INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X
Impact Factor: 6.078
(Volume 7, Issue 5 - V7I5-1380)
Available online at: https://www.ijariit.com

Use and effectiveness of online learning with animated contents amid COVID-19

Aravind N.
narayanan.aravind34@gmail.com
K R Narayanan National Institute of Visual Science and Arts, Kanjiramattom, Kerala

Dr. S. Jenefa
mkudjschod@gmail.com
Madurai Kamaraj University, Madurai, Tamil Nadu

ABSTRACT

COVID-19's impact may be seen across the world, and it affects all sectors equally. The education sector worldwide is also suffering, which is impeding the educational process. Total lockdown, which was imposed in 42 countries, harmed students' lives. The pause in the educational process has impacted around 1.277 billion pupils around the world. While change is unavoidable, COVID-19 has proved that growth is optional. This situation has compelled every educational institution to invest in ICT (Information and Communication Technology) to experiment with new ideas, such as animated teaching and multimedia in online classes. This article focuses on how online learning can be made effective during times of crisis by utilizing multimedia tools and animation. As a result, various online learning multimedia technologies and strategies that can assure learning continuity are emphasized.

Keywords— *COVID-19, Online Education, Self-learning, Effectiveness, Animation, Multimedia tools.*

1. INTRODUCTION

COVID-19, as it is now known, first debuted in Wuhan, China, at the end of 2019. In a short amount of time, COVID-19 has become a public health calamity and one of humanity's most serious tragedies [1]. COVID-19's rapid spread over the globe prompted the World Health Organization (WHO) to proclaim it a "pandemic" as of March 2020. The COVID-19 situation has forced authorities to choose between halting offline learning to guarantee public safety or operating them to ensure that students' education is not disrupted [2]. However, because saving lives and maintaining health is the most profound concern for every individual and nation, more than 190 countries have shuttered educational institutions until the situation improves, affecting 90 percent of the student community around the globe [3-5].

India's government has also taken the necessary precautions to protect its citizens from pandemic-related dangers. Due to the rapid spread of the illness, 'The Janta Curfew' was implemented, and people were advised to stay at home during the lockdown. Schools and institutions were also closed. The closure of schools, colleges, and universities has wreaked havoc on the educational system. According to UNESCO, about 1.725 billion students are affected by school closures worldwide, with 320 million in India as of May 18, 2020 [5]. India's educational infrastructure contains 1.5 million schools, 250 million students, 9.4 million schoolteachers, and 50,000 higher education institutions, according to Unified District Information System for Education (UDISE) data. This accounts for 72 percent of the global student population, and if the trend continues, Indian children's access to education may be jeopardized [6].

Education is regarded as a country's foundation and backbone. School learning is a critical component of a child's total development. Participating in co-curricular activities helps youngsters develop their social skills, personalities, and motor skills. Students follow a strict learning plan and work in a disciplined manner when they go to school [7]. Educational institutions may be closed in certain situations, but the flow of education cannot be stopped. As a result, educational institutions have shifted to an alternate teaching mode, learning, i.e., online teaching, to compensate for the loss of learning caused by school closures and reduce their impact on education [8].

Globalization and enormous technological advancements characterize the twenty-first century. During this pandemic crisis, it has ushered in a massive upheaval in the sphere of education. Teaching has become much more exciting and productive because of

technological progress. One of the specialized tools that have made teaching and learning possible is multimedia technology. Over the last decade, the exponential expansion of multimedia applications has resulted in a massive shift in the fundamental concept of data storage, transfer, and presentation. Academicians and professionals acknowledged the importance of computer-based multimedia learning to maintain education relevant to today's world. Several studies have demonstrated that using multimedia resources in the classroom dramatically improves students' learning and retention capacities. Even while these options can't totally replace the advantages of schools, they can let students learn at their own speed while still staying at home.

In industrialized countries, where most of the population is online, and schools are already adopting online teaching methods, transitioning to an online manner of teaching has been relatively simple. Even so, in developing nations like India, where online learning is less common, this move has presented significant obstacles [9]. The first and most critical problem is ensuring that students have access to digital devices and high-speed internet connections to participate in online learning activities [10,11]. Other issues to consider are electricity supply reliability and digital device ownership. The digital abilities of teachers and students are the most critical aspect determining online instruction [12]. Some experts predict that as instructors and students become more comfortable using technology in the classroom, the crisis will lead to a radical shift within education system.

On the other hand, others see online teaching as a stopgap measure until proper classroom instruction can be restored [13, 14]. However, online learning has its own set of obstacles and limitations. For a country like India, the key challenges are the absence of digital infrastructure in remote and rural areas and teachers' lack of familiarity with technology-based platforms for teaching.

Although the concept of ICT (Information and Communication Technologies) is not new, many people are unfamiliar with using it for regular online lectures. Educators understand that technology is never neutral and that anything new must face some opposition [15]. COVID-19 infections could take months or longer to eradicate, and parents cannot put their children's lives in danger by sending them to school until then. Students will have to rely on online learning until that time comes. According to multiple studies, teachers confront a variety of obstacles when teaching online, and as a result, the teaching process is unsuccessful. This paper aims to learn about the numerous multimedia tools/platforms that both students and teachers are familiar with and assess their usefulness. In the COVID-19 age, this review looks at the efficacy and necessity of online teaching using multimedia tools and animations.

2. ONLINE LEARNING DURING COVID PANDEMIC

Online learning is urgently needed to keep up with the pace of growth in the education sector, which is aided by information technology and driven by the digital era. Online learning is a flexible process that can take place at any time and from any location. The emergence of the COVID-19 pandemic has thrown the world's balance off. Therefore, it's critical to be cautious, which can only be accomplished by engagement with others. The disruption of learning in this scenario can be mitigated by utilizing online learning [16]. Online learning, according to study, enhances information retention and takes less time, hinting that the changes caused by the coronavirus may be permanent [17].

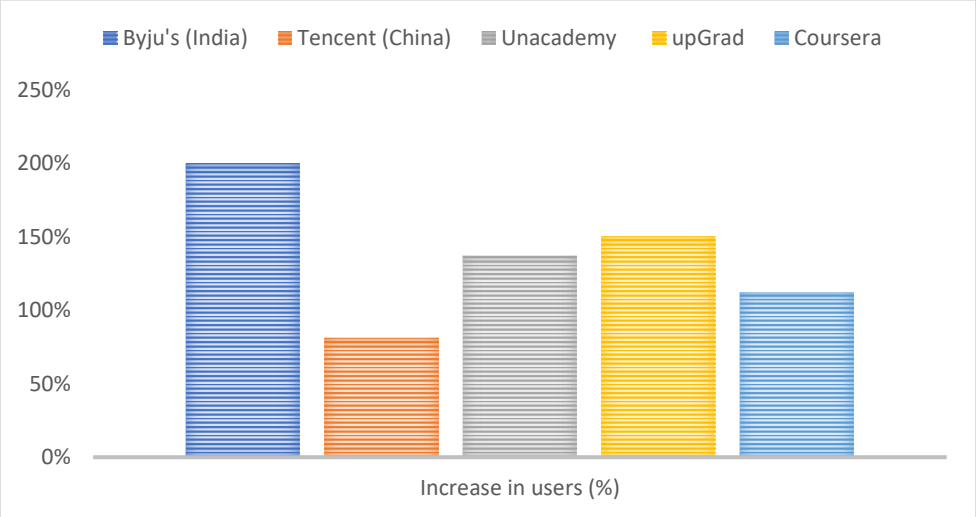

Figure 1: Increase in percentage of users for various online educators' applications

There has been a significant increase in the use of online applications, virtual courses, video conferencing software, and online learning software since COVID-19. In response to high demand, many online learning platforms, like BYJU'S, are providing free access to their services. BYJU administrators claim that since providing free live classes on its Think and Learn app, the number of new students using the programme has increased by 200 percent [17]. According to a World Economic Forum study released in April 2020, online classrooms are on the rise, and online educators' applications are thriving (Figure. 1).

COVID-19 undoubtedly hurts educational systems around the world. This, however, has provided an opportunity to investigate the possibilities. Online learning has a place, and it is now up to us to realize its potential fully.

3. GOVERNMENT'S INITIATIVES FOR ONLINE LEARNING DURING THE COVID IN INDIA

The country is experiencing multiple crises in various areas because of the Covid-19 outbreak, but the education sector has been affected the worst. Students and teachers are battling to get an internet connection that is both reliable and consistent.

Simultaneously, the country should not jeopardize students' much-desired academic advancement. As a result, educational institutions should use innovative approaches to address the endemic challenge, such as online learning. During the lockdown, many Indian state governments are looking into using an online learning platform to access online educational resources. They're trying to figure out how to keep students learning throughout the Covid-19-related state-wide lockdown. The goal is to ensure that the lockdown does not disrupt students' academic cycles. The University Grants Commission (UGC) encouraged online classes across various campuses to ensure that students did not miss any classes during the lockdown. Students are encouraged by the Ministry of Human Resource Development (MHRD) to continue their studies utilizing online learning technologies to ensure that their education is not disrupted and that they have full access to classes as before. Students can use online learning platforms to obtain full access to study materials, participate in online classes, and communicate with teachers like they would in a real classroom. A list of some of the MHRD and UGC's digital activities for schoolchildren, UG and PG students [18] is as follows:

1. **SWAYAM online courses** provide learners with unrestricted access to the best teaching and learning tools formerly available only on the SWAYAM platform.
2. **SWAYAMPRABHA** is a collection of 32 DTH channels that offer high-quality educational curriculum-based course content in a variety of subjects. These channels can be accessed for free over the air or through your cable provider. The televised films/lectures are also available as archived videos on the Swayamprabha website.
3. **e-PG Pathshala** offers high-quality, interactive e-content in 70 postgraduate subjects, with a variety of modules (e-text and video).
4. **National Digital Library** has a wide collection of academic materials in a variety of formats for students of all academic levels.
5. The **CEC-UGC YouTube channel** has a growing library of educational curriculum-based lectures available for free.
6. **Vidwan** is a national expert database that connects peers, possible collaborators, funding organisations, policymakers, and researchers with information about experts.
7. **Shodhganga** is a digital archive platform for Indian Electronic Theses and Dissertations, with about 2,60,000 of them. PhD candidates can upload their theses online and make them available to the entire academic community.

4. MULTIMEDIA TECHNOLOGY'S APPLICATION STATUS, AND NECESSITY IN ONLINE LEARNING

In the twenty-first century, science and technology have expedited the development and renewal of various industries, with multimedia technology being one of the fastest developing. With the advancement of society and people's needs, it has become widely used in a variety of businesses and fields, most notably in education sector. The widespread use of multimedia technology has significantly enhanced our country's teaching level compared to the past. Multimedia technology helps in gaining a broader and more in-depth understanding of various information in all disciplines, as well as a deeper comprehension and mastery of common abstract topics.

Multimedia uses technology to combine multiple media types such as text (alphabetic or numeric), symbols, graphics, photos, audio, video, and animations to improve knowledge or recall [19]. For better expression and comprehension, it supports spoken instruction using static and dynamic pictures in the form of visualization technology [20, 21]. Multimedia technology refers to the gear and software used to create and run multimedia applications [22]. Integration, diversity, and engagement are some of the properties of multimedia technology that allow people to exchange information or ideas using digital and print materials. The terms "digital" and "print" in this sense relate to multimedia-based apps or tools that are used to communicate information to individuals for them to understand concepts better. Figure 2 shows the multimedia-based learning tools.

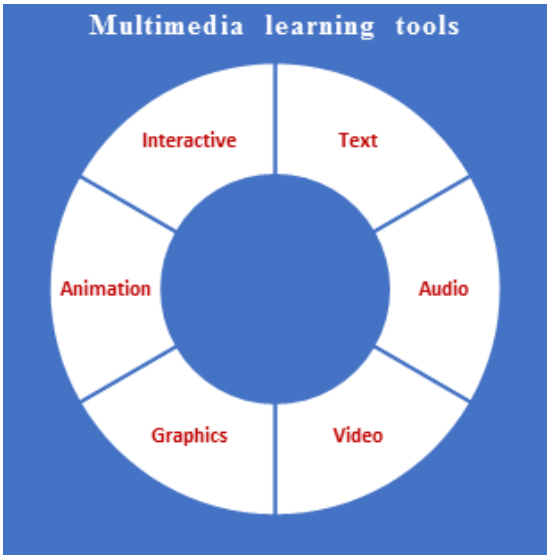

Figure 2: Different multimedia-based learning tools

As a novel teaching approach and means, multimedia technology-assisted teaching offers three key advantages: immediacy, visualization, and intuitiveness, as contrasted to traditional teaching methods. Years of practice and progress have improved multimedia teaching as supplemental teaching, both technologically and methodologically. Multimedia teaching has been widely recognized from a visual standpoint, first and foremost because of its convenience in teaching resources and the use and management of rich teaching resources through multimedia technology. It is necessary for the development of teaching to interact with and integrate a wide range of information and develop a strong, perfect, and systematic teaching system by using multimedia technology.

Second, because multimedia technology breaks down the conventional rigid classroom method, teachers can transfer information to student through photos, video, and text throughout the class, providing a lasting effect on them. Such teaching goals are precisely what modern education requires. As a result, the proper application of multimedia technologies in the online learning is critical.

5. ROLE OF ANIMATION IN ONLINE LEARNING

Traditional media that solely uses still slides makes it challenging to present complicated subject matter and concepts. The use of animation allows for a more accurate portrayal of these complex ideas. Because it displays steps regularly, animation can explain procedural information more explicitly. The importance of animation in the learning process has been identified. It creates a learning environment that allows learners to be more productive if it is used correctly. Steward (2002) claimed that animation in teaching and learning is rapidly becoming one of the most critical and generally discussed problems in the contemporary educational circle, underlining the importance of animation in the instructional process [23]. Okon (2008), in a report on the condition of animation in school teaching-learning activities, noted the regrettable scenario in which it was viewed solely as a kind of amusement. He went on to say that the importance of animation in the educational process is obvious; animation holds a lot of promise in the instructional process and has recently dominated teaching methods [24].

Several experts and students now witness the fact that using animation in teaching and learning combats monotony by activating the senses of sight, hearing, and, in the case of physical items, touch. Animation allows students to involve in more engaging activities, laying a solid foundation for conceptual thinking in situations when more than one sense of perception is used. Frank (2006) claims that the more senses involved in perception (learning circumstance), the faster and better the learning and the longer the memory [25].

When used correctly, the animation may bring previously inaccessible processes, materials, events, objects, and changes in time, speed, and space into the classroom. The animation technique serves as a springboard for propelling learners into a wide variety of learning experiences, as illustrated by the animation concept. They serve as the foundation for conceptual thinking, improving communication clarity and comprehension speed. The animation concept and practice appeal to people of all ages and abilities and enhance teacher efficiency.

Careful planning is required for effective animation-based teaching and learning. A systematic approach is needed. The system approach aims to bring all components of an issue together to achieve specified goals. This can be accomplished by utilizing all available learning tools, such as audio-visual technology, to help reach the desired destination most effectively feasible. The type of learning and learning materials, the type of learners, and the teachers' unique teaching styles are crucial factors to consider while using animation.

6. THE CHARACTERISTICS AND DIFFICULTIES OF MULTIMEDIA-BASED LEARNING TOOLS

Multimedia-based learning tools offer their own set of benefits and drawbacks. The characteristics and obstacles are based on students' perspectives in learning and teachers in the teaching process. The following are some of the features and challenges [26].

6.1 Multimedia tools development training

Traditional teaching aids, such as the blackboard and chart preparation, do not necessitate any special training. When it comes to the combination of music and animated visuals, multimedia-based instructional aids require very little training. There are numerous software programs available for creating multimedia-based teaching aids. Students are easily adaptable to technology; nonetheless, it is necessary to investigate the need for course instructors to receive training in the production of multimedia tools.

6.2 Choosing a methodology for teaching aids

The nature of the course and the goal of the course teacher influence the teaching methodology chosen. In general, there are three sorts of courses: (i) theory, (ii) semi-analytical, and (iii) analytical. Lectures, blackboard use, and PowerPoint presentations are all examples of classic teaching approaches. Course instructors must pick which teaching aid style will help students learn the material better. Blackboard teaching is required for analytical subjects such as mathematics, and multimedia tools help students understand some ideas.

6.3 Audio is required in multimedia teaching aids

Audio is an optional requirement in multimedia teaching, and it is up to the course instructor. Audio has a positive impact in a multimedia presentation because it generates a virtual teaching environment. The benefit of employing audio in multimedia presentations is that the course instructor does not have to exert much effort, and because the recorded audio will provide the essential information, the voice modulation will be continuous, and the course content will be delivered efficiently. Rather of merely using a power point, incorporating audio will help students pay attention.

6.4 Choosing animation for multimedia presentation

The animation is likewise an optional component of the multimedia presentation, but, for some courses, it will aid student comprehension. The animation of a presentation will cause content to be exposed in real-time. For example, rather than a 2D image, an animated depiction of the working of a DC motor will provide better insight into the working of various components and their attributes. The 3D effect will significantly enhance students' knowledge of animation. The students will benefit considerably from the analytical course materials when they are explained with animation.

6.5 Need for interactive sessions

The interactive multimedia session will heighten students' attention. An online quiz will be used to assess the effectiveness of a multimedia presentation at the end. The interactive presentation will enthrall students. When interactive sessions are used, the problem is the time consumption.

6.6 Issues with multimedia presentation

Even though multimedia presentations have a lot of benefits, putting one together requires some abilities. When interactive sessions are employed, time consumption in content delivery is one of the challenges with multimedia presentations. The classroom should be situated to allow for optimum visibility, power stability, and proper network connectivity. A course instructor must overcome the obstacles to provide content efficiently.

6.7 Examining the interests of students and course instructors

The first is the choice of educational materials (lecturing, hands-on demo, and multimedia aid). The second factor is submitting the assignment (classical method of writing in paper, e-assignment submission by email and multimedia-aided submission). The third factor is the examination writing technique (traditional paper writing vs web-based online testing).

7. CONCLUSION

Today, the most popular technique of remote learning is online learning. Online learning is the most excellent venue for keeping learners/educators engaged and secure during the Covid-19 lockdown phase by preserving social separation. Researchers have evaluated the usage of multimedia tools and animations for online learning in various ways, and this article summarizes some of their findings. Most of the publications studied were optimistic about the influence of multimedia content in online teaching. This paper also indicated that the effectiveness of using animation in the classroom is determined by the teachers' understanding of the concepts and practices that guide its use, the learners' characteristics, and the lesson's objectives.

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BIOGRAPHIES

Mr. Aravind N,
Faculty Member.
Department of Animation and VFX
K R Narayanan National Institute of Visual Science and Arts, Kanjiramattom, Kerala, India

Dr. S. Jenefa
Professor and Head
Dept. of Journalism & Science Communication School of Linguistics & Communication
Madurai Kamaraj University, Madurai, Tamil Nadu, India