ICT Resources for Teaching-Learning Process

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Abstract

ICT is a big buzzword for its use in education. A lot of emphases is on the integration of ICT technologies in the teaching-learning process. Consequently, the teaching-learning process is shifting from chalk and talk to online mode. The pandemic COVID-19 exponentially accelerated this process in education. But this also created a lot of hitches in front of the stakeholders, the paper presents a wide-ranging overview of the use of ICT in the teaching-learning process. It also discusses abundant digital tools which can be used to make teaching learning more effective.

Introduction

The exponential development of technology and easier access to information has brought tremendous changes in the social, political, economic and educational fields. This change further accelerated due to the Covid-19 pandemic. The pandemic brought the whole world to instil, including education. That's why the use of digital technology in education has already gained acceptance. The need is to educate the teachers, students, parents and school administrations to manage the new technologies, become able to solve the problem with the help of technologies and make a decision. This has tipped the balance between skills and knowledge slightly more in the direction of skills, particularly problem solving and thinking skills.

The teachers, researchers and experts in the field of education are continuously putting their effort to raise the standard of the student's achievements in their learning process by examining how students learn effectively.

To deal with the sudden transition from face-to-face teaching mode to online teaching mode, the institutions have developed some alternative plans, under the guidance of various agencies like the ministry of health, MHRD and UGC, etc.

The UGC has issued guidance to conduct online classes smoothly in which UGC suggested reducing the curriculum, flexible timing of online classes, alternative ways of assessment and evaluation. The teacher education institution also shifted to online mode. At an earlier stage, most of the teachers were not prepared to deal with such a situation because they were not skilled enough to use online platforms for the teaching-learning process (TLP). Universities organized several workshops, short-term courses and webinars to train the teachers to harness the opportunities in this diverse situation. These initiatives play a significant role in enabling teachers to utilize online resources fruitfully.

As we know the Covid-19 pandemic pushed the teachers to the limit in every aspect of life but the leverage

of technology, especially digital technology, provides learning continuity when the students cannot be present in the classroom (Anna Dabrowaski, 2020). However, there are several barriers to the success of the online TLP ranging from teachers' and students' preparedness, easy access to the online resources and devices and student support at home.

ICT Resources

ICT is a diverse set of technological tools and resources used to communicate and to create, disseminate, store and manage information". According to National Policy on ICT in School Education (2012) "ICTs are defined as all devices, tools, content, resources, forums, and services, digital and those that can be converted, into or delivered through digital forms, which can be deployed for realizing he goals of teaching-learning, enhancing access to and reach of resources, the building of capacities, as well as management of the educational system. ICT tools can be employed to improve the learners' ability of understanding. García-Valcárcel (2014) goes so far as to say that the ICT becomes the channel for communication and information that is essential for guaranteeing learning environments that are open, interactive, replete with incentives, sources of information, motivating for students, and focused on developing skills.

The use of ICT as a resource of TLP has the following functions:

1. It promotes, arouses and maintains the learner's interest.

2. It enables the learner to organize information, create new knowledge, link the knowledge and apply it to new situations.

3. Provide an environment for learners to create and express ideas.

4. It guides the learners' learning.

5. It provides the opportunity for learners to assess knowledge and skills.

6. It provides an environment for observation, exploration and experiments with simulation, animation and videos.

ICT aids are employed in the teaching and learning process, it involves most of the sensory organs of students and also makes learning more real to students (Abdulai & Akaglo,2020). In Edgar Dale cone of experiences, the cone shows the progression of learning experiences from concrete to abstract rather than as a prescription for instruction with media (Lee & Reeves,2007). Edgar Dale introduced the modern media in education, postulated the "Cone of Experience". The arrangement of Dale's cone of experiences is not based on difficulty level but abstraction and also several senses involved in learning. The cone of experiences can be categorized into 11 stages starting from concrete experiences at the bottom of the cone and becoming more and more abstract as we move upward to the peak of the cone. Thus, the moving from verbal symbol (Peak of the Cone) to direct and purpose experiences, the degree of abstraction gradually decreases and learners become more participative Edgar Dale's cone experience recommends more learning from reality, simulation and various types of active and experiential learning (Lee & Reeves,2007; Abdulai & Akaglo,2020). The ICT resources use multiple senses in the formation of experiences. The selection of these resources or tools is responsible for bringing a change in the classroom environment. The availability of a wide range of such teaching-learning material will catalyze the transformation of classrooms into ICT-enabled classrooms. Therefore, the teacher must be competent enough

to select and critically evaluate digital content and resources. Initially, the teachers may start with the computer lab, later on, more classrooms can be equipped with appropriate ICT resources making way for ICT-enabled classrooms.

ICT Resources for the TLP

The development of digital technology provides an abundance of ICT resources and tools to enhance the teaching-learning environment. Various ICT resources can be analyzed based on their use in the TLP. The ICT can be categorised as:

- Informative resources
- Collaborative resources
- Learning resources
- Resources for assessment and evaluation
- Resources for professional development

ICT as an Information Resource

The use of ICT has become increasingly important in academics and most of the academic activities are switching over to ICT-based resources and services. It has opened new avenues like online learning, e-education, e-journal, CD-ROM Database, e-books, web-based resources, etc. (Singh, Krishna & Jaiswal, 2014). The major resources of learning before the invention of digital resources were libraries only. The development of ICT-based technologies forced most libraries, not only in India but all over the world to go online and become a rich source of information. The National Digital Library of India (NDLI) is a huge resource of digitally available learning resources written by millions of authors across various subjects in different languages. The National Repository of Open Educational Resources (NROER) is another huge resource of learning materials for school and teacher education. Similarly, DIKSHA (Digital Infrastructure for Knowledge Sharing) also considered as One Nation One digital Platform is a storehouse of educational resources which is available as a portal and app as well for easy access to all.

This highly developed digital environment provided a scenario to teachers and learners with ample flexibility and an abundance of learning content and direct access to it. The internet enables the teachers as well as learners to find out additional information to address a topic from basic to advanced levels. For example, if you search 'teaching and learning' on Google, you will get billions of pages in less than one second. Thus, the internet becomes a huge resource of information. Online databases are also some other ICT resources that provide information.

ICT as collaborative resources

The learning environment depends on engagement among stakeholders. No engagement means no attention, no attention leads to no effective instruction, no effective instructions lead to no sufficient development regardless of whether the technology is used or not. The learning environment can be enhanced by the collaborative learning process. The collaborative learning approach involves teamwork and is based on the constructivist theory of learning. The constructivist theory of learning refers to the learners constructing their knowledge upon the foundation of their previous learning. This type of learning has many academic, psychological and social benefits. Collaborative learning is a way of constructivist learning and it encourages students to see situations from different perspectives, creates an environment where they can practice social and leadership skills (social

benefits) and provides a satisfactory learning experience that significantly reduces anxiety (psychological benefits) (García-Valcárcel, 2014). Collaborative learning works very efficiently with ICT; it places the learners in the process of generation, managing and sharing of information by interaction with each other in a virtual community driven by ICT resources.

Thus, collaboration is the cornerstone for the success of technology-enhanced learning in the classroom. At this time, most of the learners use the internet through their smart mobile. Therefore, most of the social networking sites, the forum moved to inform of the app. Facebook, WhatsApp, Google classroom, Edmodo, YouTube, email, blogs, wikis are some of the examples of collaborative tools in the TLP. The Edmodo and Google classrooms are very easy to use among all collaborative resources.

ICT as a learning resource

ICT learning resources offer the possibility of acquiring knowledge, attitude and procedure during the TLP (Gonzalez, 2011). ICT can supplement learning activities by using several ways, such as digital educational resources, interactive tutorials, simulation, eBooks and open knowledge reinforcement exercises.

ICT-based learning resources provide a lot of teaching-learning materials created by teachers, educators, experts, researchers and learners. Interactive tutorials provide enriched learning materials with pictures, animations, simulations and videos. The most interactive resource for learning can be simulation. The simulation is a type of modelling that provides an opportunity for the learner to engage in the construction of knowledge and experiences by experimenting with the model. Thus, the simulation provides a constructivist environment in which the learner learns the thing by "learning by doing approach". Just as children do simulation activities by role-playing, adults use computer simulations to understand complex systems, real situations or dynamic processes. The simulation model is very useful for science subjects. The virtual laboratory allows the learners to perform experiments from anywhere at any time without using the actual laboratory (Bajpai, 2013).

The educational electronic books (eBooks), audios and videos, podcasts are other digital resources that enable learners to enhance and create their knowledge (Gonzalez, 2011). There are various e-resources where anyone can find a large number of e-books, videos and audios on different educational subjects. ePathshala, a digital initiative of NCERT provides a large number of eBooks, videos, audios and other educational resources for students, teachers, parents and researchers.

ICT as resources for assessment

The term 'assessment' in education means the procedure that is used to collect information about the knowledge, attitude and skills of a learner. Based on the assessment, the teacher judges the student and gives feedback on their progress, strength and weakness. Thus, the assessment plays a vital role in the educational process. The rapid development of ICT in education enables the teachers to use different technologies and their applications to assess the students' progress. ICT-based assessments can be various types i.e. computer or laptop-based and mobile device-based. With the help of ICT, a teacher can assess the students' performance in different formats i.e. text, image, audio, video and simulation-based.

- Computer-Assisted Assessment or Computer-Aided Assessment (CAA);

- Computer-Based Assessment (CBA)

Computer-assisted Assessment

Computer-assisted assessment refers to the use of a computer to facilitate, manage and support the assessment and evaluation of the learners' progress. A teacher can use CAA at any stage of the TLP. CAA is mostly used for scoring multiple-choice questions and questions with short-answer responses using an optical mark reader (OMR). The CAA can be used to identify the learners' difficulty in the subject of trends and patterns within the learners' group. It can be also used diagnostically to identify students who would benefit from extra direction or support.

Computer-based assessment

Computer-based assessment (CBA) is generally done by the computer. It is used mostly in digital tools for assessment-related activities. It can be used for summative, formative or diagnostic purposes. This type of assessment includes multiple-type questions (MCQ), other objective type questions, essays and short answer questions. This type of assessment can be used from anyplace and anywhere with laptops, tablets and smartphones. This type of assessment is an integral part of e-learning teaching and training. For example, the assessment tools of google classroom are computer-based assessments. The concept mapping tools are also part of it.

ICT as a Resource for Professional Development

The professional development of the teachers is another important factor that can influence the teaching-learning environment in the classroom. Professional development means the acquisition of skills for personal and career development. There are various courses such as in-service and pre-service courses, designed for the professional development of the teachers. Ahmad & Chopra (2015) emphasized that the teachers have to be fully equipped to integrate ICT in their pedagogy. For this, they need extensive training on how to use ICT in their TLP. The pandemic COVID-19 also established the fact that teachers need a Continuous Professional Development program on ICT integration in TLP. The enhancement of ICT especially, MOOCs provided the opportunity to design and develop tailor-made courses for career advancement. Different institutions and organizations developed and are developing a large number of courses according to the needs of the learners. There are various platforms that provide these courses either free of cost or on nominal fees such as Coursera, edX, Udacity, Ivercity, NovoEd, Udemy, SWAYAM, etc. The SWAYAM is developed by the Government of India, which provides a platform of learning for various courses of school education, graduation, post-graduation, professional education of different streams. Besides this, the teachers can also use BLOGS, social sites, social bookmarking, podcasts and YouTube to share ideas, opinions and understanding of any topic.

Final discussion

The COVID-19 shifted the whole education system online. This sudden shift created a lot of problems in front of the stakeholders of education i.e. teachers, students, parents and school administration. Where it created a lot of problems, it also provided the solution to various problems. Due to this online education, the TLP has been continuously moved on. But the use of technology in education gives us some lessons also, such as;

- **No technology is a panacea for education**

  Most current, capable digital technology resources do not offer quick easy or universal solutions for educational problems. The digital technologies, materials and strategies are usually tools in a larger system and must be integrated carefully with other resources and with teaching activities.

  The pandemic COVID-19 forced stakeholders of the education system to shift to digital technologies for continuing education. But the overuse of digital technologies can create more problems than the solution provided by it in education. Judicious and realistic planning is necessary to harness the potential of digital technologies in education (Roblayer, 2011).

- **Teachers usually do not develop the teaching materials and curriculum**

  Teaching is one of the most time and labour-intensive jobs in society. Generally, the teachers do not develop software or create complex technology-based teaching materials. Most of the time the companies, personnel in funded projects at different levels develop the learning materials. This is one of the most crucial issues in the field of digital education. Because those developers develop the learning materials by generalized needs. Therefore, these learning materials fail to cater to the local needs. Unless teachers are not involved in the field of material development, the local needs will always be left out.

- **Technically possible but not equally desirable and feasible**

A popular saying is that today's technology is yesterday's science fiction. But science fiction also shows us that technology brings undesirable as well as desirable changes. For example, ICT has allowed attending professional conferences online, rather than traveling to another location, but it is also correct that people continue to want to travel and meet face to face (Roblayer,2011). Human cloning is technologically possible but not acceptable in society. Technology demands us to become a critical consumer of its power and capability and also decide which science fiction can become reality.

- **Things change faster than teachers can keep up**

  The resources and methodologies of teaching are changing continuously. Technological development further accelerated this change. Gone were those days-if, indeed, they ever existed, when a teacher could rely on the same handouts, homework, or lecture notes from year to year. It is very difficult to predict the new technological development in the field of education but it would be different from the present. That's why, the teachers must anticipate and accept the inevitability of change and the need for continual investment of their time (Roblayer, 2011).

Conclusion

The development of ICT technologies changes the teaching-learning environment. The teaching-learning process is now moving from traditional chalk and talks to an ICT-enabled environment. The real change in classroom teaching will be visible when the teachers will be able to integrate the ICT in every spare part of the TLP,

whether it is an objective formulation, contents selection and methodology of teaching or evaluation in the classroom. A good education depends upon the good teacher, in the same way, the effective integration of ICT in the TLP depends upon the teachers with good ICT skills. There are various ICT resources especially, MOOCs which provide tailor-made courses for teachers' professional development. Besides this, Blogs, digital bookmarking, simulation tools, podcasts, YouTube, etc. provide the opportunity for the teachers to develop their professional skills related to a different field. Thus, the teachers need to keep themselves upgraded with new ways of teaching. Today is the age of videos and podcasts and children can easily learn through this interactive media and hence teachers of the current era need to keep up with the current technology (Rani & Surana, 2015). A good teacher needs to explore themselves and try innovative educational measures to teach children.

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