**EDUCATIONAL TECHNOLOGY AND ICT**

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## Module-24: E-Learning Concepts and Tools

Hello dear learners, welcome to SWAYAM-NPTEL course on Educational Technology and ICT. I am Dr. Sarita Anand from Department of Education, Vinaya Bhavana, Visva-Bharati, Santiniketan, West Bengal, India. Today the module 24 on e-learning concepts and tools will be deal and this is the lecture 24. Before going to the topic, we have already covered the concept of PM e-Vidya. objectives of PM e-Vidya, major components of PM e-Vidya, scope and limitations of PM e-Vidya and also, we had visited the PM e-Vidya website.

Now, the e-learning concepts and the tools. E-learning involves providing education, training, learning programs using electronic methods and tools. the electronic applications and technologies for facilitating learning process. E-learning is made of education where instruction is delivered primarily through computer-based technology. It is often referred as the distributed learning, distance learning, technology enabled learning because e-learning utilizes the electronic systems or the platform to enhance the education.

It can be described as structured, interactive, instructional content or learning experiences that are delivered or facilitated through electronic technologies and devices aimed at educating and informing the learners such as students or employees. E-learning also refers to the technology driven education where the internet or intranet are being used or for delivering the diverse solutions for improving the knowledge and performance. Right now, you people who are listening this lecture are also pursuing the education through e-learning. For example, e-learning can also be exemplified by various interactive approaches such as live webinars by accompanying question answer sessions

Virtual meetings and discussions facilitated by platforms like Zoom and Google Meet also contribute to social learning. Additionally, digital education content created by subject matter experts and technical teams, encompassing courses, podcasts, blogs, and e-books,

fosters social learning experiences. This course on educational technology and ICT is also the collaborative result of SMEs, subject matter experts, and their technical teams who are working with me. Characteristics of educational programs like e-learning: the first one is digital content. Learning materials are stored as digital content, reducing reliance on physical books and notebooks, and can be accessed anytime, anywhere.

Next is the use of electronic devices. For e-learning, we have to use a variety of electronic tools and instructional resources such as CD-ROMs, DVDs, the internet, and other web-based platforms for learning. The next one is the facility of distance learning. Advanced communication technologies enable learning beyond geographical boundaries, fostering interaction and collaboration between learners and instructors from different locations.

E-learning is particularly suited for distance education. It surpasses traditional classroom-based learning and its limitations. Real-time interaction: learners and instructors can interact in real time or at their convenience, promoting flexible and efficient communication that enhances the learning process. The next one is easily updated course material. Instructors can quickly update and share the latest version of course content, ensuring learners have immediate access to the current material provided by the instructor.

Expert interaction, students can engage in threaded discussion with peers, communicate with their subject matter experts via messaging systems enriching their learning experiences. Personalized learning content e-learning material can be customized to align with specific syllabus requirements and their individual needs of the students. So, when we are talking about the e-learning there are some principles for creating an effective e-learning program. There are four major principles the first one is mobile accessibility. Given that most people rely on their mobile devices, e-learning should be mobile friendly.

Training prompts, reminders and achievement notification should be delivered to the smartphones and other mobile devices through dedicated apps. Social integration. incorporation of social media like features into e-learning platforms allow learners to receive update engage with the training content and communicate with the peers and the managers here in this course also you are getting the mobile accessibility prompt information in your email account which you have registered at the time of joining this course the effective instructional design E-learning should provide a variety of content formats to cater the different learning preferences including quizzes, infographics, podcast, demonstrations and storytelling based learning. E-learning authoring tools enable course creators even those who do not know the coding knowledge to design these diverse

materials enabling the educators to develop engaging and dynamic learning experiences for their learners.

The next principle is student progress tracking and management; this is very important for any e-learning courses. Allowing the educators to monitor the student performance identify area of difficulty and provide the personalized support. Here in this case of SWAYAM-NPTEL course you all are giving the weekly assessment and me as a course coordinator I can observe your progress that you are taking the test or not, how many if you are registered for the examination, only you have joined for the sake of seeing the course content or you will be interested for the certification. These things are the coming under the four major principle of any e-learning course or the program generated. Now, we will talk about the e-learning tools. E-learning tools are range of digital software applications and the platform that facilitates online education.

These tools empower educators to deliver educational content remotely via the internet, enabling students to access the learning material through various devices including computers, laptops, smartphones and other gadgets which they can afford. Essentially, they create a virtual learning environment where students can engage with course materials, participate in assessment and interact with instructors and peers remotely. E-learning tools. A comprehensive table organizing the popular e-learning tools by their categories that can enhance both teaching and learning experiences given in next slide.

I have prepared it for you all these e-learning tools are having their category and what e-learning tools will be coming under these categories are mentioned here in this tool. I hope this will be helpful for your examination purpose as well as for your content creation when you as a teacher or as a teacher trainee will utilize this information for e-content development. So, the first one is learning management system I have already mentioned Google Classroom, Canvas, Moodle, Blackboard, etc. Content creation or authoring tools like I have already mentioned that there are many, but Camcasia or the Lactora are famous. The collaboration and communication categories are the Zoom, Microsoft team, Google meet etcetera.

Assessment and quiz tools like Quizlet, Kahoot! Socrative, and most prominently, Google Forms. The video and multimedia tools are like Loom, Screencast-O-Matic, Screencastify, and different other portals like tools. The gamification tools like Kahoot and Duolingo are very famous. Quizzes are frequently utilized by me as well. Virtual classrooms, Google Meet, BigBlueButton, Zoom, GoToWebinar, and many others are there. Jitsi you can use;

this is small software. The interactive learning tools like ThingLink and ThinkPad. The other one is e-learning authoring and designing tools like Storyline, Vyond, and Camtasia. And the mobile learning tools like Edmodo and Google Classroom, etc. These are the lists of e-learning tools; there are many more, but I have listed a few for your reference. Now, how does e-learning work? There is the concept of the 5E model of e-learning. The 5E model of e-learning is a well-established framework used to structure and enhance the learning experiences.

It is based on the constructive approach where learners build knowledge through active engagement with the content. This model emphasizes the development of critical thinking, problem-solving, and deep understanding by guiding students through the five stages. These five stages are- engage, explore, explain, elaborate and evaluate. We will go one by one through these 5E model stages.

The first stage is engage- The engage phase is the initial step in which learners are introduced to the topic or the concept. The purpose of this phase is to spark interest, activate prior knowledge, and stimulate curiosity about the upcoming content. In e-learning, this can be achieved through various methods such as thought-provoking questions or scenarios that make learners reflect on their experiences and prior understanding of what they have learned in previous classes.

Multimedia content, videos, animations, or interactive elements can be utilized to capture the attention of the learners. Real-world connections, illustrating how the topic is relevant to everyday life or the learners' professional environment, can raise engagement in the learners. To engage the learners and assess their baseline knowledge or previous knowledge, we can utilize polls or quizzes. The whole goal is to create a hook that motivates learners to actively participate in the learning process during the engagement phase.

The second stage is explore- in the explore phase, learners begin to interact with the new content in a hands-on or investigative manner. This phase emphasizes active learning where learners are encouraged to explore ideas, solve problems, and experiment with the material. In this e-learning, this can be included as interactive simulations or virtual labs. where learners can manipulate variables and observe outcomes. Exploratory tasks like research projects, scenario-based challenges, or fieldwork encourage learners to discover and investigate the given topic.

Collaborative activities such as group discussions, forums, peer assignments, or group tasks allow learners to share findings and insights. The goal is to foster discovery learning where students construct their understanding through inquiry and experimentation. The next phase is the explain phase, where learners articulate their findings from the exploration phase. This means it is an extension of the previous explore phase, and the instructor provides direct instruction to clarify the concept. This phase is crucial for building understanding and bridging any gaps in knowledge in e-learning.

This may involve instructional videos or written explanations that provide definitions, examples, or a more structured understanding of the concept. Interactive quizzes or assessments where learners are asked to apply what they have discovered or learned and receive immediate feedback about their content. The next one is discussion forums or chat rooms where learners can ask questions and engage in dialogue with instructors or peers for further clarification.

So, the purpose of this explain-phase or the third stage is to ensure that learners solidify their understanding of what they have learned till now and correct any misconceptions that may have arisen during the exploration stage.

The fourth one is elaborate- this stage or phase encourages the learner to expand their understanding by applying the concept in new or more complex contexts. This phase allows the learners to make connections to broader ideas and real-world applications, helping to deepen their knowledge. In e-learning, it can include case studies or project-based assignments that require learners to apply what they have learned too practical or real-world problems or situations.

Advanced simulations or more challenging tasks that require critical thinking, higher-order thinking, and synthesis of knowledge can be utilized here for the elaborate stage. Personal reflection through journal writing or self-assessment tools, prompts learners to think about how the new knowledge connects to their experiences, career goals, or expected outcomes of their research or understanding. This can come under the elaborate. The goal here is to allow learners to transfer their learning to different scenarios or situations, further reinforcing that the concepts are relevant and applicable in their daily lives.

The fifth stage or phase is the evaluate- this involves assessing the learners' understanding of the topic and the effectiveness of the instructional process. It provides feedback to both the learner and the instructor to gauge the progress of the learning. How have learners learned? must they gain the knowledge this can be evaluated here in this last stage. This

phase is important for reflection and for making any necessary adjustment to the learning strategies. In e-learnings evaluation involve formative assessment. like such as quizzes, peer reviews or self-assessment throughout the learning process to monitor the progress. This is the task of the instructor to evaluate or by the quizzes or the question to give the formative assessment and knowing the progress of the learner.

The summative assessment such as final examinations, projects and portfolios to evaluate the learner's overall mastery of the topic or the content taught in the classroom. The last one is feedback survey for discussions that ask learner to reflect on their learning experiences providing insights on the area of improvement for future courses. This phase encourages learners reflect on their growth and solidify their understanding while instructor can make data informed decisions to enhance the course for future learners. Thus, the 5E model offers a structured approach to e-learning that promotes active student-centered learning through engagement, exploration, explanation, elaboration and evaluation.

Through incorporation a blend of interactive and reflective strategies, the model creates a learning environment that supports the critical thinking, knowledge retention and the application of the concept to the real-life situation. It widely used in both face to face and online education particularly in science, technology and professional training context like in teacher education. Now, we will talk about the functioning of e-learning. How it functions? Online learning combines both static and interactive methods.

Static methods include elements such as learning portals, hyperlinked pages which we have seen in the PM eVidya and NME-ICT, screen capture tutorials, streamed audio and videos, and live web broadcasts, etc. Interactive methods include discussion forums, chats, and desktop video conferencing. So, what are the needs for e-learning? The educational benefits of e-learning environments are widely recognized by academics and professional organizations for their ability to enhance teaching and learning through sound pedagogical practices. To enhance communication.

Online education tools such as discussion boards, chats, and emails improve the quality of interaction between students and instructors. These tools increase motivation and participation in class activities by encouraging students to engage more actively, fostering a sense of empowerment and collaboration among students. The third one is The third need is equal opportunity. This is the most important thing: e-learning provides equal access to quality learning materials globally.

It enables students to interact with experts worldwide and share knowledge or opinions in a neutral or unbiased environment. Shy or anxious learners feel more comfortable expressing their ideas online. As it minimizes distractions like seating arrangements or classroom dynamics. Research shows that online discussions lead to more open and direct communication among students. The next one is to support different learning styles, yes.

E-learning accommodates diverse learner preferences by presenting materials in various formats such as lecture notes, slides, audio, etc. This benefits visual and auditory learners as well as students with attention challenges by allowing them to revisit the content and focus on understanding concepts without the pressure of missing any live lecture. The next one is additional learning and reflection opportunities. Online discussions and assignments provide students extra opportunities for cognitive engagement.

The process of reading, reflecting, and responding to discussion questions or essay prompts helps reinforce knowledge, leading to active learning and deeper understanding. This also reduces dependence on physical attendance while promoting self-paced reflective learning. The next one is collaborative in nature. In traditional classroom settings, students working on group projects must coordinate their schedules to collaborate effectively. It means they have to meet together at a particular time.

In distance learning, this can be even more challenging, often requiring participants to work independently. However, with e-learning collaboration tools such as asynchronous discussion forums and file-sharing features, scheduling conflicts are no longer a barrier. These tools enable students to work in a group seamlessly, allowing them to collaborate without any logistical difficulties. The next one is continuous evaluation. Assessment plays a crucial role in education, as we all know, by helping instructors gauge the effectiveness of teaching methods and course design.

They provide timely feedback to the student's progress and identify the area that need improvement. Only tools make this online tool makes the easier for the instructor to create, distribute and compile the assessments quickly and efficiently and ensuring the smooth evaluation process. The next one is providing continuous reinforcement. Yes. regular assessment reinforces the learning concept and boosts the motivation.

Instructors can share practice test and chapter reviews without the burden of manually analyzing the results. Especially the when we are taking the test by a MCQ the auto generated answers are coming that we do need not to check the copies. Students can complete these assessments or assignments anytime in the privacy of their home with

computerized grading students receive instant feedback which helps the case test anxiety or the reduces the embarrassment for those who may not perform well in their test or assessment. The next one is self-paced learning. E-learning allows learners to progress at their own pace accommodating different learning speeds. Unlike group sessions in traditional settings e-learning enables the students to spend as much time as they need on a specific topic. If you are if they are not able to understand by one chance they can go on repeating the content and try to understand as per their own speed or pace. This approach prevents the advanced learner from losing their interest while offering extra support to slower learner in the normal traditional class. With course material accessible online globally, students can decide when and how to study.

It also allows flexibility in selecting individual course modules, helping learners align their studies with their own schedule and pace as per their interest. The next point is cost effectiveness, yes while e-learning requires a high initial investment due to the use of authoring software or creating asynchronous content the long-term cost are significantly reduced. Once the content is developed synchronous program incur ongoing cost instructors but these are still lower than those of the traditional classroom training. E-learning eliminates the expenses associated with the classroom training such as instructor fees, travel, physical infrastructure and materials.

Tele-education reduces the cost by 30 to 50 percent as it eliminates the need of for learners Additionally there are no recurring cost of the instructors delivering each session renting venues or requiring equipment like projectors etcetera. The next one is anytime anywhere learning. E-learning allows learners to participate in any session from any location at any time. Making it ideal for the individual with busy scheduling who might otherwise struggle to fit in traditional learning into their routines, maybe they are dropout, maybe they have not completed their course or the degree, they can pursue the e-learning.

In e-learning compatibility with the devices like laptops, tablets, smartphones make it highly portable. Unlike traditional classroom settings, e-learning is not restricted by specific school or college hours like you are using the Swam platform. Students can send queries via email and access archived sessions as per their own convenience.

Now, the limitations:  yes, every concept has its own limitation, so the e-learning also While e-learning offers numerous advantages, it is important to acknowledge its potential drawbacks also. Recognizing the limitation is essential both when considering e-learning as a suitable learning method and when designing e-learning programs to minimize the

potential pitfalls. The first limitation is lack of motivation. One significant disadvantage is reliance on the learner's motivation. Unlike traditional classroom setting, e-learning places greater responsibility on the learner for self-directed learning, requiring strong motivation and effective time management skills. This can pose challenges for learners who struggle with these aspects potentially leading to the procrastination and failing behind their studies.

The lack of structured classroom environment also increases the risk of distractions and interruptions. Like here in this case of educational technology and ICT, if you go to the website course page you can see there are almost 2000 people have joined this course, but the but the only 100 something had joined for the examination. Definitely there is the lack of motivation for the certification and completion of the course. So, the next one is the face-to-face interaction. Furthermore, whenever we are talking or pleasing about the praising the e-learning, it can be diminishing the opportunity for valuable face to face interaction.

In traditional classroom discussion and debate among the participant facilitate learning and knowledge sharing. The idea sharing, the absence of such interaction in e-learning environment can result in a loss of valuable information exchange, decrease the learner engagement due to isolation and ultimately a decline is there in their motivation which I have already told. Then next one is the lack of equitable access to the technology, this is the bigger limitation that effective e-learning relies on learners having access to the necessary technology including reliable internet connectivity, specific devices and compatible software. It is crucial to ensure all learners have the required technological resources to access the complete course.

Moreover, the design of an e-learning program should consider the varying levels of computer literacy among the learners. The next one is lack of control. Without a structured schedule or set learning times, it can be difficult for some learners to maintain consistency and meet deadlines. For example, weekly assignments have deadlines, final assessments have deadlines, and if you are not completing them, this lack of routine can lead to disorientation or disorganization and hinder the learning process of the learner. The next one is limitation of learning style. Definitely, each individual has their own learning style.

E-learning may not cater effectively to all learning styles. While some individuals learn best through visual aids, others prefer textual information, and still others require hands-on experiences or interactive discussions. So, designing an e-learning program that effectively accommodates these diverse learning preferences remains a significant

challenge. Next one is isolation and lack of support, which I have mentioned they can feel isolated in an e-learning environment compared to a traditional classroom. Immediate feedback and support are readily available through face-to-face interaction with the instructor or teachers and with peers, whereas, e-learning often lacks this level of immediate support, potentially leading to frustration and demotivation among learners who may disappointed.

The next one is technological challenges. The effectiveness of e-learning heavily relies on the availability and accessibility of technology. Ensuring all learners have access to compatible devices, stable internet connectivity, and necessary software can be a significant logistical challenge. Many times, technical glitches and unreliable internet connections can disrupt the learning flow and negatively impact the overall learning experience, particularly in global e-learning initiatives where technological infrastructure and reliability vary significantly across regions.

Next is, computer literacy concerns- definitely, this is also a big limitation regarding e-learning, as it requires a certain level of computer literacy among learners. Individuals who are not comfortable using computers, either due to lack of experience or limited exposure, may find e-learning daunting and challenging. The very fact of navigating e-learning platforms and interacting with learning materials can be a barrier for these learners, potentially hindering their ability to effectively absorb and retain information. So, computer literacy is a must or an essential criterion for e-learning.

Now we can conclude that e-learning is revolutionizing the way we learn. With continuous technological advancements, the future of e-learning holds immense potential as technology evolves. We can expect even more innovative and engaging learning experiences that cater to diverse needs and learning styles. While e-learning offers significant benefits, it is important to acknowledge its limitations too.

Factors like the digital divide, potential for isolation, and the need for strong instructional design must be carefully considered. A balanced approach that combines the strengths of e-learning with the value of human interaction is likely to yield the most effective learning outcomes. These are the references for your further reading. I hope you will go through them.

Thank you.