NO BOUNDARIES ON EDUCATIONAL TECHNOLOGY TOOLS FOR TEACHING, LEARNING AND RESEARCH

Dr. N. Sundar

Librarian, Thiagarajar College of Preceptors, Madurai, Tamilnadu, India

Abstract

Traditional (classroom) learning became impossible across the world and institutions adopted functioning virtually due to corona virus 2019 epidemic. Numerous open source and paid versions of online educational tools are available for teaching and learning. Crisis comes always with opportunities. Like-wise, during the lock-down period, people got the limitless chances to explore numerous educational technology tools for teaching, learning and research. The paper aims to explore the available educational digital tools in eight different categories. Some of the tools are fully free or open sourced and few of them are paid. Few examples along with desired web links are given. The most common issue in conducting online classesis adaptability. Engaging students in avirtual classroom environment is not much difficult, if the tutor or instructors use interactive tools to keep them fun and actively engaged.

Keywords: *Educational Technology; Educational Tools; Interactive Learning; Mind Mapping; MOOCs; Info graphics;*

Introduction

Once Tanya Byron said, "The technology itself is not transformative; it's the school, the pedagogy that is transformative". During the COVID-19 pandemic, educationalist and students had great chances to explore the vast educational technology tools through the online course and free webinars. Educational institutions across the globe have closed due to the COVID-19 pandemic. According to UNESCO, over 60% of the student populations have affected worldwide because of the closure of institutions. The educational digital tools divided into eight major categories such as Learning Management System (LMS), Massive Online Open Courses (MOOCs), Mind mapping, Interactive tools, Web conferencing, Info graphics, Research visibility tools, and Web-based Content Management Systems. The author of this paper has already explored few of the open educational digital tools such as Google sites, canva, GitMind and flip html. The content management system was explored for designing website by using Google sites and published.

The major challenges using online educational tools are adoptability, technical issues which including internet connectivity and required device for accessing. Castelo (2020) noted that Google provides the access for students' event if they do not have internet to continue education by using Chrome books and G Suite.

eLearning

Integrating educational technologies in online teaching is vital. eLearning is the trend of education during the corona virus pandemic. Teaching and learning through electronic resources is called eLearning or remote learning or virtual learning. This is more convenient for both teacher and instructors. In other aspects, there are many opportunities to explore and integrate different types of educational digital tools in online teaching. Students get motivated and excited while exploring new tools like Infographics, Mind mapping and Online Quizzes. These tools support students for easy understanding and remembering the concepts. Assessment tools are very useful for faculty members, because results can be announced in immediate basis. Learning Management Systems (LMS) supports a lot for systematic course delivery, other plug-in facilities.

Educational tools and resources

The virtual future is precisely trendy now and vast online educational tools accessible for enhancing teaching, learning and research. Using different technology tools in an online classroom provokes students' interest. Figure 1 shows the major categories on available educational tools for classroom teaching.

Figure 1 Educational Tools (Created by Using GitMind)

Learning Management Systems (LMS)

Traditional teaching methods with classroom, textbooks, printed handouts, and assessments are no longer required. It is almost replaced by the ICT to provide online teaching methods by using Learning Management Systems. Electronic learning environment facilitates safe, secure, reliable and convenient platform for its users. Chaubey and Bhattacharya (2015) denoted that LMS is web or cloud based online platform which supports in online teaching and learning environment. It helps effective digital instruction, delivery of course in a systematic way. Kraleva, Sabani and Kralev (2019) investigated and analyzed popular 36 LMS system and symmarized in three main tools such as Learning Skills, Communication, and productivity tools. The essential best features on LMS are integrated online classroom, course management, Assessment tools, Plug-in, reports, communication management, and Data Storage, etc. The best few open source learning management systems are listed below;

- Google Classroom (https://classroom.google.com/)
- Moodle (https://moodle.org/)
- Sakai (https://www.sakailms.org/)

MOOCs

Massive Open Online Courses (MOOCs) provides online courses through internet which acts as a professional development digital tools for teaching and learning. Baturay (2015) noted that MOOCs signifies open access, virtual-based instructions, and global content. Its characteristics are open, participation and Distribution. Faculty members can act as a resources person to share their knowledge to the students' community. Large number of learners can join the courses through internet connectivity at their convenient and hassle free distance learning. There are few of the most popular MOOCs platforms listed below.

- SWAYAM (India) (https://swayam.gov.in/)
- Khan Academy (USA) (https://www.khanacademy.org/)
- Open2Study (Australia) (https://www.open2study.com/)

Mind-Mapping Tools

Mind mapping is a visual thinking process and graphical drawing display with a central concept, idea or subject without any limitations. In general mind mapping describes brainstorming ideas and create one's mind map relationship with the concepts. It helps to create concept map, storyboard, flowcharts, and much more. The main features of mind mapping are export in multi-format such as JPEG, PNG, etc, easy for presentation. Davies (2010) explained that mind mapping permits to recognize the relations between central concepts. Concept mapping permits for understanding the associations between central concepts and domains to its belongings; argument mapping is allowing user to show the likely relationships between propositions and contentions and evaluate the concepts structure. Numerous open source mind mapping tools are available for creating, sharing and publishingone's thoughts. The best open source mind mapping tools are listed out;

- GitMind (https://gitmind.com/)
- Freeplane (open source)
- Freemind (open source)
- Compendium (open source)

Interactive Tool

Interactive applications enable opportunities to the learners more engaged, and keep them active in virtual learning environment. Interactive learning environment encompasses motivating students, and engaging them to accomplish tasks and solving problems in a fun way. Interactive tools allow conducting virtual classroom, creating

different types of digital assessment in fun manner and real time results. Teachers can provide assignments, conduct quiz and exams, distribute and collect results quickly.

- Gimkit (https://www.gimkit.com/)
- Nearpod (https://nearpod.com/)
- Padlet (https://padlet.com/)
- Kahoot (https://kahoot.com/)
- Testmoz (https://testmoz.com/)
- H5P (https://h5p.org/)
- Wigflip (https://wigflip.com/)
- Webestools (http://www.webestools.com/tools.html)

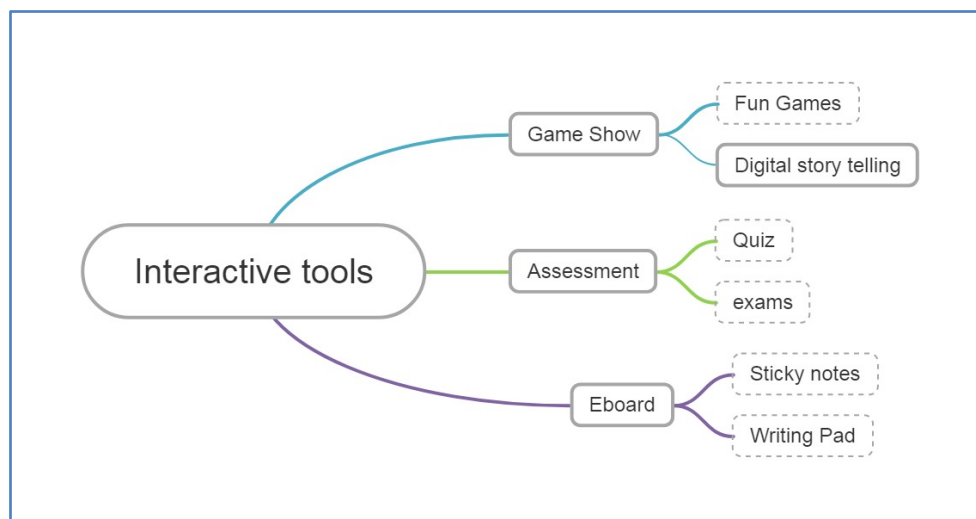**Figure 1 Sticky Note (Created by using webestools.com)**

Figure 2 Interactive Tools

Web conferencing

Online conferencing tools allow participants to join together using internet for visual communication. Suduc and Filip (2009) categorized web conferencing into two

categories such as software facilitate only audio and video supports and the other one offers features for recording, screen sharing, chat, collecting feedback, and white board, etc. During this covid-19 lock down, people had opportunities to use the video conferencing software at a large extend in work-from-home scenarios. Some of the applications are free and some of them are paid version with more meetings control options. Online conferencing platforms have certain limitations and price varies depends up on its features. Zoom had tremendously used by the people across the world and usage increased enormously.

- Zoom (https://zoom.us/)
- Free Conference Call (https://www.freeconferencecall.com/global)
- Google meet (https://meet.google.com/)

Zoom User Statistics	
Zoom peak daily meeting participants*	
December 2019	~ 10 million
March 2020	200 million +
April 2020	300 million +

Figure 3 Zoom Usgae Report (Source:BuseinssofApps)

Infographics

Infographics are the excellent tools to createvisual images and diagrams for attracting students.

The awesome ways to retain student's active learning in the classroom with more interactive sessions. It defines information with quick graphics visual demonstration for clear understanding. Murray etal. (2017) meant that information graphics use pictures and data visualizations like pie charts, bar chart and line graphs to display the research data in an attractive way and also increase values by understanding. Inforgraphics can stimulate student's critical thinking to understand the concepts visually. There are many online tools accessibleon the web for creating infographics such as icons, illustration, photos, and figures. Student dislike writing assignments and they can create infographics and submit their visual assignments.

- Piktochart (https://piktochart.com/)
- Canva (https://www.canva.com/create/infographics/)
- Venngage (https://venngage.com/)

Research Visibility

Being an author or researcher, this is part of their responsibilities to stand-outfrom the crowd of publications to get more visibility, cited and reach further

audience. To get widest visibility, researchers could possibly archive articles in the open digital repositories, register into ORCID, posting articles with DOI (Digital Object Identifier) links in social media, use the same name and affiliation, create Google scholar profile, bookmark with referencing sites such as Mandeley and Zotero, research collaboration with other institutions, create own websites and blogs with showcasing research works. Profile updation along with your publications in social networking sites by writing effective abstract and opt keywords audience likely to use. Few most popular research visibility social networking tools are listed below;

- Academia (https://www.academia.edu/)
- Google Scholar (https://scholar.google.com/)
- Linkedin (https://www.linkedin.com/)
- ResearchGate (https://www.researchgate.net/)

Content Management Systems (Websites/blogs)

Creating websites or blogs for promoting your profile and research visibility are become easier for not-techies in recent days. There are many free web tools are available to create digital profile, websites, and blogs in simple steps without hassle. This may be harder to some extent to get started. The features are very flexible drag and drop, in-build coding. So there is noneed for coding skills. The professional websites and blogs can be created with engaged contentto reach the world. Your personal websites and blogs reflect your passion and who you are. Few popular web tools are given below with hyperlinks.

1. WordPress (https://wordpress.com/)
2. Google sites (https://Sites.google.com)
3. Blogger (https://www.blogger.com/)
4. Canva (https://www.canva.com/websites/templates/)

Challenges

Online learning is more convenient for both students and teachers. But still participants face lots of common issues on eLearning. Shifting traditional teaching methods into virtual learning, instructors and students are having technical issues with limited Internet access and suitable technology devices for teaching and learning. The most common issue is adaptability. Motivating students into online learning and keep them engaged are the big challenges. Lack of Instructors' computer literacy becomes problematic on Course management and assessments systems. In addition, spending long hours on computes may cause physical health issues such as muscle pain, eyestrain, sometime leads to anxiety and depression. These issues can be avoided by providing proper orientation, computer training and health tips.

Conclusion

Engaging students in an online classroom environment is not much difficult, if faculty members using interactive tools to keep them fun and actively engaged. Tutors have to enhance their technical skills to explore available digital tools and adopt those tools in virtual classroom. During this Lock-down and work-at-home scenario is the right time to explore various educational tools and use them on the online-class.Educational interactive tools can replace the traditional boring teaching and learning methods. Students can be more actively participate and submit digital and video assignments. Course instructors can conduct online assessment and distribute results in real time.

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