational resources and launched e-pathshala. Thus, efforts from govt. side are going on to provide ICT resources to schools. However, it is very important to ensure the effective use of these ICT resources. The stakeholders must be enabled to use these resources effectively. An equipped teacher educator can equip the in-service and pre-service teachers in all necessary aspects of teaching learning. Hence, a training programme is necessary to make aware and equip DIET faculty with basic skills of ICT. Therefore, this programme was initiated.

In its very first stage, modules were developed by organising three-day workshop from 3 to 5 January 2024. Resource persons from renowned universities like IGNOU and MANUU were called to develop the modules. I express my sincere thanks to Prof. Mushtaq Ahmed I. Patel, MANUU, Hyderabad; Dr. Anjuli Suhane, IGNOU, N. Delhi; Dr. Shruti Tripathi, RIE, NCERT, Bhopal; Dr. N. C. Ojha, RIE, NCERT, Bhopal; Mr. Ashok Shaky, RIE, NCERT, Bhopal; Ms. Urvashi Shrivastava, RIE, NCERT, Bhopal; Mr. L. S. Chauhan, RIE, NCERT, Bhopal; Dr. Ganga Mahto, RIE, NCERT, Bhopal; Ms. Swati Yadav, RIE, NCERT, Bhopal; Mr. Aji Thomas, RIE, NCERT, Bhopal; Dr. S. Sebu, RIE, NCERT, Bhopal for contributing in the process of module development.

After completion of modules, the first training programme was conducted for the DIET faculties and principals of the states of Maharashtra, Gujarat and Goa during 15 to 19 January 2024. Second training programme was conducted for the DIET faculties and principals of the states of Madhya Pradesh and Chhattisgarh during 19 to 23 February 2024. Overall, 53 participants attended this training programme. The lists of topics covered are given in the programme schedule.

Dr. Sanjay Kumar Pandagale
Programme Coordinator

Regional Institute of Education, NCERT, Shyamla Hills, Bhopal
Training of KRPs of DIET on Integration of ICT in Teaching Learning Process
(15-19 January 2024)

Programme Schedule

Venue: Conference Hall No. 30, RIE Bhopal

Days & Dates	**Session 1 9.45-11.15 AM**	T E A B R E A K	**Session 2 11.30-1.00 PM**	L U N C H B R E A K	**Session 3 2.00 – 3.30 PM**	T E A B R E A K	**Session 4 3.45 – 5.15 PM**
Monday **15/01/2024**	Registration & Inauguration (Pre-Test) - **SP**		Philosophy of Technology – **BRB**		Selection and Integration of ICT Resources – **VL**		ICT for Teaching Learning - **MAIP**
Tuesday **16/01/2024**	ICT for Teaching Learning - **MAIP**		Web 2.0 Technology – **SP**		Open Educational Resources – **VL**		Learning Management System - **ST**
Wednesday **17/01/2024**	Development of E-content - **NCO**		Concept and Creation of e-Portfolio – **AS**		Assistive Technology – **SP**		Google Collaborative Tools – **VL/AS**
Thursday **18/01/2024**	ICT For Science – **LSC**		Equitable Integration of Technology – **SP**		H5P Authoring tool – **US**		ICT for Language and Social Science - **ST**
Friday **19/01/2024**	Video and Audio Editing Tools – **AS/US**		Google Form for Assessment – **GM**		Online Assessment Tools - **SY**		Valedictory Session (Post-Test/ Feedback) - **SP**

BRB – Prof. B. Ramesh Babu, RIE, NCERT, Bhopal; **VL -** Mr. Vinay Lautre, TISS Mumbai; **MAIP** – Prof. Mushtaq Ahmed I. Patel, MANUU, Hyderabad; **SP -** Dr. Sanjay Kumar Pandagale, RIE, NCERT, Bhopal; **ST -** Dr. Shruti Tripathi, RIE, NCERT, Bhopal**; NCO** – Dr. N. C. Ojha, RIE, NCERT, Bhopal; **AS –** Mr. Ashok Shaky, RIE, NCERT, Bhopal; **US –** Ms. Urvashi Shrivastava, RIE, NCERT, Bhopal; **LSC** – Mr. L. S. Chauhan, RIE, NCERT, Bhopal; **GM** – Dr. Ganga Mahto, RIE, NCERT, Bhopal; **SY** – Ms. Swati Yadav, RIE, NCERT, Bhopal

Regional Institute of Education, NCERT, Shyamla Hills, Bhopal
Training of KRPs of DIET on Integration of ICT in Teaching Learning Process
(19-23 February 2024)

Programme Schedule

Venue: Conference Hall No. 53, RIE Bhopal

Days & Dates	**Session 1 9.30-11.00 AM**		**Session 2 11.15-1.00 PM**		**Session 3 2.00 – 3.30 PM**		**Session 4 3.45 – 5.15 PM**
Monday **19/02/2024**	Registration & Inauguration (Pre-Test) - **SP**	T E A B R E A K	Philosophy of Technology - **BRB**	L U N C H B R E A K	Selection and Integration of ICT Resources – **AS**	T E A B R E A K	ICT for Teaching Learning - **MAIP**
Tuesday **20/02/2024**	ICT for Teaching Learning - **MAIP**		Concept Mapping for Teaching-Learning & Assessment – **AS**		Open Educational Resources – **Ashok/SY/US**		ICT: Opportunities & Challenges - **KM**
Wednesday **21/02/2024**	Development of E-content - **NCO**		Web 2.0 Technology – **SP**		Digital Library Resources - **PKT**		Learning Management System - **ST**
Thursday **22/02/2024**	ICT For Science – **LSC**		ICT for mathematics – **AT**		Concept and Creation of e-Portfolio – **SP/Ashok**		ICT for Language and Social Science - **ST**
Friday **23/02/2024**	Video and Audio Editing Tools & Google Collaborative Tools – **Ashok/US**		Google Form for Assessment & Bhuvan – **GM/SS**		Online Assessment Tools & H5P Authoring tool – **SY/US**		Valedictory Session (Post-Test/ Feedback) - **SP**

BRB – Prof. B. Ramesh Babu, RIE, NCERT, Bhopal; **AS** - Dr. Anjuli Suhane, IGNOU N. Delhi; **MAIP** – Prof. Mushtaq Ahmed I. Patel, MANUU, Hyderabad; **KM** – Dr. Kalpana Maski, RIE, NCERT, Bhopal; **NCO** – Dr. N. C. Ojha, RIE, NCERT, Bhopal; **SP** - Dr. Sanjay Kumar Pandagale, RIE, NCERT, Bhopal; **Ashok –** Mr. Ashok Shaky, RIE, NCERT, Bhopal; **ST -** Dr. Shruti Tripathi, RIE, NCERT, Bhopal; **LSC** – Mr. L. S. Chauhan, RIE, NCERT, Bhopal; **AT** – Mr. Aji Thomas, RIE, NCERT, Bhopal; **PK**T – Dr. P. K. Tripathy, Deputy Librarian, RIE, NCERT, Bhopal; **US –** Ms. Urvashi Shrivastava, RIE, NCERT, Bhopal; **GM** – Dr. Ganga Mahto, RIE, NCERT, Bhopal; **SS** – Dr. S. Sebu, RIE, NCERT, Bhopal; **SY** – Ms. Swati Yadav, RIE, NCERT, Bhopal

Contents

Selection and Integration of ICT Resources

- Dr. Anjuli Suhane

Structure

1.1 INTRODUCTION

The knowledge of various ICT resources helps a teacher while transacting learning experiences. Sometimes, it is very difficult on the part of a teacher to judge which ICT out of an array of ICTs is the best for a given learning task .All ICTs are not suitable or appropriate for all types of teaching-learning tasks. Each ICT has its own capabilities or attributes. Each teaching-learning task also requires ICTs with specified characteristics or attributes. It is, therefore, considered that ICT selection is an important part of teaching-learning design and delivery. But it is very difficult on the part of a teacher to judge which medium out of the available media is the best for a given instructional task. A teacher, therefore, takes into consideration various factors, which affect ICT selection for the transaction of learning experience.

1.2 SIGNIFICANCE OF ICT INTEGRATION

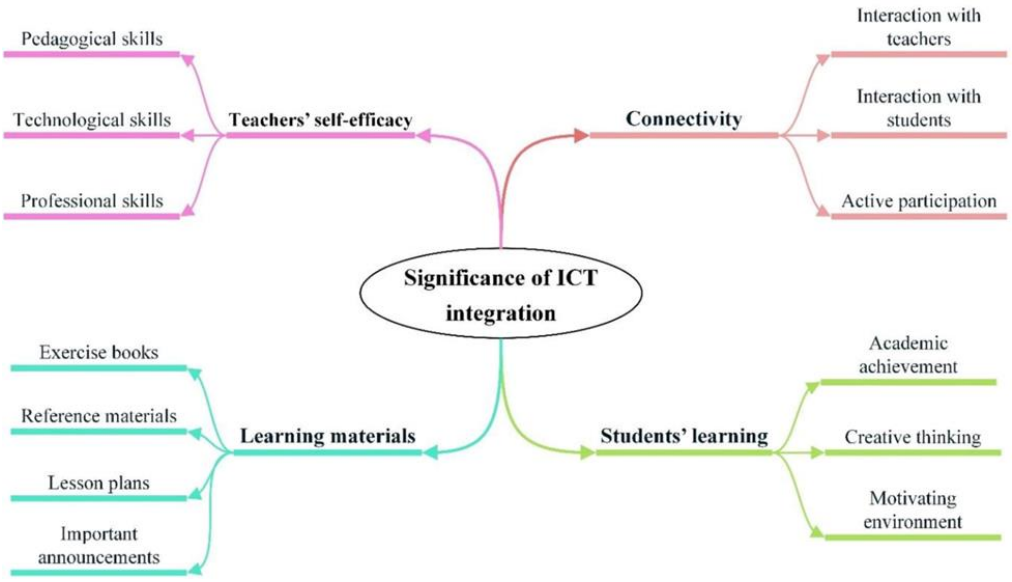


Figure 1:

Connectivity

Teachers feel comfortable guiding and discussing with their students within or outside the school through several digital platforms such as WhatsApp, Facebook, and google groups. Regarding the connection of learners with other students, ICT integration in educational practice encourages students to interact with their classmates more, which helps resolve their academic challenges and keeps them socially active.

Teachers' Self-Efficacy

ICT integration enhances the quality of the teaching-learning process and found a significant correlation between teachers' technological pedagogical and content knowledge (TPACK) and their technological competencies. Positive attitudes of teachers toward applying technology in their instructional practices and identified a significant association between technology use with their technological competencies.

Students Learning

Teacher plays an important role in cultivating successful students' online learning. ICT utilization in teaching-learning practices enables a student to make meaningful use of technologies in education by accessing, selecting, establishing, and interpreting the information. Its effective integration help in meeting the learners' educational needs by providing creative solutions to different types of learning inquiries.

Learning Materials

Students' learning is supported when they receive adequate supplementary materials, such as reference books, exercise books, or teaching aids. The correct use of such materials not only assists them in making their prospective concepts clear but also boosts their academic achievement. In this regard, technology-assisted learning enables a learner to acquire supportive learning materials easily.

1.3 FACTORS AFFECTING ICT SELECTION

While selecting ICTs for teaching-learning purposes, we are generally concerned with questions like (a) What teaching methods we are adopting; (b) What learning tasks we are going to provide the learners; and (c) What are the special characteristics of the learners? Apart from these basic concerns, there are also other factors, which contribute to ICT selection. Do the teachers and the learners have favourable attitude to the ICTs going to be used in the teaching-learning process? What is the cost of the ICT? Is it user friendly? Does the ICT effectively communicate the message? Is it available as weIl as accessible to the teacher and students? Questions such as these have to be taken into consideration in the selection of ICTs.

All the factors which contribute to the ICT selection may be categorized into the following:

1) Pedagogical Utility
2) Human Factors
3) Availability and Accessibility : Licensing
4) User Friendly
5) Cost Facilities
6) Time Availability

7) Effective Communication
8) Infrastructural Facilities
9) Hardware

Pedagogic Utility: This factor is concerned with two aspects: First, the learning objectives to be achieved at the end of the teaching-learning process. Second, learning experiences based on contents to be provided during the teaching-learning process. Learning objectives mainly pertain to three domains of Bloom's Taxonomy of objectives. These are: Cognitive Domain, Affective Domain and Psycho-motor Domain. Cognitive Domain includes Factual information, visual identification, concept formation, principle/ rule learning, learning procedures, etc. Affective Domain includes development of attitudes, interest, opinion, motivation etc. Psychomotor Domain includes development of psychomotor skills and skill coordination.

Following media can be used for development of each domain:

- Drawings, charts, maps, flip-chart etc.
- Model, real objects, simulators
- PPT Slides, filmstrips
- Individualised instruction through CAL/CAI, audio tape etc.
- TV and CCTV
- Video
- E- resources
- OERs

Selection of ICTs is also governed by the kind of content knowledge a teacher wants to provide his/her students. For example, most ICTs can handle abstract knowledge, but there are some such as television or multi-media computers that are excellent for representing concrete knowledge. ICTs also differ in the extent to which they help to develop different skills. This is related to the control characteristics and the representation features of the ICTs. For example, television, videos and computers are excellent ICTs for imparting skill education.

Human Factors: Human factors related to the selection of ICTs are the teacher who uses ICTs for teaching purposes and the learner who uses for learning purposes. So far as a teacher is considered, he/she should have favourable attitude towards the use of ICTs in teaching-learning process. Learner factor also plays a great role in ICT selection. Learners even bring to teaching-learning situation a set of capabilities for learning. These include prior information about the particular subject and basic intellectual skills to decode and process the new material. Learners interact in many ways to influence the choice of ICTs. For example, learners with low ability are more benefited from a highly structured mediated instruction, whereas learners with high ability are profited from unstructured presentation.

Availability and Accessibility: Whenever a teacher decides to use any ICT for teaching-learning purposes, he/ she should consider their availability both inside and outside the institution.

User Friendliness, Control and Interactivity: ICTs should be easy to operate and handle by their users. The operations of ICTs should not be so complex that the users have to depend on technical people for their management. The user should be able to control ICTs according to requirements. Similarly, a teacher can make use of ICTs like audio, video or computer programmes in his/her teaching and control them according to the requirements during teaching. Learners do have more control over permanent ICTs like computers than ephemeral ICTs like telecast or broadcasts. Interactivity means the ability of the learner to respond to ICTs and obtain feedback on the response. This enhances student learning to a great extent. There are 'two kinds of interactivity:

Learning material interactivity: This means learner interacts with the ICT, gets feedback from it and the ICT accommodates learner's own input and direction.

Social interactivity: Learners interact with teachers and with each other via the ICT. For example, in teleconferencing, learners situated in different locations interact with each other through it.

Effective Communication: Effective communication is the' most important factor in the process of ICT selection. While selecting any ICT, one has to look into the fact that the ICT selected is able to communicate the intended message or information effectively. If the ICT does not communicate the message effectively, use of such ICT in the teaching-learning process is meaningless.

1.4 HOW TO SELECT ICTS?

Following are the steps for the selection of ICTs:

- Select the content to be taught.
- Write a learning objective
- Determine the domain in which the learning objective can be classified: Cognitive, Affective, Psychomotor.
- Consider various methods/techniques to be adopted.
- Select appropriate ICTs.

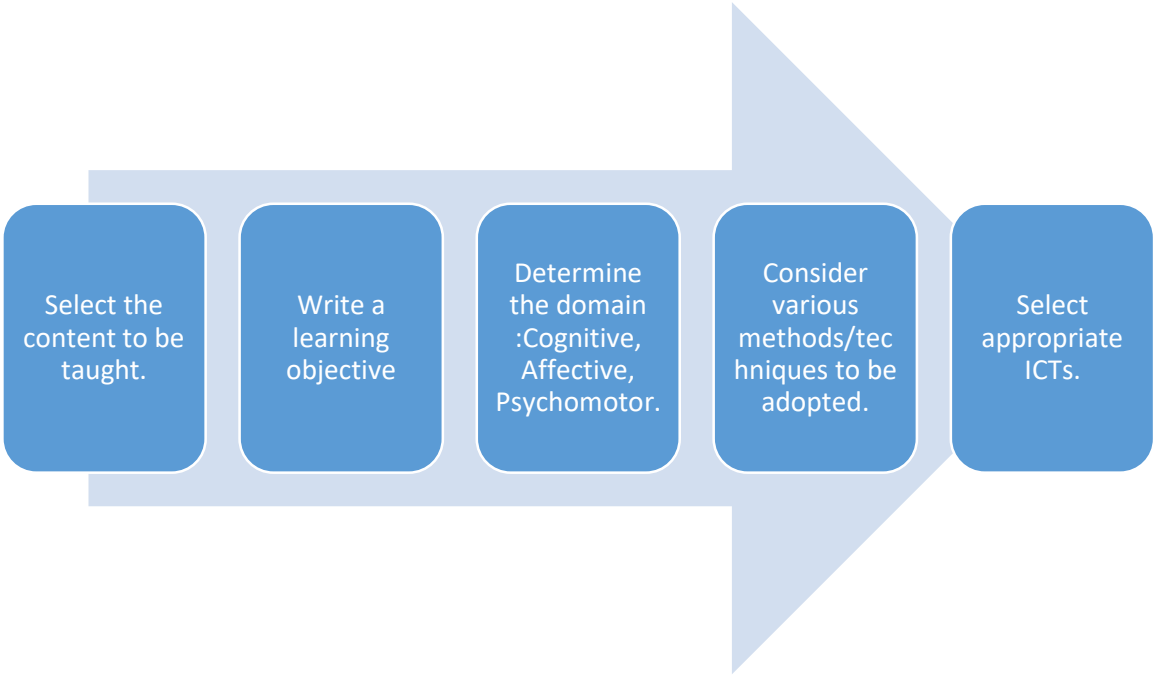
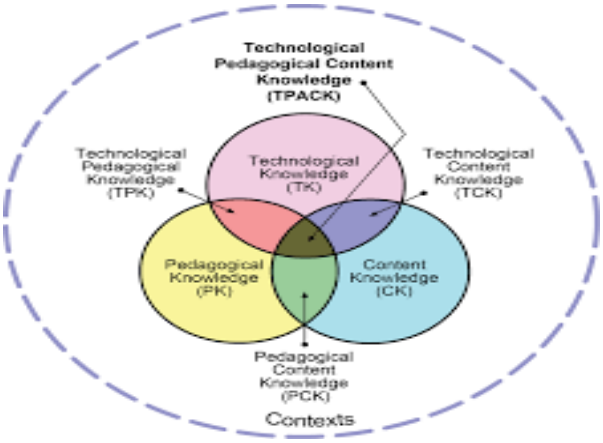


Figure 2: Steps for ICT Selection

1.5 TPACK

Mishra and Koehler (2006) developed a framework, called technological pedagogical content knowledge (TPACK). According to them, this framework emphasizes how the connections among teachers' understanding of content, pedagogy, and technology interact with one another to produce effective teaching. Their framework is an extension of the pedagogical content knowledge (or PCK) framework of Shulman (1986). Shulman's framework emphasizes "blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction" (Kohler, et.al, 2014). TPACK framework as developed by Mishra and Kohler is given in Fig.



According to (Kohler, et.al, 2014), three major knowledge components form the foundation of the TPACK framework are as follows:

- Content knowledge (CK) refers to any subject-matter knowledge that a teacher is responsible for teaching.
- Pedagogical knowledge (PK) refers to teacher knowledge about a variety of instructional practices, strategies, and methods to promote students' learning.
- Technology knowledge (TK) refers to teacher knowledge about traditional and new technologies that can be integrated into curriculum.

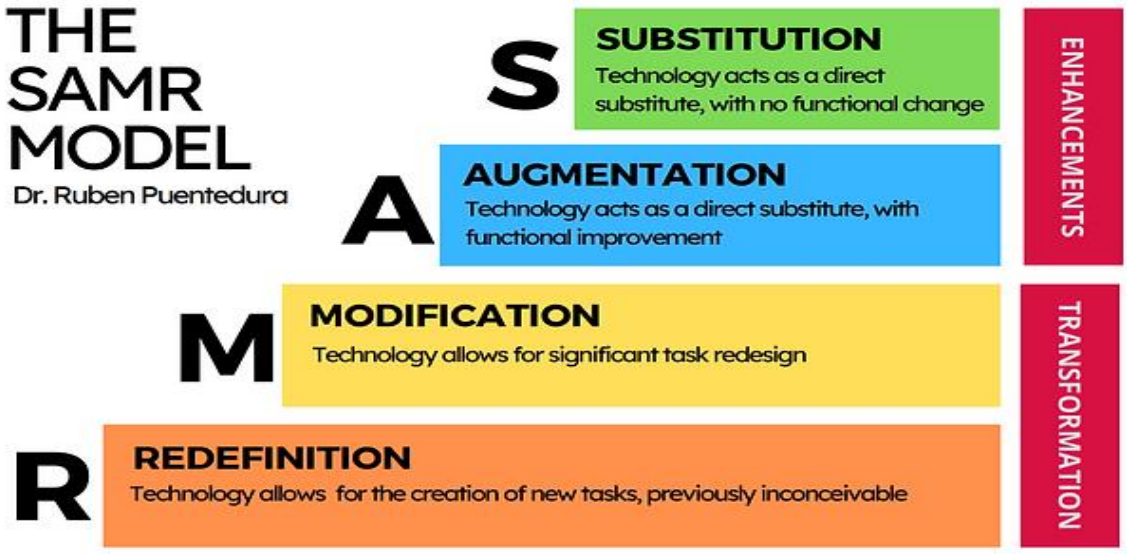
According to (Kohler, et.al, 2014), four components in the TPACK framework, address how these three bodies of knowledge interact, constrain, and afford each other as follows:

- Technological Content Knowledge (TCK) refers to knowledge of the reciprocal relationship between technology and content. Disciplinary knowledge is often defined and constrained by technologies and their representational and functional capabilities
- Pedagogical Content Knowledge (PCK) is to Shulman's (1986) notion of "an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction: (p.8)
- Technological Pedagogical Knowledge (TCK) refers to an understanding of technology can constrain and afford specific pedagogical practices.
- Technological Pedagogical Content Knowledge (TPACK) refers to knowledge about the complex relations among technology, pedagogy, and content that enable teachers to develop appropriate and context-specific teaching strategies.

As a teacher, when you intent to use TPACK framework for classroom teaching, you must have deep understanding of content to be taught, pedagogy to be used and technology or ICT to be integrated so that you can orchestrate and coordinate each of these components into your teaching.

1.6 SAMR Model

The SAMR model is a framework that orders strategies for classroom technology implementation into four stages:



Substitution and augmentation strategies use EdTech to enhance learning and add value, whereas modification and redefinition stages harness EdTech to transform learning and make new things possible. The effectiveness of any of these four strategies depends on when and how it is used.

Substitution: This is the simplest stage, where EdTech is used as a direct substitute for traditional practices. Substitution strategies can save you time and space by cutting back on laborious pen and paper tasks. Instead of printing out twenty-plus paper resources that clog the cupboard, you can use technology to manage resources with just a few clicks. Substitution also provides a much more accessible introduction to technological soft skills than modification and redefinition. It is the perfect opportunity for students to get comfortable with new technology before you start to transform their learning.

Examples of substitution

- having students type their work instead of handwriting it
- using online quizzes and programs instead of pen and paper
- uploading a worksheet in PDF for student access, as opposed to photocopying
- using a digital interactive whiteboard as opposed to a traditional whiteboard and saving the results as a document.

Remember: Substitution strategies do not change the learning process or outcome. Ask yourself what you and your students will gain from the technology before implementing it. If it adds nothing but hassle, stick to pen and paper.

Augmentation: At the augmentation stage, technology adds something to the learning process beyond just convenience. It might give your students a clearer understanding of a complex topic or making it engaging in a way that traditional methods can't.

It also allows for the introduction of more independent and student-centric learning. By using technology as a source of information, students can start actively learning without requiring constant teacher-led instruction.

Examples of augmentation

- Students give more informative and engaging oral presentations accompanied by a PowerPoint or Prezi containing multimedia elements.
- Students use the internet to independently research a topic, as opposed to relying on teacher input.
- Students use an EdTech program that gamifies curriculum content for student engagement and allows students to track progress in an accessible way.
- Teacher instruction is supplemented with a video that clarifies a particularly hard to explain concept.

Modification: At the modification stage, technology is used to design interactive and dynamic tasks that go beyond the limitations of a traditional classroom.

For example, students can collaborate on shared documents, or work in large groups, allowing for seamless collaboration and knowledge sharing. This peer-to-peer work nurtures a more cooperative and dynamic class culture.

Technologically modified tasks also allow students to generate inspired and innovative work that isn't confined to paper. Some students will jump at the opportunity to get in front of a camera, while others will do anything to make it onto the global Mathletics leaderboard.

Examples of modification

- Students produce podcasts summarising a topic, which can then be accessed by other students as a revision resource.
- Students create an informative video presentation in place of a standard oral presentation. They can use their voice alongside a broader variety of creative multimodal components.
- Students use a technological tool that makes an abstract concept visible in a hands-on, responsive way (e.g. voyaging on Google Earth to better understand measurement and geography).

Redefinition: The most sophisticated stage of SAMR, redefinition sees you using technology to make entirely new learning opportunities possible.

Redefining learning has the potential to connect learning with the real world and produce authentic outcomes. It also gives students strong technological soft skills such as digital collaboration, communication, technological literacy, and the ability to adapt to new systems and processes. Most importantly, using technology to redefine learning in your classroom translates to vibrant and engaged students who embrace a growth mindset.

Examples of redefinition

- connecting your students with other people around the world as part of the learning journey or use of video conferencing to connect classrooms in different countries.
- having students publish their work online where it can be viewed by peers and the broader community
- recording students as they deliver a presentation or practice a physical skill, then using this recording to prompt student reflection
- experimenting with tasks that use extensive multimodal elements (e.g. producing documentaries or short films, webpages, print documents with creative layouts).

1.7 ICT INTEGRATION

Each ICT has some pedagogic value or the other. Therefore, use of a single ICT cannot fulfill the requirement of any teaching-learning activity. Various ICTs have to be used in combination. Although one of the ICTs could be the 'Main ICT', other ICTs should be used so that the quality of presentation becomes maximally effective. ICTs also can be combined with appropriate methods so that teaching-learning activity becomes effective. Let us take an example of a class on geography wherein the teacher teaches about "Natural resources". The class period is 40 minutes. ICT integration on the topic "Natural Resources " is presented in Table 1.

Table 1: Example of ICT Integration on the topic "Natural Resources

Teacher Activity	ICT Integration
Introduction to the Topic	PPT slides/ audio tapes/ teacher made small clipping Video/Concept map(c-map. Mind map)

Teaching the main Content	Video/PPT/Nature Walk/Virtual nature walk/Use of assistive technologies for inclusion
Citing Examples	Video sequence /a set of 10 slides
Summary	Through chart, concept map
Evaluation	Through Online quizzes (hot potato, Kahooty, Quizlet). Google form, concept map, E portfolio

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Information Communication Technology (ICT) for Teaching-Learning

- Prof. Mushtaq Ahmed I. Patel

1.0 Introduction

Information Communication Technology (ICT) plays an important role in enhancing the quality of education. Teaching and Learning applications of ICT are currently popular in various fields due to their capabilities in facilitating the educational process from data admission to result declaration and more specifically in the teaching-learning process. Nowadays, ICT is used everywhere. With more than a billion people having access to the internet, and 8 to 10 internet users owning a smartphone, information and data are increasing by leaps and bounds. This rapid growth has led ICT to become a key item in everyday life. The National Education Policy 2020 has proposed a great role of the role of ICT in the education sector in days to come Educational houses and agencies are integrating text, and teaching resources using QR codes, and the internet. Thus, it is necessary for teachers, and resource persons working for school education to know about the use of ICT in Education.

In this module, we will look into the role of ICT in Education; understand ICT tools for teaching and learning, and pedagogical approaches to ICT. ICT usage cannot be restricted to only specific subjects, it has to be integrated across the curriculum and it has to facilitate assessing and evaluating learning. Moreover, in this context, it becomes essential that there have to be efforts for the professional development of educators in ICT integration. The module ends by looking into future trends in ICT. This module is meant for the teachers, resource persons, researchers working in the area of school education and hence a common term educator is used at most of the places. Similarly, the content uses technology, which refers to the ICT for all practical purposes of this module. The term education refers to the teaching and learning of students within and outside the school, whereas teaching-learning and assessment is meant for academic purposes within the school or the classroom.

1.1 ICT in Education

Information and Communication Technologies (ICT) are like digital helpers, which are part of almost every aspect of our lives. In education, ICT means using digital tools to make teaching and learning more interesting. For this, you can imagine smart whiteboards, online study websites, fun learning apps, and computer simulations used in schools and at home. The education here covers all the aspects of student learning within the classroom and outside including the information gathered informally in the company of their family members using technology.

We see that the use of ICT takes us Beyond the Classroom. The ICT isn't just for the classroom; it's for everywhere in school and outside! It helps students explore a world of information, talk to friends from far away, collect homework and share achievements with family members. Parents, teachers, and elder siblings get to be helpful guides, making learning experiences fit each student better, using technology.

It comes to our mind why ICT Matters so much for education. It's not only the trend, but also an important aspect which imparts education. In a time where we can find information so easily, restricting our children to classroom instruction is not sufficient. ICT makes education lively and fun, making children excited to learn.

You may be keen to know the benefits of mixing tech with education. It leads to active Learning as Students don't just listen; they get to do activities like playing educational games and making presentations. The parents and teachers can monitor and ensure equal Personal Progress. All children learn content suitable to their respective age, stage and at their speed, and technology helps this process. Interactive tools, like quizzes, games, wordplay etc. help children and elders know how well they're doing.

On the one hand, technology facilitates the education process, by providing a lot of scope for content for personalised learning, but on the other, we see that the availability of technology to all households and in all schools is an issue. This creates a digital divide, which can be filled if the education process is properly planned by making the devices accessible to all the stakeholders. If the devices are made available then the availability of content and identification of resources for educational purposes becomes an issue for teachers as well as parents in the context of education. Proper orientation and training are required for all the stakeholders. When technology is used for educational purposes the tools go into the hands of children, and how much of the technology is to be used, what is to be seen and keeping oneself away from distractions becomes essential. Proper monitoring is also required to overcome the learning gaps, which are the results of a lack of awareness. Thereby we can make the ICT work properly for the education of all.

Is ICT a short-lived phenomenon, which is going to vanish after a few years? ICT is going to bring a big, exciting change in teaching, learning, and evaluation. We want every student, teacher and field functionary to be ready for it by learning things with technology.

1.2 Tools for Teaching

In the world of education, the toolbox for teachers goes beyond daily using teaching aids like chalk and duster and is now filled with a mix of amazing tools that can make learning exciting. Here for the sake of convenience, we have listed technological tools into few categories:

1. Hardware: The hardware is physical equipment provided to the schools by the administrators. Here, it is noted that the schools are provided radio, television, computer, projector, internet facility etc. based on the policy of the schools. All such devices are magical doors to the world of information for the teaching-learning process. These devices and their arrangements bring novelty to the classroom and increase motivation and attention.

2. Software: Provision of devices alone is insufficient, as these become only dumb terminals. This is like the provision of a car without the facility of fuelling, which makes the vehicle immovable. In this context, it is interesting to note that there are various educational apps, which are designed to make learning fun and interesting. Audio-visual programmes, games, simulations, and creativity tools suit everyone's unique way of learning. Simple platforms like Google Classroom and Moodle help teachers organise lessons and encourage collaboration online.

3. Online: The internet is like a treasure of knowledge; it provides all sorts of information from across the globe at the click of a button. This sharing of information can be synchronous or asynchronous; the material can be academic, curricular, or co-curricular. Digital libraries, such as Project Gutenberg, offer free e-books, which can be searched by name of author, title of the book, subject, language, category etc. Websites like Khan Academy provide video lessons for different boards, stages, subjects etc. Educational videos on YouTube, when picked wisely, can explain things in exciting ways and show different viewpoints. These are a small number of

resources, which is just the tip of the iceberg, whereas teachers can explore many more content online.

4. Putting it All Together: Like a mother mixes appropriate ingredients while cooking a dish, a teacher attempts to blend all the resources to make the magic happen in the classroom. The process and efforts of mixing tools make learning special for each student. It's like weaving a beautiful tapestry. The trick is to understand what each tool is good at and how they all fit together. Eg. Google Meet helps in online lectures, which can be blended with PowerPoint presentations, and 'pollseverywhere' can be used to test whether the students understand the lecture.

5. Teach Smarter: With this mix of tools, teachers can make learning personal, help students understand things better, and make everyone fall in love with learning. The real trick is to know when and how to use each tool to make lessons engaging and effective. If the tools are appropriately used then the slow learners can be given YouTube links for further clarification and gifted can be assigned additional works.

So, in this digital world, teachers are like magicians with their toolbox, ensuring every student has a unique and exciting learning experience. It's all about using these tools wisely to create the perfect blend of fun and knowledge!

1.3 Pedagogical Approaches

In the world of education, ICT joins forces with various teaching methods, turning classrooms into lively spaces and making learning a hands-on, meaningful adventure. Let's look into some exciting strategies that use technology to empower students:

1. Active Learning:

- Collaborative Learning: Picture students working as a team on cool projects, improving their communication and teamwork skills. Google Workspace Tools like Google Docs, Google Sheets, and Google Slides let students and teachers collaborate in real time, even if they're far apart. There is one more interesting tool viz., Mural etymologically which means a painting or other work of art executed directly on the wall by collaboration in a digital form in online mode. These tools keep students engaged and all collaborate on one particular project eg. a science project. Each of the team members can work on a specific section of the project and a report can be generated in the shortest possible time.

- Gamification: Routine teaching learning can be made interesting by involving games. Gamification is the process of learning where aspects of games are integrated into teaching and learning eg. points, badges, leaderboards etc. This process enhances student participation and engagement as they become very active and respond to the content, which is strengthened by immediate feedback. The schools can utilise games like word search, crossword, fill-in-the-blanks, jeopardy, and memory games. Kahoot! and Minecraft Education Edition, Mambo.IO etc. provide educational games. Most of the games are to be purchased but free versions can be utilised for schools. To understand the the use of game, an example is given as under, Exploring M.A.T.H. Mummy Mayhem students will encounter key concepts in geometry including shape, symmetry, and spatial reasoning. They solve various puzzles like Puzzle 1: 3D Block Jigsaw, Puzzle 2: Symmetry Spotter etc. during the game. This is created in partnership with Cambridge Mathematics (cambridgemaths.org). This is available across all curriculum subjects.

- Flipped Classroom: The flipped classroom reverses the traditional concept of education where teaching and learning take place in the classroom and homework is assigned to practice learned material. In the flipped classroom, the student learns the content at home by watching videos, studying documents (PDF, word processors etc.), quizzes and assignments that are available 24x7. The teacher can record their lessons and students' assignments and keep them online for other students to refer to online as per their requirements. Various platforms like Google Classroom, Flip (formerly Flipgrid), Khan Academy, Moodle etc. can be used for uploading or retrieving the content. Thus, basic content awareness is created at home and classroom time is utilised for discussion on higher-order thinking skills (HOTS).

- Project-Based Learning: Students tackle real-world challenges through group projects, learning research, critical thinking, and presentation skills. Tools like Asana (with a 30-day trial) and Trello keep everything organised.

The use of technology in the field of teaching and learning made it possible to learn various concepts and skills using Project-based learning, where students learn in real-world situations. The project makes the student acquire content knowledge and skills to answer a driving question based on an authentic problem, need, challenge, or concern and thus ensures deeper learning. This approach is student-centred and students try to address real-world problems in collaboration with other team members. This involvement makes students share different aspects of the projects with co-workers with deadlines and monitor progress. The Project-Based Learning technology tool helps in planning, tracking, and collaborating on projects. The tool can be used by administrators (headmasters, resource persons), teachers, and learners. These tools help in organising tasks, Tracking progress, Communicating with the team, Monitoring progress, automating workflows, Streamlining reports, and tracking work in real time. This can be done using various tools like Asana, which is available for trial for 30 days. However, project plans can be developed and monitored through spreadsheets or word processors. Trello workspace is also available for testing and use.

2. Blending Tech with Traditional Learning:

- Blended Learning: The blended learning model is advantageous as it combines face-to-face and virtual learning. It is the teacher who decides what type of face-to-face mode and how much and what type of online learning facility will be provided. To make the teaching learning effective it is expected that the teacher needs to be aware of the content and resources that are useful for their learners. Online quizzes and interactive exercises make learning personal, while face-to-face discussions build connections and teamwork.

3. Customising Learning: Differentiated Instruction: The traditional teaching in the classroom addresses all the students. There are individual differences among students based on their intelligence, learning abilities, styles, experiences etc. and thereby their requirements and achievements also differ. Hence, there is a need for individualised, customised and differentiated learning, which can only be possible by deploying and employing technology. The differentiated instruction can tailor the lessons to meet the needs, interests and strengths of the students. Simple adjustments like change of tone, pace, brightness, and sound can be made to any computer or mobile, which suits learners with different requirements. Platforms like Knewton adjust difficulty based on performance, and digital resources like audiobooks support students with varying reading abilities.

The key to rolling ICT in teaching-learning is to match technology with teaching goals and what students need. These strategies aren't one-size-fits-all; smart integration lets teachers create exciting, engaging classrooms where students become more interested. The success depends on how you as a teacher mix and match these tools to create the perfect learning blend!

1.4 Integrating Across the Curriculum

The teaching of various subjects in the school is not made in isolation; all subjects form a curriculum, which is transacted in the school. The technology has to be integrated in all subject areas so that wholesome learning is possible. The following paragraphs discuss the integration of technology across the curriculum.

1. Science:

- Virtual Labs: The budding of flowers, the dissection of a frog, and eruption of a volcano can be shown in the classroom to all by giving a Virtual Reality presentation.

- Data Analysis Tools: Analyse real-world scientific data using programs like Excel or Google Sheets, fostering critical thinking.

- Interactive Timelines: Explore the history of scientific discoveries with platforms like Timetoast, visualising connections and advancements. You can visit to see the timeline of W. Sheakspeare

2. Mathematical Adventures:

- Math Games and Puzzles: Apps like Prodigy (free) and DragonBox (A Kahoot! company) make math concepts like fractions and algebra engaging.

- Geometric Visualization Tools: Interactively explore shapes and spatial relationships with software like Tinkercad, boosting geometric understanding.

- Problem-Solving Simulations: Solve real-world problems with tools like GeoGebra and NetLogo, optimising traffic flow or managing resources.

3. Language Exploration:

- Interactive Storytelling Platforms: Create collaborative digital stories or poems with tools like Book Creator and Story Jumper, boosting creativity and writing skills.

- Online Dictionaries and Translation Tools: Explore language nuances and improve communication skills with resources like Merriam-Webster's online dictionary and Babbel. Tools like Google Translate not only translate the content but also helps in conversation.

- Language Learning Apps: Gamify language acquisition with apps like Duolingo and Memrise, making learning languages fun and engaging.

4. Historical Journeys:

- 3D Historical Tours: Explore ancient civilizations or historic landmarks through virtual reality experiences, bringing the past to life. Eg. Virtual Library, Historic VR (Sword), Google Arts and Culture

- Primary Source Analysis Platforms: Analyse historical documents, photographs, and artefacts with tools like Zoho Projects and Padlet, fostering critical thinking.

- Collaborative Timelines and Simulations:

- Create interactive timelines to visualise historical events or simulate scenarios, enhancing understanding and engagement.

These examples are just the beginning; the possibilities are endless. The key is to identify learning objectives and choose the right technology. By creating engaging and interactive learning activities, ICT can transform subjects, turning them from static concepts into dynamic explorations that ignite curiosity and a love for learning in every student. The journey is as exciting as the destination!

1.5 Assessing and Evaluating Learning

The discussion in the above paragraphs has indicated that the classrooms can be made interesting by the involvement of technology. This involvement also gives a provision to test and evaluate the students by incorporating technology, so that records can be maintained.

1. Assessing Student Learning:

The foremost assessment is about student learning, which is done by following ways using technology.

- Interactive Quizzes and Polls: Platforms like Kahoot! and Mentimeter help in real-time assessment of students, when they get immediate feedback to encourage their participation.

- E-portfolios: The digital creations, presentations, and projects, give a holistic view of the student's progress and also help to build their e-portfolios.

- Peer and Self-Assessment Tools: The students collaborate to learn and evaluate their self-learning progress by using peer feedback. In this process they also make self-reflection.

- Creative Expression: Digital storytelling, simulations, or artistic creations, cater to diverse learning styles and talents where students' creative expression is ensured.

2. Tools and Strategies for Formative and Summative Assessment:

The assessment for learning and assessment of learning are important aspects which are done in the following ways.

- Formative Assessment: Online quizzes, learning management system analytics, and real-time feedback tools help to monitor progress, adjust instruction, and address learning gaps during learning.

- Summative Assessment: Technology-enhanced projects, interactive presentations, or digital essays help evaluate overall learning outcomes and mastery of concepts, which can be tested after the completion of learning.

- Blended Assessment: Traditional methods like written tests with technology-based activities like simulations or digital portfolios are used for a comprehensive evaluation ensuring the blending of old and new ways of testing.

3. Evaluating the Effectiveness of ICT Integration:

The learning achievements of students and their constant progress are assessed by the above two techniques, it is essential to evaluate the effectiveness of technology. Following are the techniques adopted

- Student Feedback: Student engagement, learning progress, and perceived effectiveness of technology integration are gathered through surveys, interviews, and focus group discussions.

- Teacher Reflection: Regular self-reflection on lesson planning, technology use, and student outcomes helps gauge the impact of ICT on teaching and learning.

- Data Analysis: Track student performance data from online quizzes, LMS activities, and digital portfolios to identify trends and measure the impact of technology on learning outcomes.

The digital classroom is an evolving landscape; assessments need to be as dynamic as the learning environment. By embracing creative and tech-infused assessment methods, educators can ensure a holistic understanding of student progress and the true impact of technology on the educational journey. The quest for better learning experiences continues!

1.6 Professional Development of Educators

The classroom teachers are products of bygone teacher training programmes. Innovative technologies have emerged since their training which are gradually implemented in school education in India and students are taught to meet the challenges of the future world. This is an opportunity for teachers to learn and for reputed national institutions like NCERT to arrange training of in-service training to bridge the gap. The following are the important points to be kept in mind.

1. Importance of Teacher Training in ICT Integration:

Teachers play an important role in the education of the children. They shape the teaching and learning process. Hence, they must be trained in new technologies.

- Empowered Educators: Technology is a potent tool for personalised learning and engaging activities. Trained teachers can harness their potential to enhance their teaching and accommodate diverse learning styles.

- Confident Classrooms: Teachers with strong ICT skills feel more confident and motivated to infuse technology into their lessons, creating dynamic and engaging learning environments.

- Future-proofed Learning: Equipping teachers with digital literacy skills ensures they can guide students through the ever-evolving digital landscape, fostering essential 21st-century skills.

2. Techniques for Developing Digital Literacy Skills in Teachers:

Knowing about the technology is important but how to use the technology in your classroom is also important. This is possible by constantly looking into the opportunities and scope which are seen in the following paragraphs.

- Hands-on Workshops: Immersive workshops are to be arranged that let teachers explore software, hardware, and online resources firsthand can effectively build practical skills and confidence. The training of KRPs by RIE in January and February 2024 is one such example.

- Peer Coaching and Mentoring: Pairing experienced teachers with less tech-savvy colleagues fosters a supportive learning environment and encourages knowledge sharing. Parents and grandparents learn about mobile use from young children is an example.

- Online Courses and Tutorials: Providing access to flexible, self-paced online learning opportunities allows teachers to acquire new skills at their convenience. Women learning new dishes and homemaking in their leisure time is an example of such tutorials.

- Collaborative Learning Communities: Encouraging teacher-led clubs or forums dedicated to technology exploration and problem-solving fosters collective learning and support. There are many WhatsApp, and Facebook groups where teachers share their technology usage and form learning communities.

3. Resources and Opportunities for Professional Development:

It is important to know what resources are available for the professional development of teachers for the use of ICT in teaching and learning. The following content delves into the same.

- Educational Technology Organizations: The NCERT, SCERTs, DIETs, and BRCs offer opportunities by conducting training, workshops, conferences and online learning resources which constantly help in the professional development of teachers.

- School-based Initiatives: Schools can allocate budgets for ICT training programs, provide teachers with time during school hours to explore technology, and create support networks.

- Government and Non-profit Programs: Many government and non-profit organizations offer grant funding, scholarships, and professional development programs specifically for ICT integration in education.

A digitally skilled educator translates to enriched learning experiences for students. By investing in ongoing professional development, schools create an environment where teachers confidently use technology, shaping a future-ready generation. The journey towards digital literacy is a collaborative effort that transforms classrooms into dynamic hubs of knowledge and exploration.

1.7 Challenges and Ethical Considerations

While ICT brings many advantages to education, it also poses substantial challenges and ethical considerations that demand attention for fair and responsible integration.

1. Digital Divide and Access to Technology:

- Unequal Access: Disparities in device access, internet connectivity, and technical support can widen educational gaps, leaving some students on the wrong side of the digital divide.

- Addressing the Gap: Targeted government initiatives, public-private partnerships, and community-based programs are essential to ensure that all students have access to necessary infrastructure and resources.

2. Data Privacy and Security Concerns:

- Privacy Risks: Collecting and storing student data online raises concerns about privacy violations, hacking, and potential misuse of information.

- Ensuring Protection: Implementing robust data security protocols, clear consent policies, and transparent data management practices are crucial to protecting student data ethically.

3. Promoting Responsible and Ethical Use of Technology:

- Technology-related Challenges: Overreliance on technology can lead to attention issues, digital addiction, and cyberbullying.

- Fostering Digital Citizenship: Lessons on online safety, responsible internet use, and critical thinking skills are vital to empower students to navigate the digital world responsibly.

4. Strategies for Ethical ICT Integration:

- Equity-focused Technology Policies: Prioritise allocating resources and support to students with limited access, ensuring an inclusive digital learning experience.

- Data Governance and Transparency: Implement clear data collection and usage policies, involving parents and students in decision-making processes concerning their data.

- Digital Literacy and Cyber Safety Education: Equip students with skills to critically evaluate online information, protect their privacy, and behave responsibly in the digital environment.

- Teacher Training and Ethical Framework: Prepare teachers to identify and address ethical concerns related to ICT use, setting clear expectations and promoting responsible technology practices in the classroom.

As we embrace the benefits of ICT in education, it's crucial to address the challenges ethically. By implementing targeted strategies and fostering a culture of responsible technology use, we create an environment where the advantages of technology are maximised while ethical considerations are diligently managed. Balancing innovation with responsibility ensures that ICT integration truly serves the best interests of every student.

1.8 Trends in ICT

The future of education is set to be influenced by cutting-edge technologies, propelling learning experiences beyond traditional methods and classroom confines. The following paragraphs discuss the same.

1. Emerging Technologies and their Impact:

- Artificial Intelligence (AI): AI-powered tutors will personalise learning journeys, provide real-time feedback, adapt to individual needs, and offer targeted support. Chatbots like Bard, ChatGPT can address student queries, and automated grading can free up teacher time for deeper engagement.

- Virtual Reality (VR) and Augmented Reality (AR): Immerse students in simulated environments, from exploring the pyramids of Egypt to dissecting virtual frogs. AR can overlay digital information onto the real world, enhancing science labs, history lessons, and language learning.

- Big Data and Analytics: Analyse student data to identify learning gaps, predict potential challenges, and tailor instruction accordingly. This data-driven approach allows for proactive intervention and personalised learning pathways.

2. Personalised Learning and Adaptive Learning Technologies:

- Adaptive Learning Platforms: Tailor learning content and activities to each student's pace, strengths, and weaknesses, ensuring individual mastery and eliminating the one-size-fits-all approach.

- Microlearning: Deliver bite-sized, focused learning modules that cater to shorter attention spans and allow for flexible learning on the go. Gamification elements like points, badges, and leaderboards can further boost engagement and motivation.

- Learning Management Systems (LMS): These platforms evolve from mere content repositories to dynamic hubs for personalised learning. Students can access resources, track progress, collaborate with peers, and receive individual feedback, creating a centralised learning ecosystem.

Technology is a tool, not the ultimate goal. The primary focus should be on developing critical thinking skills, fostering collaboration, and nurturing a love for learning. As we navigate these emerging trends, it's crucial to ensure equitable access, ethical considerations, and responsible integration. Bridging the digital divide and harnessing technology's true potential can enrich and empower every student's learning journey. The journey is as important as the destination!

1.9 Conclusion

ICT has the potential to be a valuable tool for teaching and learning. New technologies have to be explored, the schools have to be equipped with gadgets, and teachers and students are to be trained about the relevant ICT and use of ICT. The pedagogical approaches and evaluation procedures are to be modified. There is no end to the use of technology, it is just the beginning and teaching learning has a lot of scope for the use of ICT. It is important to use ICT thoughtfully and intentionally to maximise its benefits.

Resources for ICT in Education

There are various resources available, which are free and with registration that can be accessed to make teaching and learning effective.

Websites & Educational Platforms:

- **Educational Technology and Mobile Learning (Edutopia):** A rich resource for educators, offering practical strategies, lesson ideas, and technology reviews for integrating ICT across diverse subject areas. Visit Technology integration section and refer to the videos.
- **Common Sense Education:** Provides K-12 digital citizenship resources, lesson plans, and tools to empower students to be safe, responsible, and ethical users of technology. Students may not create an account on Common Sense Education. Accounts are to be created by educators who are above 18 or older using Google or any other email account. This requires filling in some more information to create a profile and then an account is created. Use the Professional Development tab from the window to access relevant materials. Eg. Media Balance is important presents a song where the necessity of having a balance between digital devices and physical activities is presented in the form of an interesting song that may create interest among students and improve habits. You can access "Apps and Websites for Learning" from the tab based on various filters which is useful as an educator.
- **Khan Academy:** A global learning platform offering free, high-quality educational videos, exercises, and practice problems in math, science, humanities, and more. The learning is personalised, the content is trusted, and the website has tools which empower teachers. The content is available for various grades from classes 1-12 and for the Indian context, the content is available for various boards like Punjab, Assam, Uttar Pradesh,

Odisha, Maharashtra, and NCERT. Eg. You can refer to the content of class 9 Physics "Unit 3: Gravity"

- **Kahoot!:** Kahoot! is a Norwegian online game-based learning platform. It has learning games, also known as "Kahoots", which are user-generated multiple-choice quizzes that can be accessed via a web browser or the Kahoot! App. A gamified learning platform that allows teachers to create quizzes and polls to make learning interactive and engaging for students. You can create an account as a Professional, Teacher, Student, Family & Friends and create a profile using your online accounts like Google, Microsoft, Apple etc. The account can be free or paid for an individual, team or campus and for exercise you can use a free account for familiarity with the software. "Kahoot!+ Max for Higher ed educators" is the premium facility which provides facility for Teacher essentials, Math games, Collaboration set, Student-led learning set, Discussion set, Premium content set, Customization set, Assessment set, Precision set, Teaching set, Engagement set, Feedback set, Review set, Creation set, Player limit. The paid versions help to build 21st-century skills, incorporate formative assessment, boost engagement and collaboration, introduce new topics, reinforce learning, and assess existing knowledge.
- Kahoot! is a tool that delivers and presents questions to students. It is set up as a game that students can play either individually or in groups. Instructors provide students with multiple-choice questions, which are projected on a classroom screen.
- **Moodle:** A popular open-source learning management system used by schools and universities around the world to create online courses, manage assignments, and facilitate collaboration.
- MoodleCloud's cost-effective Standard Plans come with features that enable you to create tests, deliver learning content, and monitor learner progress, with self-service support for seamless troubleshooting.
- It is appropriate to know why Moodle is to be used by the Educators. This is because as an educator you can improve your teaching, training and learner outcomes with a feature-rich learning platform that saves educators' time and provides more active learning experiences. Using the Moodle platform you can deliver content and tasks in a range of formats for different learning preferences, enable social learning and learner collaboration, keep learners updated on course requirements and deadlines, create tests and assessments, track, analyse and report on learner progress, creating learning pathways and programs of multiple courses. The educators who use Moodles are supported by online resources from the same website by studying and interacting in Forums, Documentation, Download, Demo, Trackers, Moodle Community, Moodle Net, Moodle Academy, and Moodle Plugins. Login here
- **Google Classroom:** A free tool for teachers to organize assignments, share resources, and communicate with students in a paperless, online environment.
- This is a place where teaching and learning come together.
- Google Classroom helps you as an educator to create engaging learning experiences so that you can personalize, manage, and measure these experiences. Classroom is part of Google Workspace for Education, which empowers your institution with simple, safer, collaborative tools. This means you can log in using your Google Account using Google

Docs, Sheets, Slide, Images, PDF, YouTube, forms, calendar, Meet, translate, email, chat, maps, forms etc. You can create a classroom, add teachers, enroll students, and share classes, and calendars. The students can comment or tag comments, give assignments, and feedback in addition to taking classes. The educators can create assignments, quizzes, and questions, share material, reuse posts and declare topics. Log in and try

- **Code.org:** Introduces students of all ages to coding through engaging games, tutorials, and activities, fostering computational thinking and problem-solving skills.
- This is started with a motto "Learn computer science. Change the world." This has 80 Million students, 280 Million Projects and 2 Million Teachers. You can create an account by visiting https://studio.code.org/users/sign_in using your account. Coding is an important skill required for all students from K-12 for which programming modules are present and we can practice coding using the same. Eg. a student can look into the given code and draw a suggested pattern reset the coding, run to look into the result and share the result through a QR code to others using the share button. Try out
- **TED-Ed:** Animated educational videos on a wide range of topics, perfect for sparking curiosity and engaging students in deeper learning.
- TED-Ed provides a platform to Discover, Create, and Get Involved in the project which is meant to feed the students' curiosity by providing everything they need to spark and celebrate their ideas. You can log in using your email credentials and Create customized lessons for your students, Inspire your students to share their big ideas, and Share YOUR big idea in a TED-style talk, Eg. look into a lesson How to get motivated even when you don't feel like it. The video is followed by MCQ to 'Think', learn more in the form of 'Dig Deeper', and undergo guided discussion using 'Discuss'.
- **Flip (formerly Flipgrid):** A video discussion platform that allows students to record and share short video responses to prompts, fostering active participation and collaboration.
- You can sign into the website using this link using your email credentials and create a profile. The home page of the website informs that you can share videos to express yourself and learn together in a safe space. It further asks that if you're an educator, you can create a group or else if you're a student, then it asks to enter your join code. You have to give access to your camera and microphone to record video from the browser in online mode.

Books & Articles:

- **"Teach Like a Pirate" by Dave Burgess:** Provides practical strategies for making lessons more engaging and memorable using technology, humour, and storytelling.
- **"The Innovator's Mindset" by Ken Robinson:** Encourages educators to embrace creativity, experimentation, and risk-taking to foster innovation and prepare students for the future.
- **"Digital Leadership in a Changing World" by Eric Sheninger:** Offers insights and strategies for school leaders to effectively integrate technology into their schools and achieve positive outcomes.

- **"The EdTech Bubble" by Audrey Watters:** A critical analysis of the hype surrounding educational technology, advocating for thoughtful integration and focus on pedagogy over tools.
- **"A Framework for 21st Century Learning" by The Partnership for 21st Century Skills:** Defines essential skills and knowledge needed for success in the 21st century, emphasising the role of technology in developing these skills.

Organizations & Initiatives:

- **International Society for Technology in Education (ISTE):** A global organization dedicated to advancing the use of technology in education.
- **UNESCO ICT in Education:** A program within UNESCO that works to promote the effective use of ICT in education around the world. Visit https://www.unesco.org/en
- **CIET, NCERT:** The Central Institute of Educational Technology (CIET) is a constituent unit of the National Council for Educational Research and Training (NCERT). CIET's primary goal is to improve the quality of education at the school level by using mass media, such as radio, TV, films, satellite communications, and cybermedia. The institute takes up research, training, design, production, and dissemination of e-contents and for students, teachers, teacher educators, and parents, build capacities of teachers/educators.

Pedagogy technology integration through Web 2.0 technology

- Dr. Sanjay Kumar Pandagale

Introduction

Today's world is a world of technology and education is not indifferent to it. We always tell our teachers to use ICT in education. Use of ICT in education is depends on availability of hardwares/softwares and the knowledge of using these hardwares/softwares. It can be said that the first part related to infrastructure is beginning to reach to the schools due to intervention of SSA and ICT@schools project. However, there is a need to concentrate on second part related to effective use of ICT in education. Furthermore, teachers have often been provided with inadequate training for this task. Many approaches to teachers' professional development offer a one size-fits-all approach to technology integration when, in fact, teachers operate in diverse contexts of teaching and learning.

Faced with these challenges, how can teachers integrate technology into their teaching? An approach is needed that treats teaching as an interaction between what teachers know and how they apply what they know in the unique circumstances or contexts within their classrooms. There is no "one best way" to integrate technology into curriculum. Rather, integration efforts should be creatively designed or structured for particular subject matter ideas in specific classroom contexts. Honoring the idea, that teaching with technology is a complex, ill-structured task; we propose that understanding approaches to successful technology integration requires educators to develop new ways of comprehending and accommodating this complexity.

At the heart of good teaching with technology are three core components: content, pedagogy, and technology, plus the relationships among and between them. The interactions between and among the three components, playing out differently across diverse contexts, account for the wide variations seen in the extent and quality of educational technology integration. These three knowledge bases (content, pedagogy, and technology) form the core of the technology, pedagogy, and content knowledge (TPACK) framework. An overview of the framework is provided in the following section, though more detailed descriptions may be found elsewhere (e.g., Koehler & 2008; Mishra & Koehler, 2006). This perspective is consistent with that of other researchers and approaches that have attempted to extend Shulman's idea of pedagogical content knowledge (PCK) to include educational technology. (A comprehensive list of such approaches can be found at http://www.tpck.org/.)

Nowadays with the invention of web 2.0 technology, this is also not a big issue. Web 2.0 technology opened the doors to create potential multimedia content at various platforms easily and free of cost.

Objectives

After going through the present module, the teachers will-

- Know about the web 2.0 technologies in general and web 2.0 technologies in education in particular,
- Know key web 2.0 services in education,
- Develop web 2.0 technology integrated lesson plan.

What is web 2.0 technology?

The term Web 2.0 was coined in 1999 to describe web sites that use technology beyond the static pages of earlier web sites. It is closely associated with Tim O'Reilly because of the O'Reilly Media Web 2.0 conference, which was held in late 2004. A Web 2.0 site may allow users to interact and collaborate with each other in a social media dialogue as creators of user-generated content in a virtual community, in contrast to websites where people are limited to the passive viewing of content. Examples of Web 2.0 include social networking sites, blogs, wikis, video sharing sites, hosted services, etc.

Web 2.0 websites allow users to do more than just retrieve information. By increasing what was already possible in "Web 1.0", they provide the user with more user-interface, software and storage facilities, all through their browser. This has been called "network as platform" computing. Major features of Web 2.0 include social networking sites, user created web sites, self-publishing platforms, tagging, and social bookmarking. Web 2.0 offers all users the same freedom to contribute.

Web 2.0 technology in education

Web 2.0 technologies provide teachers with new ways to engage students, and even allow student participation on a global level. By allowing students to use the technology tools of Web 2.0, teachers are giving students the opportunity to share what they learn with peers. Web 2.0 calls for major shifts in the way education is provided for students. One of the biggest shifts that Will Richardson points out in his book *Blogs, Wikis, Podcasts, and Other Powerful Web Tools for Classrooms* is the fact that education should be collaboratively constructed. This means that students, in a Web 2.0 classroom, are expected to collaborate with their peers. By making the shift to a Web 2.0 classroom, teachers are creating a more open atmosphere where students are expected to stay engaged and participate in class discussions. In fact, there are many ways for educators to use Web 2.0 technologies in their classrooms.

Key Web 2.0 services/applications

There are a number of Web-based services and applications that demonstrate the foundations of the Web 2.0 concept, and they are already being used to a certain extent in education. These are not really technologies as such, but services (or user processes) built using the building blocks of the technologies and open standards that underpin the Internet and the Web. These include blogs, wikis, multimedia sharing services, content syndication, podcasting and content tagging services. Many of these applications of Web technology are relatively mature, having been in use for a number of years, although new features and capabilities are being added on a regular basis. It is worth noting that many of these newer technologies are concatenations, i.e. they make use of existing services. In the first part of this section, we introduce and review these well-known and commonly used services with a view to providing a common grounding for later discussion.

NB * indicates an open source or other, similar, community or public-spirited project.

- **Blogs**

The term web-log, or *blog*, was coined by Jorn Barger in 1997 and refers to a simple webpage consisting of brief paragraphs of opinion, information, personal diary entries, or links, called *posts*, arranged chronologically with the most recent first, in the style of an online journal (Doctorow *et al.*, 2002). Most blogs also allow visitors to add a *comment* below a blog entry.

Well-known or education-based blogs:
http://radar.oreilly.com/
http://www.techcrunch.com/
http://www.instapundit.com/
http://blogs.warwick.ac.uk/*
http://jiscdigitisation.typepad.com/jisc_digitisation_program/*

Software:
http://wordpress.org/*
http://www.sixapart.com/typepad/
http://www.blogger.com/start
http://radio.userland.com/
http://www.bblog.com/

Blog search services:
http://technorati.com/
http://www.gnosh.org/
http://blogsearch.google.com/
http://www.weblogs.com/about.html

This posting and commenting process contributes to the nature of blogging (as an exchange of views) in what Yale University law professor, Yochai Benkler, calls a 'weighted conversation' between a primary author and a group of secondary comment contributors, who communicate to an unlimited number of readers. It also contributes to blogging's sense of immediacy, since 'blogs enable individuals to write to their Web pages in journalism time – that is hourly, daily, weekly – whereas the Web page culture that preceded it tended to be slower moving: less an equivalent of reportage than of the essay' (Benkler, 2006, p. 217).

Each post is usually 'tagged' with a keyword or two, allowing the subject of the post to be categorized within the system so that when the post becomes old it can be filed into a standard, theme-based menu system. Clicking on a post's description, or tag (which is displayed below the post), will take you to a list of other posts by the same author on the blogging software's system that use the same tag.

- **Multimedia sharing**

One of the biggest growth areas has been amongst services that facilitate the storage and sharing of multimedia content. Well known examples include YouTube (video) Flickr (photographs) and Odeo (podcasts). These popular services take the idea of the 'writeable' Web (where users are not just consumers but contribute actively to the production of Web content) and enable it on a massive scale. Literally millions of people now participate in the sharing and exchange of these forms of media by producing their own podcasts, videos and photos. This development has only been made possible through the widespread adoption of high quality, but relatively low cost digital media technology such as hand-held video cameras.

Well known photo sharing services:
http://www.flickr.com/
http://www.ourpictures.com
http://www.snapfish.com/
http://www.fotki.com/

Well known video sharing services:
http://www.youtube.com/
http://www.getdemocracy.com/broadcast/ *
http://eyespot.com/
http://ourmedia.org/ *
http://vsocial.com
http://www.videojug.com/

Well known podcasting sites:
http://btpodshow.com/
http://www.audblog.com/
http://odeo.com/
http://www.ourmedia.org/ *
http://connect.educause.edu/ *
http://juicereceiver.sourceforge.net/index.php
http://www.impala.ac.uk/ *
http://www.law.dept.shef.ac.uk/podcasts/ *

- **Audio blogging and Podcasting**

Podcasts are audio recordings, usually in MP3 format, of talks, interviews and lectures, which can be played either on a desktop computer or on a wide range of handheld MP3 devices. Originally called audio blogs they have their roots in efforts to add audio streams to early blogs (Felix and Stolarz, 2006). Once standards had settled down and Apple introduced the commercially successful iPod MP3 player and its associated iTunes software, the process started to become known as podcasting. This term is not without some controversy since it implies that only the Apple iPod will play these files, whereas, in fact, any MP3 player or PC with the requisite software can be used. A more recent development is the introduction of video podcasts (sometimes shortened to vidcast or vodcast): the online delivery of video-on-demand clips that can be played on a PC, or again on a suitable handheld player (the more recent versions of the Apple iPod for example, provide for video playing).

A podcast is made by creating an MP3 format audio file (using a voice recorder or similar device), uploading the file to a host server, and then making the world aware of its existence through the use of RSS (Rich Site Summary). This process (known as *enclosure*) adds a URL link to the audio file, as well as directions to the audio file's location on the host server, into the RSS file (Patterson, 2006).

Podcast listeners subscribe to the RSS feeds and receive information about new podcasts as they become available. Distribution is therefore relatively simple. The harder part, as those who listen to many podcasts know, is to produce a good quality audio file. Podcasting is becoming increasingly used in education (Brittain *et al*., 2006; Ractham and Zhang, 2006) and recently there have been moves to establish a UK HE podcasting community.

- **Tagging and social bookmarking**

A tag is a keyword that is added to a digital object (e.g. a website, picture or video clip) to describe it, but not as part of a formal classification system. One of the first large-scale applications of tagging was seen with the introduction of Joshua Schacter's del.icio.us website, which launched the 'social bookmarking' phenomenon.

Social bookmarking systems share a number of common features (Millen *et al*., 2005): They allow users to create lists of 'bookmarks' or 'favorites', to store these centrally on a remote service (rather than within the client browser) and to share them with other users of the system (the 'social' aspect). These bookmarks can also be tagged with keywords, and an important difference from the 'folder'-based categorization used in traditional, browser-based bookmark lists is that a bookmark can belong in more than one category. Using tags, a photo of a tree could be categorized with both 'tree' and 'larch', for example.

Examples of tagging services:
http://www.connotea.org/
http://www.citeulike.org/*
http://www.librarything.com/
http://del.icio.us/
http://www.sitebar.org
http://www.furl.net/index.jsp
http://www.stumbleupon.com/ http://www.blinklist.com/
http://www.digg.com/
http://www.rawsugar.com
http://del.icio.us/elearningfocus/web2.0 *

The concept of tagging has been widened far beyond website bookmarking, and services like Flickr (photos), YouTube (video) and Odeo (podcasts) allow a variety of digital artifacts to be socially tagged. For example, the BBC's Shared Tags project is an experimental service that allows members of the public to tag BBC News online items. A particularly important example within the context of higher education is Richard Cameron's

CiteULike, a free service to help academics to store, organize and share the academic papers they are reading. When you see a paper on the Web that interests you, you click a button and add it to your personal library. CiteULike automatically extracts the citation details, so you do not have to type them in. This tool was used during the research for this report.

http://www.adaptcms.com/
http://b2evolution.net/
http://www.bedita.com/
http://www.cmsmadesimple.org/
http://www.cmsimple.org/
http://drupal.org/
http://www.joomla.org/
http://www.mamboserver.com/
http://www.tcexam.org/

The idea of tagging has been expanded to include what are called *tag clouds*: groups of tags *(tag sets*) from a number of different users of a tagging service, which collates information about the frequency with which particular tags are used. This frequency information is often displayed graphically as a 'cloud' in which tags with higher frequency of use are displayed in larger text.

- **Wikis**

A *wiki* is a webpage or set of webpages that can be easily edited by anyone who is allowed access (Ebersbach *et al*., 2006). Wikipedia's popular success has meant that the concept of the wiki, as a collaborative tool that facilitates the production of a group work, is widely understood. Wiki pages have an edit button displayed on the screen and the user can click on this to access an easy-to-use online editing tool to change or even delete the contents of the page in question. Simple, hypertext-style linking between pages is used to create a navigable set of pages.

Examples of wikis:
http://wiki.oss-watch.ac.uk/*
http://wikieducator.org/Main_Page
http://wikispaces.com/
http://wiki.cetis.ac.uk/CETIS_Wiki*
http://en.wikipedia.org/wiki/Main_Page*
http://www.ch.ic.ac.uk/wiki/index.php/Main_Page
http://www.wikihow.com

Software: http://meta.wikimedia.org/wiki/MediaWiki*
http://www.socialtext.com/products/overview
http://www.twiki.org/http://uniwakka.sourceforge.net/HomePage

Online notes on using wikis in education:
http://www.wikiineducation.com/display/ikiw/Home*

Unlike blogs, wikis generally have a *history* function, which allows previous versions to be examined, and a *rollback* function, which restores previous versions. Proponents of the power of wikis cite the ease of use (even playfulness) of the tools, their extreme flexibility and open access as some of the many reasons why they are useful for group working (Ebersbach *et al*., 2006; Lamb, 2004).

- **Social Networking**

Professional and social networking sites that facilitate meeting people, finding like minds, sharing content—uses ideas from harnessing the power of the crowd, network effect and individual production/user generated content. Nowadays Facebook is very popular in India as well as in other countries also.

Professional networking:
http://www.siphs.com/aboutus.jsp
https://www.linkedin.com/
http://www.zoominfo.com/

Social networking:
www.myspace.com
www.facebook.com
http://fo.rtuito.us/
https://twitter.com/
http://www.spock.com/
http://www.flock.com/
http://www.bebo.com/

- **CMS**

A **Content Management System (CMS)** is a computer program that allows publishing, editing and modifying content as well as maintenance from a central

interface. Such systems of content management provide procedures to manage workflow in a collaborative environment. These procedures can be manual steps or an automated cascade. The first content management system (CMS) was announced at the end of the 1990s. This CMS was designed to simplify the complex task of writing numerous versions of code and to make the website development process more flexible. CMS platforms allow users to centralize data editing, publishing and modification on a single back-end interface. CMS platforms are often used as blog software.

The core function of content management systems is to present information on web sites. CMS features vary widely from system to system. Simple systems showcase a handful of features, while other releases, notably enterprise systems, offer more complex and powerful functions. Most CMS include Web-based publishing, format management, revision control (version control), indexing, search, and retrieval. The CMS increments the version number when new updates are added to an already-existing file. A CMS may serve as a central repository containing documents, movies, pictures, phone numbers, scientific data. CMSs can be used for storing, controlling, revising, semantically enriching and publishing documentation.

- **Document sharing and self-publishing platform**

The expansion of the Internet in recent years has provided web users with a robust platform for content sharing -- whether it be files, documents, music or videos, among others. Like never before, the Internet has provided professionals and everyday users alike with the ability to send and receive information quickly and easily.

http://www.calameo.com/
http://www.slideshare.net/
http://www.scribd.com/
http://www.docuter.com/
http://www.wepapers.com/
https://www.zoho.com/rip/zohoshare-eof.html
http://www.edocr.com/

- **Free websites**

Although the modern Internet community is moving towards social networks and clouds, there is still some space for **traditional free web hosting** that enables to publish a *custom web page*, or *custom blog*, or other *"manually" build website* on the web at absolutely no cost.

http://www.webs.com/
http://www.wix.com/
http://www.biz.nf/
http://www.freehostingeu.com/
http://www.biz.ly/
http://www.freehostia.com/index2.html
http://byethost.com/
http://www.x10hosting.com/
https://www.yola.com/pricing?cid=CJ20035

- **The 5E Approach to Constructivist Learning ***

The Biological Science Curriculum Study (BSCS), a team whose Principal Investigator is Roger Bybee developed an instructional model for constructivism, called the "Five Es". The 5Es represent five stages of a sequence for teaching and learning: *Engage, Explore, Explain, Extend* (or *Elaborate),* and *Evaluate. The details are given below:*

Engage

This stage should stimulate curiosity and activate prior knowledge of student. The activity should be a problem or an event that raises questions and motivates students to discover more about the concept. Specifically this stage helps in:

1. Make connections between past and present learning experiences
2. Anticipate activities and focus students' thinking on the learning outcomes of current activities. Students should become mentally engaged in the concept, process, or skill to be learned.
3. Gives an opportunity for teacher to understand misconception of students

Explore

Students need the opportunity to actively explore the concept in a hands-on activity. This establishes a commonly shared classroom experience and allows students to share ideas about the concept. This phase of the 5 E's provides students with a common base of experiences. They identify and develop concepts, processes, and skills. During this phase, students actively explore their environment or manipulate materials.

Explain

This phase of the 5 E's helps students explain the concepts they have been exploring. They have opportunities to verbalize their conceptual understanding or to demonstrate new skills or behaviors. Teachers use questioning strategies to lead students' discussion of information discovered during the Explore stage. This phase also provides opportunities for teachers to introduce formal terms, definitions, and explanations for concepts, processes, skills, or behaviors.

Elaborate

This phase of the 5 E's extends students' conceptual understanding and allows them to practice skills and behaviors. Through new experiences, the learners develop deeper and broader understanding of major concepts, obtain more information about areas of interest, and refine their skills. Students are encouraged to apply, extend, and enhance the new concept and related terms during interaction with the teacher and other students.

Evaluate

This phase of the 5 E's encourages learners to assess their understanding and abilities and lets teachers evaluate students' understanding of key concepts and skill development. The teacher must create a quality assessment to gauge the learner's understanding of the topic. The students must also be able to reflect on their own understanding and progress.

A Sample Web 2.0 Integrated Constructivist Learning Plan *

Based on the discussions above, a sample constructivist learning plan is designed using the 5E model is given below. The unit is based on the content of NCERT science textbook for class IX. The topic is poultry farming under the larger unit of animal husbandry and is suitable for any secondary school class level. There are many technology-integrated activities suggested

under each phase of the model and the facilitator can choose and direct the learning based on the available time and resources.

The main purpose of learning this topic is to make the learner aware of the poultry farming practices and its importance. The learner is also encouraged to explore the poultry farming practices in different regions of the world and the current status of poultry farming in the country. This unit is also expected to give them many answers to the problem of bird flu, which is very common in today's context. The learning environment created through various phases of this model encourages the learner to use varieties of web 2.0 tools. The learning environment provides the information that learners need to understand poultry farming and related concepts through text documents, graphics, sound, video and animation resources, which can be accessed through the World Wide Web. The learners are also provided with various collaborative tools such as e-mail, chat, forum, wiki, blog etc. to form learning communities to negotiate and co-construct meaning about the concepts through these tools.

Web 2.0 Mediated Constructivist Learning Design *

Area: Animal Husbandry- Poultry Farming

5E Approach

Class IX

Engage

Engaging Activities for the Topic

- View the *online streaming* video on poultry farming from http://www.youtube.com/watch?v=aJ7rrHYmFiQ
- Collaborative *digital concept map* on egg/poultry farming–mind map- use freemind (offline), bubbl(online) http://www.bubbl.us/index
- Questions that you want to ask about egg and poultry farm- *online forum* (questions like the following will emerge) http://www.allexperts.com/
- Take a *online webquest* on Bird flu from http://www.mofb.org/WebQuest.aspx/BirdFlu.aspx

Explore

Exploration Activities for the topic

- Take the following *virtual fieldtrip*

1. Online visit to an organic egg farm / virtual trip http://www.exploratorium.com/cooking/eggs/farm/index.html
2. Poultry virtual farm http://sites.ext.vt.edu/virtualfarm/poultry/poultry.html
   - Visit a Poultry Farm. Visit a nearby poultry farm. Take along all types of *digital recording* equipment. Audiotape farm sounds. Videotape farm activities. Photograph farm people, equipment, crops and animals. Show the world a unique farm in your area by adding your own farm website to the Internet.
   - Different poultry birds and stages/process of poultry farming –creating *digital album* – flicker/picasa
   - Understanding poultry farming and poultry birds in different country through:

1. *Online collaboration* through e-pal
2. Viewing and discussion of various *streaming videos* from youtube http://www.youtube.com/watch?v=-kOk8lcn_TQ
3. Through *Google image* search
    - Ask an expert. Have your class *e-mail (or live chat if available)* an expert about question they have about the poultry farm http://www.allexperts.com/ , specifically http://www.allexperts.com/el/Poultry-Farming/ , http://en.allexperts.com/q/Poultry-Farming-3481/index_11.htm
    - ask question on the following *forum sites*

1. http://apps.exploratorium.edu/cgi-bin/yabb2-cooking/YaBB.pl
2. http://www.the-coop.org/cgi-bin/UBB/ultimatebb.cgi
    - View the *webcast* on egg http://www.exploratorium.edu/cooking/webcasts/index.html

Explain

Explain Activities for the Topic

- Students collaborate and develop a *wiki* on poultry farming using wiki space http://www.wikispaces.com/
- *E-News letter* on poultry farming – Microsoft publisher or equivalent open source software
- Plan and design a *digital poultry farm* of your own in groups and share the design
- Discuss the difference in poultry farming in different countries using *discussion board/forum/groups*
- After the visit to the local poultry farm Show the world a unique farm in your area by adding your own farm *website to the Internet*.
- Compare traditional poultry farming with modern poultry farming using *discussion board/forum/groups*
- Collaborative *digital concept map* on poultry farming–mind map- use freemind (offline), bubbl(online) http://www.bubbl.us/index

Elaborate

Elaborate Activities for the Topic

- Making art work using egg egg shell
- They analyse and develop a *social bookmarking* of websites related poultry farming/animal husbandry
- Take a *webquest* on the following

1. Bird flu http://www.mofb.org/WebQuest.aspx/BirdFlu.aspx
2. From egg to chick http://www.mofb.org/webquest/wq23a.htm
3. adventures on aviculture http://www.besd61.k12.il.us/webquests/8th%20Grade/sharp/birds2/studentspage.htm
    - Write a review of a poultry farming website in your *blog*
    - Develop a collaborative *podcasts* on importance of poultry farms and host it in Gcast
    - Conduct a survey of poultry industry in india- *internet search and online survey*
    - Explore the poultry(duck) farming in kerala through *internet and e-mail*

- searching the net and making a *database* of poultry related websites

1. The Coop is dedicated to all the folks around the world that raise, breed or show poultry, waterfowl, gamebirds and related species. http://www.the-coop.org/index.html

Evaluate

Evaluation Activities for the Topic

- Create a *digital portfolio* on poultry farming – develop the portfolio using mahara http://mahara.org/
- Portfolio artifacts
- News letter
- Project report
- Blog posts etc.
- *Online reflective journal* using http://edublogs.org/
- Peer Assessment
- Create *digital rubrics* along with students for assessing the portfolio and other activities using rubistar http://rubistar.4teachers.org/
- Develop *digital checklist* for all other activities they are involved in and products they have created using online free form creator -soho creator (http://www.zoho.com/creator/html-form-builder.html) or googledocs- forms (http://www.google.com/google-d-s/forms/)
- Develop and conduct a traditional multiple choice *online test* using Easy Test Maker http://www.easytestmaker.com/

(* retrieved from http://www.ictmanual.net/index.php/introduction/web20-unit-plan)

Above are the only few examples of web 2.0 technology. There are number of other tools available on the web. Following are the links to find them-

- http://pinterest.com/esheninger/web-2-0-tools-for-educators/
- http://edudemic.com/2011/11/best-web-tools/
- nroer.org.in
- coursera.org

Online Education Resources

- Ashok Shaky

Introduction

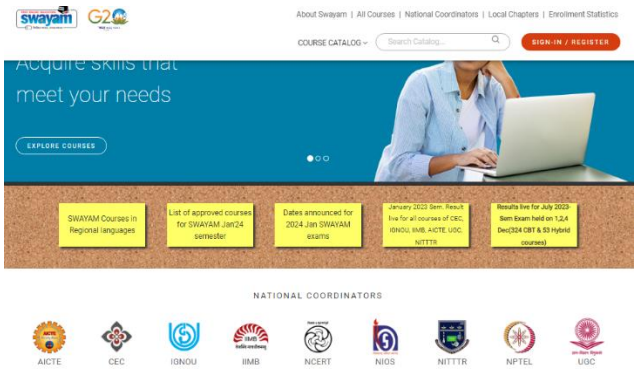
Information and communication technology (ICT) development is bringing new patterns of behaviour to many aspects of society, including university settings. Institutions in higher education mostly use limited forms of ICT-supported learning, such as course management systems, virtual learning environments and web-based applications to deliver curriculum and student support. Some universities provide distance education, and lately some provide video lectures and online courses. Because of the speed and the nature of technological changes, novel ICT technologies are harder to implement in formal learning environments. The official university curriculum is now more oriented towards empowering students' competencies for preparing their own learning environment as well as self-regulation abilities, the setting of learning goals and the acceptance of responsibility. Since universities do not provide fixed e-learning environments, students are expected to be more active and resourceful with regard to the use of ICT to support learning. In this connection, the literature reveals some personal factors in connection with personal innovativeness University students report that the use of ICT is expected of them at university, even though the formal training for such skills is often missing. ICT skills, beneficial for learning purposes, are therefore often developed in informal ways, such as with ICT use for leisure, self-initiated exploratory behaviour and information from peers, family or media .

Types of E-learning Resources

- Digital Print
- Digital Audio
- Digital Video
- Web-based Resources
- E-learning through Web 2.0 tools

SWAYAM

(https://swayam.gov.in/) provides Massive Open Online Courses with 140 universities approved credit transfer feature. Students enrolled in Jan-20 & in total are 26 Lakhs & 1.57 Cr respectably. Total 1900+ courses covering school and higher education.



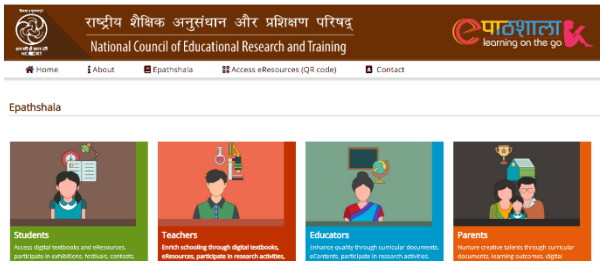
SWAYAMPRABHA *(https://www.swayamprabha.gov.in/)* provides high quality educational programs 24*7 through 32 DTH channels. Around 56,000 total videos have been telecasted covering school & higher education. It has 3+ crores total views on Youtube since inception.

National Digital Library (NDL) ***(https://ndl.iitkgp.ac.in/)*** is a repository of econtent on multiple disciplines from primary to PG levels. It has 4.3 crores content (Text / Audio / Video / Simulation /Graphics), harvested from 250 sources; in 300+ languages. NDL has 55 Lakhs + registered users.

DIKSHA (***https://diksha.gov.in/)*** is a National Platform for Our Teachers & all other learner.

e-Yantra (https://www.e-yantra.org/) provides hands on experience on embedded systems. It has about 380 Lab and made 2300+ colleges benefited

Epathshala ***(http://epathshala.gov.in/)***



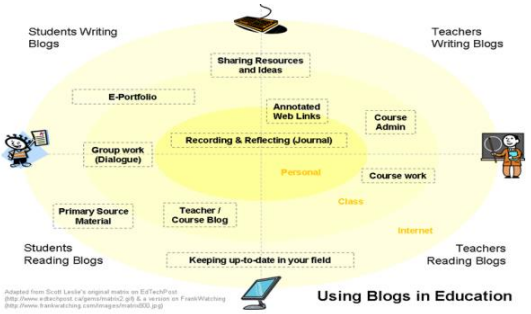
provides Free access of e-books (class I to XII) through website and app.

FOSSEE (https://fossee.in/) is acronym for Free/Libre and Open Source Software for Education, which developed, promote open source softwares for education as well as professional use.

Virtual Labs (http://www.vlab.co.in/) has developed Web-enabled curriculum based experiments designed for remote – operation. Its 275 labs with 2200+ experiments made 18+ Lakhs students benefitted.

e-gyankosh (http://egyankosh.ac.in/) is a National Digital Repository to store and share the digital learning resources. Its content developed by the Open and Distance Learning Institutions in the country.

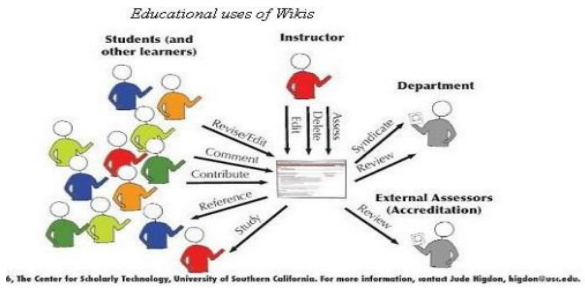
GyanDarshan (http://www.ignouonline.ac.in/gyandarshan/) is a web based TVchannel devoted to educational and developmental needs for Open and Distance Learner.



Educational benefits & uses of web 2.0 tools

Blogs

'Creative interaction with one's own development helps to ensure that new knowledge is incorporated in and integrated with existing knowledge



Wikis

Students can create simple websites without having prior knowledge in HTML programming or current software used for website authoring. A wiki facilitates the ability to interact with an evolving document over time. The authors can see the evaluation of written task and comment on it rather putting comments on final work. Wiki is very useful for tracking and streamlining group projects.

Gyan Vani (105.6 FM Radio) & Gyandhara (web radio)

(http://ignouonline.ac.in/Gyandhara/) Gyan Dhara is an internet audio counselling service where students can listen to the live discussions by the teachers and expertson the topic of the day and interact with them through telephone.

DIKSHA (https://diksha.gov.in/) is a National Platform for Our Teachers & all other learner.

Epathshala (http://epathshala.gov.in/) provides free access of e-books (class I toXII) through website and app.

e-PGPathshala (https://epgp.inflibnet.ac.in/) is a gateway for e-books up to PG, which provides High quality, curriculum based, and interactive content in differentsubjects across all disciplines.

e-ShodhSindhu (https://ess.inflibnet.ac.in/) is a collection of e-journals, e- journal archives and e-books on perpetual access basis. It has 10,000+ e-journals, 31,35,000+ e-books.

Shodhganga (https://shodhganga.inflibnet.ac.in/) is a platform for research students to deposit their Ph.D. theses and make it available to the entire scholarly community in open access

Shodh Shudhhi (PDS) (https://pds.inflibnet.ac.in/) is a Plagiarism Detection Software Encourage original information by preventing plagiarism.

VIDWAN (https://vidwan.inflibnet.ac.in/) is an Expert Database and National Research Network, which has profiles of scientists / researchers and other faculty members working at leading academic institution

Spoken Tutorial (https://spoken-tutorial.org/) is a Tutorial in IT application, which provides self-training in IT fields.

NEAT (https://neat.aicte-india.org/) is an AI adaptive learning portal. This is an initiative for skilling of learners in latest technologies through a PPP model.

SAKSHAT (https://sakshat.ac.in/) is one Stop Education Portal for addressing all the education and learning related needs of students, scholars, teachers and lifelong learners. The

portal provides the latest news, press releases, achievements etc related to Ministry of HRD. So visit SAKSHAT to know the world of online learning.

S.N.	Initiated by	Resource	About	URL
Audio-Video e-content				
1	Ministry of Education	**SWAYAM**	Offers courses from Class 9 to Post Graduation with rich e-learning content in the form of: - e-Tutorial: Audio, Video, Virtual labs etc. - Specially prepared Downloadable e-content - Self-Assessment tools like MCQs, Assignments, Quizzes etc. - Online discussion forum for clearing doubts - Evaluation and certification available at nominal fee	https://swayam.gov.in/
2	Seven Indian Institutes ofTechnology (IITs) and Indian Institute of Science (IISc)	**NPTEL** (National Programme on Technology Enhanced Learning)	- Largest online repository for web and video courses in engineering, basic sciences and selected humanities and social sciences subjects - No pre-requisites, no age limit, no	http://nptel.ac.in/

			entrance criteria to enroll - Certification courses are offered twice a year (Jan-Jun, Jul-Dec)	
3	Consortium for Educational Communication(CEC-UGC)	**Curriculum Classes**	- Offers digital content in 87 UG subjectsas per model syllabi of UGC - Visual, web and text based learning - material - Self-paced learning opportunity	http://cec.nic.in/cec/curriculum_class (YouTube Channel https://www.youtube.com/user/cecedusat)
4	NCERT	**DIKSHA** (Digital Infrastructure for Knowledge Sharing)	- Provides video courses and practice tests for students and teachers of Class I to Class XII - School curriculum based courses prepared by NCERT, CBSE, State boardsetc.	https://diksha.gov.in/
5	National Skill Developmen tCorporation	**e-Skill India**	- Provides online courses across all sectors ranging from Beauty, Agriculture to IT-ITES and BFSI - No pre-requisites, no age limit, no - entrance criteria to enroll - Self-paced, certification	https://www.eskillindia.org/

			Skilling courses	
Digital content: access journals and e-books				
6	Ministry of Education	**National Digital Libraryof India**	- Offers learning content for users from Primary to Post Graduate Levels across all disciplines - Content available in multiple formats (Audio, Video, Web, Dataset, Report, Book, Thesis, Album etc.) - Ease of highly filtered and focused searching	https://ndl.iitkgp.ac.in/
7	NCERT	**e-Pathshala**	- Offers e-textbooks and supplementary books of NCERT for all subjects for classes I to XII in English, Hindi and Urdu - Offers e-Resources like audios, videos, interactive images, maps, question banks etc. in English and Hindi	http://epathshala.nic.in
8	Ministry of Education	**e-PG Pathshala** (executed by UGC)	- A gateway to all Post graduate courses	https://epgp.inflibnet.ac.in/#

			- Offers curriculum based and interactive e-content in 70 subjects across all disciplines of social sciences, arts, fine arts, humanities and natural & mathematical sciences	
9	Ministry of Education	**Sakshat**	One stop education Portal that offers: - Learning content across disciplines in the form of audio-visual tools, web e-books, e-journals etc. - Educational material to learners from - Kindergarten to PhD - Self-Assessment tools like MCQs, Quizzes etc. - Online discussion forum for clearing doubts	https://www.education.gov.in/en/technology-enabled-learning-1
10	Ministry of Education	**e-Kalpa**	- Offers distance e-learning programs on Design - Offers Digital Design Resource - Database including the craft sector	https://www.dsource.in/

Learning Management System- Google Classroom

- Dr. Shruti Tripathi

Introduction

A Learning Management System (LMS) is a software application or online technology designed for the planning, execution, and evaluation of a specific learning process. Primarily utilized for e-learning, the LMS comprises two key components: a server responsible for fundamental functions and a user interface (UI) accessible to instructors, students, and administrators.

Typically, an LMS empowers instructors to create and deliver content, monitor student engagement, and evaluate student performance. Additionally, it may offer interactive features for students, including threaded discussions, video conferencing, and discussion forums.

These systems find applications in various sectors, including businesses, government agencies, and both traditional and online educational institutions. LMSs enhance traditional educational approaches, leading to efficiency gains and cost savings for organizations. A well-designed system facilitates streamlined management of tasks such as user registration and access, content delivery, calendar management, communication, quizzes, certifications, and notifications for instructors and administrators.

Schoology, Kadenze, Canvas, Blackboard, Brightspace are few LMS platforms that are being used for the purpose of education. A very easy and friendly LMS is the Google Classroom. Let us learn about it-

Google Classroom, a free service by Google, revolutionizes the educational landscape by providing a seamless and paperless way to share files, create assignments, grade student work, and foster communication within a digital environment. To access this powerful tool, your school or district must sign up for a G-Suite for Education account, which ensures privacy and protection for students.

Classroom is available to:

- Schools using G Suite for Education
- Organizations using G Suite for Nonprofits
- Individuals over 13 years of age with personal Google Accounts. Age may vary by country.
- All G Suite domains

It's important to note that to access Google Classroom without G-Suite for Education, signing into a Gmail account is required. Once signed in, navigate to https://classroom.google.com to access the platform and explore its features.

Importance of Google Classroom as an LMS

Accessibility

1. **Anytime, Anywhere Learning:** Google Classroom facilitates remote learning, enabling students to access educational materials from anywhere with an internet connection.
2. **Device Compatibility:** It supports various devices, including computers, tablets, and smartphones, promoting flexibility in learning.

Collaboration

1. **Real-time Collaboration:** Google Classroom promotes collaboration through features like real-time document editing and discussion forums.
2. **Teacher-Student Interaction:** It provides a platform for teachers to engage with students, offering feedback and answering questions.

Organization

1. **Centralized Information:** All course materials, assignments, and communication are centralized in one location, simplifying organization for both educators and students.
2. **Efficient File Management:** Google Drive integration allows for easy file sharing, submission, and grading.

Uses of Google Classroom

Course Creation

1. **Setting up a Classroom:** Educators can create a virtual classroom for each course they teach, customizing settings and preferences.
2. **Integration with Google Apps:** Seamless integration with Google Drive, Docs, Sheets, and other apps enhances the teaching and learning experience.

Content Delivery

1. **Uploading Materials:** Teachers can upload lectures, presentations, and reading materials directly to Google Classroom.
2. **Stream for Announcements:** The Stream feature allows educators to make announcements, post updates, and share important information.

Assignments and Assessments

1. **Creating Assignments:** Educators can create various types of assignments, including quizzes, essays, and projects.
2. **Grading and Feedback:** The platform facilitates efficient grading, feedback, and grade tracking.

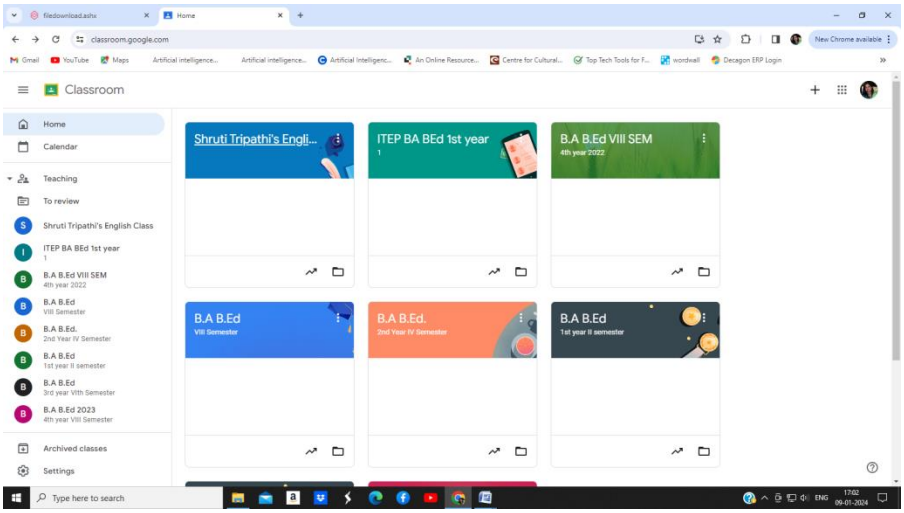
Communication

1. **Discussion Forums:** Google Classroom includes discussion forums for collaborative learning and student engagement.
2. **Private Communication:** Private comments and messaging features enable secure communication between teachers and students.

Steps for Using Google Classroom as an LMS

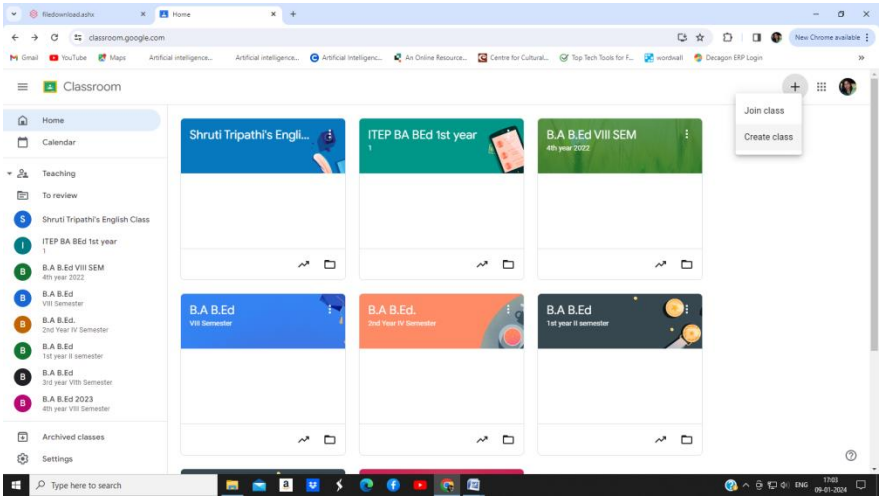
Open up your **internet browser** by clicking on the internet icon. (This could be f**irefox**, **Google Chrome**, **Internet Explorer**, etc., whichever internet explorer you use most often.)

After signing into your Gmail or G-Suite account, use the link https://classroom.google.com to login and the following screen appears.

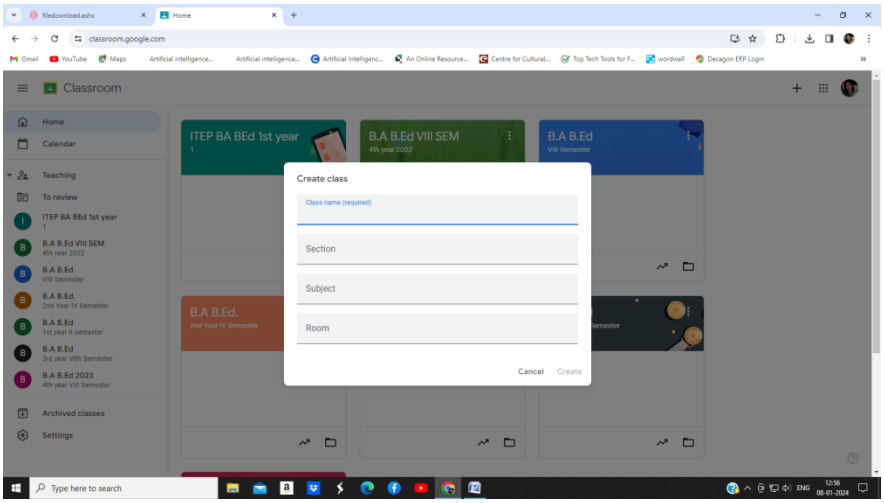


Create a Class

To initiate the process, your first step is to establish a class. Whether it's a single class encompassing a specific subject or multiple classes catering to distinct groups of students, the creation process remains the same. Simply navigate to the top right corner and click on the plus (+) sign. From there, select "Create Class" to set up your desired learning environment.

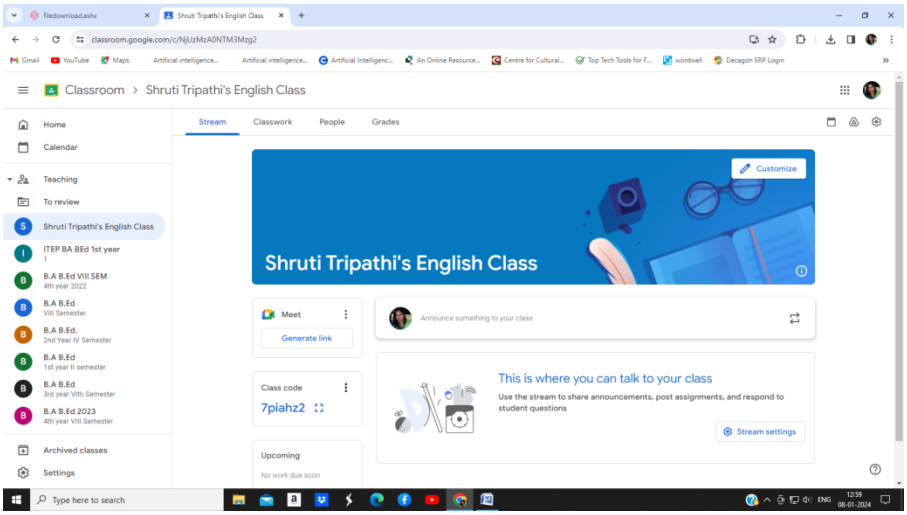


You will then enter the Class Name, Section Subject and Room number but the only required item is Class Name



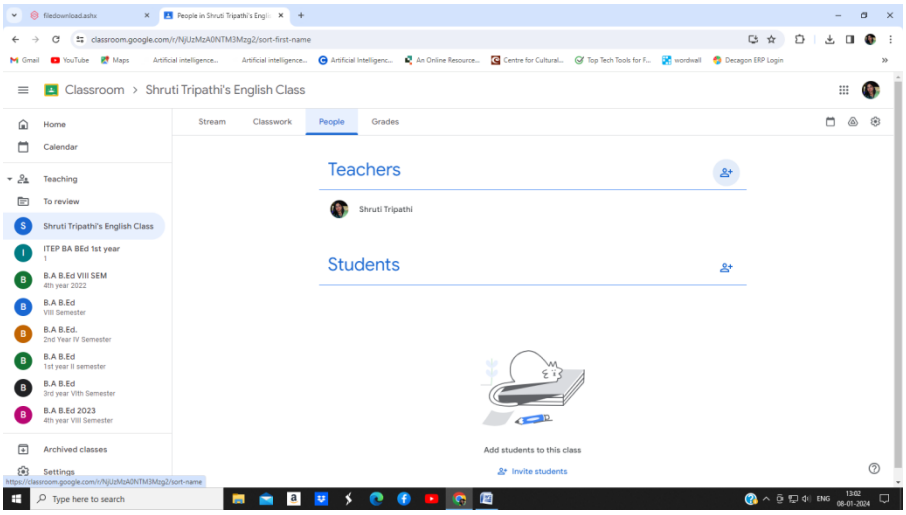
Tip: You could use your personal name for the Class such as Shruti Tripathi's English Class to personalize it for your students.

Click on Create and you are re-directed to the Class page. The Class page looks like this.



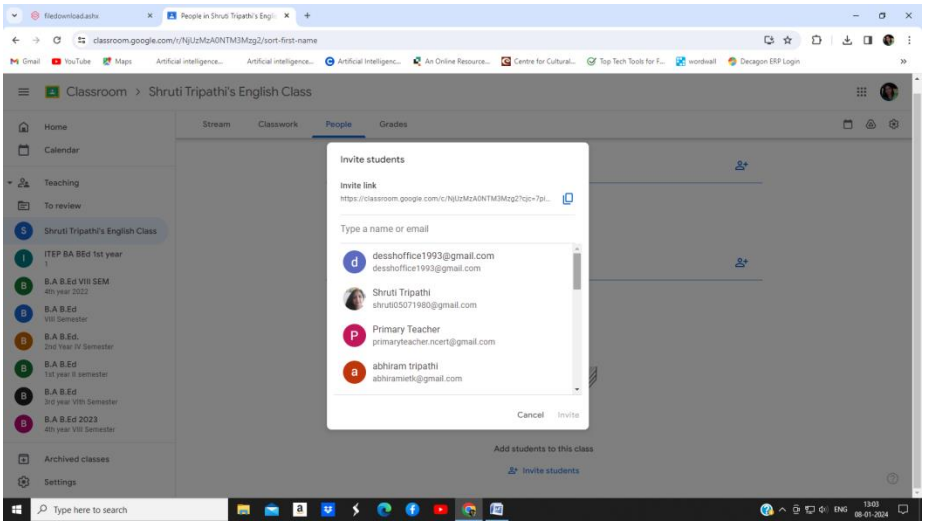
Invite Students to the class

There are various ways to invite and add students to your class.
Click on People to invite students to the class



Click on the Plus sign to invite students to the class or give them the class code

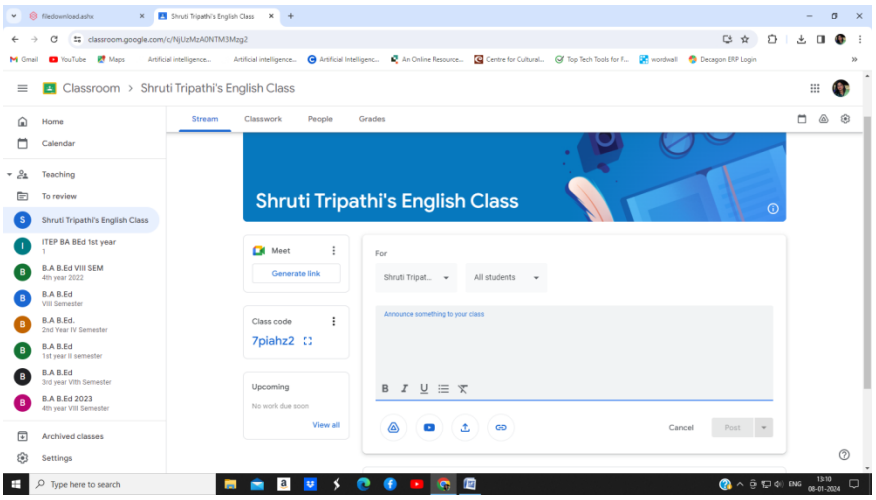
Type in an email address or search for an existing name in your contact list



Students can also join a class on their own. To Join a class, students go to their google classroom, find the class and instead of clicking on the create class option, they will choose the join class option. Enter the class code and select join. Once a student joins a class, it will always remain in their classroom until you remove the student from the class, or you archive the class.

The Stream Tab

Within the Stream Tab, you'll find a comprehensive record of all classroom activities, encompassing teacher announcements, posted assignments, and student comments or posts if permitted. The content is arranged chronologically, with the latest entries positioned at the top. To contribute to the stream, simply click on the "Share something with your class" box, allowing for the seamless posting of announcements or attachments.



You can either type a message to your students or attach files from your computer by clicking on File, or Google Drive, you can add YouTube videos or Links and then post directly to your Stream page.

The Classwork Tab

This is the area where you can create assignments for your students. To create a new assignment, click on the Create button and choose the type of assignment that you want to create. The regular Assignment option is the most open ended so more popular to use. You can

create your own title, type in your own instructions along with attaching any documents, you tube videos etc.

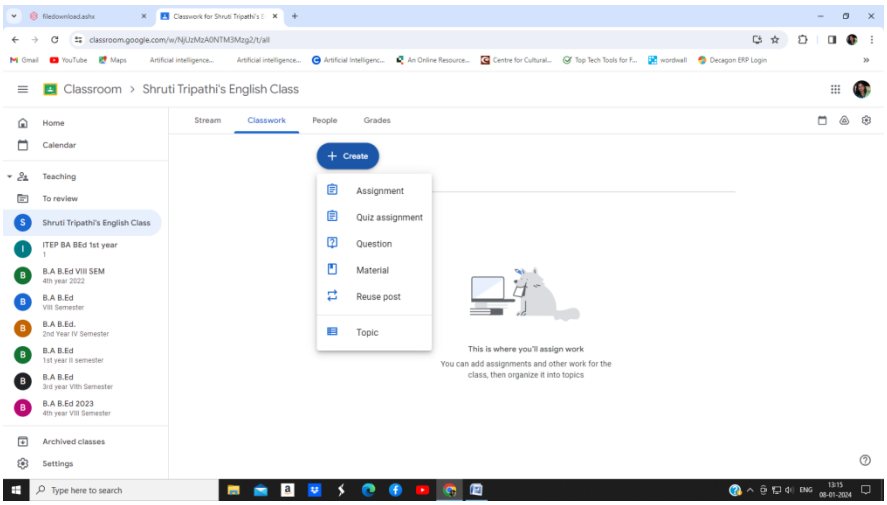
Tip: Why is this different than adding an announcement on the Stream page? Because you can assign a point value to the assignment or have it be ungraded. You can also assign a due date for the assignment and you can create a topic for the assignment. You can post the assignment to go out immediately or to go out on a specific date and time or you can save it as a draft and return to it later.

The quiz assignment will automatically attach a blank Google form that you can use to create a quiz for your students. Click on Blank Quiz to create a new quiz in Google Forms

Note: Under the direction of your instructor, you will learn how to create Quiz questions and grade responses.

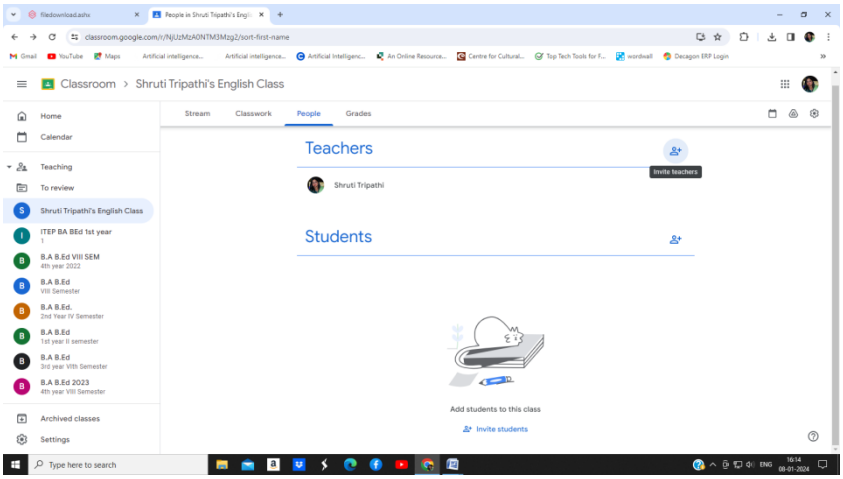
The Question option allows you to pose a question to your students and then have them respond to it. The Material option is a great way to share attachments or materials with your students for example to share digital copies of notes and other resources.

The Reuse Post option allows you to reuse a post that you have already created in another class The Topic option is a great way to organize all your assignments into Topics



The People Tab

The People tab allows you to see all the students and the teachers that you have connected to your class. Follow the same steps that you used to add students to the class to also add teachers to the class for co-teaching or if you want them to have access to your materials. You also can email students, mute students which revokes their ability to post and comment on Google classroom. This can be very handy or remove students from your class if they are no longer in it.

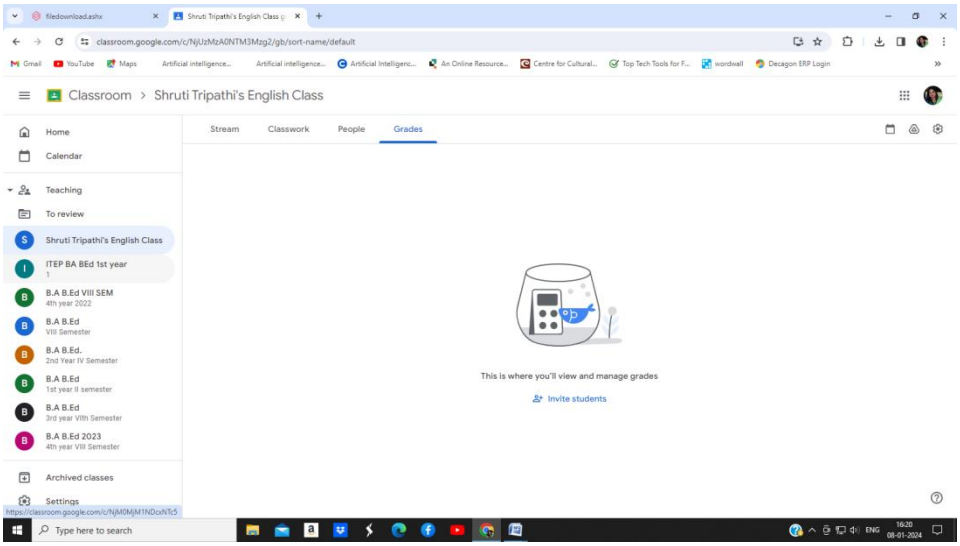


The Grades Tab

This is an online grade book, of all the assignments for all of the students that you have on Google classroom. This is very handy to be able to see student grades all in one place You can also go in and edit any of the grades if you need to, rather than going directly to that assignment. You can also click on any assignment and view student work that was submitted, or you can click on a student and view all of the work that they have submitted for the different assignments.

The Classroom Menu

Click on the Classroom Menu in the top left corner of your screen to see a list of Classes that you are teaching along with a To-do list and a list of Archived classes plus the classroom Settings.

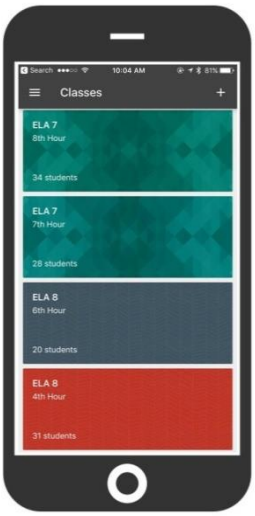


Click on Settings to change your Profile and picture and other Notifications

Class Settings

Access the Class Settings by clicking on the gear icon in the upper right-hand corner of your class page You can edit any information for your class in the Class Details section The General Settings allows you to change settings for the Class Code, Comments and Notifications, change

the Grading system etc. The Grading Settings allow you to control the grading method, add grade categories and show overall grades to students.



Utilize the Mobile App

A mobile App is available for both IOS and Android platforms. The Classroom app lets you stay connected any time. App specific features include the ability to add and edit classes, add and communicate with Students and Upload files, create Video clips, etc.

Conclusion

Google Classroom serves as an invaluable Learning Management System, offering a myriad of benefits for both educators and students. Its accessibility, collaborative features, and organizational capabilities make it a powerful tool in the digital education landscape. By following the outlined steps, educators can effectively utilize Google Classroom to enhance the teaching and learning experience.

Development of E-Content

- Dr. N. C. Ojha

Wide varieties of digital materials, which are of educational significance, are available online. Some of the quality materials which are available free of cost or with minimum restrictions can be used, re-used and modified by teachers and students for their teaching and learning. As textbooks are too expansive, the students are switching from textbooks to digital course materials. These materials provide both teachers and students a greater interactivity and social collaboration. One of the materials which can be designed and developed used, re-used and distributed is e-content.

E-content is becoming popular because of it's flexibility of time, place and pace of learning. E-content includes all kinds of content created and delivered through various electronic media. E-content is available in many subjects and almost all levels of education. It can be used by wide variety learners with diverse needs, different backgrounds, and previous experience and skill levels. It can be shared and transmitted easily and promptly among unlimited number of users around the world. Teachers, students and others get benefited by the use of well designed and developed e-content. It is advantageous to the educational organizations to make their program accessible to their teachers and students on campus, home and other community learning or resource centers. It has a significant implications for open and distance learning institutions.

It encompasses eTexts and digital learning resources. These could be digital textbooks, workbooks, articles, videos, or multimedia. Switching from traditional textbooks to digital course materials is a growing trend in higher education. Advantages for students and faculty include greater interactivity, customizability, and opportunities for social collaboration.

Electronic content (e-content) which is also known as digital content refers to the content or information delivered over network based electronic devices or that is made available using computer network such as internet. According to Oxford dictionary 'e-content is the digital text and images designed to display on web pages'. According to Saxena Anurag (2011) 'E-content is basically a package that satisfies the conditions like minimization of distance, cost effectiveness, user friendliness and adaptability to local conditions'.

Well developed e-content can be delivered many times to different learners. Individual course components i.e. units, lessons and media elements such as graphics and animations can be re-used in different contexts.

The purpose of e-content development is to create an information rich society. Everyone in the society is empowered to create, receive, share and utilize information for their progress. Very well designed, developed and validated e-content will provide access to high quality meaningful digital content and serve as an effective virtual teacher.

E-content design, development and approach will depend upon the nature of the content and the learners. It will also depend on the quality and complexity the learning you wish to create. Various instructional design models are available according to our requirements. Most of the models involve the process of analyzing the learner needs and goals of the instructional

material development, development of a delivery system and content, pilot study of the material developed, implementation, evaluating, refining the materials etc. In designing and development of E-content we have to adopt one of the instructional design models based on our requirements. Before understanding the designing and development of e-content it is essential to understand the meaning of instructional design.

According to Wikipedia '**instructional design** is the practice of creating instructional experiences which make the acquisition of knowledge and skill more efficient, effective and appealing. The process broadly consists of determining the current status of learner understanding, defining the end goal of the instructional material and creating some 'intervention' to assist the transition. This systematic approach provides a step by step process for the analysis of the learners' needs, the design and development of the material'. Most common and popular model used for creating instructional materials is the **ADDIE** model. This abbreviation stands for the five phases involved in the model. They are **analyze, design, develop, implement and evaluate**. This model is initially developed by Florida State University to explain the processes involved in the formulation of an instructional systems development (ISD) program for military inter-service training. ISD was meant for training individuals to do a particular job. This can also be applied to any inter-service curriculum development activity. Originally the model contained several steps under its five original phases (analyze, design, develop, implement and evaluate). Over the years the steps were revised and finally the model itself became more dynamic and interactive.

Analysis: It is the first phase of this model meant for examining the suitability of the e-content to be developed. It is related to analyzing the learning needs, context, learner, task and content. Analyzing the learning needs is identifying the needs from the perspective of different learners, teachers, subject experts, practitioner, policy makers etc. Needs are to be clearly stated.

- **Contextual analysis** is collecting data related to the context of learning such as learning environment. Whether the e-content developed is for the individual or group, formal or informal, facilitated or self-learning etc.
- **Learner analysis** is collecting data related to learners academic levels and attributes such as skills, motivation, visual literacy, language competency, learning styles etc. That is nothing but preparing the learner profile. It helps to know about the learner.
- **Task analysis** is stating the purposes of developing the e-content. Deciding whether that is developed for educating, training, creating awareness, developing skills etc.
- **Content analysis** is nothing but preparing a content outline. Good content comprehension is required before designing and developing content. It includes verifying the content with respect to cognitive appropriateness, factual accuracy, completeness etc. It also includes classifying the content into facts, concepts, principles, processes and procedures.

Design: It is concerned with defining the learning objectives, structuring the content logically, specifying the instructional and evaluation strategies, and preparing for visual and technical design.

- **Learning objectives** are to be defined in clear, realistic and measurable terms. Learning objectives are the statements that describe what the learner will be able to do

at the end of the course or program. Learning objectives should specify performance and communicate their purposes. Prepare a detailed content outline in which content is thoroughly analyzed and logically organized. Content is to be structured logically following simple to complex, known to unknown, concrete to abstract, general to specific etc.

- **Instructional strategies** are to be stated clearly. Depending on the learning style and nature of the content we have to decide the appropriate instructional strategy. Appropriate **media mix** that is combination of audio, video, graphics, animation; simulation etc is to be decided.
- **Learner evaluation strategies** such as practice, computer marked or tutor marked assessments, pre-test, post-test, remedial tests etc are to be specified. We have to decide about the formative and summative assessments. Before developing the content for the selected course review the proposed learning objectives. Make sure that content, assessment tests and exercises match the objectives stated. Provide the information and knowledge required to meet the learning objectives.

Development: It is related to the creation of story board. **Story board** is nothing but scripting the entire course content. The term 'story board' is taken from film production. In a movie it indicates the visual representation of the various scenes. In e-content development the story board describes step by step script of the final outcome of the e-content i.e. story board is created to provide a blue print of the course with each and every detail along with the content notes. The story board is created based on the objectives and instructional strategies. Here the developers create and assemble the content assets and learning objects. **Programming and integration** of all media elements into a cohesive multimedia package are the part of this phase.

Implement: In the implementation phase, materials are distributed to learners. A comprehensive implementation strategy document is developed. This document should cover the course curriculum, learning outcomes, method of delivery in terms of hard ware and soft ware requirements and testing procedures. Ensure that the web site is functional if the material is on the web site.

Evaluation: The evaluation phase consists of two parts i.e. Formative and summative evaluation. Formative evaluation is present in each stage of the ADDIE process. Summative evaluation determines the adequacy of the distributed materials in achieving the course objectives. Material is to be revised at all the stages based on the feedback received.

Learner's Characteristics and needs

Educational audio and video materials are invariably addressed to specific learner groups of conventional or ODL systems. It is, therefore, of utmost importance that audio/video scriptwriters have as much information as possible about their target audiences. In ODL systems where learners are placed at a distance and are scattered and almost invisible, it is all the more important to have such vital information about them, viz. their age, sex, maturity level, attitudes, beliefs and aspirations, socio-economic background, lifestyles, (urban/rural), existing knowledge, skills, language proficiency, vocabulary, likes, dislikes, preferences and information needs. It is also important to know about the context or conditions in which the audio/video programmes will be listened/viewed by these audiences.

Access to and knowledge of this kind of learner profile is very useful for educational audio and video scriptwriters. It gives them greater insight into learners' needs and helps in tackling their communication problems. Such detailed information about the target audiences is also useful in formulating precise learning objectives and identifying appropriate content and presentation formats for different programmes. Similarly, need assessment studies help in ascertaining the actual needs of the target audiences and identifying suitable programme topics, themes and content areas. Audio and video scriptwriters can certainly develop relevant need-based scripts and programmes if they are familiar with the needs, interests and characteristics of their specific learner groups.

Instructional objectives and programme briefs

Another necessary condition for a scriptwriter to be able to write a meaningful and effective audio or video script is concerned with 'what' and 'why' of a programme or what is generally known as 'programme objectives'. Therefore, the crucial questions that a scriptwriter must ask himself/herself right in the beginning are:

- Why am I writing this script? Or, in other words, what are the instructional objectives I am required to achieve through this programme script?
- What is the precise content to be presented? Does the content really lend itself to audio or video treatment?
- What do I want to happen to my audiences through this particular programme or a series of programmes (in terms of gaining knowledge, information or acquiring certain skills, or influencing their attitudes, habits, behaviors, etc.)?

When analyzed and researched further, these questions get expanded into what we call a 'programme brief' or 'an academic note' or a 'programme outline'. A programme brief is a written, typed or printed statement of intent. It represents a 'road map' that traces the scripting path from the beginning to the end. It serves as a basic document that provides all related content – information, ideas, sources and suggestions – for a proposed audio or video programme at one place. Researchers are scriptwriters can freely draw upon such materials to design their scripts. A programme brief should usually include the following information:

- Series title
- Programme title (working title only)
- Target audience (their characteristics, needs, and entry behavior)
- Programme length or duration
- Programme objectives (stated in behavioural terms)
- Brief content outline (preferably in distinct sequences matched with one or more programme objectives)
- Expected learning outcomes (as reflected from objectives, but more concrete and performance-oriented)
- Suggested treatment and production hints (for each sequence)

Usually, detailed programme briefs are designed jointly by a team consisting of subject experts, instructional designers, researchers, scriptwriters, and media producers. Programme briefs serve as basic reference material for scriptwriters, researchers, producers and evaluators. Programme briefs facilitate the scriptwriters and producers to the given mandate and help them remain on track while developing audio and video scripts and producing final programmes.

Script as the core of the programme

The script is the foundation of any programme whether for stage, radio, film, television or videotape. It is crated and evolved step by step into a carefully designed blueprint that provides detailed instructions for actors/participants, technicians and producers who finally transform the script into a worthwhile listening experience or a viewable programme. In the ultimate analysis, the script is the 'core' of any educational audio or video programme. In other words, we can say that it is the quality of the script that determines the quality of the programme.

At this point, we may return to the basic questions raised earlier. How are educational audio and radio scripts planned and developed? What is the scripting process like? What are the steps involve in the scriptwriting process?

Undoubtedly, planning and writing educational audio/video scripts is a demanding task. It requires intelligence, imagination, creativity, knowledge of a subject, a deep insight into the nature, attributes and constraints of the medium, its language, grammar and techniques and above all the ability and willingness to work in a team.

The felicity of the language and the skill to convert simple ideas into powerful aural (audio) experiences and/or to transform abstract ideas and concepts into visual illustrations and appropriate analogies, are other important traits of scriptwriters of educational audio and video programmes.

Developing scripts for radio/audio programmes

Writing for radio differs from other forms of writing such as 'writing for print' or 'television'. The reasons are given as follows:

- In radio/audio writing, words are required to be spoken and heard (not required to be read).
- Unlike a television of film viewer, the radio listener only hears the speaker (but does not see him/her).
- The potential listeners, especially those targeted in open schooling and distance learning systems, comprise of all ages and conditions and have vast variations in their levels of understanding, achievement and intelligence. In this case, therefore, the audio/video writer must use the simplest possible language and avoid long, usual and bombastic words and sentences. In other words, it may say that the educational radio/audio writer must learn to:
  - Write for the ear, not the eye,
  - Write for speaking, not for reading,
  - Write in a simple language, using short sentences so that he/she is understood correctly, and not misunderstood.

General guidelines for radio/audio scriptwriting

Writing for educational audio/radio programmes appears to be a rather simple activity. It is, however, not so in actual practice. It is a demanding task that requires a lot of creativity and imagination. Whereas the ways to writing may vary from writer to writer, the process of script development entails a few essential steps, which all writers follow consciously or unconsciously. The general guidelines that we present below will provide you a better insight into the scriptwriting process for radio/audio.

Carry out programme research

Once you have acquainted yourself fully with a particular 'programme brief' or have thoroughly understood the scriptwriter's mandate in terms of general objectives, content, target audience and programme length, your first task is to carry out a thorough research on the given topic/ content by consulting books journals, experts and other knowledgeable people or subject specialists. You must keep your target audience and programme objectives in focus while selecting appropriate content and authentic information. You must also ensure that your facts are correct and up-to-date. You must double check every bit of information before you put in your script. Always look for some information that may enrich and provide interest to your storyline. Select only the most relevant content, resources and ideas, which match your programme objectives.

Select key ideas

The next step is concerned with the selection of content for the programme. Here, you have focus on the basic content and reduce in to a few key ideas. Put these key ideas in a logical sequence and this will help you define the main focus or the central theme of your program. You will also be able to decide on the weightage and emphases you need to give to different programme objectives.

Make a plan

At this point, you are ready to concretize you presentation strategy. You may choose a special format or combination of formats to put your content in certain style, pace and sequential continuity. You are ready with a detailed story structure or script outline, which is essential designing a draft script.

Write your draft script

While putting your draft script on paper, the most essential rule to follow is to always keep individual listener in focus. That means you must address your writing to one person, not thousands and millions of distance learners. Radio, of course, is a mass medium, yet your was end up in the mind of one person, i.e. the individual listener. Radio writing is, therefore, an intimate, one-to-one talk. It is just 'you' and 'me'. By that reason, you must consciously construct your sentences in 'active voice'.

Think of a good beginning and a good end

Give adequate attention to the beginning of your programme. The first sentence or the open of the programme. The first sentence or the open of the programme must be interesting and should hold the listeners attention. Thereafter, you may follow it with other key points and ideas linking them together in a sequence that you already decided above. Join each sequence by signposts of aural indicators, which will help draw the listener's attention and move from one point to the other.

After you have dealt with all key points in your script, spend some time on finding a good of your programme. In educational radio, it is a good idea to return to the introductory remark end the programme reinforcing the same point. There can be several other interesting way round off our programme. For example, you may choose to leave your listeners with a spy theme, a punch line, a particular action or task. The programme must close on a positive me and in natural way – not in an abrupt, sudden or unnatural fashion. Openings and closing although most difficult to visualize and write certainly make radio programmes a memorable experience for the listeners.

Check and rewrite

Write the draft script in your hand, it is now time to shape the final script. It is the good idea I discuss the draft script with some of your colleagues or media experts to get their reaction suggestions and incorporate the same in the revised version of the script. Now, read you're to yourself and ask the following type of questions:

- Is the script interesting? (If not, change it.)
- Is it easy to understand? (If not, replace difficult words and expressions with simple and straight ones.)
- Is it accurate and authentic in information and content? Is it free from controversies that may invite criticism or an objection later? (If not, update it.)
- Are there too many facts and details? (If yes, reduce and simplify.)
- Is it logically sequenced? (If not, alter the sequences accordingly.)
- Does the content match with the given objectives? (If not, modify the content.)
- Does it have enough 'signposts' for joining different key points? (If not, add more.)
- Does it begin and end with a punch or memorable sentence? (If not, add think more and modify.)
- Is the language conversational so as to engage the listener in a one-to-one interaction? (Remember that it will be
- Are the sentences and phrases short and simple to understand and speak? (Modify to remove tongue twisters and bombastic words and phrases.)

As you answer the above kind of questions to yourself, you must try to revise, refine and rewrite your script into the final form. One golden rule to test eh quality of your script is to read it out aloud to yourself – speaking reach sentence one, twice, thrice, exactly in the same way you would like it to be heard. In this way, you can modify, rearrange, refine and polish your language and ideas on the basis of your own feedback and judgment. You may add some more attention-catchers in your script, if you find the need to do so at this stage,

The final script, as described above, is ready for recording at this stage. The radio producer will arrange all studio facilities and production resources, crew and artists to produce and record the programme for broadcast or playback.

The educational audio script, in its final form, must indicate all relevant instruction in CAPITAL LETTERS so that these are not mistaken for a 'dialogue to be spoken'. Instruction on the script can also be underlined, as these are not to be spoken by actors or performers. Such instructions must be noted and followed both by the artists and the production crew.

Developing scripts for TV/video programmes

Writing for television or video is a kind of visual scripting. It is just not an activity or coordinating words with pictures in sequential continuity. It requires intelligence, creativity, drawing capability, knowledge of the medium, its nature, language, grammars and techniques.

Television or video is primarily a visual medium. That means it is the visuals or pictures that come first, and are the main carriers of messages. Words do have their place but only in support of the visuals. Many a time, pictures need no words; they speak for themselves and make powerful statements. A TV/video scriptwriter has, therefore, to learn to think in terms of visuals, visual ideas and visual illustrations for ideas.

In television, a writer has to communicate in an entirely new language: in which the writer uses the video camera as his/her and all the different kinds of shots, movement devices, techniques,

effects, transitions, dialogues, sounds, noises and even silences as his/her language. Writing for TV/video is thus quite different from other forms of writing particularly 'writing or print' or 'writing for radio'.

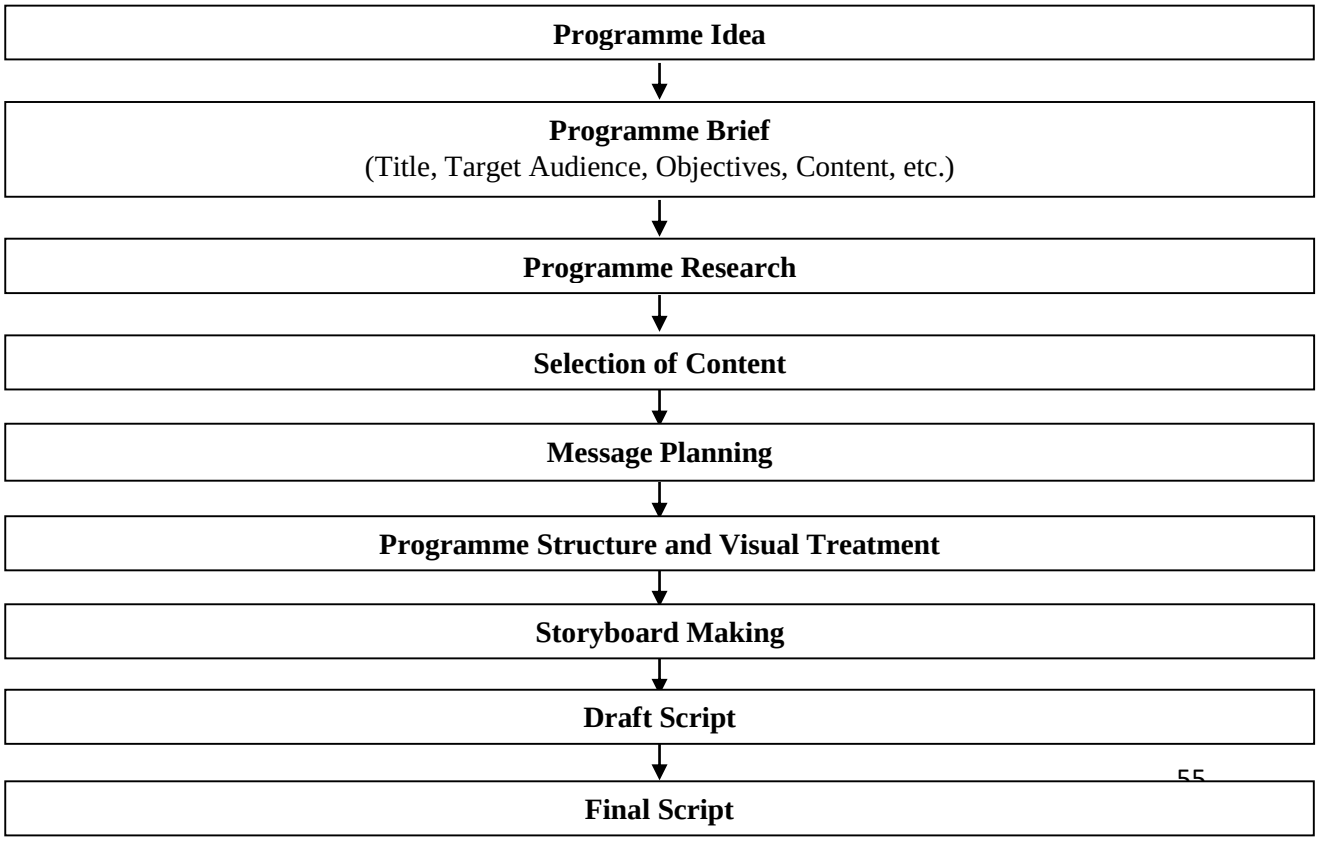
Writing as such is a solitary activity. However, writing for television or video is largely a co-operative effort; a team mode approach. It may be seen as a sort of a continuous dialogue or a constant interaction among the scriptwriter, the researcher, the subject specialist, the producer and other members of the production team. This dialogue or interaction generally begins with a 'programme idea' or a 'programme topic' or a 'theme' around which a video script is proposed to be evolved and continuous up to the end when there is no time left and the programme script has got to be finally produced. While the scriptwriter is the principal architect of the script other team members contribute in many different ways to its instructional effectiveness, authenticity, visual quality, technical perfection and overall embellishment. To put it differently, we can say that video or television scripts are evolved step by step. Creatively, imagination and cooperative effort are the key words in the video scripting process.

Process of TV/video scriptwriting

It is rather difficult to describe what the video scriptwriting process like. Experiences vary from writer to writer and from script to script, and it is very hard to generalize. However, television./video scriptwriting may be seen as consisting of a series of steps or stages or processes which together and often overlap. But the basic pattern of the scripting and programming processes remain almost the same. All TV/video scriptwriters, whether consciously or unconsciously, go through these stages or steps in one way or the other. The sequence and timing of these steps may vary and even overlap in most of the cases.

Major steps of TV/video scriptwriting process

A descriptive presentation of the steps involved in the video scriptwriting process suggested below may be helpful to you. Certainly it is a loose, flexible and arbitrary arrangement. Yet this process framework will give you sufficient insight into the creative activity of TV/video scriptwriting.



Programme ideas

Ideas are basic to any kind of writing, not just television writing. Indeed, all educational TV/video scripts originate with an idea. Once an idea or a theme has been identified, it needs to be analyzed for its possible expansion into a worthwhile visual presentation. If the idea is found to be entertaining, educative and appropriate for the intended audience and suitable for television presentation, it meets the criteria for being 'production worthy'.

Programme brief

Once an idea or a theme or a topic is adjudged as 'production worthy' for TV/video production, it can be further analyzed and expended into a 'programme brief' or an 'academic note'. As already discussed, a programme brief is the first written statement-which forms the basis of an educational video script. It provides a road map to the scriptwriter.

Programme research

A well-designed programme brief delineates the parameters of the proposed video script and enables the scriptwriter to begin the process of programme research. Programme research is the most essential pre-requisite for developing a video script. It is at this initial stage that the scriptwriter must plan and carry out thorough research both on the topic as well as the target audience. He/she should look for suitable visual materials and other interesting and related information on the topic. Not only should she/he consult books, journals, census reports, yearbooks and encyclopaedias hut should also talk to experts and knowledgeable people in that particular field.

At this stage, it is important for the scriptwriter to get to know the target audience well - their background, maturity level, interests, likes, dislikes preferences etc. Such knowledge about the audience enables the scriptwriter to collect, select and organizle1 relevant programme materials and information in a manner most interesting for the viewers. It is not uncommon for writers and researchers interact with small groups of their target audience and know their first-hand experiences and interests on the topic. Some writers do not attach much importance to programme research and tend to skip this step, often claiming, that they already know a lot about the topic and the audience. It is, however, a grave misconception and must be guarded against.

Selection of content

During programme research, the writer is often able to come across a large mass of material and information (both written and verbal) besides pictorial evidence on the programme topic. At this stage, therefore, he/she must go through this mass of materials and select the most relevant material, visual resources and information which match the programme objectives, are relevant to audience needs and interests and are sufficient to cover the given content and fill programme time most appropriately.

To put it conversely, the scriptwriter must eliminate what is not relevant to programme objectives or is not likely to click with the viewers or may go over-their heads, or may even unnecessarily lengthen the programme and increase its information size.

Message planning

Message planning is the most decisive and creative stage of video script development. Here, the scriptwriter explores interesting ways of dishing out his/her programme to the audience. Many options and considerations come into sharp focus and the writer has to design a strategy taking appropriate decisions on each of the following aspects:

- Identifying key teaching concepts or ideas to be highlighted.
- Selecting a suitable format or a combination of formats for presenting the programme.
- Adopting a particular programme style and approach.
- Exploring media possibilities; use of visual examples and analogies, graphics, photographs, reality bites, stock shots, animation, experiments, demonstrations and other resources, both visual and aural.
- Choosing a definite storyline for message presentation: using human characters in the story - men, women, children, presenter, anchor, puppets, cartoon figures, animals, birds etc.

While deciding on the above aspects, as suggested earlier the writer must always keep in view: (i) the nature and requirements of the topic or the subject, (ii) viewers' age, characteristics, needs and interests, (iii) programme objectives, and (iv) a balanced presentation of the given content in an interesting way.

Programme structure and visual treatment

Programme structuring is the creative process of giving the programme a definite shape and form. It is at this stage that the programme begins to unfold its shape or structure with a clear-cut storyline with a beginning, a middle and an end. Here, the scriptwriter must give some thought to such questions as:

- How will the programme begin? (or what will be the first or introductory sequence of the programme?)
- How will the programme end? (or what will be the concluding sequence of the programme?)
- What will be the shape and Order of the sequences that will form the middle part (or the body) of the programme?
- How many sequences will the programme finally contain? And in what order?
- What will be the length, sequence, emphases and amount of educational content of each of the sequences?
- Does the content of each of the sequences contribute to and match the programme objectives set out in the beginning? If yes, to what extent? If .not, how can content and objectives be matched optimally?

While finding solutions to such questions as noted above, the writer must rethink of a good beginning for the programme. Most often, it is the introductory sequence, which holds the attention of the audience and keeps their motivation high for receiving the rest of the programme. On the contrary, however, if the beginning is uninteresting and dull, the programme may fail to click with the viewers.

The scriptwriter should also devote some time to think about a good natural ending for the programme. Viewers invariably tend to like and remember for long a programme that ends on a cheerful and satisfying note and provokes them to think and act in the desired way. Rest of the sequences that constitute the middle part or the body of the programme, must also receive writer's attention in the same way - arranging the visual and aural content logically and meshing it with the given objectives.

As the programme structure takes a definite shape, the writer has to work out simultaneously a detailed visual treatment for different sequences of the programme. The visual treatment must provide at each step a full description of:

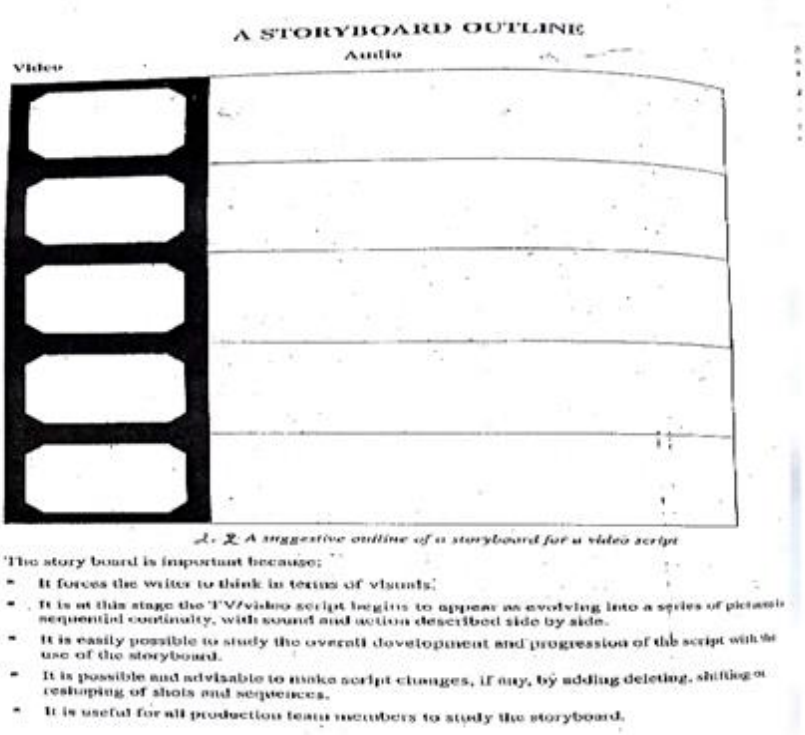
- What will the viewers see?
- What will they hear?
- What will they think?
- How will they feel and react to a particular visual sequence or a part of it?

In this process, the writer must again think of and provide for visual illustration and analogies for abstract ideas and key concepts proposed to be presented in the programme. Different sequences of the script should be arranged in a logical and natural order so that they appear to be evolving from one sequence to the other. The writer must also think of and decide on possible visual and/or aural links or transitions from one sequence to the other. It is very helpful to draw a 'timeline' showing how much time should be devoted to each sequence keeping in view: (i) the coverage of the content, (ii) weightage or emphasis on programme objectives and key teaching points, and (iii) the attention span of viewers. Some scriptwriters, especially those who write for young children, draw up an 'interest curve' or a 'tension chart' to ascertain uninterrupted attention of viewers.

Storyboard making

The storyboard means a detailed, shot-by-shot description of the programme on sheets of paper divided into two vertical columns. The rectangular boxes (3:4) in the left hand column are used for drawing pictures/sketches with shot sums described on each; and the right hand column is used for writing supporting words, sound effects and music, as shown in Figure 2.2.

A STORYBOARD OUTLINE



2. 2 A suggestive outline of a storyboard for a video script

A suggestive outline of a storyboard for a video script

The story board is important because:

- It forces the writer to think in terms of visuals.
- It is at this stage the TV/video script begins to appear as evolving into a series of pictures in sequential continuity, with sound and action described side by side.

- It is easily possible to study the overall development and progression of the script with the use of the storyboard.
- It is possible and advisable to make script changes, if any, by adding deleting, shifting or reshaping of shots and sequences.
- It is useful for all production team militias to study the storyboard.

Some experienced TV Scriptwriters skip the storyboard stage and straightway prepare a draft script. For beginners, however, storyboard Making is immensely useful and is strongly recommended. Let's at this stage describe a little more about a draft script and the final script.

Draft script

The storyboard, when complete, at once road to the preparation of a draft script. The draft script is the first full-length script that includes a complete listing and description of all visuals, captions, accompanying commentary, dialogues, actions, movements, music, sound effects and any kind of pre-recorded inserts or audio/video inputs. The draft script must be shared and discussed with all team members, experts as well as the producer to get their reactions and suggestions on various aspects. The scriptwriter must be open to criticism and ideas fur improvement of the Script should be welcomed.

Final script

At the final script stage, the writer incorporates all suggestions made at the stage of the draft script. This stage suggests that the scriptwriter has more or less finally accomplished his/her job. In most cases, he/she hands over the script to the TV producer. As the scriptwriter usually bows out at this stage, the producer and his/her team take over. However, the interaction between the scriptwriter and the producer and other team members must continue up to the point the programme has been finally produced.

From the above description, it may be amply clear that video scriptwriting is a co-operative activity. It is not just a process of writing words and sentences and thinking of pictures to accompany them or vice versa. TV/video scriptwriting is indeed a highly creative process. Video scripts are evolved bit by bit, rather than written. That is why each video programme is unique Milts message, design, format, style and technique. In all cases, however, a video scriptwriter must go through all the stages and processes of script development as described above.

SOURCES

e-Pathshala

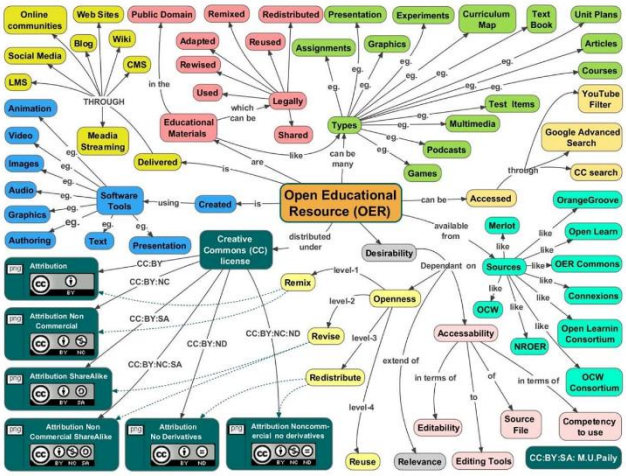
National Repository of Open Educational Resources (NROER)

e-pgpathshala

Gyanpitara

Karnataka Open Educational Resources (KOER)

The Open Educational Resources universitas (OERu)



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Concept and Creation of e-Portfolio

- Mr. Ashok Shaky

An ePortfolio is an electronic portfolio or record of learning acquired from all learning environments – a digitally created and managed archive of acquired skills and knowledge. The term "learning" is used as shorthand for "a body of acquired skills, knowledge and abilities (SKA) resident in either an individual or a community." The term "electronic" is used to imply the use of a computer, particular software or tools, and, often, the Internet.

The ePortfolio is formally defined as "a collection of authentic and diverse evidence, drawn from a larger archive representing what a person or organization has learned over time on which the person or organization has reflected, and designed for presentation to one or more audiences for a particular rhetorical purpose". Therefore, the term ePortfolio is shorthand for two items – the digital archive and the presentation drawn from it. The term ePortfolio is also shorthand for both process and product. ePortfolio tools help creators to identify and reflect on the outcomes of learning experiences. Creators can be individuals, organizations, even businesses – and they can be the receivers/processors as well. The process for creating an ePortfolio is for an individual or a group of individuals to focus on experiences and draw from them statements and evidence of the acquired learning and culture. Explicitly, for ePortfolio experts, the ePortfolio development process includes identification, collection, selection, reflection and presentation of evidence of learning and culture. These are the steps that are followed to create an ePortfolio – archive and/or purpose-driven presentation.

An ePortfolio can be created and used by individuals, communities and/or organizations to archive and share learning and culture acquired from informal, non-formal and formal learning environments; provide evidence or verification of learning in a dynamic, multimedia fashion; manage personal and collective learning to maximize usage and to plan; and showcase or promote particular assets as required. Looking at the history of the ePortfolio, as sweeping generalizations, it has been used in:

- primary and secondary education as a tool for demonstration of learning;
- in higher and post-secondary education for the assessment of learning;
- lifelong learning to enable continuous "reflective" learning and to inventory all types of learning;
- the workplace for the recognition of work experience and workplace training, for recruitment and targeted training, and for career advancement;
- eLearning for Learning Management Systems and Knowledge Management through both online tools and web-based services; and
- Organizational and/ or economic development through asset mapping and quality assurance.

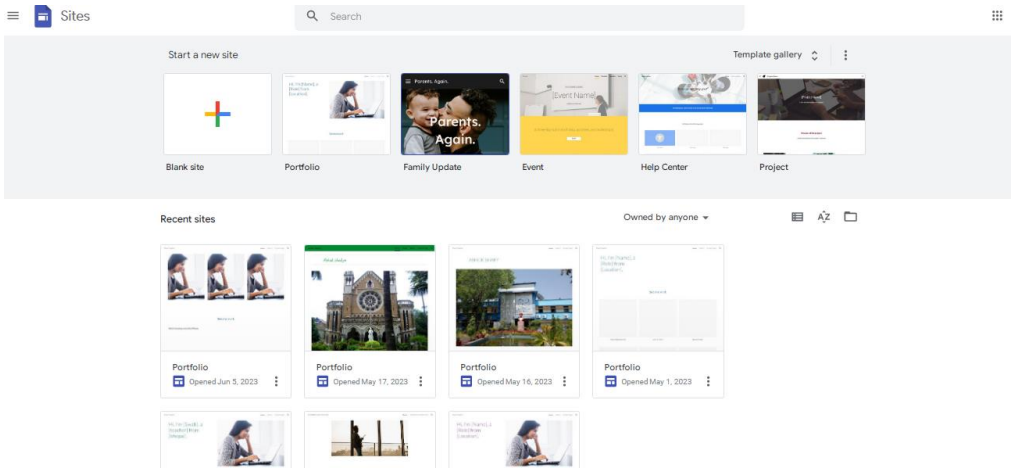
Types of ePortfolios

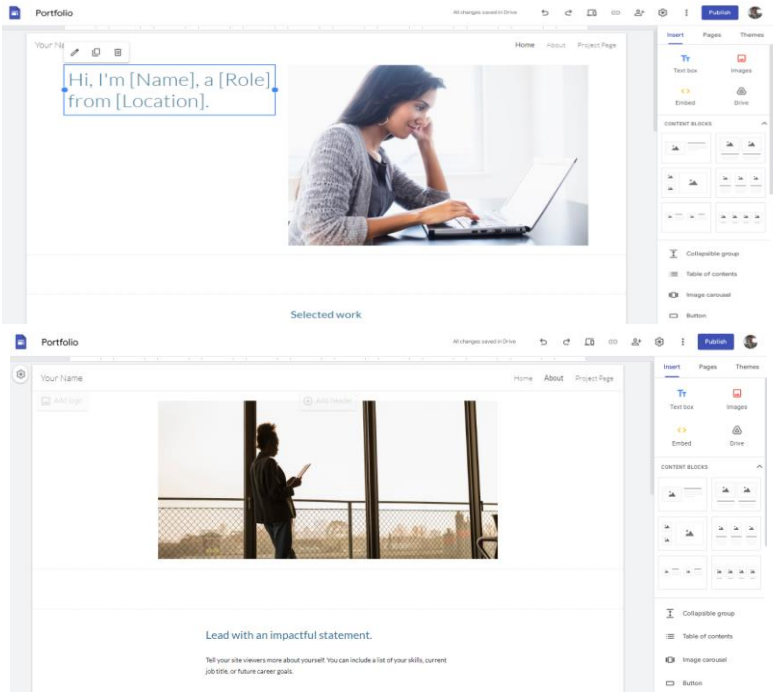
There are three types of ePortfolios – standards-based, showcase, and social networking. Many schools, institutes and training agencies are now requiring students to generate and use ePortfolios. In British Columbia, ePortfolios are used by students to demonstrate and showcase competencies outside the academic curriculum, for example, the competencies required for

active citizenship.2 In other jurisdictions, students create ePortfolios of their learning in academic programs to show progress and achievement in a course or program against stated learning outcomes – matching achievements against standards. In schools and outside school, students comment on each other's work and lives using social networking ePortfolio tools. The most common use of ePortfolio is in the education environment, but all three types have applications in and between employment and learning environments. At it's most simple, an ePortfolio may resemble a personal homepage or an electronic resume, and at its most complex, it may become a person's digital identity. ePortfolio types and applications have been developed from very different perspectives and applications, for example:

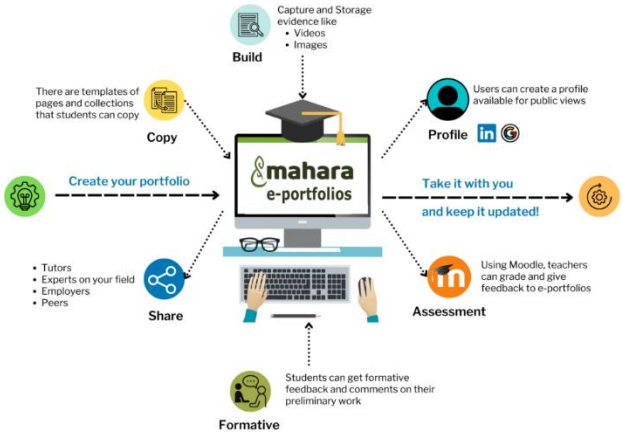
- Digital storytelling tools to record changes, achievements and cultural artifacts by children, families and communities;
- learning assessment tools to demonstrate expected learning outcomes by students of all ages;
- digital inventory tools to assemble and display capabilities, with supporting evidence, by artists, athletes, businesses, agencies or communities;
- Reflective learning tools to promote and support individualized learning through the thoughtful examination of experience;
- Electronic tools for authentic assessment of learning in non-academic areas, workplace experience or informal training;
- Management tools for student information systems and knowledge management systems; • cultural archiving and media exploration by Aboriginal communities;
- Quality assurance tools for comparison of product quality to standards of excellence or professional standards of accreditation.

Development of ePortfolio Using Googlesite





Development of ePortfolio Using Mahara



Assistive Technology in Education

- Dr. Sanjay Kumar Pandagale

Assistive technology is an umbrella term that includes assistive, adaptive, and rehabilitative devices for people with disabilities. It promotes greater independence by enabling people to perform tasks that they were formerly unable to accomplish, or had great difficulty accomplishing, by providing enhancements to, or changing methods of interacting with, the technology needed to accomplish such tasks.

Classification

- Mobility impairment (गतिशीलता हानि),
- Visual impairment (दृष्टि क्षीणता),
- Hearing impairment (श्रवण बाधित),
- Cognitive impairment (संज्ञानात्मक बधिरता)

Mobility impairment

- **Wheelchairs**

Wheelchairs are devices that can be manually or electrically propelled and that include a seating system and are designed to be a substitute for the normal mobility that most people enjoy. Wheelchairs and other mobility devices allow people to perform mobility related activities of daily living, which include feeding, toileting, dressing grooming and bathing.

Visual impairment

Light or Low Assistive tech for individuals with visual impairments include-

- Braille
- Magnifying glasses
- Large print text/books
- Anti-glare paper
- Contrasting text and background colors
- Thick lined paper
- Reading/writing stand
- Optical magnifier
- Highlighters
- Felt tip markers with various thicknesses
- Slant board
- Color filters

Screen readers

Screen readers allow the visually impaired to easily access electronic information. These software programs connect to a computer to read the text displayed out loud.

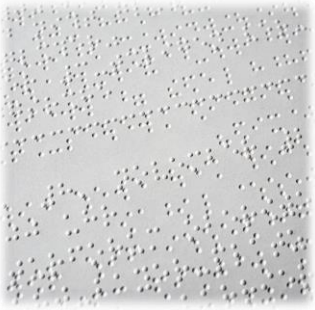
The most popular commercial screen readers include-

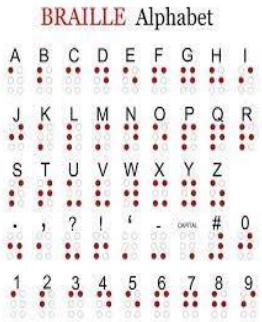
- JAWS
- Window-Eyes
- Supernova Screen Reader
- NVDA
- Thunder
- System Access to Go

MS window screen reader- ctr+win+enter

Braille and braille embossers

Braille is a system of raised dots formed into units called braille cells. People can use their fingers to read the code of raised dots. A braille embosser is a printer for braille. Instead of a standard printer adding ink onto a page, the braille embosser imprints the raised dots of braille onto a page. Some braille embossers combine both braille and ink so the documents can be read with either sight or touch.





Mid Assistive tech for individuals with visual impairments include –

- Large key keyboards
- Keyboards with high contrast
- MP3 players to record lectures/notes
- Light box - used with students to train their visual acuity
- Audio books
- Books in alternative formats
- Portable word processing device
- Large key calculator

Large key keyboard

Mp3 players for the VI person

The device is laid out similarly to a large mobile phone, complete with a numerical keypad and dedicated volume buttons on the side.

High contrast keyboard

Audio books

If you search for audio book websites then you will find number of sites for free audio books. One such site is http://www.loyalbooks.com/

Books in alternative formats

There are several types of alternative formats that books can be displayed in for individuals with a visual impairment. Check out these sites-

- Learning Ally (formerly RFB&D): www.learningally.org
- Bookshare: www.bookshare.org
- LibriVox: www.LibriVox.org
- Project Gutenberg: www.gutenberg.com
- Inkling: www.inkling.com
- Louis Database of Accessible Materials, American Printing House for the Blind: www.loius.aph.org
- National Library Service for the Blind and Physically Handicapped: www.loc.gov/nls/
- Google eBooks: http://books.google.com/ebooks

Light box

A lightbox is a piece of equipment that lights a see through plastic piece of paper. It can also illuminate clear shapes, colors, and objects.

Portable word processing device

A portable word processor, often called a portable keyboard, is a lightweight device that is an alternative to using a laptop for writing. It can be easily transported from class to class and between home and school.

Large key calculator

High Assistive tech for individuals with visual impairments include –

- Screen magnification
- Reading machines
- Video magnifiers
- Refreshable Braille displays
- Braille translation software
- Note taker recognition
- Mobile devices

Screen magnification

- A screen magnifier is a tool that can magnify everything (text, photos, graphics, etc.) on a computer or a mobile device screen.
- Screen magnifiers can sometimes include extra features such as:
  - ✓ Contrasting background and text colors
  - ✓ Mouse pointers and cursors can be enhanced
  - ✓ Some can even do basic screen reading functions
- Most recent computer running Windows, Mac OS or Linux have a screen magnifier built into them.
- Some common screen magnifiers for Windows computers include:
  - ✓ ZoomText
  - ✓ MAGic
  - ✓ Supernova Screen Magnifier
- Start the screen magnification function from the control panel

Reading machines

- A reading machine utilizes a camera or a scanner with Optical Character Recognition (OCR) software.
- Basically it turns a printed document into electronic text.
- This text can then be relayed to a screen to read in large print or read aloud by a screen reader.

Video magnifiers/ CCTV

- A CCTV is an aid that uses magnification and it is made of a camera and a monitor.
- The magnification level is much greater than for a hand magnifier

Refreshable Braille displays

A braille display is used with a screen reader to output screen information in a tactile form.
It consists of a number of cells which have eight pins which can be moved up and down to form braille characters.

Braille translation software

- Braille translation software can be used to convert an electronic document, such as one in Microsoft Word into braille.
- The result can then be printed by an embosser, which is a printer that uses pins to indent the dots onto paper.

Voice Recognition Software

- Voice recognition provides an alternative way to control or input information to a computer or mobile phone.
- You talk to the computer or phone and what you say is interpreted as commands or converted to electronic text.
- Google assistant is the best example.

Digital Accessible Information System (DAISY)

- DAISY is a technical standard for digital audiobooks, periodicals, and computerized text.

- It is designed to be a complete audio substitute for print material and is specifically designed for use by people with "print disabilities", including blindness, impaired vision, and dyslexia.
- Based on the MP3 and XML formats, the DAISY format has advanced features in addition to those of a traditional audio book. Users can search, place bookmarks, precisely navigate line by line, and regulate the speaking speed without distortion.
- It also provides aurally accessible tables, references, and additional information. As a result, DAISY allows visually impaired listeners to navigate something as complex as an encyclopedia or textbook, otherwise impossible using conventional audio recordings.

Hearing impairment (श्रवण बाधित)

❖ **Captioning**

Captioning allows spoken word on the television to be translated into typed English or other language for the viewer to read.

❖ **Live Speech Captioning**: in this process, a stenographer types the spoken language as teacher talks and text is displayed on computer monitor.

Cognitive impairment (संज्ञानात्मक बधिरता)

Assistive technology for cognition (ATC) is the use of technology (usually high tech) to augment and assistive cognitive processes such as attention, memory, navigation, emotion recognition, management, planning, and sequencing activity.

❋ Educational software

Educational software is a software that assists people with reading, learning, comprehension, and organizational difficulties. Any accommodation software such as text readers, notetakers, text enlargers, organization tools, word predictions, and talking word processors falls under the category of educational software.

Other assistive mobile apps

- Google translate
- Microsoft translator
- Speech Texter
- Keep Notes
- TalkBack
- TalkBack Braille Keyboard

Resources

- **Web Resources for Assistive Technology in the Classroom**
  http://www.sc.edu/scatp/ATclassroom.htm

This website offers a variety of resources that can be useful in learning more about assistive technology and its use in the classroom. I have included a few of its listed websites and the description of those websites below. Others may be found by logging on to the address above.

- **The Power of Assistive Technology** by Janet Jendron, South Carolina Assistive Technology Program Overview of the common uses of assistive technology in the classroom.
  http://www.connsensebulletin.com/jendron.html
- **Assistive Technology and Learning Disabilities** by Janet Jendron, South Carolina Assistive Technology Program. This article includes an overview of various hardware, software and low tech tools for students and teachers with a focus on literacy and a mention of available math tools. While there is an emphasis on middle and high school, many of the tools described are useful for elementary school students. http://www.sc.edu/scatp/ld.htm
- **"NEW" Freeware, Shareware and Demo Programs on the Internet.** Reprinted in the ConnSENSE Bulletin (www.connsensebulletin.com) from the Butte, Montana Office of Education, this is a 9/04 document that lists freeware and shareware off the Internet in the following categories: Cursors, Demos, Drawing, Coloring and Creating programs, Educational Games and Programs, E-Text, Graphics, Graphic Organizers, Internet sites, Keyboarding, Math Support, Modification Checklists, Mouse Skills, On-Screen Keyboards, Sign Language, Symbol Support, Text-To-Speech, Tools and Visual Support
  http://www.connsensebulletin.com/freeware05.pdf
  http://www.connsensebulletin.com/freeware.html
  http://www.sc.edu/scatp/ATclassroom.htm
- **The National Center to Improve Practice (NCIP)** was funded by the U.S. Department of Education, Office of Special Education Programs from 1992-1998 to promote the effective use of technology to enhance educational outcomes for students with sensory, cognitive, physical and social/emotional disabilities. The NCIP Library has a wealth of information about technology, disabilities, practice, and implementation. They also offer an outstanding series of video profiles that vividly illustrate how students with differing disabilities use a range of assistive and instructional technologies to improve their learning. Each video, approximately 10 minutes in length, is accompanied by supporting print materials that explore topics more fully. Their online tour of two exemplary early childhood classrooms show practical uses of AT.
  http://www2.edc.org/NCIP/
- **"Web Toolboxes for Educators,"** compiled by Dr. Cheryl Wissick at the USC College of Education, this alphabetical listing of terrific educational resources can serve as a starting point on your search of the Web, provide interactive activities, informational resources, and lessons; and help with the integration of technology in education. One section of this web site would be of particular interest to special educators, with links

for software related to web access, talking word processes, text-to-speech tools, found at
http://www.ed.sc.edu/caw/toolboxsource.html
http://www.ed.sc.edu/caw/toolboxvendors.html

- **Cool Assistive Technology Tools for the Classroom:** Also compiled by Janet Jendron of SCATP. http://www.sc.edu/scatp/cooltools.htm
- The **South Carolina Assistive Technology Program's** Web site is at http://www.sc.edu/scatp
- **Assistive Technology | Helping Challenged Kids Get the Most from Learning** http://www.educationworld.com/a_tech/tech/tech086.shtml
- **Tools for Life: Learning Disabilities Guide**
  http://www.gatfl.org/LearningDisabilitiesGuide.aspx

This is an excellent website showing how assistive technology can help in the classroom. It is also a good source to help in selecting the specific technology needed for students.

- **Assistive technology for kids with LD: An Overview**

http://www.greatschools.org/special-education/assistive-technology/702-assistive-technology-for-kids-with-learning-disabilities-an-overview.gs This site offers a wealth of information on a variety of assistive technology tools.

- **The Georgia Project for Assistive Technology: Resources** www.gpat.org/

This page offers information on assistive technology definition, devices, legal mandates, considerations, implementation and integration, evaluation, policies and procedures.

- **National AT Advocacy Project** *www.nls.org/natmain.htm*

This site contains a booklet that focuses on the rights of students in public schools to have the help of assistive technology. It is ideal for advocates and others that work with disabled children. It offers a wealth of information concerning IDEA and section 504 and how the law affects the availability and use of assistive technology in the classroom, today.

- **AbilityNet GATE: Global Assistive Technology Encyclopedia**
  http://abilitynet.wetpaint.com
- **Assistive Technology from Wikipedia**
  http://en.wikipedia.org/wiki/Assistive_technology
- **Assistive Technology in Education: A Guide for the Delivery of Assistive Technology Services for Students with Disabilities**
  http://www.atp.ne.gov/techassistdoc.html
- **Hearing Assistive Technology**
  http://www.asha.org/public/hearing/treatment/assist_tech.htm
- **N_A_T_E_ Network Site** http://www.natenetwork.org/
- Accessibility features of android mobile device
- Web Accessibility Features

H5P Authoring tools

- Ms. Urvashi Shrivastava

H5P makes it easy to **create, share and reuse HTML5 content and applications**. H5P empowers everyone to create rich and interactive web experiences more efficiently - all you need is a web browser and a web site with an H5P plugin. H5P allows you to easily and quickly create rich interactive content on a web page. H5P is a plug-in for existing publishing systems that enables the system to create interactive content like Interactive Videos, Presentations, Games, Quizzes and more!

H5P Content Types

1. Virtual Tour (360)

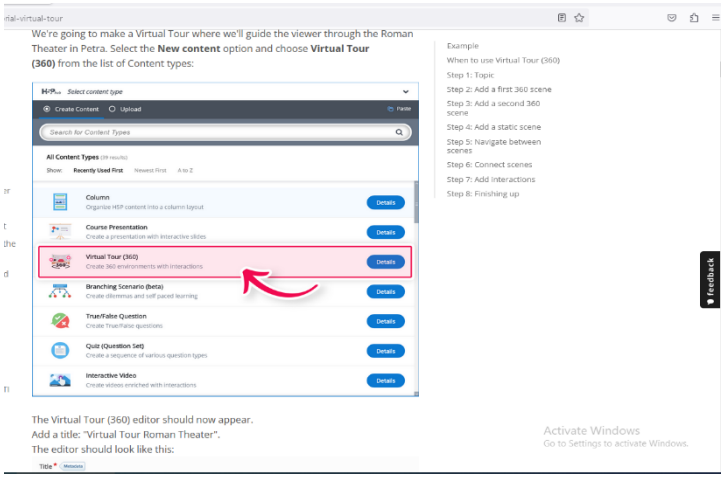
360 (equirectangular) and normal images may be enriched with interactivities like explanations, videos, sounds, and interactive questions. The images may also be linked together to give the user an impression of moving between environments or between different viewpoints within the same environment.

This content type may be used to give a feeling of exploring and learning within a realistic environment. It includes an easy to use drag and drop authoring widget making it easy for everyone to create his or her own virtual tours.

Features

The following H5P content types may be added to a Virtual Tour Scene:

- Text
- Image
- Sound (both for the entire Virtual Tour, per room/scene and as buttons in the scenes.
- Video
- Single Choice Set
- Interactive Summary
- Connections to other scenes

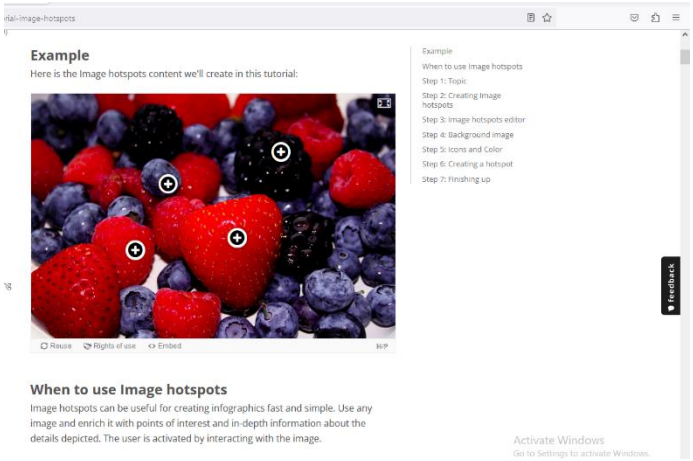


2. Image Hotspots

Image hotspots makes it possible to create an image with interactive hotspots. When the user presses a hotspot, a popup containing a header and text or video is displayed. Using the H5P editor, you may add as many hotspots as you like. The following is configurable:

- The number of hotspots
- The placement of each hotspot, and the associated popup content

- The color of the hotspot



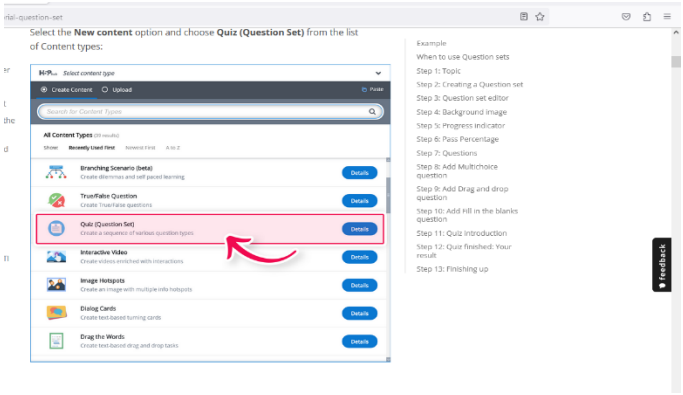
3. Interactive Video

Videos may be enriched with interactivities like explanations, extra pictures, tables, Fill in the Blank and multiple choice questions. Quiz questions support adaptivity, meaning that you can jump to another part of the video based on the user's input. Interactive summaries can be added at the end of the video. Interactive videos are created and edited using the H5P authoring tool in a standard web browser.

Features

The following H5P content types may be added to your video:

- Multiple choice questions with one or more correct answers
- Free text questions
- Fill in the blank questions
- Drag and drop questions
- Interactive summaries
- Single choice question sets
- Mark the word activities
- Drag and drop text
- Images
- Tables
- Labels
- Texts
- Links

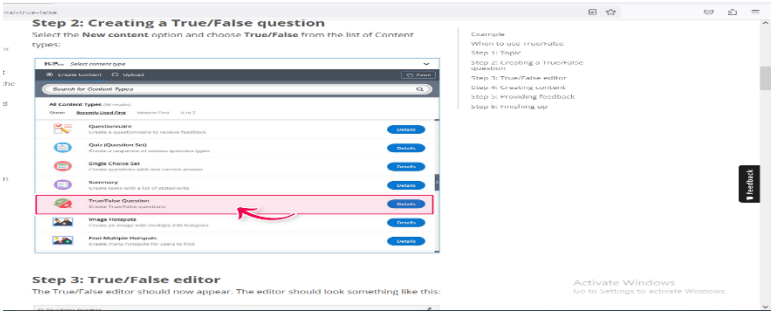


4. Quiz (Question Set)

Question Set is your typical quiz content type. It allows the learner to solve a sequence of various question types. You can combine many different question types like Multichoice, Drag and drop and Fill in the blanks in a Question set. As an author, there are many settings you can use to make it behave just the way you want it to. You may for instance customize the Question set with background images and define a pass percentage for the learner.

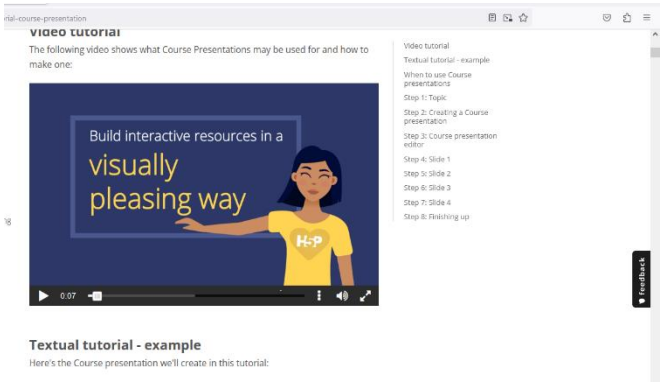
The Question Set also allows you to add videos that are played at the end. One video for success, another if the learner fails the test. This might motivate learners to try again if they fail so that they get to see the success video.

5. **True/False Question**



True/False Question is a simple and straightforward content type that can work by itself or combined into other content types such as Course Presentation. A more complex question can be created by adding an image or a video.

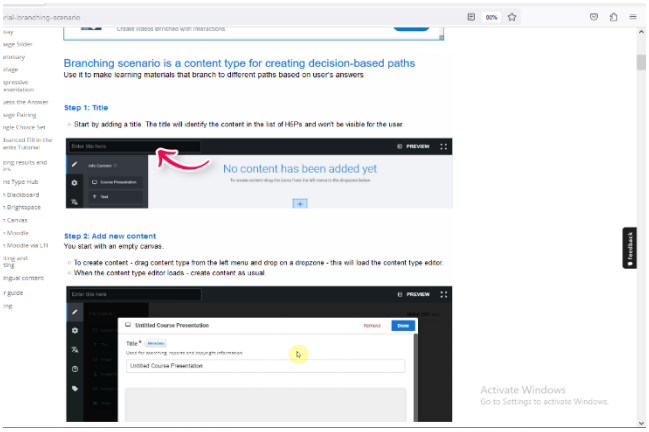
6. Course Presentation



Course presentations consist of slides with multimedia, text, and many different types of interactions like interactive summaries, multiple choice questions and interactive videos. Learners can experience new interactive learning material and test their knowledge and memory in Course Presentations. As always with H5P, content is editable in web browsers, and the Course Presentation activity type includes a WYSIWYG drag and drop based authoring tool.

A typical use of the Course Presentation activity is to use a few slides to introduce a subject and follow these with a few more slides in which the user's knowledge is tested. Course Presentations may however be used in many different ways, including as a presentation tool for use in the classroom, or as a game where the usual navigation is replaced with navigation buttons on top of the slides to let the user make choices and see the consequences of their choices.

7. Branching Scenario



Branching Scenario is a flexible content type that enables authors to present a variety of rich interactive content and choices to learners. Learners make choices that determine the content they will see.

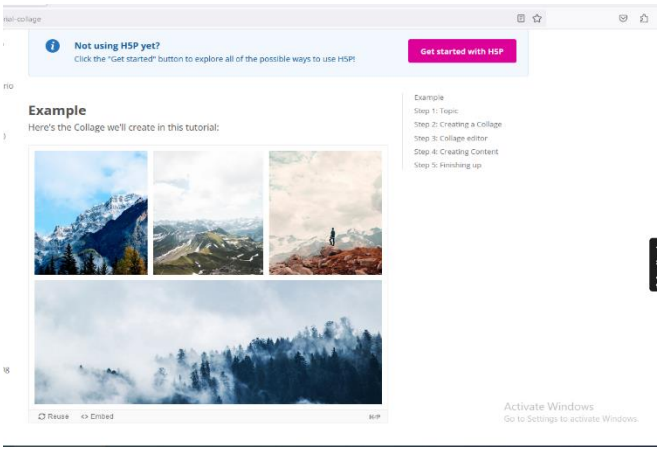
The authoring tool can be used in full screen and allows authors to structure the content as a tree with multiple branches and endings.

8. Collage

The Collage tool allows you to put together beautiful images in a soothing composition. If you want to impress your followers by adding cool image collages to your blog, this is definitely the tool for you!

Choose from 11 layouts and configure:

- image pan and zoom
- image spacing (inner frame size)
- outer frame size
- height of the collage



9. Chart

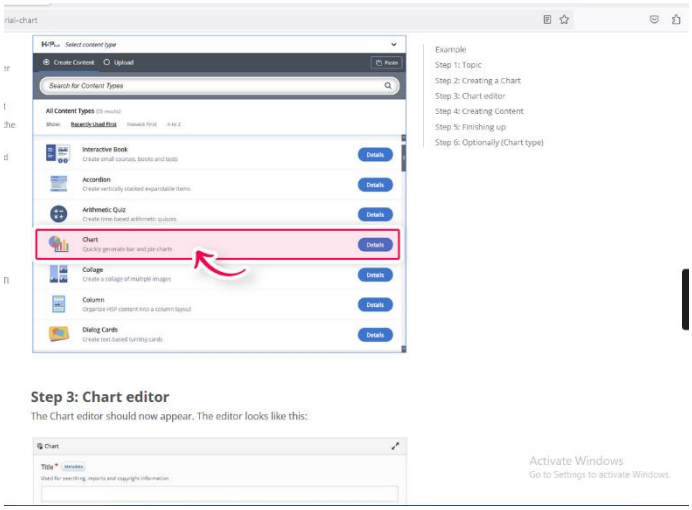
Need to present simple statistical data graphically without creating the artwork manually? Chart is your answer.

Features

- Select between bar and pie chart view
- Add label and value to each data element
- Select background color each data element
- Set font color for each data element

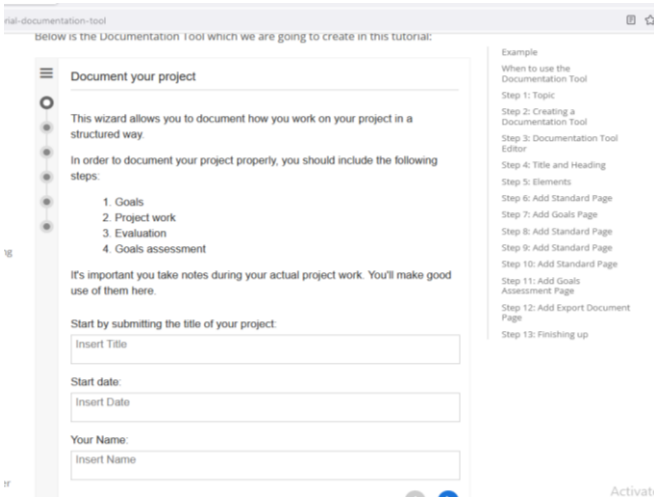
10. Documentation Tool

The documentation tool aims to make it easy to create assessment wizards for goal driven activities. It can also be used as a form wizard.



While editing, the author can add multiple steps to the wizard. In each step, the author can define which content goes into that step. Content can be plain text, input fields, goal definition and goal assessment.

Once published, the end user will be taken through the steps of the wizard. On the last step of the wizard, the user can generate a document with all the input that has been submitted. This document can be downloaded.

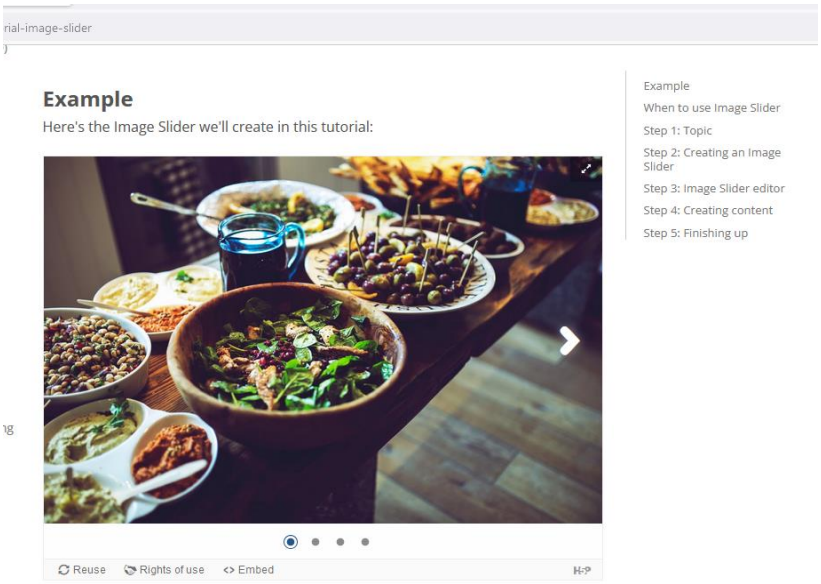


The Documentation tool is fully responsive and works great on smaller screens as well as on your desktop.

11. Image Slider

Description

Present your images in an appealing way with ease. Authors just have to upload images and provide alternative texts for the images.



The next two images are always preloaded so switching between images will usually be snappy with no delay for loading the next image.

Images may be experienced as part of the page or in full-screen mode. When used as part of the page the system will pick a fixed aspect ratio depending on the images being used. Authors may decide to handle aspect ratios differently.

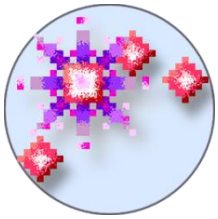
Video-Based Analysis Freeware: Tracker

- Mr. L. S. Chauhan

GENERAL OBJECTIVE

1. To develop data interpretation ability
2. To develop graphical interpretation ability
3. To study given problem of mechanics

INFORMATION ABOUT TRACKER



Tracker is a free video analysis and modelling tool built on the Open Source Physics (OSP) Java framework. It is designed to be used in physics education.

Tracker **video modelling** is a powerful way to combine videos with computer modelling.
Tracker requires Java 1.6 or higher.

Tracker Features

Tracking:

- Manual and automated object tracking with position, velocity and acceleration overlays and data.
- Centre of mass tracks.
- Interactive graphical vectors and vector sums.
- RGB line profiles at any angle, time-dependent RGB regions.

Modelling:

- Model Builder creates kinematic and dynamic models of point mass particles and two-body systems.
- External models animate and overlay multi-point data from separate modeling programs such as spreadsheets.
- Model overlays are automatically synchronized and scaled to the video for direct visual comparison with the real world.

Subjects	Levels	Resource Types
Education Practices	Lower Undergraduate	Instructional Material
Curriculum Development	High School	Activity
Laboratory	Upper Undergraduate	Interactive Simulation
Instructional Material Design		Laboratory
Technology		Model
Computers		Tool
Multimedia		Software
General Physics		Audio/Visual
General		Movie/Animation
Measurement/Units		

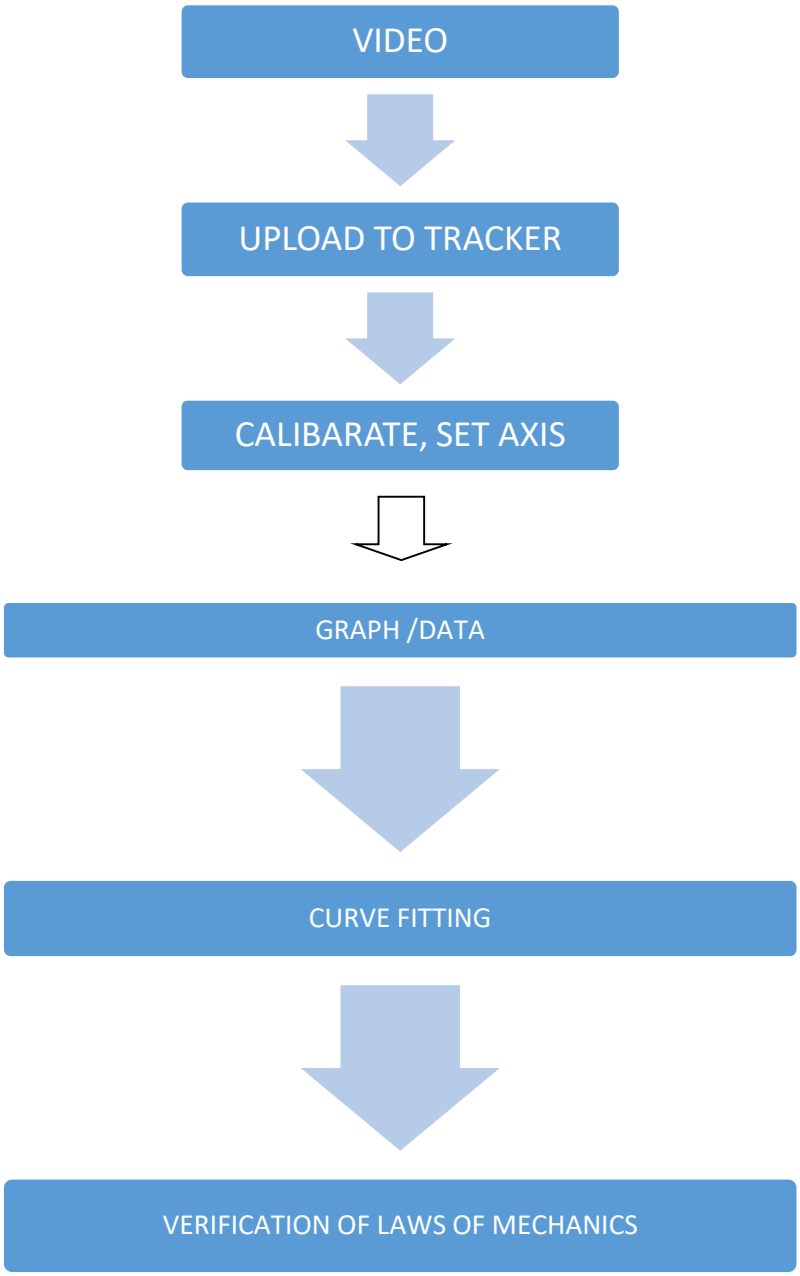
Intended Users	Formats
Learners Educators	

METHODOLOGY

First, we identified some daily life problems/situations like

- Freely falling body
- Two body system attached with a pulley
- Friction between two bodies

Performed the activities in somewhat ideal conditions, recorded and analysed using Tracker:



ACTIVITY 1: FREE FALL

Specific Objective

1. To verify the value of acceleration due to gravity (g) of freely falling body on earth using Tracker.
2. To verify the following equations of motion:
   a) $v = u + gt$
   b) $h = ut + \frac{1}{2}gt^2$

(Where symbols have their usual meaning)

Materials Required

- Object (Ball)
- Camera, stand
- Scale (for calibration)

Theory

Free fall is the motion of any body where gravity is the only force acting upon it.

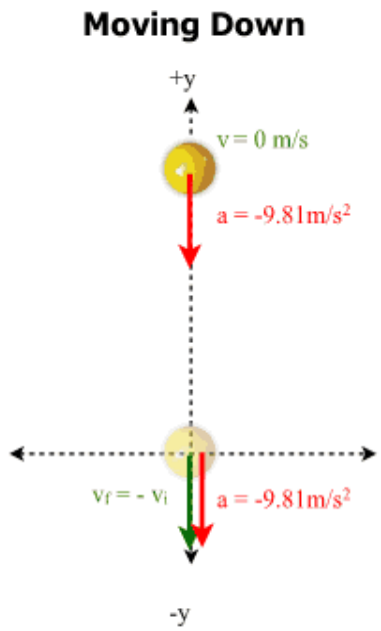


Fig.1: Equations of motion

In mathematical physics, **equations of motion** are equations that describe the behaviour of a physical system in terms of its motion as a function.

The three equations of motion are:

$v = u + at$

$s = ut + \frac{1}{2}at^2$

$v^2 - u^2 = 2as$

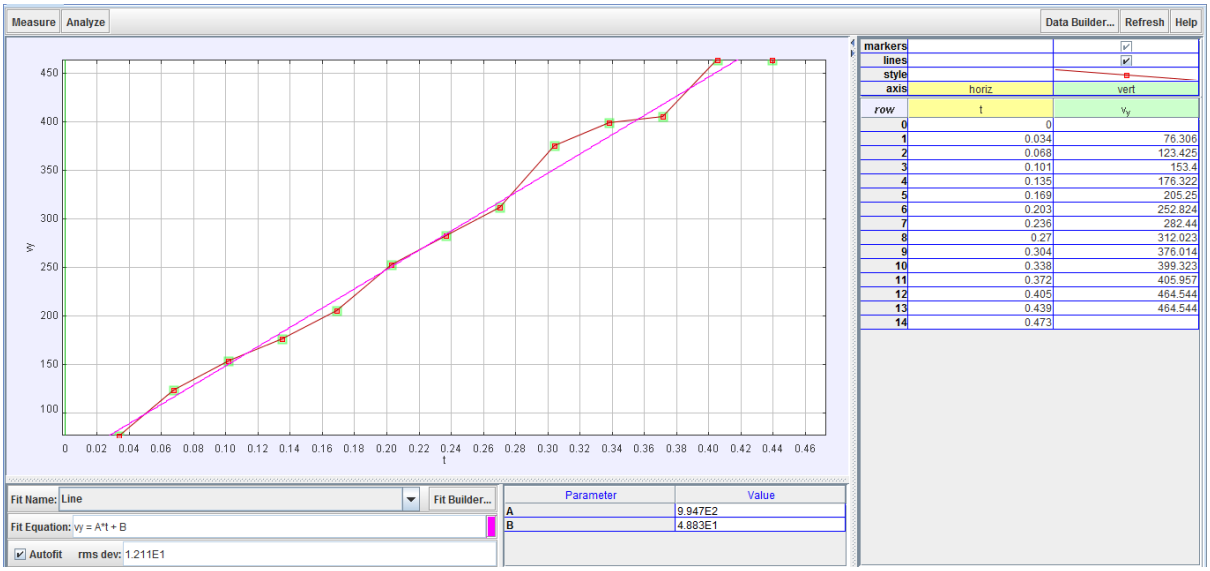
Analysis using Tracker

Fig. 2

Fig. 3

- For first equation of motion

  v = u + gt (here, u = 0)



Graph 1

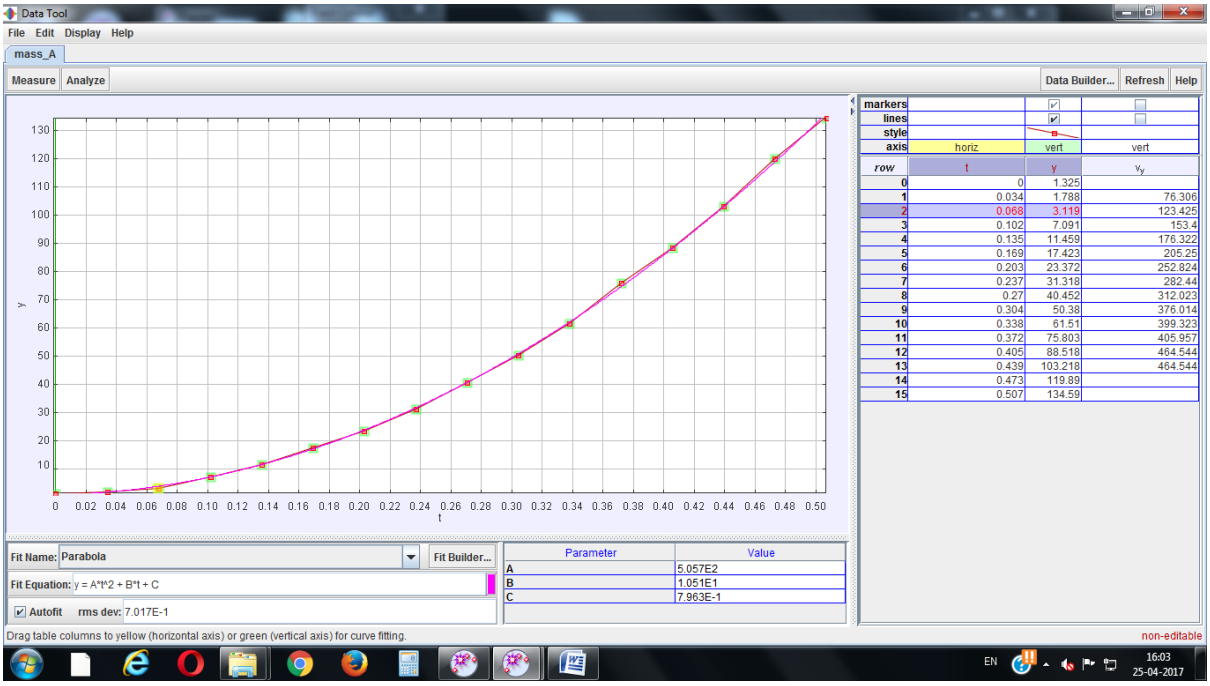
Curve between velocity (v) and time (t) is a straight line and the value of A (=g) = 9.947E2

Result

Clearly, graph satisfies the first equation of motion v = u + gt. In addition, acceleration due to gravity of freely falling body (ball) on earth is **994.7 cm/sec^2.** Theoretical value of g = 980 cm/sec^2. So error = -1.43%

- For second equation of motion

  $h = ut + \frac{1}{2}gt^2$



The graph between y (h) and t is a parabola.

A = 5.05E2, B = 1.051E1

Clearly, the graph satisfies $h = ut + \frac{1}{2}gt^2$.

CONCLUSION

By performing the above-mentioned activities we can say that any daily life situation/problem can be easily and accurately analysed from which laws of physics can be verified.

Advantages of using Tracker

- Gives accurate results
- Shows the deviation between standard and obtained data
- Graph between different parameters can be easily obtained
- With minimum input data it gives maximum output
- Easy to use
- It promotes effective learning
- Saves time
- Creative and interesting

Scope

Tracker is a highly useful software, which has got great utility in various field of physics. We have used it to verify the laws of mechanics but it can also be used in

Optics

To verify Malus law, Snells law, fraunhoffer diffraction, spectroscopy, etc.

- Other areas of **mechanics**
  - Projectile motion
  - Stokes law
  - Rotational motion of bodies
  - Simple harmonic motion, etc.

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ICT in Mathematics

- Aji Thomas

Information and Communication Technology (ICT) has significantly influenced the teaching and learning of mathematics, transforming the way educators deliver content and how students engage with mathematical concepts. In this section, we explore the specific impact of ICT on mathematics education, examining the benefits, challenges, and emerging trends in this dynamic field.

I. Enhancing Mathematical Understanding:

A. **Interactive Learning Tools:** ICT provides a plethora of interactive learning tools that make abstract mathematical concepts more tangible. Visualization software, graphing calculators, and dynamic geometry applications allow students to explore mathematical ideas in a hands-on and visually intuitive manner.

B. Simulation and Modeling: Simulations and modeling tools help students understand complex mathematical phenomena. Whether exploring mathematical functions, solving real-world problems, or simulating mathematical scenarios, students can develop a deeper appreciation for the practical applications of mathematical concepts.

C. Virtual Manipulatives: Digital manipulatives, such as virtual algebra tiles or geometric shapes, enable students to manipulate and explore mathematical concepts in a virtual environment. These tools provide a bridge between abstract mathematical ideas and concrete, tangible representations.

II. Personalized Learning in Mathematics:

A. Adaptive Learning Platforms: ICT facilitates adaptive learning platforms that tailor mathematical instruction to individual student needs. These platforms use algorithms to assess a student's proficiency level and dynamically adjust the difficulty and pace of the content, ensuring a personalized learning experience.

B. Online Assessments and Feedback: Digital platforms allow for real-time assessments and immediate feedback on students' mathematical performance. This not only helps identify areas of improvement but also enables educators to provide timely and targeted support to individual students.

III. Collaborative Mathematics Learning:

A. Online Collaboration Tools: ICT promotes collaborative learning in mathematics through online platforms, discussion forums, and collaborative document editing. Students can work together on mathematical problems, share insights, and engage in discussions, fostering a sense of community and collective problem-solving.

B. Virtual Classrooms: Virtual classrooms powered by video conferencing and collaboration tools facilitate remote learning in mathematics. These platforms enable real-time interaction

between students and teachers, fostering a collaborative and interactive online learning environment.

IV. Addressing Math Anxiety:

A. Gamification of Mathematics: Educational games and gamified applications make learning mathematics enjoyable and less intimidating. Through interactive challenges, puzzles, and competitions, students can develop their mathematical skills in a stress-free and engaging manner.

B. Multimedia Content: The integration of multimedia content, including videos, animations, and interactive simulations, helps break down complex mathematical topics into more digestible and visually appealing formats. This approach can alleviate anxiety and enhance understanding.

V. Challenges in Integrating ICT into Mathematics Education:

A. Teacher Training: Effective integration of ICT in mathematics education requires well-trained educators. Teachers must be proficient in using digital tools, software, and online platforms to create a conducive learning environment.

B. Access to Technology: Disparities in access to technology can hinder the equitable implementation of ICT in mathematics education. Schools with limited resources may struggle to provide students with the necessary devices and connectivity.

C. Technological Infrastructure: The availability and maintenance of a robust technological infrastructure, including high-speed internet and up-to-date devices, are essential for the successful integration of ICT in mathematics education.

VI. Emerging Trends in ICT in Mathematics Education:

A. Artificial Intelligence (AI) in Mathematics: AI-powered tools can provide personalized recommendations for mathematics practice, offer instant feedback, and even assist in solving complex mathematical problems. These applications augment traditional teaching methods and support individualized learning.

B. Virtual Reality (VR) for Mathematical Exploration: Virtual reality offers immersive experiences for exploring mathematical concepts in three-dimensional spaces. VR applications in mathematics education can enhance spatial reasoning and provide students with a unique perspective on mathematical structures.

C. Data Analytics for Educational Insights: The use of data analytics allows educators to track students' progress, identify areas of difficulty, and tailor instructional strategies accordingly. Analyzing data from digital platforms can inform evidence-based decision-making in mathematics education.

VII Some Essential Software in Mathematics Education:

1. PhET Interactive Simulations:

Overview: PhET Interactive Simulations is a collection of free, online math and science simulations developed by the University of Colorado Boulder. It provides a range of interactive, animated simulations that cover various topics in mathematics, physics, chemistry, biology, and more.

Key Features:

1. **Interactivity:**
    - PhET simulations are highly interactive, allowing students to manipulate variables and observe the real-time effects on the simulation. This hands-on approach promotes active learning.

2. **Diverse Subjects:**
    - The simulations cover a broad spectrum of subjects, including mechanics, electricity, waves, quantum mechanics, and mathematics. In the context of mathematics, PhET offers simulations for algebra, calculus, geometry, and statistics.

3. **Accessibility:**
    - PhET simulations are freely available online, making them accessible to educators, students, and learners worldwide. The platform supports multiple **languages.**

4. **Teacher and Student Resources:**
    - PhET provides supporting materials for teachers, including lesson plans, teacher guides, and interactive activities. Students can also use the simulations for self-directed learning**.**

5. **Real-World Applications:**
    - The simulations often incorporate real-world scenarios, helping students see the practical applications of mathematical concepts**.**

Educational Benefits:

- **Concrete Visualization:** PhET simulations provide concrete visualizations of abstract mathematical concepts, making them more accessible and engaging.
- **Active Learning:** Students actively engage with the simulations, fostering a deeper understanding of mathematical principles through exploration.
- **Experimentation:** PhET allows students to experiment with different scenarios and observe the outcomes, promoting a hands-on approach to learning.

2. GeoGebra:

Overview: GeoGebra is a dynamic mathematics software that integrates geometry, algebra, statistics, and calculus. It is designed for learning and teaching mathematics at various levels, from primary school to university.

Key Features:

1. **Dynamic Interface:**

- GeoGebra offers a dynamic and interactive interface that allows users to explore mathematical concepts in real-time. Changes to parameters instantly reflect on the visualizations.

2. **Integration of Mathematical Areas:**
   - The software seamlessly integrates geometry, algebra, statistics, and calculus, providing a versatile tool for educators and students across different mathematical disciplines.

3. **Multiplatform Support:**
   - GeoGebra is available on multiple platforms, including desktop applications for Windows, Mac OS, and Linux, tablet apps for Android, iPad, and Windows, as well as a web application based on HTML5 technology.

4. **Educational Resources:**
   - GeoGebra offers a rich database of ready-made examples, technical documentation in multiple languages, and a community where users can share resources and insights**.**

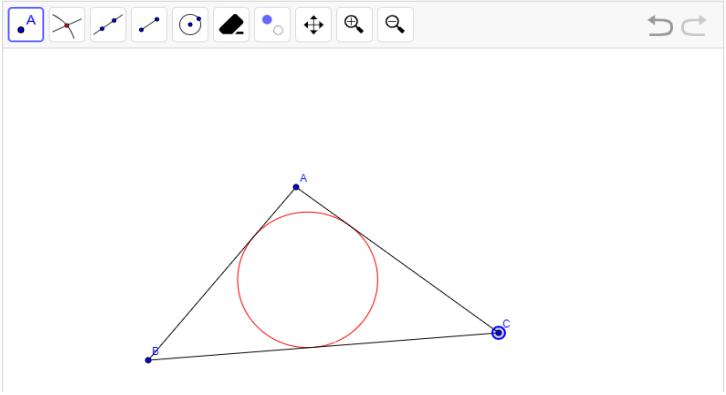
5. **Dynamic Objects:**
   - All objects in GeoGebra are dynamic, allowing users to visualize changes and explore mathematical relationships dynamically.

Educational Benefits:

- **Versatility:** GeoGebra caters to a wide range of mathematical topics, making it a versatile tool for educators teaching different subjects.
- **Real-Time Exploration:** The real-time manipulation of geometric and algebraic objects enhances students' exploration and understanding of mathematical concepts.
- **Integration of Technology:** GeoGebra seamlessly integrates technology into mathematics education, promoting digital literacy and computational thinking.
- **Publication and Collaboration:** GeoGebra allows users to publish their work on the web, fostering collaboration and sharing of mathematical explorations**.**

Interface:

GeoGebra's interface is designed with clarity and functionality in mind. It includes several views such as algebraic, geometric, spreadsheet, CAS (Computer Algebra System), protocol design, and command line. These views are interconnected, ensuring that changes made in one view are reflected appropriately in others. The dynamic nature of GeoGebra allows for the exploration of mathematical concepts through various representations.



Examples:

Example 1: Constructing a Circle on a Triangle Suppose we

want to construct a circle inscribed in a triangle using GeoGebra (Figure 1). By leveraging GeoGebra's dynamic geometry tools, we can visualize and manipulate the construction, providing a more engaging and interactive exploration of geometric concepts.

Example 2: Understanding the limit concept: Limits play a fundamental role in calculus, providing a way to describe and analyse the behaviour of functions as they approach a certain point. While the mathematical definition involves precision, visualizing limits can enhance comprehension, especially for learners new to the concept. In this article, we leverage GeoGebra, a dynamic mathematics software, to create an interactive exploration of limits through the inscribing of polygons within a circle.

GeoGebra as a Dynamic Tool:
GeoGebra's versatility in integrating geometry and algebra makes it an ideal platform for exploring mathematical concepts visually. Its dynamic interface allows users to manipulate geometric shapes, parameters, and equations in real-time, providing a hands-on experience that aids in understanding abstract ideas.

The Visual Concept: Inscribed Polygons in a Circle:
To visualize limits, we choose the concept of inscribing polygons inside a circle. The idea is to start with a simple polygon, such as a triangle, inscribed within a circle. As we increase the number of sides in the polygon, we observe how the shape approaches the circle more closely. This gradual approach of refining the polygon provides an intuitive representation of the limit concept.

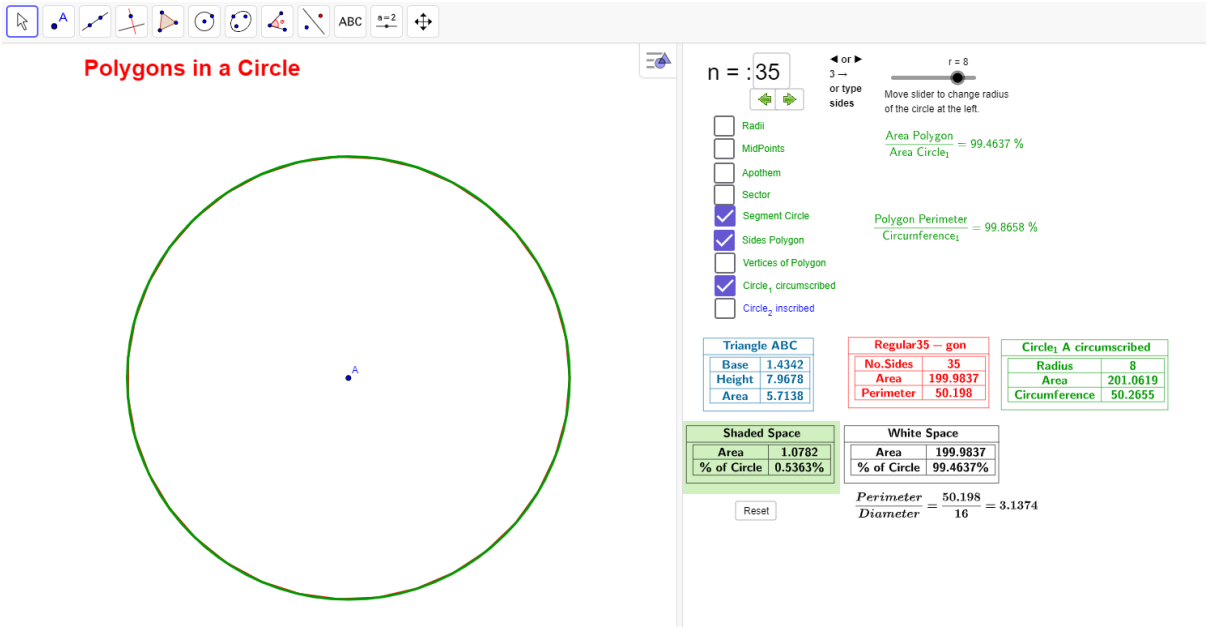
GeoGebra Construction Steps:

1. **Create a Circle:**
    - Begin by using GeoGebra's circle tool to create a circle. This will serve as the boundary within which the polygons are inscribed.

2. **Inscribe a Polygon:**
    - Inscribe an initial polygon, such as a triangle, within the circle. Utilize GeoGebra's polygon tool to construct the shape.

3. **Increase Polygon Sides:**
    - Duplicate the polygon and gradually increase the number of sides. GeoGebra allows users to dynamically adjust the number of sides, providing a real-time visual transformation of the shape.

4. **Observe Convergence:**
    - As the number of sides increases, observe how the inscribed polygon approaches the circle. The visual convergence of the polygon towards the circle illustrates the concept of a limit.



Interactive Exploration:
Encourage students to actively engage with the GeoGebra model. They can experiment by changing the number of sides in the inscribed polygon and observe how the shape evolves. This interactive exploration fosters a deeper understanding of how the polygon approaches the circle and visually demonstrates the concept of a limit.

Mathematical Insights:
While the visual exploration provides an intuitive understanding, it is essential to connect it with the mathematical definition of limits. Discuss how, in calculus, the limit represents the behavior of a function as the input approaches a specific value. Relate the visual convergence of the inscribed polygon to the concept of a limit in a mathematical context**.**

Educational Benefits:

1. **Intuitive Understanding:**
   - The visual representation of limits through inscribed polygons offers an intuitive understanding, making the concept more accessible to students.
2. **Dynamic Exploration:**
   - GeoGebra's dynamic environment allows for real-time manipulation and observation, enabling students to actively explore and experiment with the concept.
3. **Connection to Calculus:**
   - The visual exploration serves as a bridge between geometry and calculus, helping students connect the idea of limits to their studies in calculus.
4. **Engagement and Retention:**
   - The interactive nature of the GeoGebra model enhances student engagement and retention, fostering a positive learning experience.

Visualizing limits through the inscribing of polygons inside a circle using GeoGebra provides a dynamic and interactive approach to understanding this fundamental calculus concept. The

exploration allows students to actively engage with the material, fostering a deeper comprehension of limits. This visual representation serves as a valuable supplement to traditional mathematical explanations, making the concept more tangible and memorable for learners. As technology continues to play a crucial role in education, leveraging tools like GeoGebra enhances the learning experience and promotes a deeper understanding of mathematical concept.

GeoGebra emerges as a valuable tool in overcoming challenges in teaching mathematics by providing an interactive and dynamic learning environment. The examples presented illustrate how GeoGebra can be utilized to construct, solve, and visualize mathematical problems, with a specific focus on Projectile Motion. As technology continues to play a pivotal role in education, GeoGebra stands as a powerful resource for educators seeking to enhance the learning experiences of students in mathematics.

Conclusion:

PhET Interactive Simulations and GeoGebra stand out as essential software tools in mathematics education, complementing traditional teaching methods and providing interactive, dynamic, and engaging learning experiences. Their unique features contribute to the development of a deeper understanding of mathematical concepts and promote active learning in the digital age.

GeoGebra emerges as a valuable tool in overcoming challenges in teaching mathematics by providing an interactive and dynamic learning environment. The examples presented illustrate how GeoGebra can be utilized to construct, solve, and visualize mathematical problems, with a specific focus on Projectile Motion. As technology continues to play a pivotal role in education, GeoGebra stands as a powerful resource for educators seeking to enhance the learning experiences of students in mathematics.

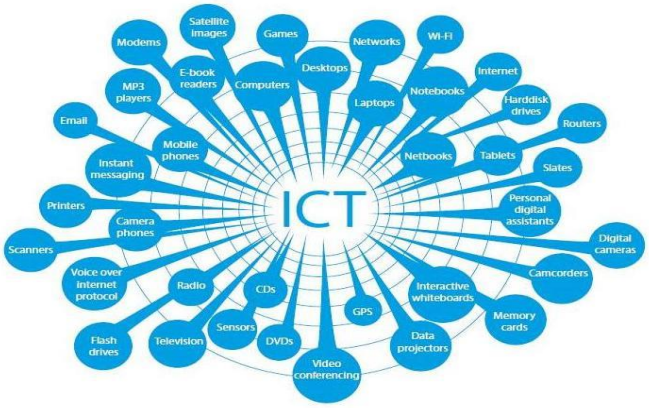
ICT for Language and Social Science

- Dr. Shruti Tripathi

Introduction

The 20th century marked an era where power was synonymous with possessing weapons. However, in the 21st century, it is increasingly evident that the true source of power lies in knowledge and skills, surpassing the traditional dominance of weapon-based strength. The relentless progress in science and technology has brought about a transformative shift in the lifestyles of people worldwide.

The acronym 'ICT,' denoting Information and Communication Technologies, encompasses a multitude of technologies facilitating information reception and communication exchange. Global economic strategies, coupled with advancements in ICT, have rejuvenated communication tools in the 21st century. Terms like digital literacy, e-literacy, screen literacy, multimedia literacy, information literacy, and ICT literacy encapsulate the skills required by students and educators in this digital age.



In the contemporary world, swift and timely communication is indispensable. In this context, modern technologies and internet tools have become indispensable. Email, blogs, e-groups, smart mobile phones (serving not only for calls and texts but also for social networking), and websites are likened to the lifeblood and oxygen of communication.

The boundaries of learning have transcended traditional classroom settings. New terms have emerged to describe these innovative learning approaches, such as M-learning (mobile learning) and U-learning (ubiquitous learning). This paradigm shift underscores the pivotal role that knowledge and technology play in shaping the dynamics of the 21st-century communication landscape.

This module discusses about web tools for ICT integration in Language and Social Science that can be utilized for enhancing the process of knowledge transaction in the classroom and beyond it. There are many applications that a teacher may learn under the broad area of ICT skills. Brief idea about various applications under the broad area of ICT skills are given below.

Flippity

Flippity serves as a versatile hub offering a diverse array of functions, catering to the needs of educators. It presents teachers with a comprehensive suite of digital activities and tools, encompassing practical classroom utilities like the Random Name Picker, Badge Tracker, Leaderboard, Fun with Fonts, Progress Indicator, Word Cloud, and Tournament Bracket. Additionally, it includes knowledge-building tools such as Flash Cards, Quiz Show, Virtual Breakout, and Typing Test, along with entertaining mini-games like Matching Game, Connecto Game, Bingo, Crossword Puzzle, Word Scramble, Word Search, Snowman, WordMaster, and MadLibs.

Flippity proves valuable in supporting assessment, knowledge acquisition, and learner-centric experiences. Assessment tools like Quiz Show and Virtual Breakout aid in gauging comprehension, while the Self-Assessment tool allows students to reflect on their feelings post-assignment. Knowledge-centered tools, such as Flash Cards, Timeline, Typing Test, and Spelling Words activities, contribute to enhancing understanding. Learner-centered tools like Manipulatives and Word Cloud, or activities that encourage students to create content themselves (e.g., MadLibs or Crossword Puzzle), further emphasize a learner-centric approach.

By consolidating such a diverse range of programs within a single platform, Flippity simplifies the process of exciting and engaging learners through user-friendly tools.
https://www.flippity.net/

Vocaroo

Vocaroo stands out for its simplicity and user-friendly interface, offering a hassle-free experience. Users can access the tool directly without the need for an account login. The audio files generated on Vocaroo can easily be shared by providing a link on blogs, websites, and various social networking platforms. Typically, recordings remain accessible for a few months, usually around three months.

The convenience extends further as Vocaroo provides a widget that can be seamlessly embedded on other websites. This feature allows, for instance, students to record voice messages directly from your class website, eliminating the need for additional logins or complex HTML knowledge. Moreover, Vocaroo supports the downloading of recordings in various formats, such as mp3, Ogg, flag, and wav, providing flexibility for users based on their preferences.
https://vocaroo.com/

iSL collective

iSL Collective stands as an invaluable resource for educators and learners in the realm of English as a Second Language (ESL). Functioning as a collaborative platform, iSL Collective provides a vast repository of teaching materials, worksheets, and lesson plans contributed by educators globally. This diverse collection spans various aspects of language learning, encompassing grammar, vocabulary, speaking, listening, reading, and writing. The platform's user-friendly interface facilitates seamless navigation, enabling teachers to find and download materials tailored to their students' needs. What sets iSL Collective apart is its emphasis on user contributions, fostering a community-driven approach to ESL education. Educators can share their own creations, providing a wealth of diverse and culturally relevant resources. The platform's adaptability to different proficiency levels and the option for customization make it a versatile tool for educators catering to a broad spectrum of learners. Additionally, iSL Collective's commitment to open access ensures that many resources are available for free, promoting inclusivity and accessibility. While the platform offers a plethora of ready-made materials, it also encourages teachers to modify and adapt resources to suit their specific teaching objectives. Whether it's reinforcing grammar rules, enhancing vocabulary, or facilitating engaging language activities, iSL Collective emerges as a dynamic hub that not only supports ESL educators in their teaching endeavors but also fosters a collaborative global community dedicated to enhancing language education for learners worldwide.
https://en.islcollective.com/

Flip

Flip, formerly recognized as Flipgrid, proves to be an invaluable tool in the field of education, catering to those seeking to incorporate video-based interactivity both within and beyond the traditional classroom setting.

At its core, Flip functions akin to a private social media platform, facilitating the exchange of videos between teachers and students. Notably, it is designed with a robust privacy framework, enabling complete control over privacy settings and the option to organize video creation based on subjects.

Teachers can initiate the interaction by posting a video accompanied by text, emojis, and other elements. Students, in turn, can respond with their own videos, establishing a dynamic space for nuanced communication. This setup fosters an environment conducive to engagement, particularly benefitting students who may be less assertive. Additionally, Flip provides a secure platform for expressing opinions and delving into discussions on a spectrum of topics.
https://info.flip.com/

Crossword Labs

Crossword Labs stands as a complimentary web-based solution for constructing, printing, sharing, and solving crossword puzzles at no cost. Users simply input a title and the words they want to incorporate, leaving the rest to the application. The tool accommodates puzzles in multiple languages and offers a repository of pre-made crossword puzzles on diverse topics. Crossword Labs emerges as a straightforward and efficient platform for crafting diverse crossword puzzles, making it an excellent resource for students looking to enhance their vocabulary skills.
https://crosswordlabs.com/

LyricsTraining

LyricsTraining stands out as an innovative language-learning tool that taps into the power of music to enhance language proficiency. Designed for learners of diverse linguistic backgrounds, the platform transforms song lyrics into interactive language exercises. Users can select songs from a wide array of genres and difficulty levels, turning the process of learning into an engaging and enjoyable experience. As the music plays, lyrics are presented with strategically omitted words or phrases, challenging learners to fill in the blanks in real-time. This approach synchronizes language comprehension with the rhythm of the song, providing a dynamic and immersive learning environment.

One of LyricsTraining's notable features is its versatility, catering to users of all ages. Whether individuals are learning English as a second language or seeking to improve proficiency in another language, the platform adapts to varying linguistic goals. The extensive catalog of songs spans different genres, ensuring users can choose music that aligns with their preferences. Beyond individual learners, LyricsTraining serves as a valuable resource for educators. Teachers can integrate music-based lessons into their curriculum, creating a dynamic and interactive classroom environment. The platform allows educators to customize exercises according to the linguistic objectives of their students, promoting collaborative learning.
https://lyricstraining.com/

Wizer.me

Wizer.me emerges as a versatile and interactive digital worksheet platform, revolutionizing the way educators create, share, and assess learning materials. This user-friendly tool empowers teachers to design engaging and multimedia-rich assignments, incorporating a variety of question types, videos, images, and interactive elements. With a focus on personalized learning, Wizer.me allows educators to tailor assignments to meet the unique needs of individual students or entire classes. Furthermore, the platform supports real-time feedback, enabling teachers to assess progress promptly and provide targeted guidance. Students, in turn, benefit from an intuitive interface that encourages active participation and a deeper understanding of the subject matter. Wizer.me also facilitates easy collaboration, as teachers can share their created worksheets within the Wizer.me community or on various learning management systems. As education continues to evolve in the digital age, Wizer.me stands at the forefront, offering a dynamic and adaptive tool that enhances the educational experience for both teachers and students, fostering creativity, engagement, and effective learning outcomes.

https://app.wizer.me/

WordArt

WordArt is a dynamic and creative tool that transforms ordinary text into visually striking word clouds, adding a unique dimension to presentations, graphics, and projects. This user-friendly platform allows individuals to input text, customize font styles, colors, and layouts, and generate visually appealing word clouds effortlessly. WordArt is versatile, making it suitable for various purposes such as brainstorming sessions, educational materials, social media graphics, and more. Users can manipulate the appearance of the word cloud to emphasize specific words or themes, providing a visually engaging representation of textual content. The ability to adjust the shape, orientation, and arrangement of words adds a layer of customization, enabling users to create aesthetically pleasing and meaningful designs. Whether utilized by educators to visualize key concepts, by businesses for marketing materials, or by individuals for creative projects, WordArt serves as a valuable tool for expressing ideas in a visually compelling manner. Its intuitive interface and diverse customization options make it accessible to users of all skill levels, making the process of transforming text into captivating visual representations both enjoyable and effective.

https://wordart.com/

ClassroomScreen

ClassroomScreen proves to be a versatile and user-friendly tool that has transformed the dynamics of classroom management and engagement. Serving as a digital Swiss Army knife for educators, ClassroomScreen consolidates a variety of essential features into a single, accessible interface. With customizable widgets for timers, noise level monitors, random name pickers, and virtual dice, among others, teachers can seamlessly organize and optimize their instructional time. The tool provides a visual and interactive element to maintain student focus and participation. The simplicity of ClassroomScreen's design ensures that teachers, regardless of their technological expertise, can effortlessly incorporate it into their daily routines. The platform fosters a dynamic and interactive classroom environment by allowing educators to adapt quickly to various teaching scenarios. Whether it's setting a countdown for an activity, managing noise levels, or randomly selecting students for participation, ClassroomScreen empowers teachers to enhance the structure and engagement within their classrooms. The collaborative features, such as the drawing and typing options, enable educators to illustrate

concepts, annotate ideas, and provide instant feedback. This digital whiteboard aspect of ClassroomScreen enhances the interactive and visual aspects of lessons. As education continues to evolve, ClassroomScreen stands as a testament to the effectiveness of streamlined tools in creating an efficient, engaging, and well-managed classroom experience for both educators and students alike. Its intuitive design and diverse functionalities make it an invaluable asset for educators seeking to leverage technology for enhanced classroom interaction and management.
https://classroomscreen.com/

Conclusion

In conclusion, the module on Information and Communication Technology (ICT) for Language and Social Science has provides a comprehensive exploration of the transformative impact technology can have on these disciplines. Through an in-depth examination of digital tools and platforms, educators and learners alike can gain insights into leveraging technology to enhance language skills, foster collaboration, and deepen understanding in social science contexts. The integration of ICT tools, ranging from language-learning platforms to interactive social science simulations, showcases the potential for innovative and engaging pedagogical approaches. As we navigate an increasingly digital and interconnected world, this module serves as a valuable guide, emphasizing the importance of adapting to technological advancements to enrich both language education and the study of social sciences. By embracing the possibilities offered by ICT, educators can inspire a new generation of digitally literate and socially conscious learners, equipped with the skills necessary to thrive in the dynamic landscape of language and social science studies.

स्कूल भूगोल शिक्षण में भू-स्थानिक प्रौद्योगिकी

- डॉ .एस .सेबू

सीखने का उद्देश्य

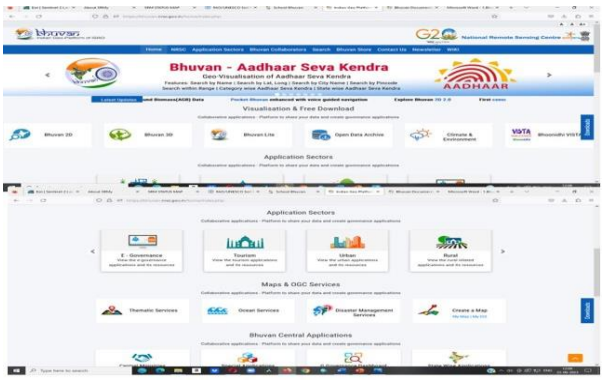
- प्रौद्योगिकी ज्ञान प्रदान करना
- विभिन्न भू-स्थानिक प्रौद्योगिकी ज्ञान का उपयोग करने के लिए
- शिक्षकों को शिक्षण-अधिगम प्रक्रिया में प्रौद्योगिकी को एकीकृत करने में सक्षम बनाना

भू-स्थानिक प्रौद्योगिकी आज कई क्षेत्रों में उपयोग की जाने वाली एक उभरती हुई तकनीक है। भू-स्थानिक प्रौद्योगिकी विभिन्न उच्च तकनीक प्रणालियों और उपकरणों के उपयोग का वर्णन करती है जो विभिन्न प्रकार के स्थान-आधारित डेटा का अधिग्रहण, विश्लेषण, प्रबंधन, भंडारण या कल्पना करते हैं। भू-स्थानिक प्रौद्योगिकी में भौगोलिक सूचना प्रणाली (जीआईएस), रिमोट सेंसिंग और ग्लोबल पोजिशनिंग सिस्टम (जीपीएस) शामिल हैं।

भू-स्थानिक प्रौद्योगिकी भूगोल शिक्षकों को अपने कक्षा शिक्षाशास्त्र में प्रौद्योगिकी को एकीकृत करने के लिए पर्याप्त अवसर प्रदान करती है।

भुवन क्या है?

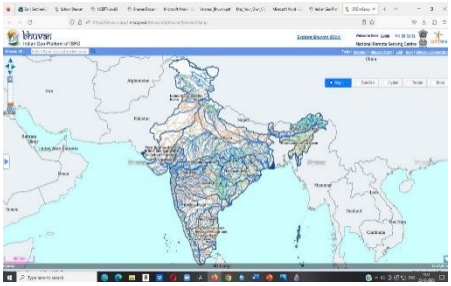
भुवन भारतीय अंतरिक्ष अनुसंधान संगठन (इसरो) का एक जियोपोर्टल प्लेटफॉर्म है, जिसे वर्तमान में **यूआरएल http://bhuvan.nrsc.gov.in** के माध्यम से होस्ट किया गया है, जिसमें व्यापक सेवाओं की मेजबानी की गई है, जिसमें मल्टी-डेट, मल्टी-प्लेटफॉर्म, मल्टी-सेंसर सैटेलाइट डेटा, विषयगत मानचित्र प्रदर्शन, क्वेरी और विश्लेषण, मुफ्त डेटा डाउनलोड और उत्पाद, वास्तविक समय आपदा सेवाओं, क्राउडसोर्सिंग के लिए ऐप और विविध भू-स्थानिक अनुप्रयोगों का विज़ुअलाइज़ेशन शामिल है। प्लेटफॉर्म इंटरैक्टिव उपयोग के लिए कई भाषाओं के उपयोग का भी समर्थन करता है। अंग्रेजी के अलावा, भुवन अब हिंदी, तमिल और तेलुगु में उपलब्ध है और सभी प्रमुख भारतीय भाषाओं में विस्तार करने की दिशा में काम कर रहा है। भुवन दैनिक आधार पर



नए अनुप्रयोग और सेवाएं प्रदान कर रहा है, जिसमें विशेष उत्पाद और अभिनव विज़ुअलाइज़ेशन क्षमताएं शामिल हैं।

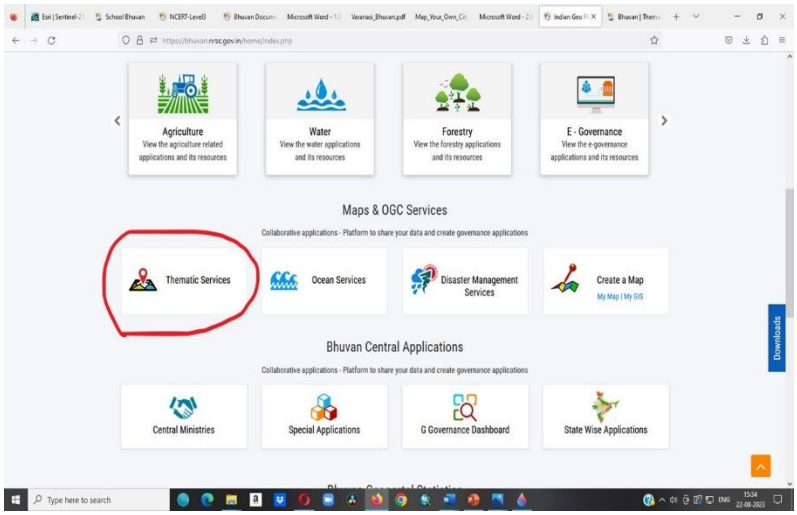
चलो भुवन से शुरू करते हैं।

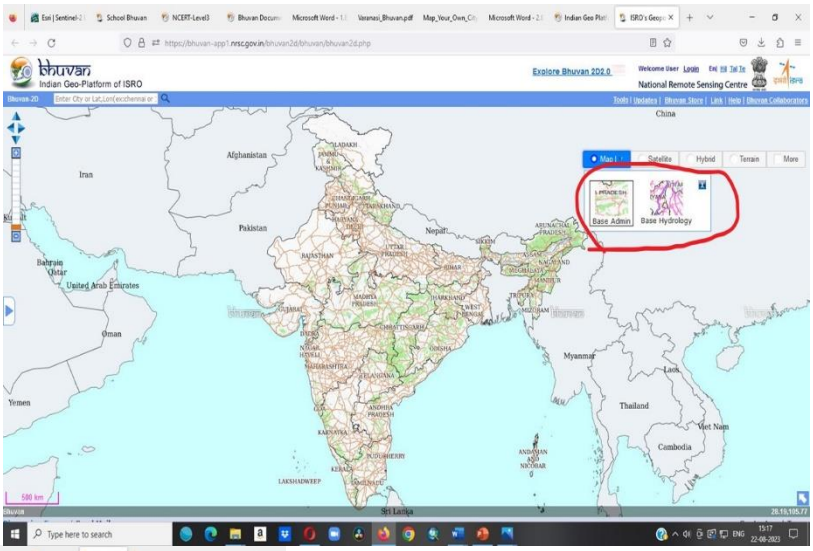
यदि आप "भारत: भौतिक पर्यावरण" पढ़ा रहे हैं, तो अपने छात्रों को दृश्य चित्र दिखाने के लिए भुवन 2 डी पर जाएं। भुवन 2 डी पर क्लिक करें। दाएं कोने में, आपके पास भाषा बदलने का विकल्प है।

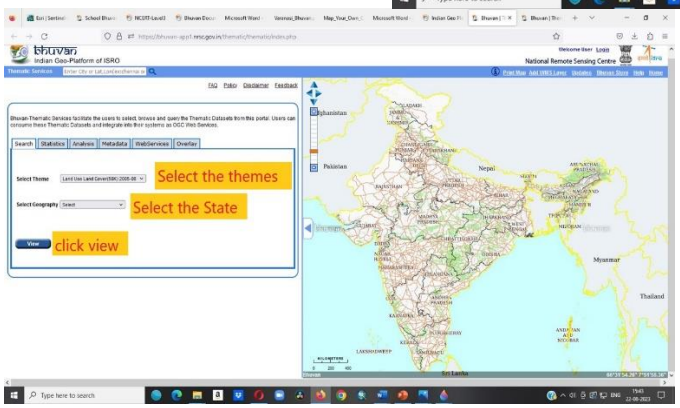


बेस हाइड्रोलॉजी पर क्लिक करने से भारत का ड्रेनेज सिस्टम दिखाई देगा। इसी तरह, कक्षा की आवश्यकता के अनुसार, शिक्षक अन्य विकल्पों जैसे उपग्रह, हाइब्रिड, इलाके और बहुत कुछ पर क्लिक कर सकते हैं।

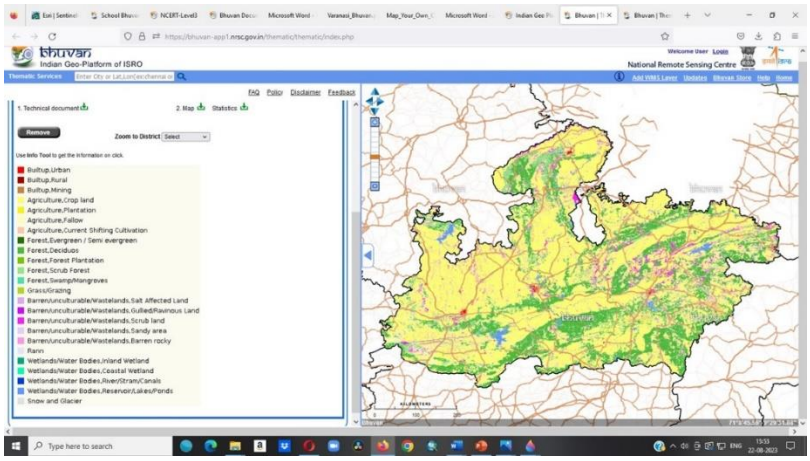
विषयगत सेवा उपयोगकर्ताओं को विषयगत डेटासेट जैसे लैंडयूज लैंड कवर, भूमि क्षरण, शहरी भूमि उपयोग आदि का चयन करने, ब्राउज़ करने और क्वेरी करने की सुविधा प्रदान करती है।

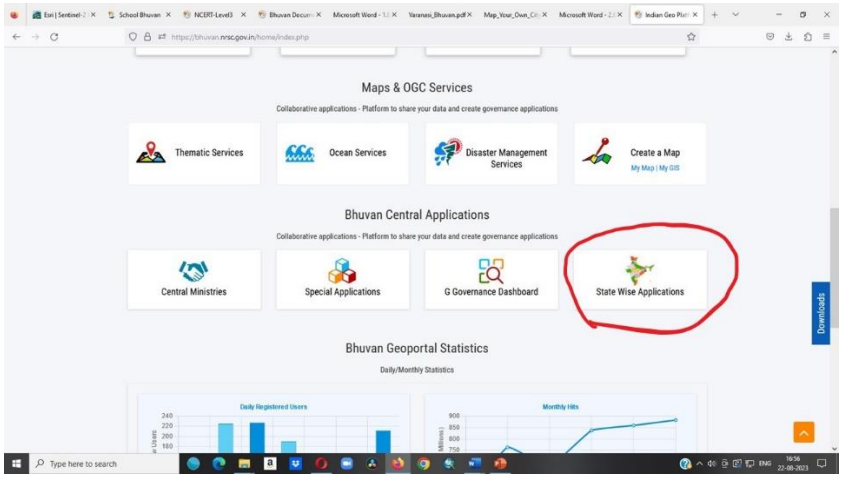




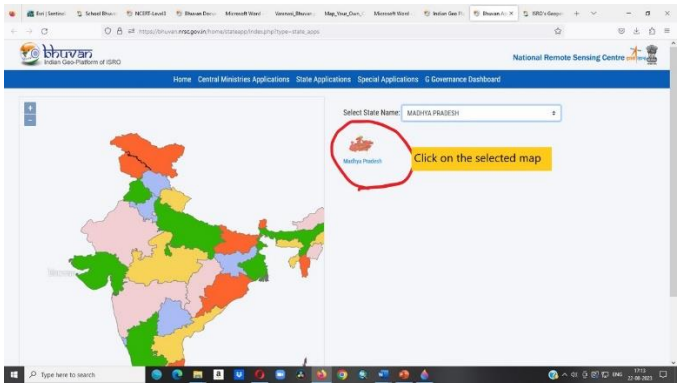


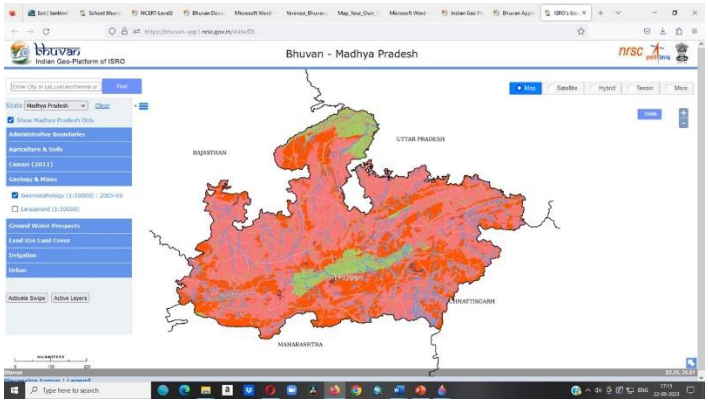
उदाहरण के लिए, यदि आप मध्य प्रदेश की भू-आकृति विज्ञान दिखाना चाहते हैं, तो राज्य का चयन करें।





कृषि और मिट्टी, भूविज्ञान और खान, भूजल की संभावनाएं, और भूमि उपयोग भूमि कवर डेटा देखने के लिए राज्यवार आवेदन पर क्लिक करें।



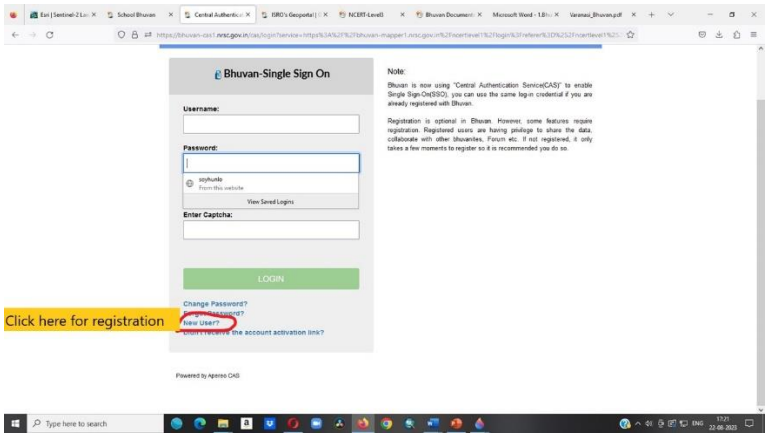


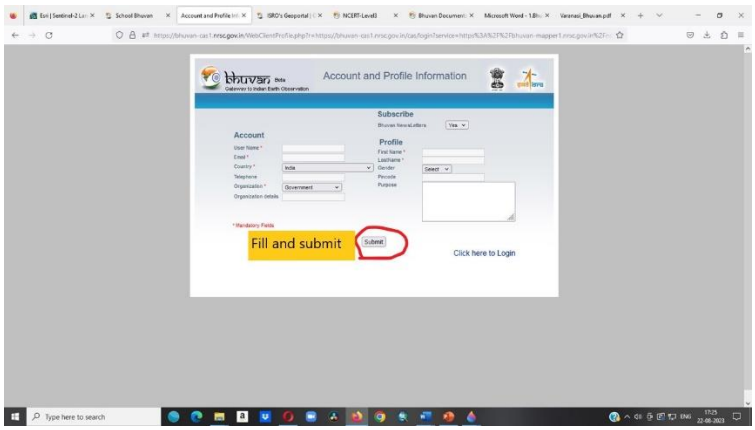
स्कूल भुवन

स्कूल भुवन पोर्टल देश के प्राकृतिक संसाधनों, पर्यावरण और सतत विकास में उनकी भूमिका के बारे में छात्रों के बीच जागरूकता लाने के लिए मानचित्र-आधारित शिक्षा प्रदान करता है।

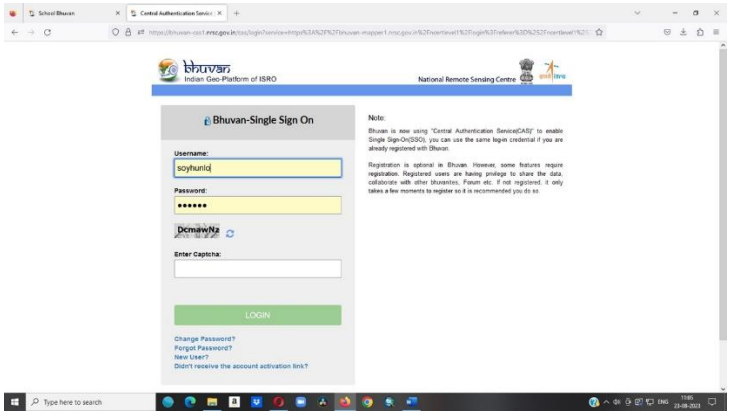
चलो स्कूल भुवन का पता लगाते हैं

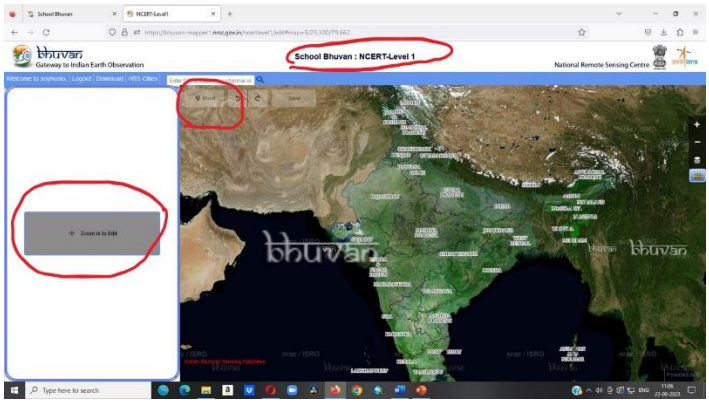
सबसे पहले, आपको पोर्टल में पंजीकरण करना होगा।

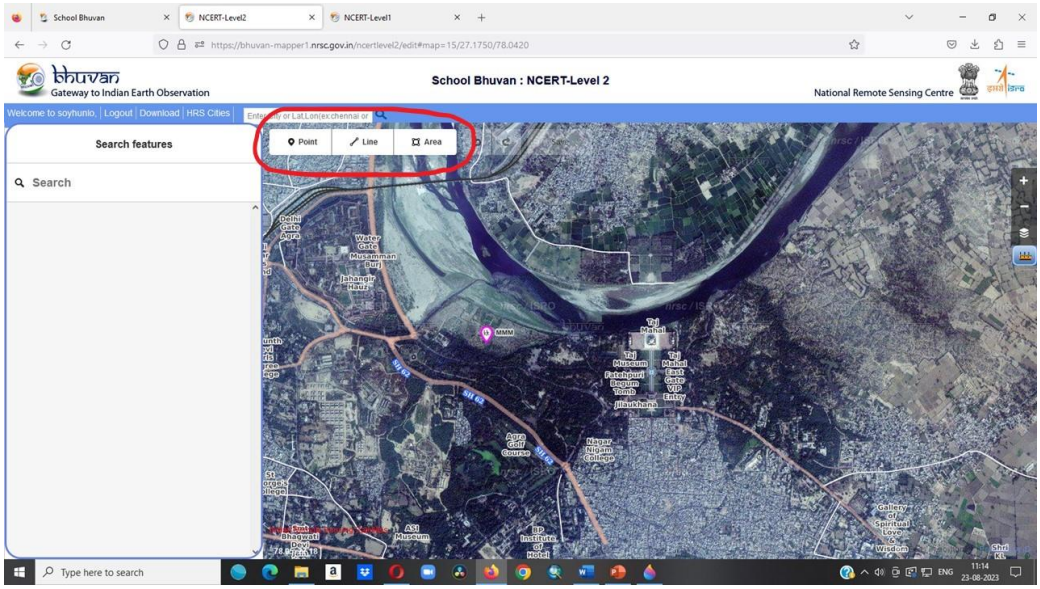


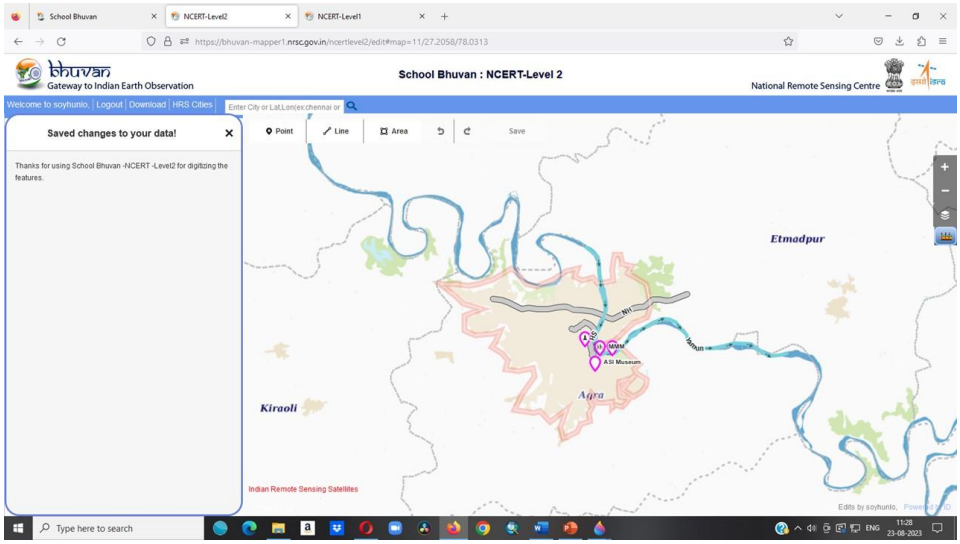


रजिस्टर होने के बाद आप लॉगिन कर सकते हैं।

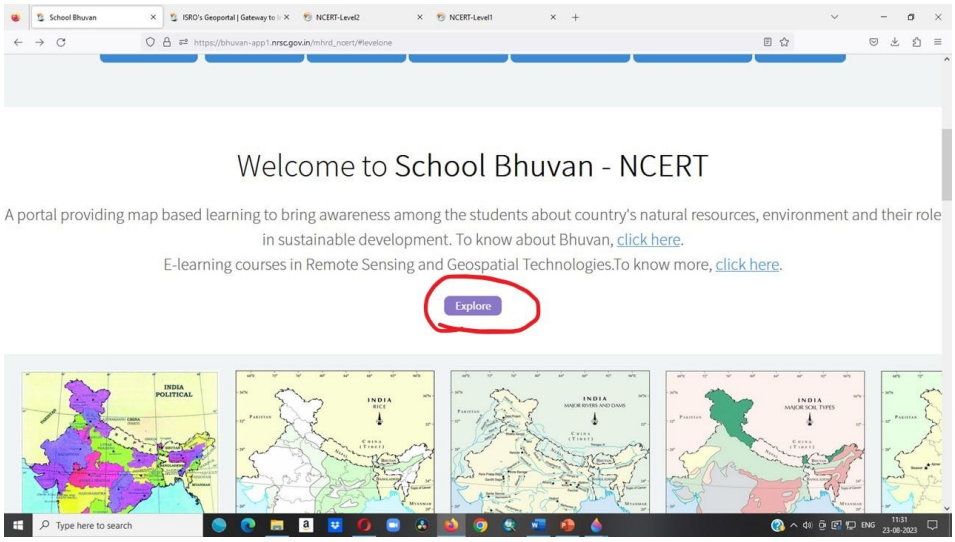




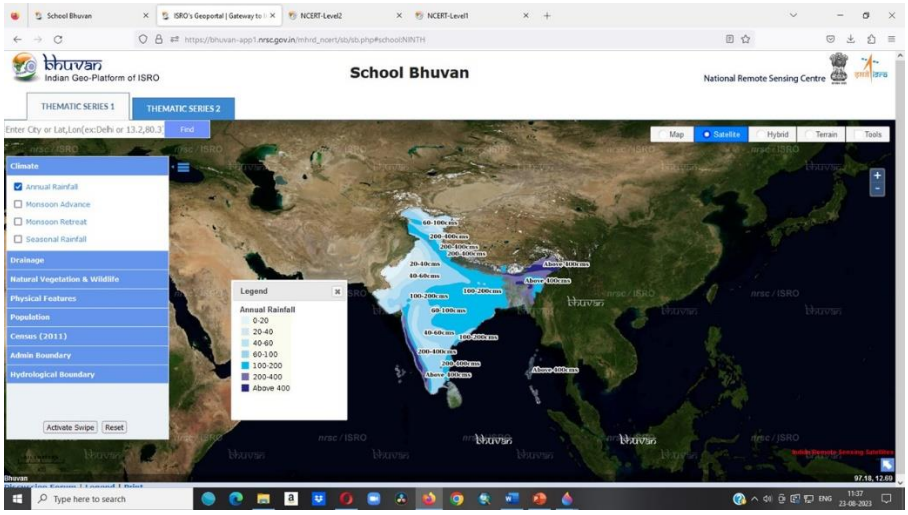




विषयगत 1 और विषयगत 2 का पता लगाने के लिए अन्वेषण पर क्लिक करें। विषयगत 1 जलवायु, जल निकासी, प्राकृतिक वनस्पति और वन्यजीव, भौतिक विशेषताओं, जनसंख्या, जनगणना (2011), प्रशासन सीमा, हाइड्रोलॉजिकल सीमा से संबंधित है। विषयगत 2 कृषि, पारंपरिक ऊर्जा स्रोत, उद्योग, खनिज, बिजली संयंत्रों, मिट्टी, परिवहन और जल संसाधन से संबंधित है।



उदाहरण आप जलवायु के तत्व दिखाना चाहते थे, जलवायु अनुभाग और वार्षिक वर्षा पर क्लिक करें। इसी तरह आप अन्य अनुभाग में एक ही चरण का पालन कर सकते हैं।



सीखने के परिणाम

i) प्रौद्योगिकी-एकीकृत शिक्षाशास्त्र हमेशा प्रकृति में दिलचस्प और इंटरैक्टिव है। यह शिक्षार्थियों को भौगोलिक संस्थाओं के स्थानिक वितरण को समझने में सक्षम बनाता है जो भौगोलिक पूछताछ और महत्वपूर्ण सोच को बढ़ावा देते हैंप्रौद्योगिकी-एकीकृत शिक्षाशास्त्र सूचना की एक विस्तृत श्रृंखला और अप-टू-डेट सांख्यिकी प्रदान करता है जो सूचना साक्षरता को बढ़ावा देता है।

ii) प्रौद्योगिकी-एकीकृत शिक्षाशास्त्र शिक्षार्थियों को लोगों और उनके सांस्कृतिक वातावरण को सीखने और समझने में सक्षम बनाता है जो सामाजिक कौशल को बढ़ावा देता है।

iii) प्रौद्योगिकी-एकीकृत शिक्षाशास्त्र शिक्षार्थियों को अपने निर्णय लेने के कौशल में सुधार करने में मदद करता है जो सहयोग कौशल और नेतृत्व कौशल को बढ़ावा देता है।

iv) प्रौद्योगिकी-एकीकृत शिक्षाशास्त्र शिक्षार्थियों को डिजिटल वातावरण को समझने में मदद करता है जो प्रौद्योगिकी साक्षरता को बढ़ावा देता है।

Video and Audio Editing Tools

- Ms. Urvashi Shrivastava & Mr. Ashok Shaky

About Audacity

Audacity is a free, open-source audio editor and recorder that can be used on several operating systems including Windows and MAC. The Audacity project was started nearly 20 years as part of a research project at Carnegie Mellon University. This tool developed by Mazzoni and Dannenberg was initially released as an open-source audio editor in May 2000.

Open-source software means that the source code is available for individuals to study, change, use, and distribute. Currently, the tool is distributed the terms of the GNU General Public License (GPL) and maintained by a team of global volunteers.

As a free software, you can install Audacity on any personal or work (with appropriate permissions) device for personal, commercial, or educational use. For other terms and conditions regarding the reselling and rebranding of Audacity, visit their site at https://www.audacityteam.org/about/license/.

Download Audacity

Currently, Audacity is only available as a 32-bit application that can be used on a 32-bit and 64-bit system. In order to use Audacity on your Windows, MAC, or GNU/Linux device, you must download the software. You also have the option of building Audacity yourself utilizing the source code.

Safe Downloading & Access Links

Prior to downloading the software, visit Audacity's safety when downloading page where you can access their checksum list for insuring that the download file is correct:

https://www.audacityteam.org/download/online-safety-when-downloading/

Click the following links adjacent to your operating system to download the software. Please note that GNU/Linux is source code for those advanced users desiring to build their Audacity, rather than simply download the software.

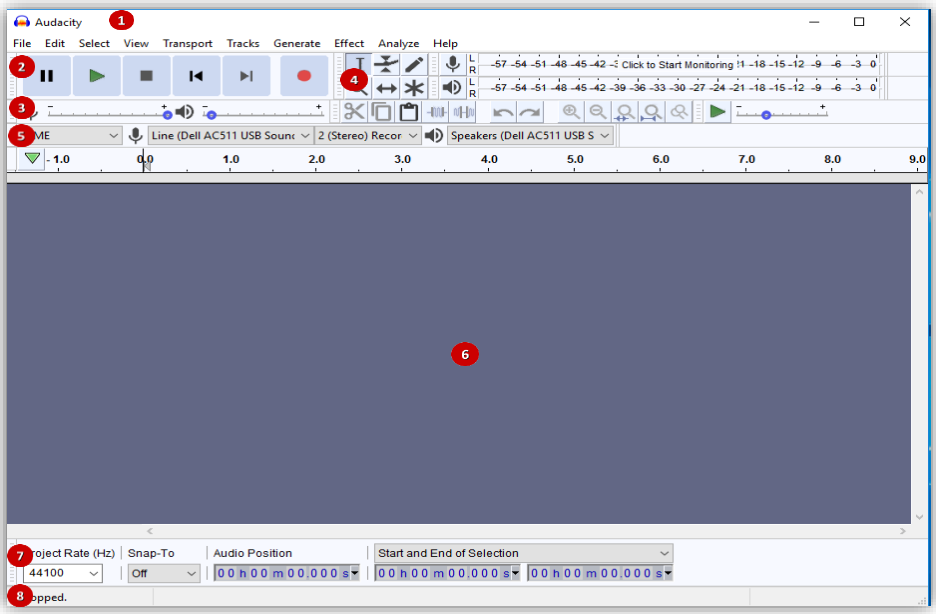
Audacity for **Windows**	https://www.audacityteam.org/download/windows/
Audacity for **MAC OS X/macOS**	https://www.audacityteam.org/download/mac/
Audacity for **GNU/Linux** (source code)	https://www.audacityteam.org/download/mac/

Navigating the Audacity Interface

Now that you've installed Audacity, you will want to familiarize yourself with the interface. Please read descriptions of the key components below.

Menu Bar: access to commands such as file upload, creating new audio, and processing audio.

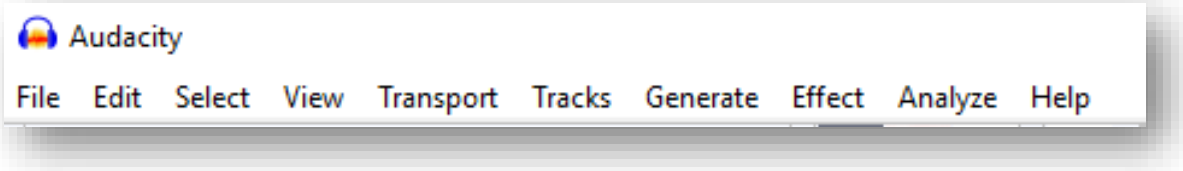
1. **Transport Toolbar:** buttons for controlling playback, recording, and moving projects.
2. **Mixer Toolbar:** can be used to adjust the volume for recording and playback.
3. **Tools Toolbar:** enables you to manage tasks such as zooming, time-shifting, and adjusting volume.
4. **Device Toolbar:** select your device for recording and playback.
5. **Track Display Area:** the project window, acts as a visual display area for audio tracks.
6. **Selection Toolbar:** use to control project rate and manipulate time.
7. **Status Bar:** displays message about recording/playback, indicates where mouse is hovering, shows hints.



Getting Started with Audacity- Audacity can be used to import and record audio files. This is a quick guide to the basic tasks of:

- Importing and recording audio
- Selecting audio to edit
- Editing your audio
- Saving your Audacity project
- Exporting your audio to MP3 or other audio file

Prior to performing these tasks, it is helpful to have an understanding of the menu bar commands in Audacity. The image below is the **menu bar** as it appears in Windows.



Command	What it provides…
File	Contains commands for creating, opening, importing, and exporting Audacity files
Edit	Basic editing commands: Undo, Delete, Duplicate, Paste
Select	Enables you to select specific parts of the audio track
View	Allows you to zoom in on track details and view track history

Transport	Commands include Play, Stop, Record, and Scrubbing
Tracks	Commands are for creating and removing, mixing, muting, aligning, sorting tracks
Generate	For audio creation using noise, silence, or tones-includes rhythm track, risset drum
Effect	Commands to apply effects to audio such as fade, reverse, bass, and echo
Analyze	Tools for finding out details in your audio including silence detection
Help	Commands to access Audacity manuals, screenshots, and diagnostic resources

Importing Audio

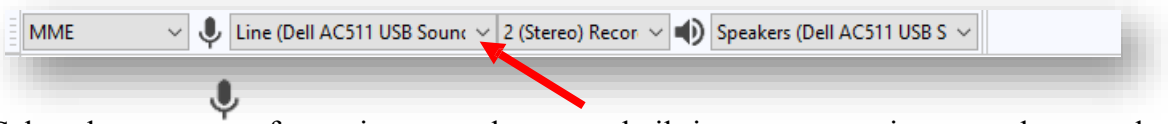
Import simply means adding new content to an Audacity project. Audacity can import and play a variety of audio formats including **AIFF, AU, FLAC, MP2, MP3, OGG Vorbis** and **WAV** in Windows, as well as **M4A** and **MOV** files from Apple devices.

To edit files **for a *new* project**, you can either drag the files into the project window or click **File** in the menu bar and choose **Open** to select your audio file.
If you want to add files to a ***current* project**, click **File** and choose **Import** and then select Audio type.

Recording Audio

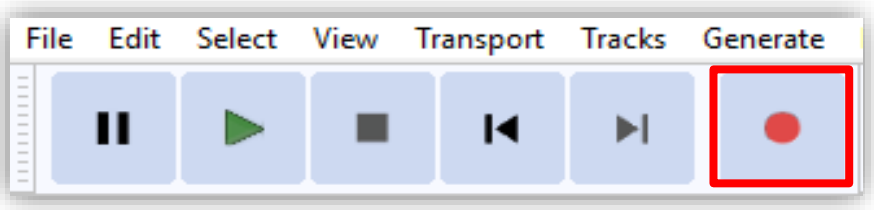
It is advisable that when recording with Audacity that you close all other applications. This can help minimize technical issues such as recording ticks. First, you will need to select your recording device.
Be mindful that bad audio can distract from the message that you are attempting to send. An external mic with noise cancellation is strongly suggested in order to enhance the quality of your recording.

First, select your device using the **Device Toolbar**.



1. Select the menu for options to select your built-in computer mic or another attached device which you will use for recording. Next to the mic options is the Recording Channels feature. Channel refers to the number of signals used by the microphone driver. If your device is mono, Select 1 (Mono). If the device is stereo, select 2 (Stereo). Refer to your mic property settings for more information if you are not sure which channel to select.

2. Next, use the playback menu to select your playback device. The playback device is not separate from the selected recording device and the appropriate device should appear by default. After selecting your device, you can monitor your voice level and adjust as needed. The playback sound can be adjusted using the right-hand slider on the Mixer Toolbar. Adjust the *recording* volume with the left slider.
3. Press the Record button in the Transport Toolbar to start recording.



When you are done recording, press the stop button.

Tip: Export the audio so that you have an original copy prior to editing. To do so, click File, then Export and Export Audio and select to WAV or AIFF.

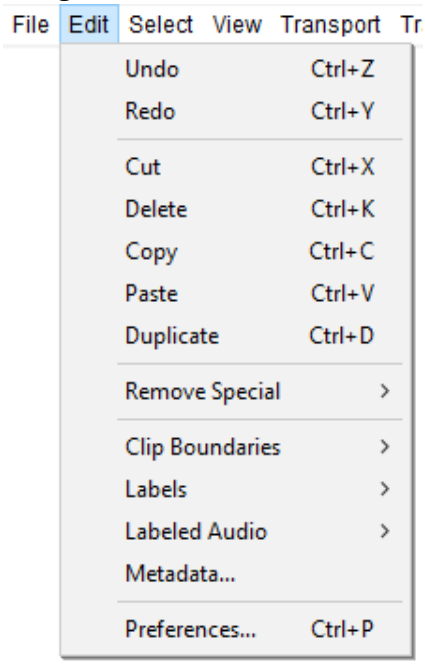
Selecting Audio to Edit

Using your **mouse to select** parts of the track to edit will facilitate smoother editing. First, make sure that **the Selection tool** from the Tools Toolbar is still highlighted blue (by default). If not, click the I in the toolbar. Then, use your mouse to left click anywhere inside the audience track to edit. A hand icon will appear, pointing to a vertical selection line. By dragging this line, you can **move the selection boundary** and pick a portion of the track. Release your mouse when done isolating your selection to start editing.

You can also select the entire track by using the Select command from the Transport Toolbar. Choose Select > All or the shortcut Ctrl + A.

Editing Your Audio

Editing actions that are commonly used can be found in the Edit menu. In addition to edits such as cutting and pasting you may want to add additional effects using the Effects menu.



To edit a file, select the region you want to edit by left-clicking in the track and then by dragging the shaded area. If you do not select a portion of the audio, Audacity will select *all* of the audio track displayed in the project window by default.

About common editing menu options

Undo-undoes the last editing operation you performed to your project

Redo-redoes editing operations that were undone; if you perform a new edit, you cannot redo operations that were undone

Cut-removes selected audio data and labels and copies them to the clipboard

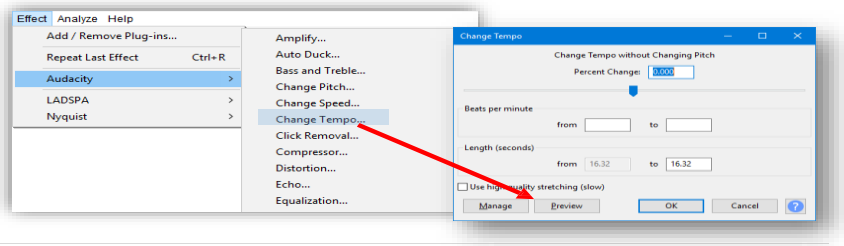
Delete-removes selected audio and labels without copying them to the clipboard

Copy-copies the audio data to the clipboard without removing it from project

Paste-pastes audio data which has been cut or copied to the clipboard; inserted at cursor point,

or replaces selection

Duplicate-creates a new track containing only the current selection as new clip



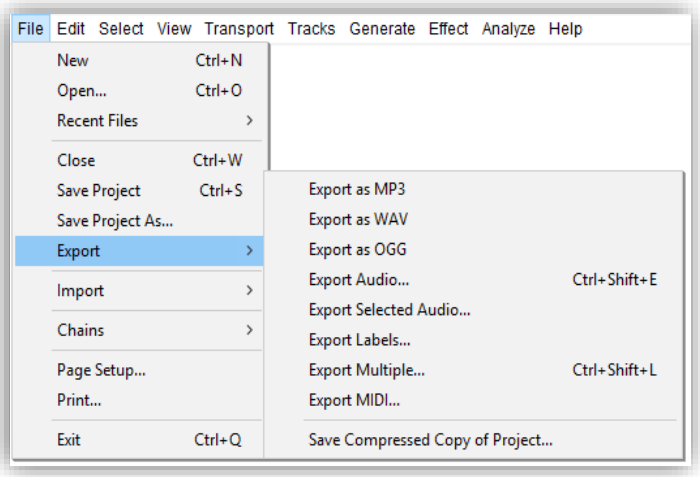
Choosing Effects

To apply effects, you will first need to left-click within the track to select the audio. Next, click the **Effects** menu and choose an effect. Lastly, set the parameters for the effect and select the Start Playback or Preview button to preview. When you are satisfied with the effect press OK to apply it to your audio.

Saving and Exporting Audacity Projects

Saving Your Audacity Project

To continue *editing* your audio file in Audacity with other tracks, you will need to save an Audacity Project. Click the File button on the Transport tool and select **Save Project**. The file will save as an .aup project file and a _data folder containing the actual audio.



This saves or updates the .aup file and _data folder. Saving a project lets you save unfinished work and reopen it later in Audacity exactly as it was and with all your edits and recorded tracks still in place.

Please note that .aup files cannot be opened by other programs and must be kept together in the folder as created by Audacity. Please do not rename or move files as you may not be able to reopen them in Audacity for further edits.

You can also select the **Save Project As** option for saving an empty project or for saving an existing project with a new name. According to Audacity developers, Save Project As is also the safe and *recommended* way to make a copy of a project with a new name or in a different location which can serve either as a single backup copy, or as one of several incremental copies of the project.

Exporting Your Audacity Project

To *share* your audio or to hear your audio in other applications, you will need to Export the files from Audacity. Available formats in Audacity include WAV and Ogg Vorbis.

One of the most commonly shared formats is MP3. However, in order to export as MP3s, you will need to have Lame MP# encoder installed on your device. In addition, for other formats including MP4, WMA, and AMR, you will need FFmpeg library.

Access guide for installing these tools at:
https://manual.audacityteam.org/man/faq_installation_and_plug_ins.html#lame
To export a file, select File and then Export and choose among these options:

- Export as Audio (MP3, WAV)-choose the file format you want to export in the dropdown menu
- Export Selected Audio-to export only selected audio
- Export Multiple-to export multiple files at the same time

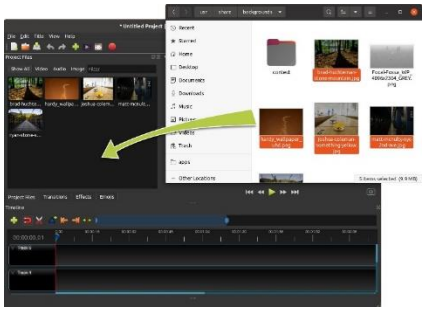
OpenShot Video Editor

OpenShot Video Editor is an award-winning, open-source video editor, available on Linux, Mac, Chrome OS, and Windows. OpenShot can create stunning videos, films, and animations with an easy-to-use interface and rich set of features.

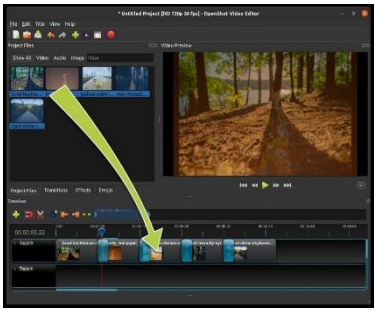
Basic Terminology

To help understand the steps below, here are some definitions of a few basic terms used in this tutorial.

Term	Description
Project	A **project** includes references to all the video files and edits (animations, titles, etc.), saved in a single file.
Timeline	The **timeline** is an editing user interface that represents edits and clips on a horizontal ruler. Time progresses from left to right.
Track	A separate **layer** on the timeline, which can hold clips. A timeline is made up of many tracks, stacked vertically.
Clip	A **trimmed** portion of video, audio, or both positioned on a track, and at a specific position in time. When files are dropped on the timeline, they are represented as a Clip.
Transition	A method to **blend** two images. Transitions can take many forms, including cuts, dissolves, and wipes.



Step 1 – Import Photos & Music

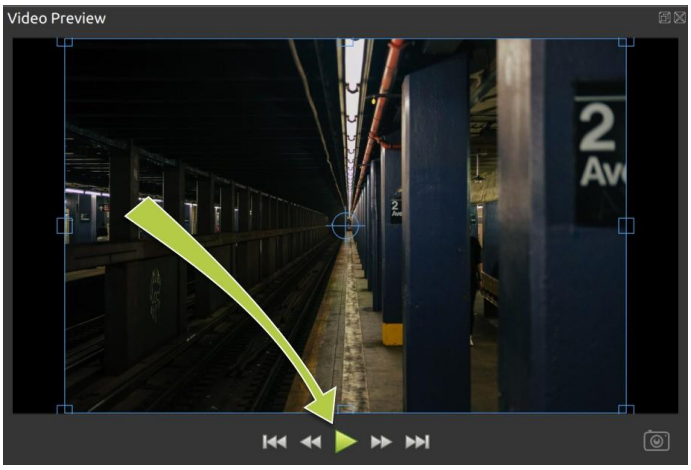


Before we can begin making a video, we need to import media files into OpenShot. Most video, image and music file formats will work. Drag and drop a few videos or images and a music file from your Desktop to OpenShot. Be sure to drop the files where the arrow in the illustration is pointing to.

Step 2 – Add Music to Timeline

Step 3 – Preview your Project

To preview what our video looks & sounds like, click the *Play* button under the preview window. You can also pause,rewind, and fast-forward your video project by clicking the corresponding buttons.



Step 4 – Export your Video

Once you are satisfied with your slideshow video, the next step is to export your video. This will convert your OpenShot project into a single video file, which will work on most media players (like VLC) or websites (like YouTube, Vimeo, etc.). Click the Export video icon at the top of the screen (or use the File menu> Export video). Choose one of the many preset export options and click the Export Video button.

How to Create and Analyse Google Forms

- Dr. Ganga Mahto

Introduction

Google Forms is a powerful and user-friendly tool that allows individuals and organizations to create online surveys and forms. Whether you're collecting feedback, conducting research, or organizing an event, Google Forms provides a versatile platform for gathering and analyzing data. In this comprehensive guide, we will explore the various features of Google Forms, step-by-step instructions on creating forms, customization options, and strategies for analyzing collected data. Additionally, we will include screenshots to provide visual guidance throughout the process.

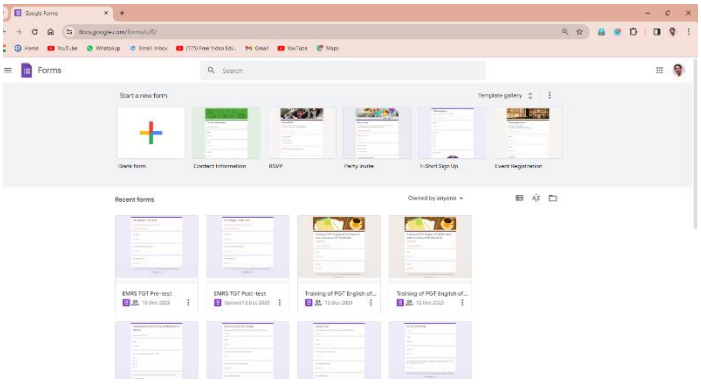
1.1 Overview of Google Forms

Google Forms is a free online survey tool developed by Google. It allows users to create customizable forms and surveys quickly. Users can design forms for various purposes, such as event registrations, customer feedback, academic research, and more. Google Forms automatically stores responses in a connected Google Sheets spreadsheet, making it easy to analyze and visualize collected data.

1.2 Accessing Google Forms

To access Google Forms, you need a Google account. Visit https://docs.google.com/forms/u/0/ and sign in with your Google credentials. If you don't have an account, you can create one for free.

1.3 Interface Overview



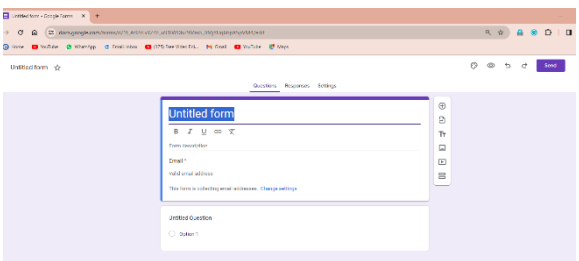
Upon accessing Google Forms, you'll encounter a clean and intuitive interface. The main components include the toolbar, form canvas, and form settings. The toolbar contains options to add questions, change the form theme, and preview the form. The form canvas is where you design your form, and the form settings allow you to configure various aspects such as form title, description, and more.

2. Creating a Basic Form

You may start creating the form by clicking the + tab which says “Blank form.”

2.1 Form Title and Description

When creating a form, start by giving it a descriptive title and, if needed, a brief description. The title should provide a clear indication of the form's purpose, and the description can offer additional context or instructions for respondents.



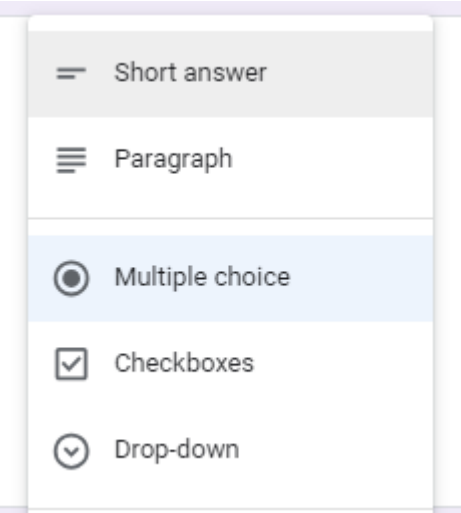
Click on the form title at the top, and a pop-up window will appear.

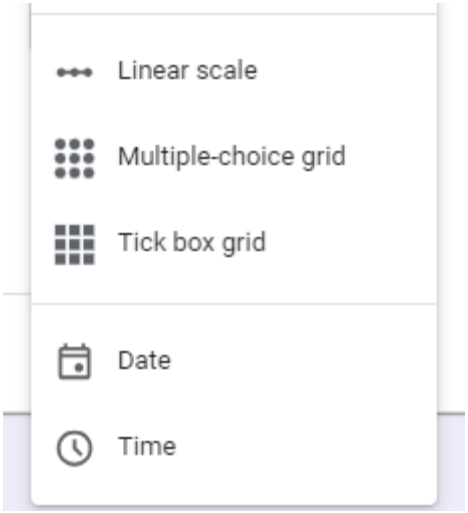
Enter the desired title and description.

Click "OK" to save your changes.

2.2 Adding Questions

To gather information, add questions to your form. Google Forms supports various question types, including multiple-choice, short answer, paragraph, and more.





Click on the "+" button in the toolbar.

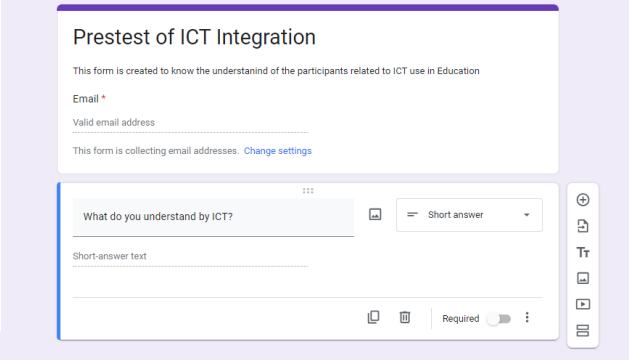
Select the question type from the options.

Enter the question text and customize options as needed.

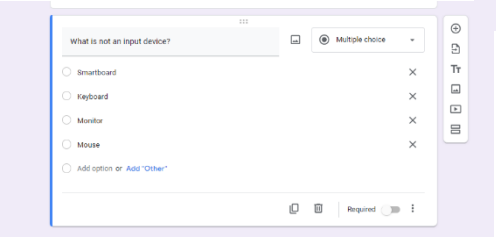
2.3 Types of Questions

Google Forms offers a variety of question types to suit different data collection needs. Some common question types include:

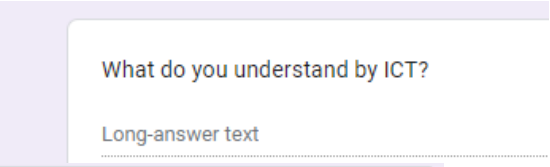
Short Answer



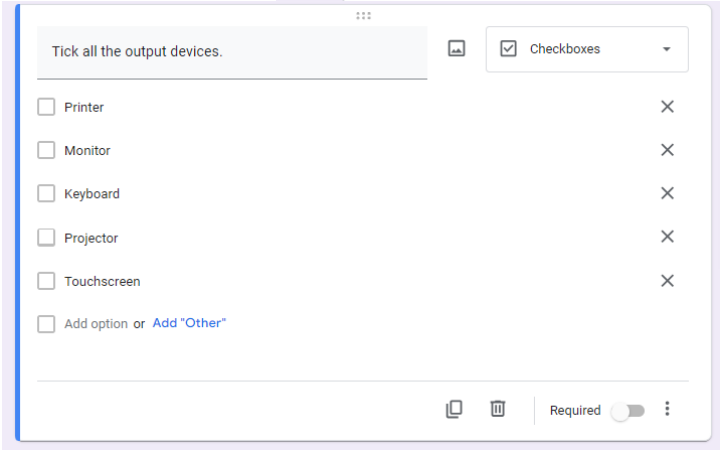
Multiple Choice



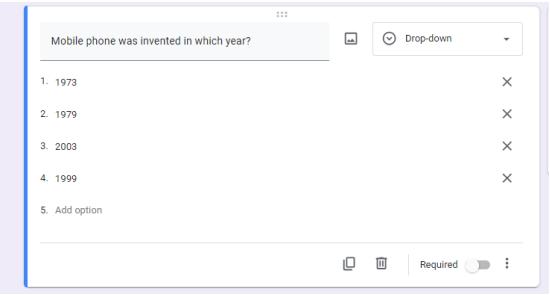
Paragraph



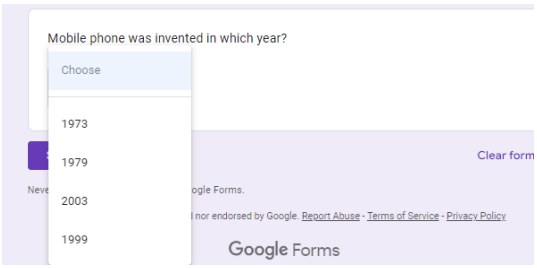
Checkbox



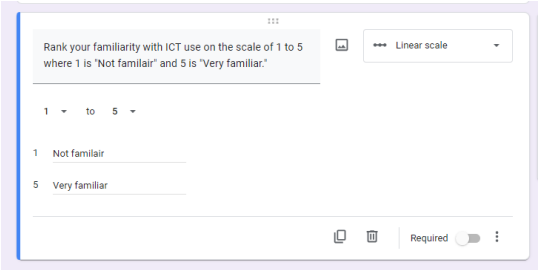
Dropdown



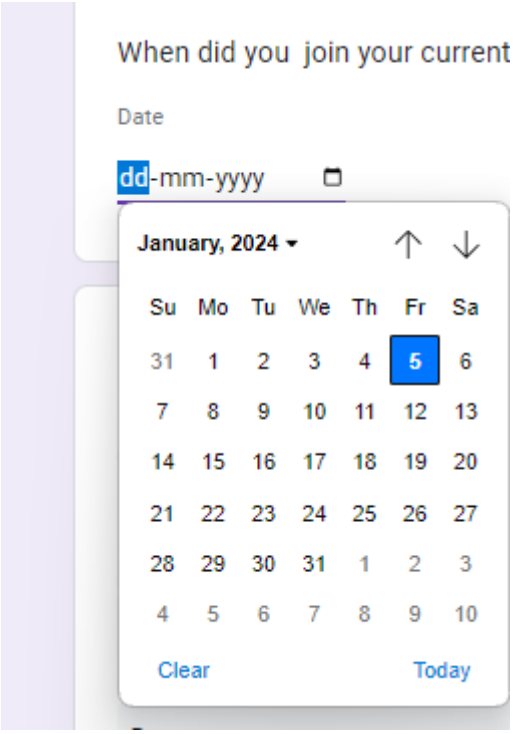
This is how the drop-down question will appear for the receivers.



Linear Scale

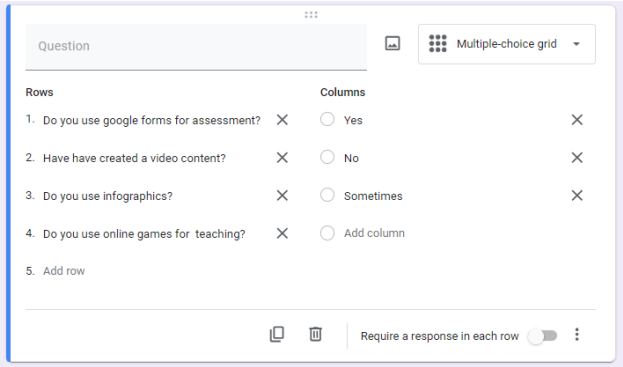


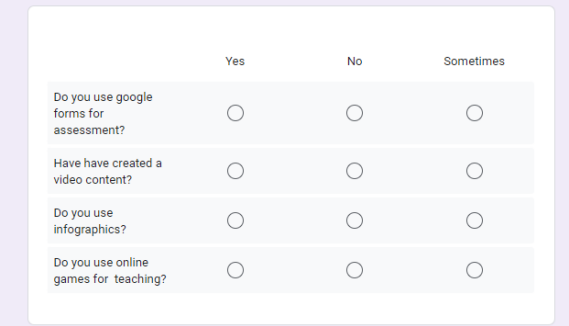
Date and Time



Multiple Choice Grid

This is how the multiple-choice grid question will appear for the receivers.

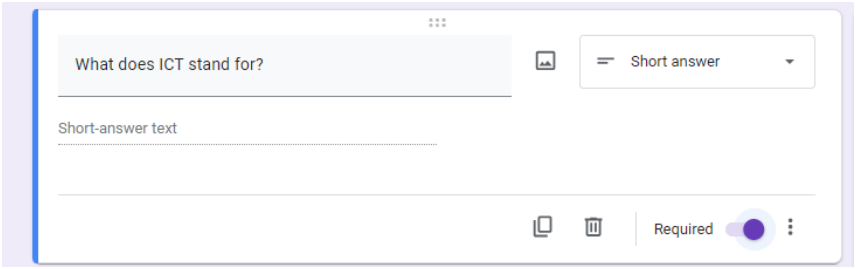




Experiment with these question types based on the type of information you want to collect.

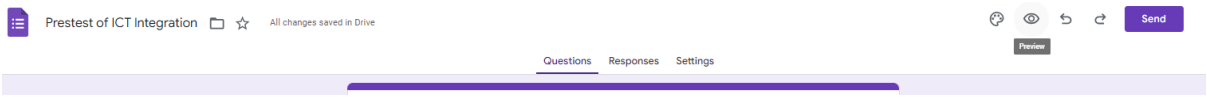
2.4 Required Questions

Designate questions as required to ensure respondents provide essential information. Toggle the "Required" switch when adding or editing a question.



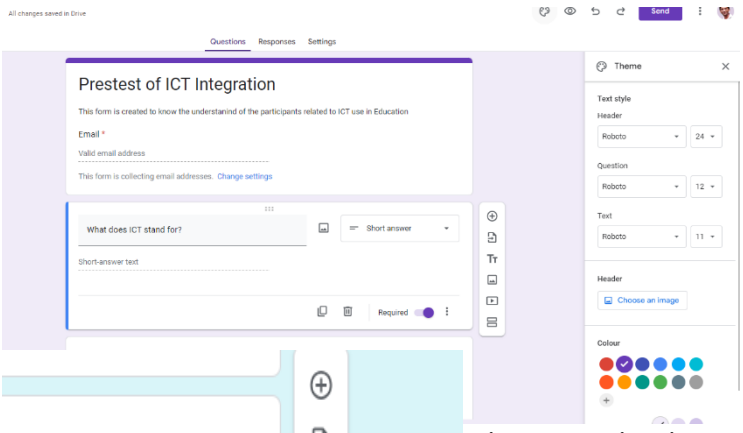
2.5 Previewing the Form

Before sharing the form, preview it to ensure everything appears as intended. Click on the eye icon in the toolbar to enter preview mode.



3. Advanced Form Customization

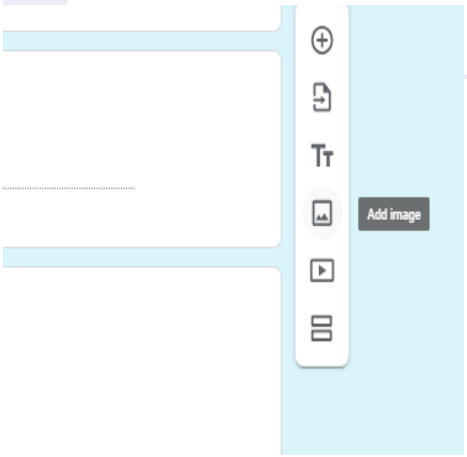
3.1 Theme Customization

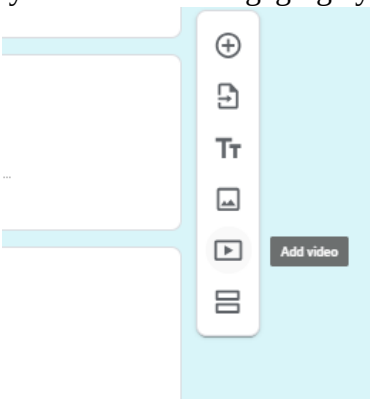


Enhance the visual appeal of your form by customizing its theme. Click on the palette icon in the toolbar to access theme options. Experiment with colors, fonts, and background images to create a personalized look.

3.2 Adding Images and Videos

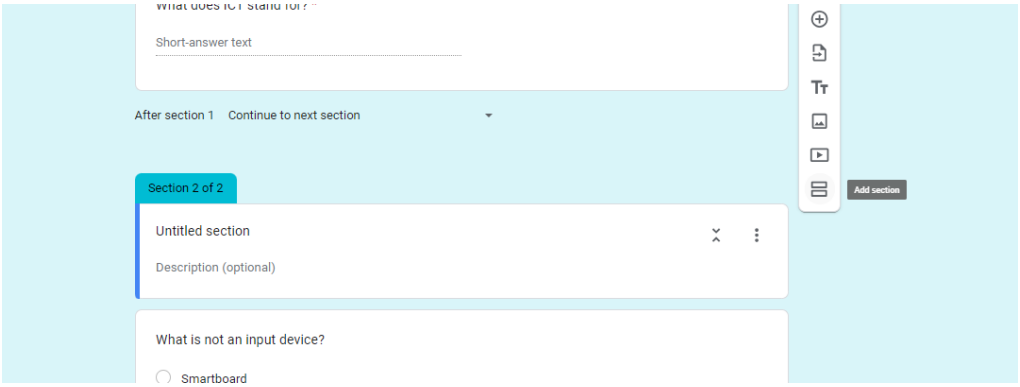
Make your form more engaging by incorporating images and videos. Use the image and video icons in the toolbar to upload media from your computer or link to online content.





3.3 Section Breaks

Organize your form into sections for a more structured experience. Add section breaks to group related questions together and provide context to respondents.

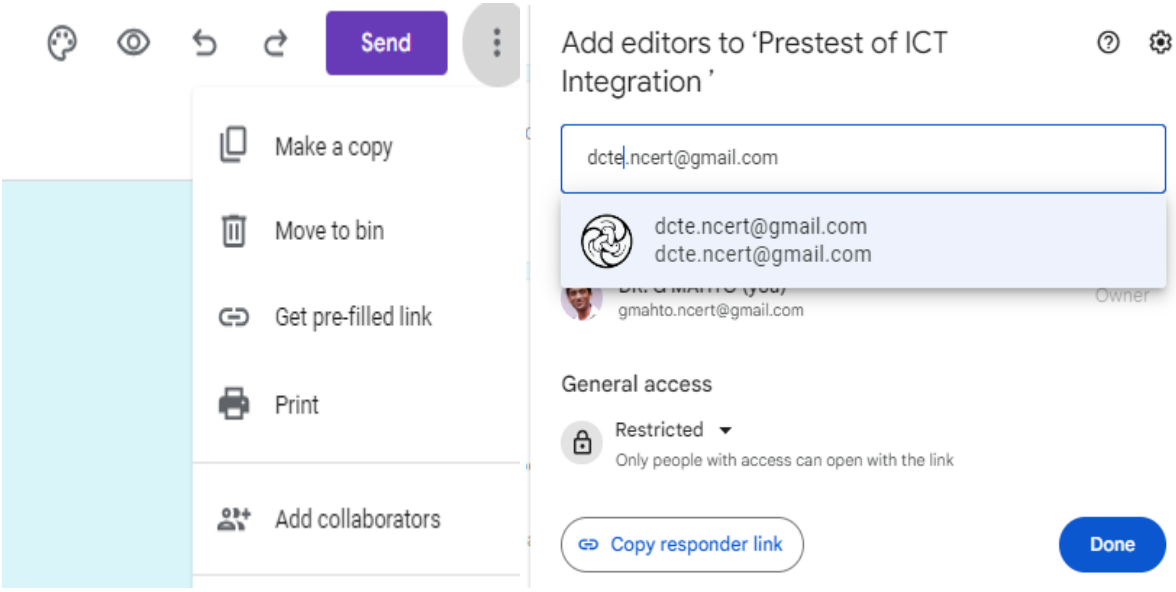


For longer forms, consider breaking them into multiple pages. Use the page break option to create a seamless navigation experience for respondents.

4. Collaboration and Sharing

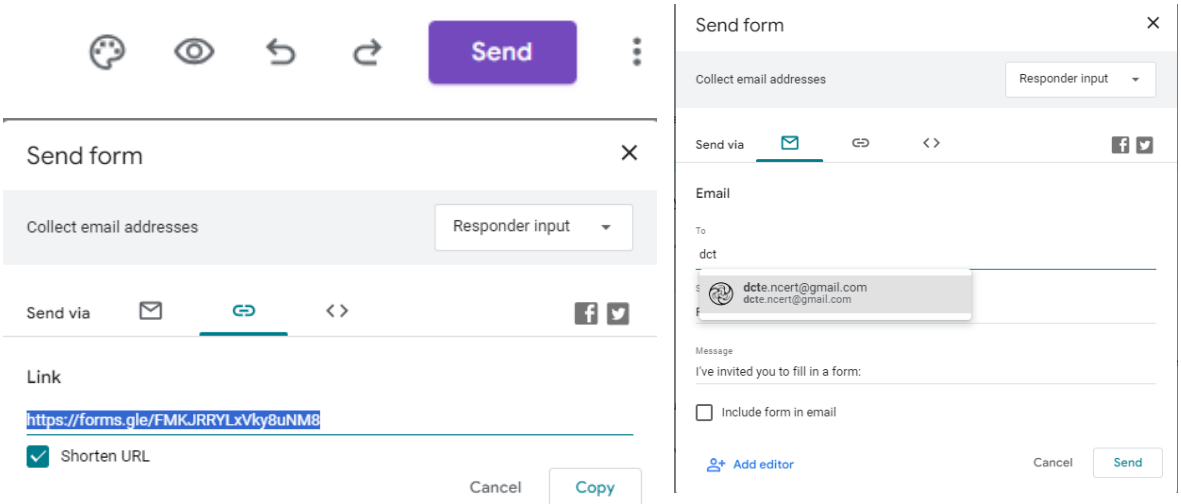
4.1 Collaborative Editing

Google Forms supports real-time collaborative editing, allowing multiple users to work on a form simultaneously. Share the form with collaborators and see edits in real-time.

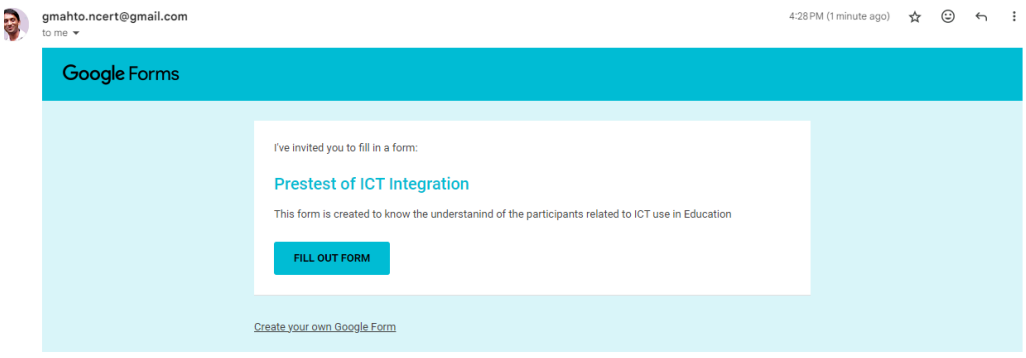


4.2 Sharing Options

Once your form is ready, share it with respondents. Click on the "Send" button in the top-right corner to access various sharing options, including email, link, and social media.

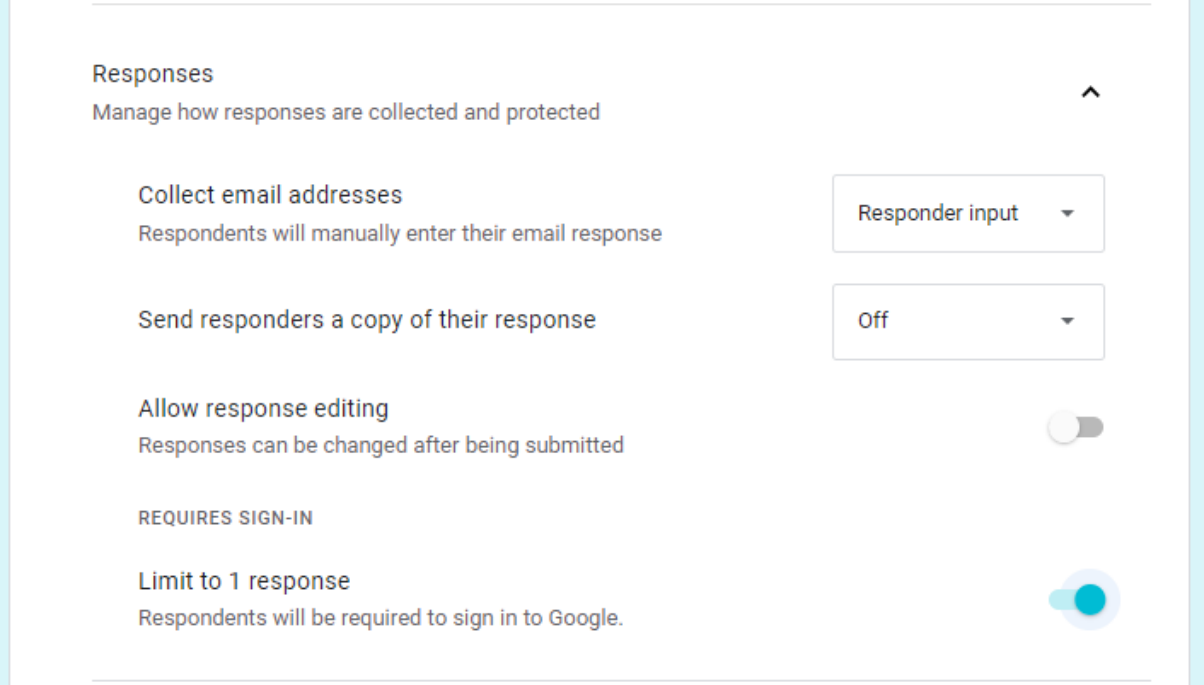


This is how the received forms will appear to the receivers.



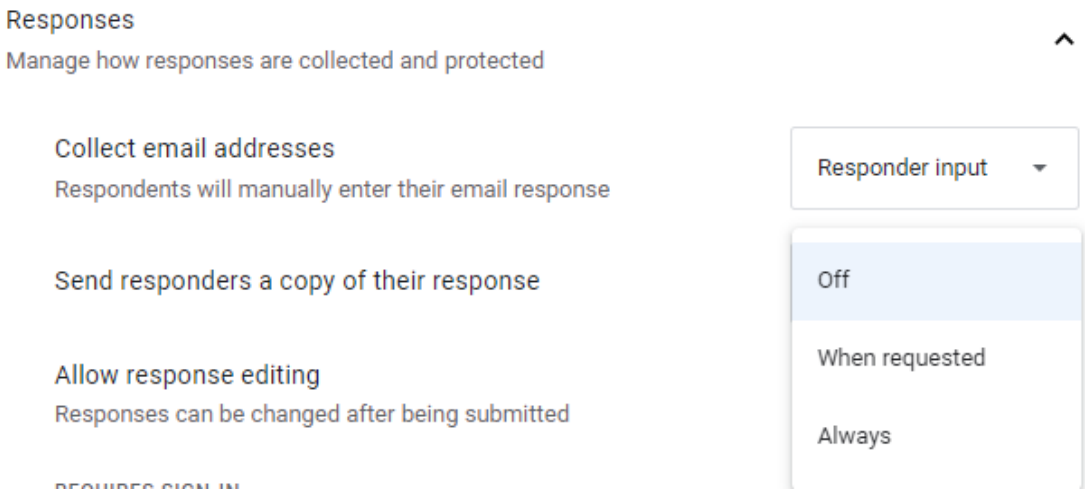
4.3 Collecting Responses

Choose how respondents submit their answers. Google Forms supports online responses, email collection, and even allows you to limit responses to one per person.



4.4 Response Notifications

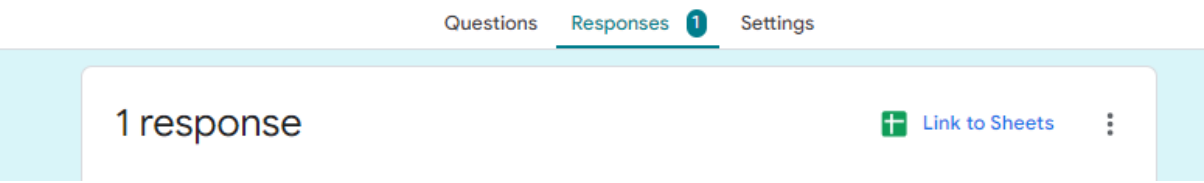
Receive email notifications whenever someone submits a response. Enable response notifications in the form settings to stay informed about new submissions.



5. Data Analysis and Reporting

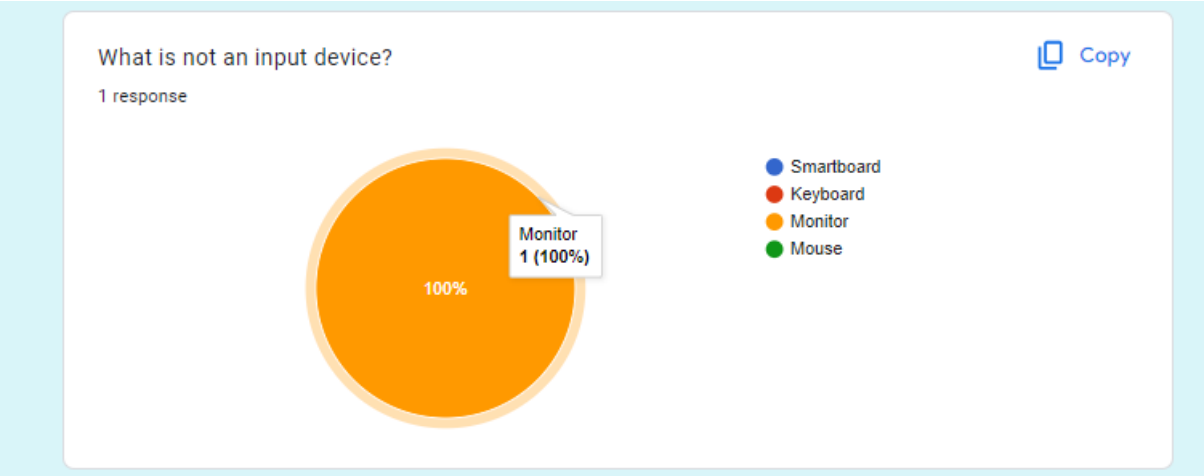
5.1 Viewing Responses

Access responses directly within Google Forms. Click on the "Responses" tab to view a summary of collected data.



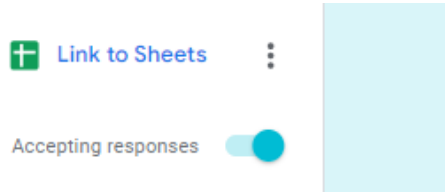
5.2 Summary of Responses

Review a summary of responses, including charts and graphs for visual analysis. Google Forms automatically generates visualizations to help you interpret the data.



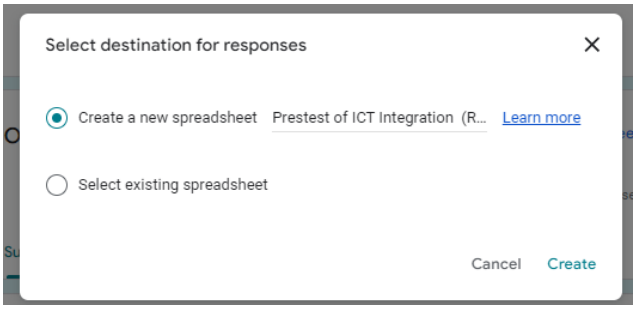
5.3 Downloading Responses

For more in-depth analysis, download responses as a spreadsheet. Click on the Sheets icon to create a linked Google Sheets document or download responses as a CSV file.



5.4 Integrating with Google Sheets

Leverage the power of Google Sheets for advanced data manipulation and visualization. The linked spreadsheet updates in real-time as new responses come in.



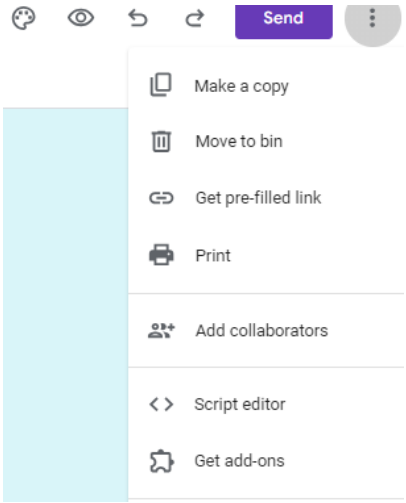
6. Advanced Features and Add-ons

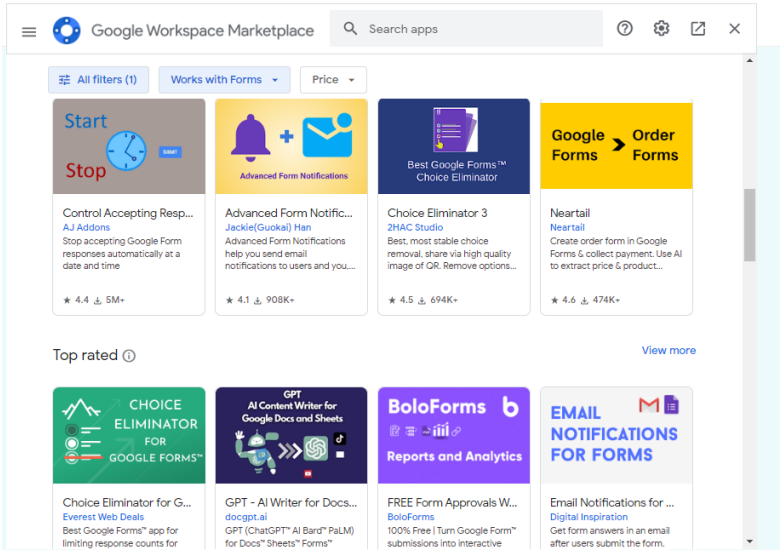
6.1 Add-ons Overview

Extend the functionality of Google Forms with add-ons. Add-ons are third-party tools that enhance form capabilities, such as advanced question types, data validation, and more.

6.2 Popular Google Forms Add-ons

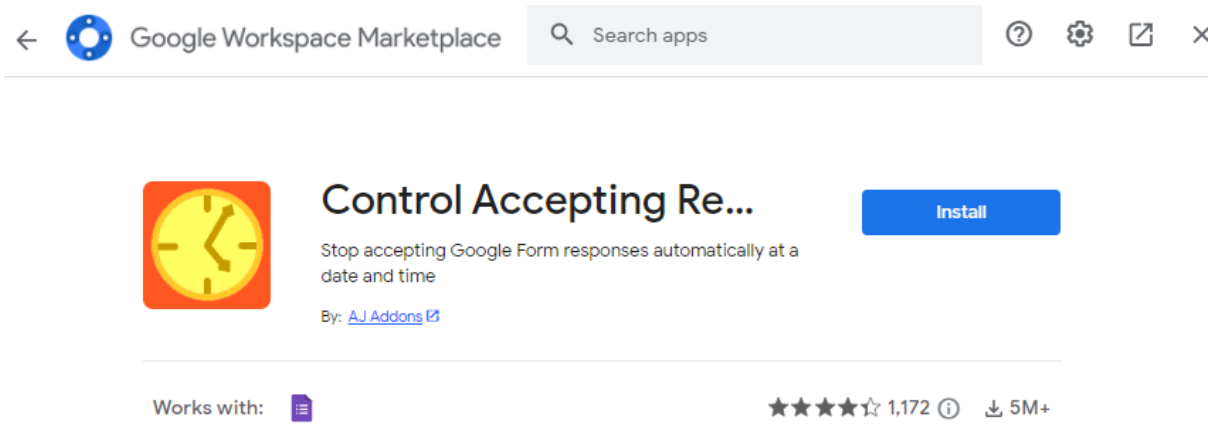
Explore popular add-ons like Form Publisher, FormLimiter, and Choice Eliminator. These add-ons offer advanced features such as document merging, response limiting, and dynamic answer choices.





6.3 Installing and Managing Add-ons

Learn how to install add-ons from the Google Workspace Marketplace. Access the "Add-ons" menu in Google Forms to manage installed add-ons and explore new ones.



7. Best Practices and Tips

7.1 Designing Effective Forms

Follow best practices for designing effective forms. Use clear and concise language, organize questions logically, and consider the respondent's experience throughout the survey.

7.2 Ensuring Accessibility

Create forms that are accessible to a wide audience. Utilize accessible design principles, such as providing alternative text for images and ensuring keyboard navigation.

7.3 Data Security and Privacy

Prioritize data security and privacy. Google Forms adheres to Google's robust security measures, but it's essential to be mindful of the information collected and how it's used.

7.4 Tips for Analyzing Data

Implement effective strategies for analyzing collected data. Use filters and pivot tables in Google Sheets to uncover trends and insights hidden within the responses.

8.2 Additional Resources and Support

You may watch the following videos for review and more information

English: https://www.youtube.com/watch?v=BtoOHhA3aPQ

Hindi: https://www.youtube.com/watch?v=bPGyesmwNQ0

Conclusion

Google Forms is a versatile and accessible tool for creating online surveys and forms. This comprehensive guide has covered the basics of creating a form, advanced customization options, collaboration and sharing features, data analysis techniques, and tips for optimizing the form creation process. By following this guide, users can harness the full potential of Google Forms to collect and analyze data effectively. Whether you're a student, researcher, or professional, Google Forms provides a user-friendly platform for gathering valuable insights from your audience.

References

https://docs.google.com/forms

Online Assessment Tools

- Ms. Swati Yadav

An online assessment may be defined as an evaluation of a person's abilities, behaviours and/or characteristics. This test is conducted over the Internet by using available web technologies.

An assessment may set out with clear objectives such as:

- To test the knowledge or learning of a candidate.
- To select suitable candidates from a huge pool of applicants.
- To identify the strengths and weaknesses of the test taker.
- To identify specific personality and character traits.
- To provide clues in career counseling and identify the suitable training, job or career for the test taker.

Online assessments are becoming quite popular and are being used quite extensively in various sectors including education, government and corporate companies.

Why choose Online Assessment over Traditional Assessment?

An online assessment gives you the advantage of speed and accuracy when compared with a traditional assessment method. The robust online tools eliminate any chances of malpractice and guarantee a positive evaluation.

Many institutions are relying on the online assessment for various reasons that are as follows:

- Online assessment saves lots of time and money.
- Ensures consistency in the exam session.
- It is accurate and secure.

Online Assessment in Education

The educational sector has been able to streamline their examination processes with online assessments, be it tests preparation, campus recruitment, entrance exams, or semester exams.

How can Online Assessment be helpful for students?

Online assessment helps students in a plenty of ways from improvement in learning skills to enhance students engagement. These assessments are carried out using an online assessment platform that makes the assessment conducting process incredibly simpler and productive. Here are a few benefits of online assessment, which is helpful for students that are as follows:

- Students can give exams on any device.
- It is quick to mark answers
- It offers quick feedback
- Offers friendly environment
- Students can give exams from anywhere and anytime.

As the field of education has moved more toward relying on education technology (or EdTech), institutions have encouraged teachers to increase their use of technology in the classroom.

What Online Assessment Tools can do?

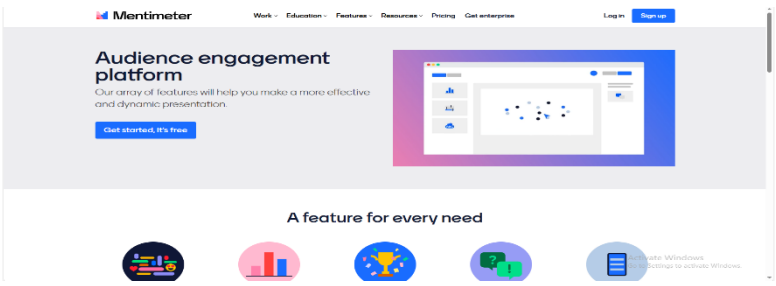
Teachers can use them to test students, gauge performance, organize unique activities, and encourage discussion. Here are some other ways to use these tools:

- Assign and grade homework.
- Conduct interviews (either with students or as an activity to assign students).
- Assess oral reports.
- Assess long-form writing assignments (term papers, essays, free writing).
- Record instructor observations.
- Distribute classroom surveys.
- Create and map curricula.
- Develop rubrics and conduct qualitative student assessments.
- Conduct focus groups.
- Create and evaluate student portfolios.

Some Online Assessment Tools

1. Kahoot	5. Google Forms	9. ProProfs	13. Plickers
2. Mentimeter	6. Pear Deck	10.Coggle	14. ClassMarker
3. Socrative	7. Rubistar	11. Edulastic	15. Quizalize
4. Quizlet	8. EDpuzzle	12. Padlet	16. Gimkit

1. Mentimeter



Mentimeter is great for gauging the understanding of the whole class and targeting outliers during formative assessment. It's also a valuable tool for tapping into the affective side of learning, including student motivation. "Mentimeter allows everyone to ask questions, to get clarification or a clearer understanding on subjects resulting in a more fulfilling learning experience."

2. Pear Deck

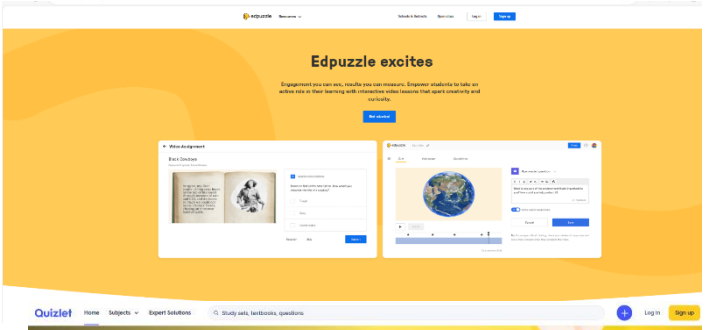
Pear Deck is a formative assessment tool that is a way to spruce up your existing slideshows and lectures. It's an extension for Google Slides that incorporates questions and activities into presentation material so that formative assessment doesn't have to slow down during a lecture.

3. Kahoot

This is the "fun one," with bright colors and music. There are countless existing quizzes and games on Kahoot already, so you can probably find something to meet your needs without starting from scratch.

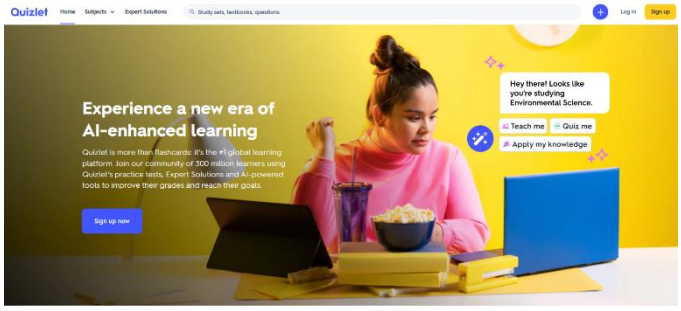
4. Edpuzzle

Edpuzzle is a tool that is perfect for assessment in a flipped-classroom setting or for video-based homework. You can assign a video (either your own or from the web) and offer questions and tips while the video is playing. The result is an interactive experience for the student and a clear understanding of students' knowledge and mastery for the teacher.



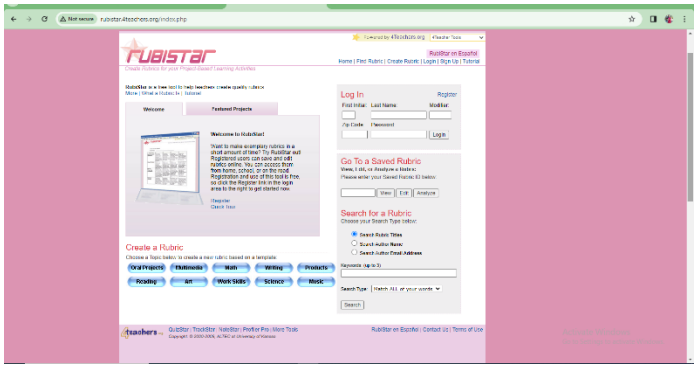
5. Quizlet

Quizlet is a tool based on the flashcard design, with 1-to-1 words and definitions to help students memorize essential info. Plus, it has many different ways to drill the material, including in-class competitions and games. There are many existing sets, so you probably won't have to start from scratch when building the vocab lists.



6. Rubistar

Rubistar is a simple online rubric generator where students and teachers can either choose from pre-made rubrics or design their own. You can create a rubric without creating an account, or sign up for easier access to all the content.



KAHOOT

First, what is Kahoot? Kahoot is a game-based learning platform used by millions of people around the world every day to discover, create, play and share learning games. It makes learning fun and engaging for students and teachers, businesses, families and friends.

At school, Kahoot can be used for any subject, any age, and with any device - students don't even need to register for an account. You can use Kahoot both when teaching in class, for distance learning and in a blended learning format. Millions of teachers use Kahoot to…

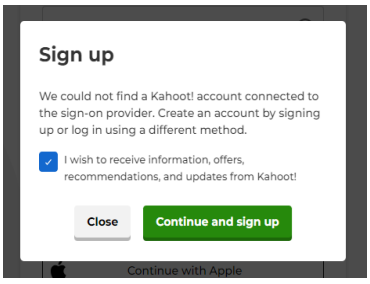
- Introduce new topics
- Review content at class and home
- Engage students via distance learning
- Run formative assessment

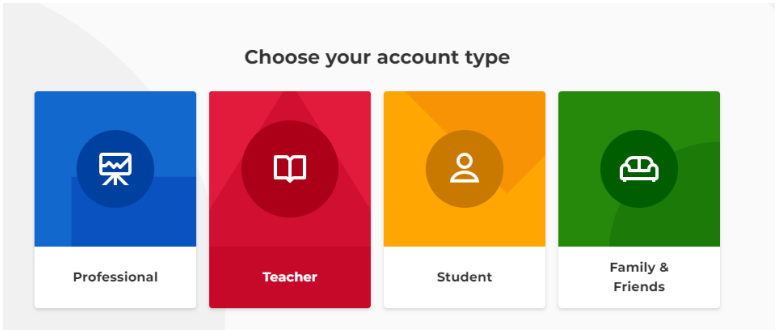
- Teach interactive lessons
- Break the ice and reward the class
- Collect student opinions
- Foster creativity and teamwork
- Engage colleagues with professional development

How to create a Kahoot account?

To get started with Kahoot as a teacher, you need to register for an account. Note that students don't need accounts in order to play kahoots.

1. Go to kahoot.com and click Sign up.
2. Choose Teacher as your account type.
3. Specify whether you work in a school, a higher education institution, or in school administration.
4. If you'd like to sign up with an email, type your email address and a secure password you'd like to use. Alternatively, you can sign up with your existing Google, Microsoft or Apple accounts and use those credentials to log in to Kahoot later.
5. Choose a plan: you can use Kahoot for free, or upgrade to one of our premium plans to unlock additional features. You can decide to upgrade at any time!
6. Fill out some additional information in the welcome screen so we can better customize the Kahoot experience for you.
7. Voila, you're a registered Kahoot user! Shortly, you'll receive a welcome email with some tips to get started.

1. 

2. 

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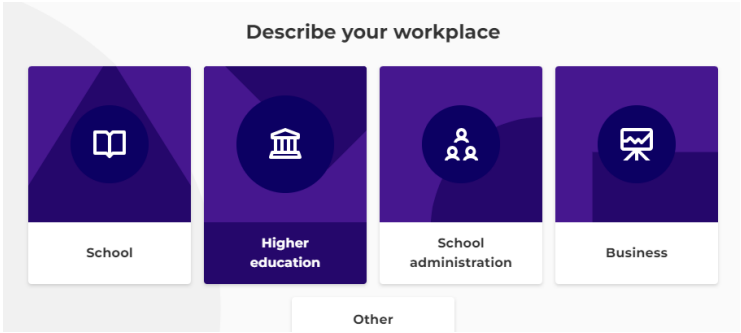

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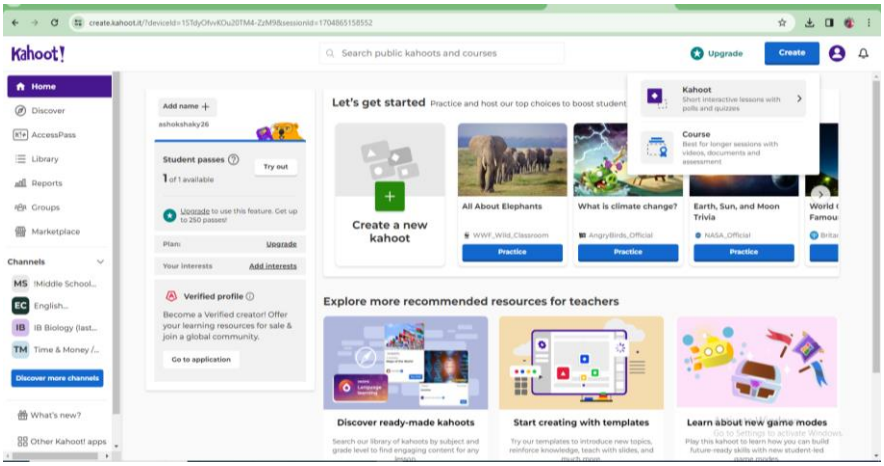


How to host a kahoot live in class?

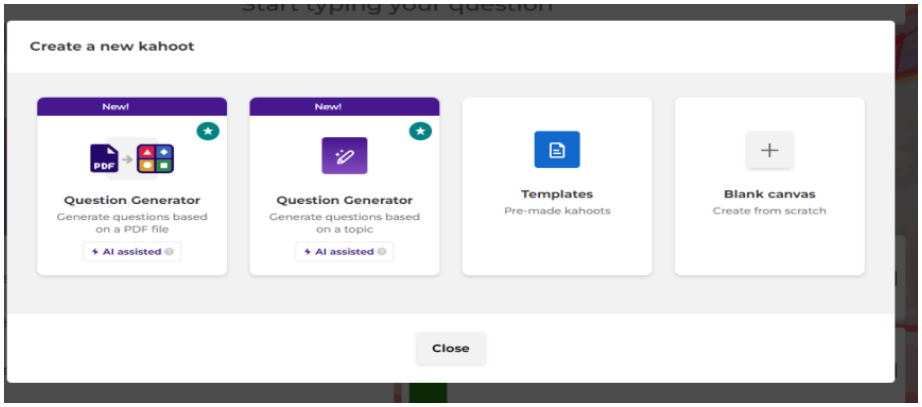
When playing live in class, kahoots are displayed on a shared screen everyone in the classroom can see. Students join in and answer using their own device with an internet connection - for example, a tablet or computer.

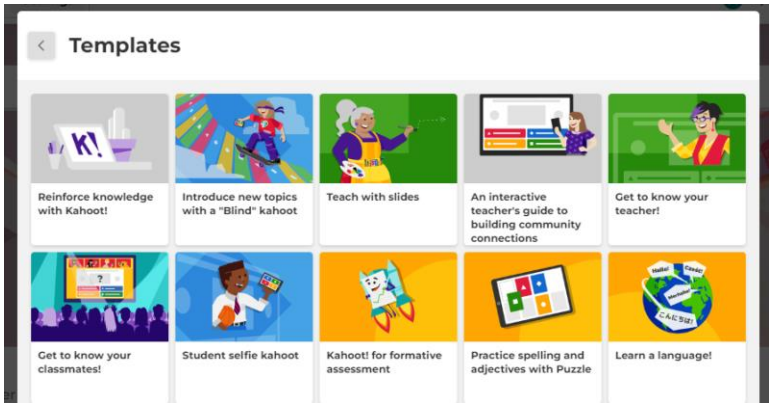
1. Open a kahoot you'd like to host for your students, click Play and choose Teach.
2. Adjust game options - for example, randomize the order of questions, or enable our friendly nickname generator to avoid inappropriate nicknames. Choose whether students play individually (Classic mode) or in Team mode.
3. By default, questions are displayed on a shared screen, while students tap answer tiles on their devices. If you'd like students to see questions and answer alternatives on their devices (for example, if you have a large classroom or students are joining remotely), toggle this setting on: Show question and answers on players' devices.
4. A unique Game PIN will be displayed at the top of the screen. Students enter this PIN to join the live kahoot in the Kahoot app or at kahoot.it in their browser.
5. Click Start once you can see all the players' nicknames in the "lobby". During playing you can use the spacebar or your mouse to go to the next question.
6. After the kahoot, you can always find and assess results in the Reports section.

How to create a kahoot?

1. Log in to your Kahoot account. Click Create and choose New kahoot.
2. Start typing your first quiz question. Add answer alternatives and mark the correct answer(s).
3. Tune the timer and points depending on the complexity of the question.

4. Add an image by uploading it from your computer or choosing one from our image library. You can also embed a YouTube link or add audio to the question (requires an upgrade).
5. Click Add question on the left-hand side. With a free Kahoot account, you can add multiple-choice quiz, true or false questions, and classic slides. With an optional upgrade to one of our paid plans, you can add these advanced question types:
    - Puzzle: students need to arrange answers in the correct order
    - Poll: gather feedback or do a quick pulse-check during a lesson
    - Advanced slide layouts: teach a topic or provide more context
    - Type answer: students need to type a short text answer
    - Open-ended question (available in Kahoot EDU): gather student opinions as text answers up to 250 characters
    - Word cloud (available in Kahoot EDU): collect short free-form poll responses that will be visualized as a word cloud.
    - Brainstorm (available in Kahoot EDU): gather, discuss and vote on ideas. All changes will be automatically saved as you go!
6. After you've added questions, click Settings above to add a catchy title, fill out summary details and add a cover image. Hit Done!

1. 

2. 

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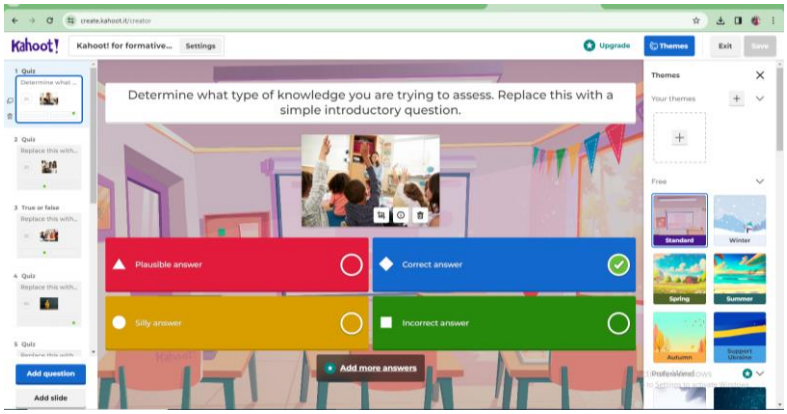
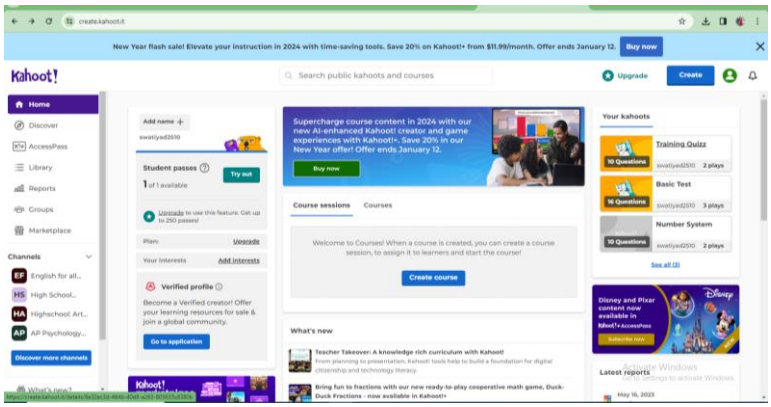
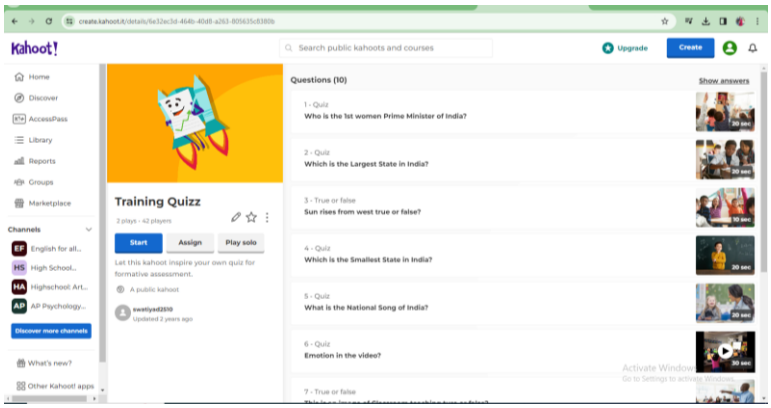

Kahoot!
Kahoot! for formative...
Settings
Upgrade
Themes
Exit
Save
Determine what type of knowledge you are trying to assess. Replace this with a simple introductory question.
Plausible answer
Correct answer
Silly answer
Incorrect answer
Add more answers
Add question
Add slide
Themes
Your themes
Free
Standard
Winter
Spring
Summer
Autumn

4.

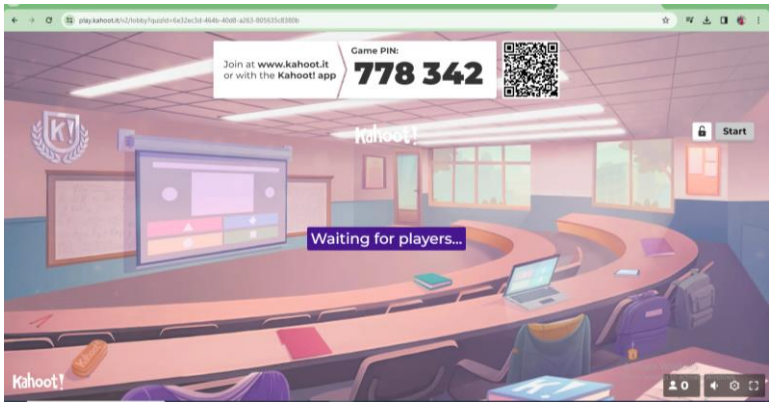

New Year flash sale! Elevate your instruction in 2024 with time-saving tools. Save 20% on Kahoot!+ from $11.99/month. Offer ends January 12.
Buy now
Kahoot!
Search public kahoots and courses
Upgrade
Create
Home
Discover
AccessPass
Library
Reports
Groups
Marketplace
Supercharge course content in 2024 with our new AI-enhanced Kahoot! creator and game experiences with Kahoot!+. Save 20% in our New Year offer! Offer ends January 12.
Buy now
Your kahoots
Training Quizz
Basic Test
Number System
Course sessions
Courses
Create course
What's new
Latest reports

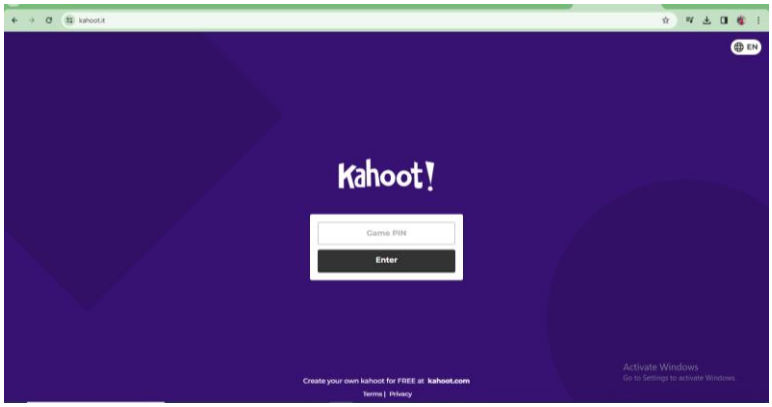
5.


Kahoot!
Search public kahoots and courses
Upgrade
Create
Training Quizz
Start
Assign
Play solo
Questions (10)
Show answers
1 - Quiz
Who is the 1st women Prime Minister of India?
2 - Quiz
Which is the Largest State in India?
3 - True or false
Sun rises from west true or false?
4 - Quiz
Which is the Smallest State in India?
5 - Quiz
What is the National Song of India?
6 - Quiz
Emotion in the video?

6.


Kahoot!
Upgrade
Select mode for
Training Quizz
Classic mode
Start
Up to 10 players
Interactive presentation
Assessment
Bring friendly competition to this kahoot. Players go head-to-head and compete for a top spot on the podium. Players who answer the quickest and get the most correct answers will have higher scores.
Classic mode
Winter Holidays mode
Team mode
Robot Run
The Lost Pyramid
Submarine Squad
Cosmic Conquest
Color Kingdoms

7. 

8. 

How to assess learning results with Kahoot Reports?

With Kahoot reports, you can capture useful instructional insights for formative assessment. Learn how to use reports to assess learning and better target your further instruction - which is especially important for distance learning when you're interacting with students remotely.

How to find reports After you've hosted a game live or assigned a student-paced challenge, go to the Reports section in the top navigation bar and find the report you need. High-level summary of kahoot results The Summary section presents various actionable insights in a neat, visual way:

- All the key stats - how many students played, how many questions there were, etc.
- Which questions were the most difficult and might need reteaching.
- Which players need help based on their game results?

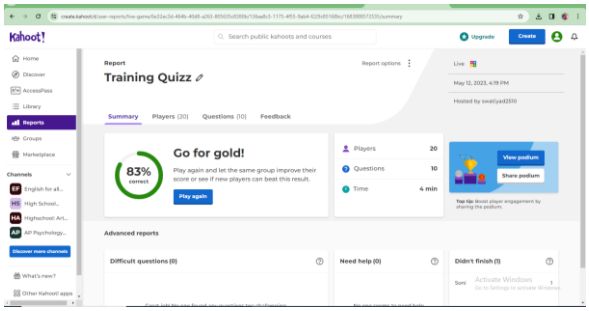
Deeper dive into analytics In the Question view you can identify where exactly key challenges occur. Be sure to look at:

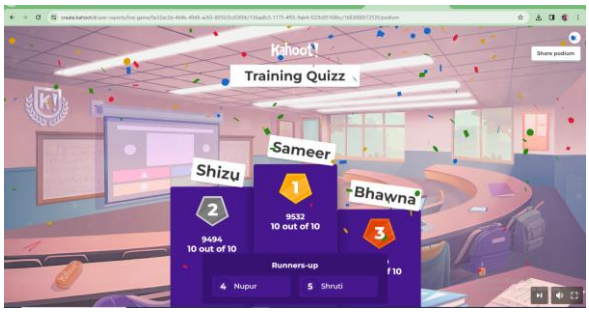
- The correct overall percentage of the question
- How long it took (in seconds) for students to answer When you come across a question that was answered more incorrectly, immediately check to see if multiple students were picking the same wrong answer.

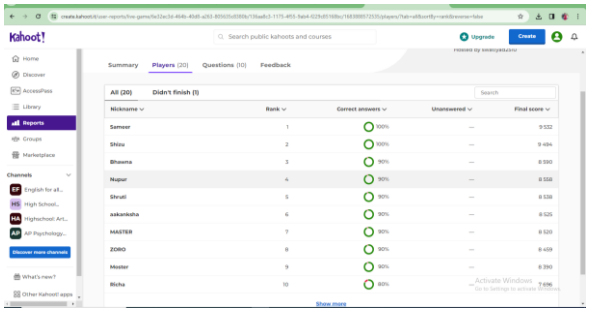
Look at the Player view to check which student (via their nickname) is answering incorrectly. How long are they taking to answer?

If they are answering faster than their peers and making errors, you may need to focus on their lack of attention. If there were 3 or more difficult questions in a game, you can generate a new kahoot with them to reinforce learning, power up content review and prep for exams.

A question is labelled as difficult if less than 35% of students answered it correctly.

1. 
Kahoot!
Training Quizz
Summary
Players (20)
Questions (10)
Feedback
Go for gold!
83%
correct
Play again
Players 20
Questions 10
Time 4 min
View podium
Share podium
Advanced reports
Difficult questions (0)
Need help (0)
Didn't finish (1)

2. 
Kahoot!
Training Quizz
Share podium
Shizu
Sameer
Bhawna
2
9494
10 out of 10
1
9532
10 out of 10
3
Runners-up
4 Nupur
5 Shruti

3. 
Kahoot!
Summary
Players (20)
Questions (10)
Feedback
All (20)
Didn't finish (1)
Nickname
Rank
Correct answers
Unanswered
Final score

Google Collaborative Tools

Mr. Ashok Shaky

Introduction

Higher education has a definite and challenging role in shaping the students to adapt the online technologies in their learning process. Internet has become the backbone of the modern education system. Internet provides opportunities for students to develop proactive approach towards their learning. Cloud Computing relies on sharing computing resource. Google Docs is one of many cloud computing document-sharing services. It is important for students to see the power of collaboration through cloud and to learn the rules about collaborative with each other in doing their team activities. Collaborative tool helps the students to do group work with their team members from anywhere, anytime and on any device with the help of internet to complete the tasks. It also enhances the educational experience of the students. Google Docs allows student to create, format text documents, slides, sheets and forms collaboratively with their team. The objective of this paper is to implement the Google Docs, an online collaborative tool for doing academic activities such as group assignment, seminar, review presentation, documentation and dataset preparation. Cloud computing is latest trend in IT world. It is an Internet-based computing, whereby shared resources, software and information, are provided to computers and other devices on-demand. This technology has the capacity to admittance a common collection of resources on request. The development of the Amazon played vital role by making modern data centres. In 2007 Google, IBM and many remarkable universities and companies adopted it. In addition, in 2008 Gartner highlighted its characteristics for customer as well service providers specified in.

Cloud computing enables companies to consume compute resources as a utility as discussed in. Three of the main benefits of cloud computing includes:

1. Self-service provisioning: End users can spin up computing resources for almost any type of workload on-demand.
2. Elasticity: Companies can scale up as computing needs increase and then scale down again as demands decrease.
3. Pay per use: Computing resources are measured at a granular level, allowing users to pay only for the resources and workloads they use.

Cloud computing provides Software as a Service, Platform as a Service, Infrastructure as a Service on-demand specified in. Software as a service (SaaS) is a cloud- based applications that run on distant computers “in the cloud”. It can be owned and operated by users’ computers via the Internet.

Collaborative learning is essentially people working together to solve a problem. Collaboration tools can route works through a process, distribute tasks to involved team member, and help to coordinate activities.

Document sharing and comments provide students with opportunities to work on the document online. Since Docs are stored online, students can work at college and at home from any computer with an internet connection. The online collaborative tool assists

in basic project management activities, assignments, creative drawings for presentation, remote presentation, enabling groups to modify output in real time.

Google Drive is a file storage and synchronization service created by Google. It allows students to store files in the cloud, share files, and edit documents, spreadsheets, and presentations with collaborators.

Google Docs includes four major options: Google Documents, Google Spreadsheets, Google Presentations, and Google Drawing, which all share similar functions. There are also tools to compare any two versions of a document specified in

Google Docs is a productive tool where learning activities can be designed differently and creatively. For instance, an instructor might post a text, intentionally replete with errors, for learners to correct. Likewise, learners can easily peer-edit, as this program leaves an editing trail.

The activities such as document creation, project review report, seminar presentation and other tasks were implemented in Google Docs. The files that are created in Google Docs are saved in Google Drive.

Implementation of Google Docs

Sharp (2009) suggests that this collaborative editing tools allow a group of individuals to edit a document simultaneously while they can view the changes made by others in real time.

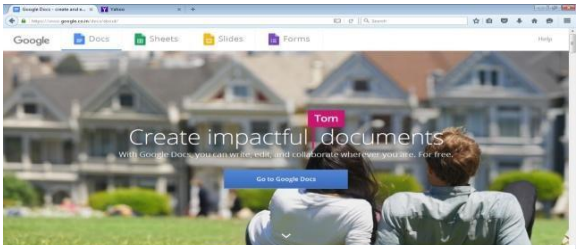


Fig.1 Home Page of Google Docs

Choose the documents, slides, forms and sheets to be collaborated in Google Docs using Gmail account.

Google Docs lends itself to collaborative academic activities with multiple team members work together in real time located at diverse location.

All Team members can see who made specific document changes and when those alterations were done, as the documents are stored online design the document collaboratively. For sharing dynamic data by different members in cloud, it is necessary to register before they want to view the shares data.

The students can prepare their presentations for seminar, project review and other relevant task using Google Slides.

In Google Sheets, the student can prepare data set for Research, perform mathematical functions and can represent graphically.

Google Drawings will be helpful for the students to perform image-processing techniques and other graphics manipulation demonstrated in this paper. This online collaborative tool is especially useful for students to enhance the learning skills, developing the attitude of sharing among team members to achieve a common task seated at different location by using diverse devices.

Finally, one area of application we hope to exploit in future is the use of Google Docs as a

tool for academic research.

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Digital Library Resources and Web Resources for Academics

- Dr. P. K. Tripathy

Introduction

In the realm of academia, library resources play a pivotal role in fostering intellectual growth, research excellence, and the overall development of students and scholars. These resources extend beyond the conventional perception of libraries as repositories of books to encompass a vast array of digital and print materials, databases, and specialized services. One of the primary functions of academic libraries is to provide access to an extensive collection of scholarly publications. This includes textbooks, reference materials, journals, and monographs covering diverse disciplines. The library serves as a hub where students and faculty can delve into the wealth of knowledge compiled over centuries, facilitating a deeper understanding of their subjects.In the contemporary academic landscape, digital resources have gained prominence. Online databases, e-books, and scholarly articles accessible through the library portal offer a dynamic and up-to-date platform for research. This digital transformation not only expands the scope of available information but also allows for efficient and convenient retrieval of resources, transcending the constraints of physical boundaries.

Moreover, academic libraries serve as collaborative spaces, fostering a sense of community among students and faculty. Group study areas, meeting rooms, and interactive learning spaces contribute to a vibrant academic atmosphere, encouraging knowledge exchange and collaboration.

Resource need for Academics

Every academic professional needs educational materials for various purposes like classroom delivery, research guidance, paper publication, conference presentation, e-content development, and many more. Good quality content, global level content and digital content in library collectively enable academic faculties to prepare high quality content.

Traditional V/s Digital Library Resources

Format of Resources:

- ***Traditional Library***: Relies on physical formats such as printed books, journals, and other tangible materials.
- ***Digital Library***: Emphasizes electronic formats, including e-books, online journals, databases, and multimedia resources.

Accessibility:

- ***Traditional Library***: Requires physical presence at the library to access resources, limiting availability to specific locations.
- ***Digital Library:*** Offers remote access, allowing users to retrieve information from anywhere with an internet connection, promoting convenience and flexibility.

Storage and Preservation:

- ***Traditional Library***: Physical materials are susceptible to wear, tear, and damage, necessitating careful handling and preservation efforts.
- ***Digital Library***: Information is stored electronically, reducing physical wear, and allowing for easy duplication and backup, enhancing long-term preservation.

Search and Retrieval

- ***Traditional Library:*** Relies on manual cataloging systems and requires users to physically browse through shelves to find resources.
- ***Digital Library:*** Facilitates quick and precise searches using electronic databases, saving time and providing efficient retrieval of information.

Space Requirements:

- ***Traditional Library***: Demands significant physical space to house books, shelves, and reading areas.
- ***Digital Library:*** Requires minimal physical space, as resources are stored electronically, reducing the need for expansive infrastructure.

Cost Implications:

- ***Traditional Library***: Involves costs related to physical infrastructure, maintenance, and printed materials.
- ***Digital Library***: Incurs expenses related to technology infrastructure, subscription fees for electronic resources, and maintenance of digital platforms.

Availability of Resources:

- ***Traditional Library:*** Limited by the library's operating hours and physical constraints on the number of available copies.
- ***Digital Library:*** Provides 24/7 access to a vast array of resources, accommodating a larger user base simultaneously.

Interactivity and Multimedia:

- ***Traditional Library:*** Primarily relies on text-based resources, with limited interactive or multimedia content.
- ***Digital Library:*** Incorporates multimedia elements, interactive simulations, and dynamic content, enhancing the learning experience.

Library Resources

I. **Print Library**- Print library resources provide a rich and tangible collection of knowledge, comprising of books, journals, magazines, reports, theses, dissertations, newspapers, etc. These physical repositories offer in-depth information across diverse subjects, fostering a comprehensive learning environment. In contrast to digital resources, print materials allow users to engage with the text in a tactile manner, enhancing the learning experience. The library's print collection includes academic textbooks, reference materials, fiction, and non-fiction works, catering to various research needs. Accessing these resources encourages critical thinking and supports academic endeavors, promoting a holistic approach to learning that extends beyond digital platforms, ensuring a well-rounded and immersive educational experience.

II. **Digital Library** - Digital library resources revolutionize access to information, offering a vast and easily navigable collection of electronic materials. These resources encompass e-books, academic journals, multimedia content, and research

databases, providing instant and global access to a wealth of knowledge. The digital format enables users to search, retrieve, and interact with information swiftly, promoting efficient research and learning. With the ability to access materials remotely, digital libraries break down geographical barriers, fostering collaboration and inclusivity. The dynamic nature of digital resources allows for continuous updates, ensuring that users have access to the latest information in diverse fields, contributing to a dynamic and adaptive learning environment. Selective digital library materials are discussed here:

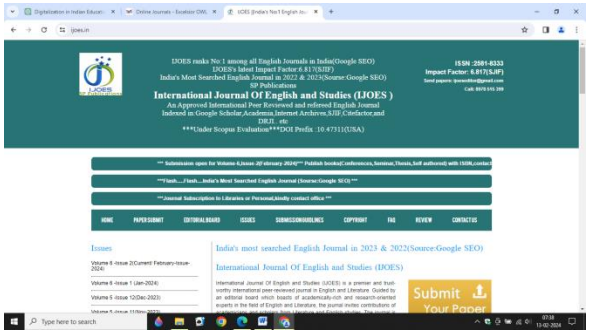
i. **CD/DVDs** - A CD, or compact disc, is an optical (meaning light) disc that is used to store sound recordings, music, photographs, videos, text files, and other types of information. DVD's are similar in size and shape, but use a higher capacity way to record and can store more information. In present Internet age these types of documents have been converted into on-line materials.

https://www.bobology.com/public/What-are-CDs-and-DVDs.cfm

ii. **e-Books** - An e-book (short for electronic book), also known as an e-book or e-Book, is a book publication made available in electronic form, consisting of text, images, or both, readable on the flat-panel display of computers or other electronic devices. https://en.wikipedia.org/wiki/Ebook

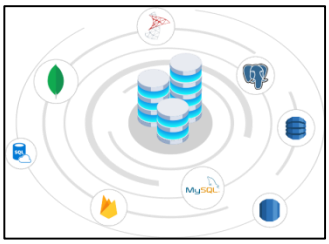
iii. **Online Journals**–The journals published in electronic mode and available in the publisher's website for online access for the users through Internet. The example of an online journal is:

https://owl.excelsior.edu/online-writing-and-presentations/online-journals/

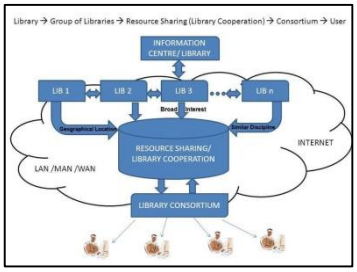


iv. **Databases**-A database is an organized collection of structured information, or data, typically stored electronically in a computer system.

https://www.oracle.com/in/database/what-is-database



v. **Consortium materials -** Library consortia facilitate resource sharing among member libraries. This includes sharing physical materials such as books, journals, multimedia resources, and electronic resources like databases, e-books, and e-journals. Eg. **https://nlist.inflibnet.ac.in/**

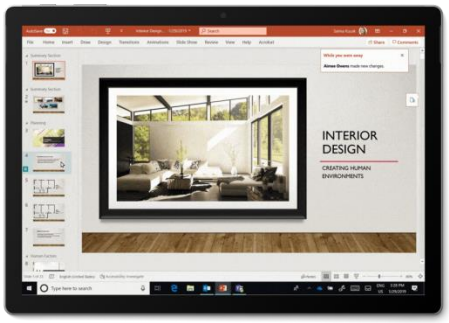


vi. **ETDs -** An Electronic Thesis or Dissertation (ETD) is a document that explicates the research of a graduate student and expresses in a form simultaneously suitable for machine archives and worldwide retrieval. Eg.

vii. **A/V materials–** Audio-visual materials, such as videotapes, DVDs, audio tapes, audio CDs and microforms, can be difficult to identify and access. Increasingly, audio-visual materials are available through the open web, although much material has been placed on the open web without the copyright owners' permission.

viii. **PPTs -** PPT stands for PowerPoint Presentations which are demonstrations of data, methods or a sequence of steps by which something is done. It contains drawings, charts and other images to communicate messages clearly.

https://unacademy.com/content/cbse-class-11/full-forms/full-form-of-ppt/

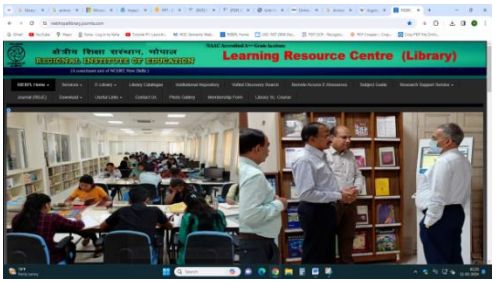


ix. **AR/VR materials** - Augmented reality (AR) is an interactive experience that

combines the real world and computer-generated content. AR can be defined as a system that incorporates three basic features: a combination of real and virtual worlds, real-time interaction, and accurate 3D registration of virtual and real objects. In virtual reality (VR), the users' perception of reality is completely based on virtual information. https://en.wikipedia.org/wiki/Augmented_reality

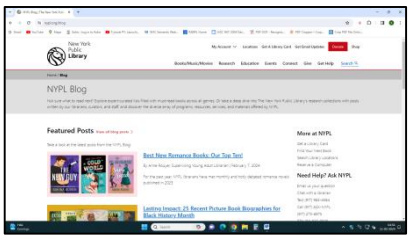
Web Resources

Information sources available in the Internet are called Web Resources. Important web resources are:



i. **Websites -** A **website** (also written as a web site) is a collection of web pages typically dedicated to a particular topic or purpose, such as news, education, commerce, entertainment or social networking.

https://riebhopallibrary.joomla.com/index.php/



1. **Blogs -** A blog (a truncation of "weblog") is an informational website consisting of discrete, often informal diary-style text entries (posts).

2. **Wikis -** A wiki is a form of online hypertext publication that is collaboratively edited and managed by its own audience directly through a web browser.

https://en.wikipedia.org/wiki/Wiki

3. **All Digital Library materials** – All Digital Library materials like e-Books, On-line Journals, ETDs, AR/VR materials, etc. are available in the Internet.

4. **Digital Repository -** The digital repository is where the digital resources are stored. It is a digital storage system that can hold large amounts of data and make it accessible to users. https://shodhganga.inflibnet.ac.in/

5. **Social networked materials** - A social networking service or SNS (sometimes called a social networking site) is a type of online social media platform which people use to build social networks or social relationships with other people

who share similar personal or career content, interests, activities, backgrounds or real-life connections.https://en.wikipedia.org/wiki/Social_networking_service

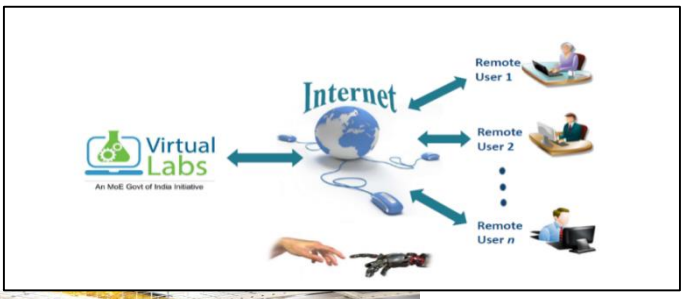
6. **Virtual Labs -** Virtual Labs have been designed to provide remote access to labs in various disciplines of Science and Engineering. Virtual Labs enable the students to learn at their own pace and enthuse them to conduct experiments. Virtual Labs also provide a complete learning management system where the students can avail various tools for learning, including additional web resources, video lectures, animated demonstration, and self-evaluation. Virtual Labs can be used to complement physical labs. https://en.wikipedia.org/wiki/Virtual_Labs_(India)

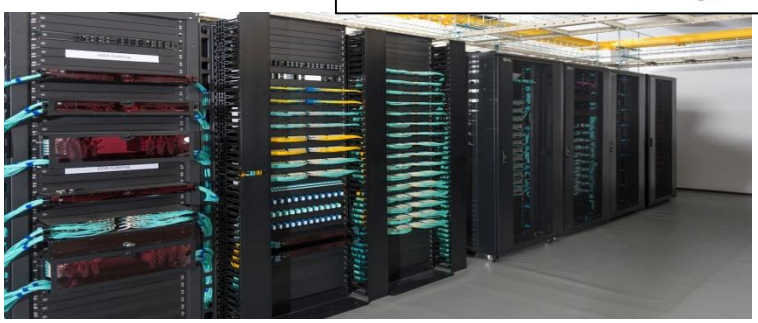
7. **Audio books -** An audio-book (or a talking book) is a recording of a book or other work being read out loud. A lot of audio books are available at https://librivox.org/

8. **Interactive sites -** An interactive website is simply a site that promotes interactions with users. Rather than a traditional website that is more of an information provider with basic choices like "click" or "learn more", an interactive website encourages communication and engagement with visitors through the use of interactive elements. http://interactivesites.weebly.com/math.html

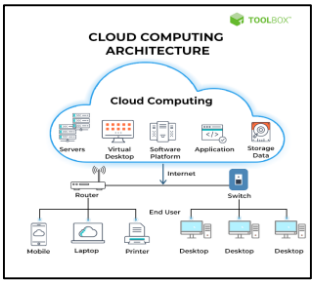
ICTs used in e-library

1. **Servers** - A server is a computer or system that provides resources, data, services, or programs to other computers, known as clients, over a network.





2. **Computers** - A computer is a machine that can be programmed to carry out sequences of arithmetic or logical operations (computation) automatically.



3. **Tabs** - A tablet computer, commonly shortened to tablet, is a mobile device, typically with a mobile operating system and touch screen display processing circuitry, and a rechargeable battery in a single, thin and flat package.

4. **Cloud computers -** Cloud computing is on-demand access, via the Internet, to computing resources—applications, servers (physical servers and virtual servers), data storage, development tools, networking capabilities, and more—hosted at a remote data centre managed by a cloud services provider (or CSP).

   https://www.ibm.com/topics/cloud-computing

5. **AR/VR devices**

6. **Networking devices**

These are the networking devices used in library:

i. ***Routers* -** A router is a device that connects two or more packet-switched networks or sub-networks.

ii. ***Wi-Fi access points* -** In computer networking, a wireless access point, or more generally just access point (AP), is a networking hardware device that allows other Wi-Fi devices to connect to a wired network or wireless network.

iii. ***Barcode -*** A **barcode** or **bar code** is a method of representing data in a visual, machine-readable form. Initially, barcodes represented data by varying the widths, spacings and sizes of parallel lines. https://en.wikipedia.org/wiki/Barcode

iv. ***QR code -*** A QR code (quick-response code) is a type of two-dimensional matrix barcode, invented in 1994, by Japanese company Denso Wave for labelling automobile parts. https://en.wikipedia.org/wiki/QR_code

v. ***RFID -*** **Radio-frequency identification** (**RFID**) uses electromagnetic fields to automatically identify and track tags attached to objects.

https://en.wikipedia.org/wiki/Radio-frequency_identification

vi. ***Scanner -*** A scanner is an electrical device that reads and converts documents such as photos and pages of text into a digital signal.

https://www.javatpoint.com/what-is-scanner

vii. ***Printer -*** A printer is a hardware output device that is used to generate hard copy and print any document. https://www.javatpoint.com/printers

Digital Resources in RIE, Bhopal Library

The RIE, Bhopal Library possesses all kinds of services for students, teachers and researchers. https://riebhopallibrary.joomla.com

Conclusion

Library resources are indispensable assets in the academic journey, serving as gateways to a wealth of information, facilitators of research excellence, and hubs for collaborative learning. Embracing both traditional and digital formats, libraries play a central role in shaping the intellectual landscape of educational institutions, ensuring that academics thrive in an environment rich with resources and opportunities.

Challenges and opportunities in using ICT in Education

- Dr. Kalpana Maski

Introduction

ICT (Information and Communications Technology) has transformed the landscape of education by introducing innovative teaching and learning methodologies, new possibilities for interactive learning, flexibility, and access to a global knowledge base. It encompasses a wide range of digital tools and resources that facilitate interactive and engaging educational experiences for both educators and students and improved educational outcomes. The potential applications of ICT in education are vast and continue to grow, shaping the future of learning.

The integration of Information and Communication Technology (ICT) in education is a fundamental aspect of modern teaching and learning. It encompasses the use of technology to enhance the delivery of educational materials, facilitate communication and collaboration, and provide personalized learning experiences. ICT has the potential to transform traditional educational practices, making learning more engaging, interactive, and accessible to students of all backgrounds and abilities. In this context, ICT includes various tools and resources such as computers, tablets, educational software, internet resources, and digital platforms.

The use of information and communication technologies in the educative process has been divided into two broad categories: ICTs for Education and ICTs in Education. ICTs for education refer to the development of information and communications technology specifically for teaching/learning purposes. ICTs in Education involve the adoption of general components of information and communication technologies in the teaching learning process.

Role of ICT in enhancing the teaching-learning process

Information and Communication Technology (ICT) plays a crucial role in enhancing the teaching-learning process by providing various tools and resources that facilitate better communication, collaboration, and engagement. Here are several ways in which ICT contributes to the improvement of the teaching-learning process:

Access to Information: ICT provides easy access to a vast amount of information through the internet. This allows both teachers and students to access up-to-date and relevant content, enhancing the quality of learning materials.

Interactive Learning: ICT tools, such as educational software, simulations, and multimedia presentations, make learning more interactive and engaging. This interactivity can improve understanding and retention of complex concepts.

Collaboration and Communication: Platforms like online forums, video conferencing, and collaborative tools enable students and teachers to interact beyond traditional classroom boundaries. This fosters collaboration, discussion, and the exchange of ideas, making the learning process more dynamic.

Personalized Learning: ICT allows for personalized learning experiences tailored to individual student needs. Adaptive learning platforms and educational apps can provide customized content and pace, catering to different learning styles and abilities.

Real-world Applications: ICT facilitates the integration of real-world applications and examples into the curriculum. This helps students see the practical relevance of their studies, making the learning experience more meaningful.

Multimedia Presentations: Teachers can use multimedia presentations, including videos, images, and interactive content, to explain complex concepts more effectively. This caters to visual and auditory learners and makes the learning process more engaging.

Online Assessments: ICT enables the use of online assessments, quizzes, and tests, providing immediate feedback to both students and teachers. This allows for continuous monitoring of student progress and helps identify areas that need further attention.

Digital Resources and E-books: Instead of relying solely on traditional textbooks, teachers can use digital resources, e-books, and online libraries. This not only saves costs but also ensures that materials are easily accessible and updated.

Remote Learning: Particularly relevant in situations like the COVID-19 pandemic, ICT facilitates remote learning. Virtual classrooms, online lectures, and digital collaboration tools enable education to continue even when physical attendance is not possible.

Professional Development for Educators: ICT supports ongoing professional development for teachers, helping them stay updated on the latest teaching methods, technology trends, and educational research.

Role of ICT in enhancing the quality and accessibility of Education

Information and Communication Technology (ICT) plays a essential role in enhancing the quality and accessibility of education by providing tools and solutions that bridge gaps, facilitate learning, and offer new opportunities. ICT contributes to these aspects as:

Global Access to Information: ICT, particularly the internet, allows students and educators to access a wealth of information globally. Online resources, digital libraries, and educational websites provide up-to-date and diverse content, enriching the learning experience.

E-Learning Platforms: ICT enables the creation and utilization of e-learning platforms and Massive Open Online Courses (MOOCs). These platforms offer a wide range of courses, making education accessible to learners around the world. Students can learn at their own pace and from the comfort of their homes.

Remote Learning Opportunities: With the help of ICT, education is not limited to physical classrooms. Remote learning tools, video conferencing, and virtual classrooms make it possible for students to receive quality education irrespective of geographical constraints. This is especially important during emergencies, such as the COVID-19 pandemic.

Digital Textbooks and Resources: ICT facilitates the creation and distribution of digital textbooks and educational resources. These materials are often more affordable, easily updated, and accessible on various devices, ensuring that students have access to the latest information.

Personalized Learning: Educational software and applications powered by ICT allow for personalized learning experiences. Adaptive learning platforms can tailor content to individual student needs, promoting a more effective and engaging learning process.

Interactive Multimedia Content: ICT supports the development and use of interactive multimedia content, such as videos, simulations, and virtual reality. These resources enhance the quality of education by providing visual and interactive elements that make complex concepts easier to understand.

Collaborative Learning Tools: ICT tools facilitate collaboration among students and educators. Online forums, collaborative documents, and virtual group projects enable interactive learning experiences, fostering teamwork and communication skills.

Assessment and Feedback: Digital assessment tools provide quick and accurate evaluation of students' progress. Automated grading, online quizzes, and instant feedback mechanisms enhance the assessment process and help teachers tailor their teaching strategies to address specific learning needs.

Professional Development for Educators: ICT supports continuous professional development for educators. Online training programs, webinars, and virtual conferences enable teachers to stay updated on the latest teaching methodologies, technology integration, and educational research.

Inclusive Education: ICT helps address diverse learning needs, making education more inclusive. Assistive technologies and tools cater to students with disabilities, ensuring that they have equal access to educational resources.

Role of ICT in enhancing the learning environment and learners' motivation

The integration of Information and Communication Technology (ICT) in education significantly enhances the learning environment by providing tools and resources that contribute to a more dynamic, interactive, and engaging educational experience. Here are several ways in which ICT plays a decisive role in enhancing the learning environment:

Interactive Learning Resources: ICT enables the development and use of interactive learning resources such as educational software, simulations, and multimedia presentations. These resources engage students and make learning more interactive, fostering a positive learning environment.

Digital Collaboration Tools: Online platforms and tools facilitate collaboration among students, allowing them to work together on projects, share ideas, and participate in discussions. This collaborative approach enhances the learning environment by promoting teamwork and communication skills.

Virtual Classrooms: ICT tools like video conferencing and virtual classrooms provide opportunities for remote learning and bring students together in a virtual space. This is particularly beneficial for learners who may be geographically dispersed, contributing to a more inclusive and diverse learning environment.

Access to Diverse Learning Materials: The internet and digital libraries offer a vast array of educational resources, ensuring that students have access to diverse and up-to-date materials. This contributes to a rich learning environment where students can explore various perspectives and resources.

Personalized Learning Experiences: ICT supports personalized learning by providing adaptive learning platforms and educational apps. These tools cater to individual learning styles and pace, allowing students to have a more personalized and effective learning experience.

Immediate Feedback Mechanisms: Digital assessment tools and online quizzes enable immediate feedback for students. This quick feedback loop enhances the learning environment by helping students understand their strengths and areas for improvement, promoting continuous learning.

Multimedia Presentations: Teachers can use multimedia presentations, including videos, images, and interactive content, to explain complex concepts more effectively. This variety in instructional materials contributes to a more engaging and stimulating learning environment.

Gamification of Learning: Gamified learning platforms leverage ICT to introduce game elements into educational activities. This approach makes learning more enjoyable, motivating, and immersive, thereby enhancing the overall learning environment.

Inclusive Education: ICT tools, such as assistive technologies and accessible digital content, promote inclusive education by addressing the diverse needs of learners. This ensures that all students, including those with disabilities, can fully participate in the learning environment.

Real-world Applications: ICT facilitates the integration of real-world applications into the curriculum. This connection to practical, real-life scenarios makes the learning environment more relevant and helps students see the applicability of their studies.

Role of ICT in supporting Teachers' Instruction

Information and Communication Technology (ICT) plays a vital role in supporting teachers' instruction by providing tools and resources that enhance the teaching process and contribute to more effective and engaging classroom experiences. There are several ways in which ICT supports teachers' instruction:

Interactive Whiteboards: ICT tools like interactive whiteboards allow teachers to create dynamic and interactive presentations. They can use multimedia elements, draw diagrams, and engage students directly, making lessons more visually appealing and interactive.

Digital Lesson Plans and Resources: Teachers can create and share digital lesson plans, presentations, and resources using ICT. This not only streamlines instructional preparation but also allows for easy sharing and collaboration among educators.

Online Learning Platforms: ICT enables the use of online platforms for course management and content delivery. Teachers can organize materials, assignments, and assessments in a centralized online space, making it easier for students to access information and stay organized.

Educational Software and Applications: Various educational software and apps are available to support teaching across different subjects. These tools provide interactive simulations, virtual labs, and exercises that complement traditional instruction methods, making learning more engaging.

Virtual Reality (VR) and Augmented Reality (AR): VR and AR technologies can create immersive learning experiences. Teachers can use these technologies to take students on virtual field trips, explore historical events, or visualize complex concepts in three-dimensional space.

Multimedia Presentations: Teachers can enhance their instruction by incorporating multimedia elements such as videos, animations, and interactive content. This variety in instructional materials caters to different learning styles and captures students' attention more effectively.

Online Collaboration Tools: ICT tools facilitate collaboration among teachers and students. Online discussion forums, collaborative documents, and shared platforms enable teachers to interact with each other, share ideas, and create a collaborative learning environment for students.

Learning Management Systems (LMS): LMS platforms provide a centralized location for teachers to manage course materials, assignments, grades, and communication. This

streamlines administrative tasks, allowing teachers to focus more on instructional planning and student engagement.

Assessment and Feedback Tools: Digital assessment tools enable teachers to create online quizzes, tests, and assessments. Immediate feedback helps teachers gauge student understanding quickly and tailor their instruction to address specific learning needs.

Professional Development Opportunities: ICT supports ongoing professional development for teachers. Online courses, webinars, and virtual conferences allow educators to stay updated on the latest teaching methodologies, technology integration, and educational research.

Data Analysis and Insights: Educational analytics tools provide insights into student performance and engagement. Teachers can analyze data to identify trends, assess the effectiveness of instructional strategies, and tailor their teaching approaches based on real-time information.

Communication Platforms: ICT facilitates effective communication between teachers, students, and parents. Email, messaging platforms, and online communication tools provide a seamless way for teachers to share information, provide updates, and address queries.

Technology and its challenges while using it in the Teaching-Learning Process

While technology offers numerous benefits in the teaching-learning process, it also presents several challenges that educators, students, and institutions must navigate. Some of the challenges mentioned below:

Access Disparities: Not all students have equal access to technology. Socioeconomic factors, geographical location, and infrastructure limitations can lead to disparities in access to devices and the internet. This digital divide can result in unequal learning opportunities.

Technical Issues: Technical glitches, such as network connectivity problems, hardware malfunctions, or software errors, can disrupt the teaching-learning process. These issues can hinder the seamless integration of technology into the classroom and lead to frustration for both teachers and students.

Training and Professional Development: Many educators may not have received adequate training in integrating technology into their teaching methods. Lack of proficiency in using educational technology tools can hinder effective implementation and limit the benefits for students.

Cost of Technology: Acquiring and maintaining technology infrastructure, devices, and software can be expensive for educational institutions. Budget constraints may limit the ability to invest in the latest and most effective educational technologies.

Digital Literacy Gaps: Students may lack essential digital literacy skills needed to navigate online resources, critically evaluate information, and use technology for learning purposes. This gap in digital literacy can affect the effectiveness of technology integration in the classroom.

Cyber security Concerns: As technology becomes more prevalent, the risk of cyber security threats increases. Educational institutions must implement robust cyber security measures to protect sensitive student and institutional data from unauthorized access and cyber-attacks.

Privacy Issues: The use of technology often involves collecting and storing student data. Ensuring the privacy and confidentiality of this information is a significant concern. Institutions

must implement policies and practices to protect student privacy and comply with data protection regulations.

Screen Time Concerns: Excessive screen time can have negative effects on students' health and well-being, including eye strain, fatigue, and potential disruptions to sleep patterns. Balancing the use of technology with other forms of learning and physical activities is crucial.

Resistance to Change: Some educators may resist incorporating technology into their teaching practices due to a fear of change or a lack of confidence in their technological abilities. Overcoming resistance and fostering a positive attitude toward technology adoption is essential.

Pedagogical Shifts: Integrating technology often requires a shift in teaching methodologies. Educators may need to adapt their instructional strategies to effectively leverage technology for student engagement and learning outcomes.

Maintaining Student Engagement: While technology can enhance engagement, there is a risk of students becoming distracted or disengaged if not used effectively. Educators must find ways to maintain student focus and participation during online or technology-enhanced lessons.

Equitable Assessment: Assessing students fairly in a technology-driven environment can be challenging. Ensuring that online assessments are secure, unbiased, and accessible to all students is crucial for maintaining academic integrity.

Benefits of using ICT in Education

1. ***Enhanced Learning***

ICT provides access to a diverse range of educational content, multimedia resources, and simulations, enhancing the learning experience and making complex concepts more comprehensible.

2. *Personalized Education*

ICT enables adaptive learning platforms and personalized assessment tools that cater to individual student needs, allowing for customized learning paths and targeted support.

3. *Global Connectivity*

Through ICT, students can connect with peers and experts worldwide, fostering cultural exchange and collaboration opportunities, enriching their educational experience.

Challenges in implementing ICT in Education

1. ***Infrastructure Limitations***
   Many educational institutions lack the necessary technological infrastructure such as reliable internet connectivity and adequate computer hardware, hindering the effective integration of ICT.
2. ***Digital Literacy Gaps***
   Teachers and students may face challenges in effectively utilizing ICT tools due to limited digital literacy skills, necessitating comprehensive training programs.
3. ***Resource Accessibility***
   Acquiring and updating educational software and learning resources can be costly, making it difficult for some institutions to keep pace with technological advancements.

Training and Capacity Building for Teachers

Educational Workshops

Engaging teachers in specialized workshops and training sessions focused on integrating ICT into their teaching practices and curriculum development

Online Certifications

Offering online certifications and professional development courses to equip educators with the necessary skills to effectively utilize ICT resources

Peer Mentorship

Establishing peer mentorship programs to encourage collaboration and knowledge sharing among educators for effective ICT integration

Digital Divide and Accessibility Issues

Technological Disparities

The digital divide highlights the disparities in access to technology between different socio-economic, geographic, and demographic groups

Addressing Equity

Efforts to address the digital divide involve implementing policies and programs aimed at providing universal access to ICT resources and narrowing the accessibility gap

Opportunities for Innovation in ICT in Education

Adaptive Learning Platforms

Innovative adaptive learning platforms utilize AI to personalize educational content and tailor learning experiences to individual student needs

Virtual Reality Learning

Integration of virtual reality technology in education opens up immersive and interactive learning experiences that enhance student comprehension

Big Data Analytics

Utilizing big data analytics to assess student performance, identify learning trends, and develop personalized interventions and support strategies

Conclusion and Future Prospects

Unlimited Learning Resources

ICT facilitates access to a wealth of digital learning resources from across the globe, enabling a more comprehensive and diverse educational experience

Technological Advancements

Anticipating future technological advancements can lead to innovative applications of ICT in education, promising new opportunities for learning and knowledge acquisition

Global Educational Connectivity

Continued efforts to bridge the digital divide can result in global educational connectivity, fostering collaborations and knowledge exchange on a global scale

Lifelong Learning Transformation

The ongoing evolution of ICT in education is reshaping the concept of lifelong learning, providing enhanced learning experiences for students of all ages. At all levels of education, whether at school or College ICT has promising results. It can enhance the quality of education in several ways. New and emerging technologies challenge the traditional process of teaching and learning and the way education is managed. The integration of ICT in education is important to improve the quality of education and make it more effective. No Nation can develop without ICT based education. It is regarded as the fuel of development. The application of ICT is creating significant changes in teaching and learning at all levels ICT use in the classroom is important for giving the students opportunities to learn and apply 21st Century skill. It not only improves teaching learning process, but also provides facility of e-learning. ICT is an effective tool to provide greater flexibility in education. With the use of ICT. It is now possible for the learner to access knowledge regardless of time and space. Teachers and educational system are using ICT integrated teaching and learning process to inculcate required knowledge and skills among the students.