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Development of Teaching -Learning materials through Multimedia and Animation

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Abstract- Animation and multimedia courses extensively deal with 2D and 3D animation, VFX, film editing, motion, cinematography, modeling, storyboarding, texturing, visual effects, framing, sketching, designing, editing, rendering, and learning various software to make animated movies, videos, etc. The courses also enhance creativity skills, visualization, storytelling ability, and technical knowledge essential to ignite the unrealistic imaginary world, making it as realistic as possible. Animation courses and multimedia courses have grown in popularity among students in recent years, making them one of the most in-demand professional paths. Animation is the art of giving life to still images, texts, etc. Animation is widely used in the modern days, in films, photographs, and much more. Access to quality education is still a major bottleneck in developing countries. Efforts at opening the access to a large majority of citizens in developing nations have explored different strategies including the use of multimedia technology. This paper provides a systematic review of different multimedia tools in the teaching and learning processes with a view to examining how multimedia technologies have proven to be a veritable strategy for bridging the gap in the provision of unrestricted access to quality education and improved learners' performance. The review process includes conducting an extensive search of relevant scientific literature, selection of relevant studies using a predetermined inclusion criteria, literature analysis, and synthesis of the findings of the various studies that have investigated how multimedia have been used for learning and teaching processes. The review examines various case study reports of multimedia tools, their success and limiting factors, application areas, evaluation methodologies, technology components, and age groups targeted by the tools. Future research directions are also provided. Apart from text and images, existing tools were found to have multimedia components such as audio, video, animation and 3-D. The study concluded that the majority of the multimedia solutions deployed for teaching and learning target the solution to the pedagogical content of the subject of interest and the user audience of the solution while the success of the different multimedia tools that have been used on the various target groups and subjects can be attributed to the technologies and components embedded in their development.

Key Words- Multimedia, Animation, Teaching , Learning.

Introduction-Multimedia is a combination of more than one media type such as text (alphabetic or numeric), symbols, images, pictures, audio, video, and animations usually with the aid of technology for the purpose of enhancing understanding or memorization (Guan et al., 2018). It supports verbal instruction with the use of static and dynamic images in form of visualization technology for better expression and comprehension (Alemdag and Cagiltay, 2018; Chen and Liu, 2008). The hardware and software used for creating and running of multimedia applications is known as multimedia technology (Kapi et al., 2017). Multimedia technology has some characteristics like integration, diversity, and interaction that enable people to communicate information or ideas with digital and print elements. The digital and print elements in this context refer to multimedia-based applications or tools used for the purpose of delivering information to people for better understanding

of concepts. Indeed, various aspects of human endeavours, especially the educational sector, are being transformed by the advent of Information and Communication Technology (ICT). ICT involves the use of hardware and software for the purpose of collecting, processing, storing, presenting, and sharing of information mostly in digital forms. Multimedia technology is an important aspect of ICT that deals with how information can be represented and presented digitally, using different media such as text, audio, video, among others (Guan et al., 2018). It involves the combination of several technologies provide information in the best possible formats, packages, and sizes. However, when used in the classroom or for educational purposes, the design quality and sophistication of multimedia application must be high enough to combine the different elements of the cognitive processes so as to achieve the best mimicking of the teacher. There are different types of multimedia applications available in the market today. These applications have been deployed for different educational purposes such as the works deployed for Mathematics classes, Social Sciences, Sciences, Physiology, Physics and Physical Education Studies (Al-Hariri and Al-Hattami 2017; Anderson, 1993; Chen and Liu, 2008; Chen and Xia, 2012; Ilhan and Oruc, 2016; Jian-hua & Hong, 2012; Milovanovi et al., 2013; Shah and Khan, 2015).

The central problem, however, remains the same. Which is, the problem of how to use the applications to provide students with stimulating experience by delivering information for better understanding of concepts. While it is important to develop various applications for effective teaching delivery, each of these applications has its own focus area, peculiarities, target age, merits and demerits. Thus, the taxonomy and component synthesis for the development of the multimedia application need to be extensively investigated as these would affect the teaching delivery, learning and wider applicability.

Components, technology and applications of multimedia tools in education

The results from the review revealed that most of the existing multimedia tools in education consist of various multimedia components such as text, symbol, image, audio, video and animation, that are converged in technologies such as 3D (Huang et al., 2017), Camtasia Studio 7 software (Karel and Tomas, 2015), Macromedia Flash (Zhang, 2012), HTML5, JavaScript, CSS (Bánsági and Rodgers, 2018; Eady and Lockyer, 2013; Chen and Liu, 2008; Shah and Khan, 2015; Shoufan, 2019). As shown in figure 1, the analysis confirms that text (26.8%) is the predominant multimedia component being used in most of the educational materials while other components such as videos (19.5%), audios (18.3%), images (18.3%) and animation (11.0%) are fairly used in teaching and learning multimedia materials. However, annotation and 3D technologies are least incorporated.

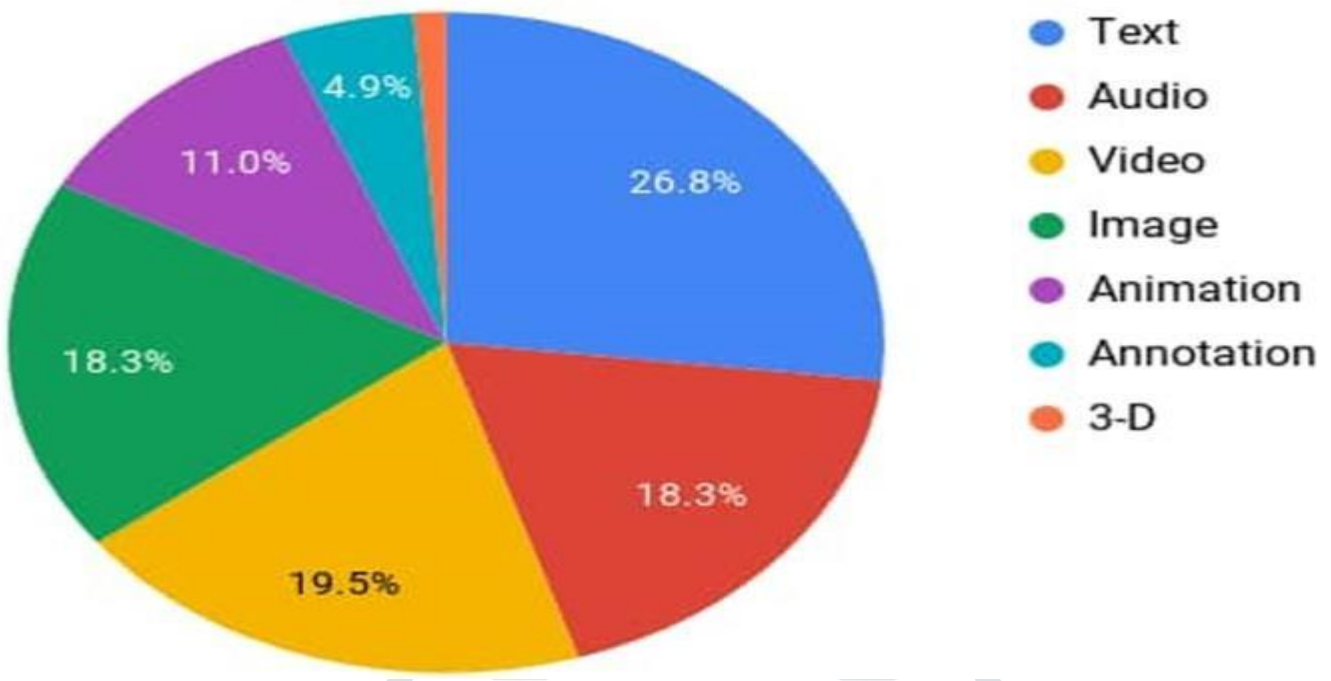


Figure 1- Proportion of multimedia components in reviewed articles.

How these components are combined is shown in Figure1.

Perhaps, the combination of these four major components (text, video, audio, image) provides the best outcome for the learner and points to the place of text as a most desired multimedia component. The components used also reflect the type of subject matter being addressed. For instance, the audio component is important for language classes while video and image components are stimulating in Biology classes, for example, due to the need for visual perception for the learners. It is, therefore, imperative to note that the choice of the combination of these components could yield variable impacts to learners. Hence, it can be deduced from the studies that most of the tools are applied either as teaching or/and learning aids depending on the nature of the audience and teacher.

Multimedia learning is the process of learning, usually in a classroom or similarly structured environment, through the use of multimedia presentations and teaching methods. This can typically be applied to any subject and generally any sort of learning process can either be achieved or enhanced through a careful application of multimedia materials. Multimedia learning is often closely connected to the use of technology in the classroom, as advances in technology have often made incorporation of multimedia easier and more complete. In general, the term "multimedia" is used to refer to any type of application or activity that utilizes different types of media or formats in the presentation of ideas. With regard to education, multimedia learning usually means the use of different types of media to teach a lesson or enhance a lesson with further examples or activities for students. This type of learning can be as simple as using film clips of footage shot during World War II while learning about the war in a history class, or as complicated as having students use computer software to create simulations in a physics class. The connection between multimedia learning and technology is usually made because advances in technology often make the use of different media easier and less expensive for schools and teachers. This is demonstrated by the use of overhead projectors in the classroom. Initially these projectors allowed teachers to go beyond the limitations of the chalkboard and present ideas in writing in a way the entire class could see more easily. Technology has advanced beyond the older projectors, however, and modern smart boards and digital projectors allow a teacher to type at a computer and have it displayed for the entire room to see. This type of multimedia learning can also include a teacher seamlessly incorporating video clips or interactive presentation software on the computer into a lesson as well. Multimedia learning goes beyond passive learning, however, and can also allow students to interact with computer software and video or audio presentations to further enhance their learning. Some students, for example, may be able to learn about the human body through lectures and images in books that demonstrate the various

systems within the body. For other students, however, the ability to use a computer program that provides a digital model of the human body and how each system is interrelated can be far more powerful. Especially as the students are able to interact with the model and see each system separately and together from various angles and points of view. This effort to give the tools of learning to students, then allow them to learn in the way that is most meaningful for them, is one of the cornerstones of multimedia learning.

Merits of using Multimedia in the Classroom

Using multimedia in classroom helps educators engage students and provide them with valuable learning opportunities. It is easy to remember a picture than a paragraph, an animated video of a concept worth more of a lecture and a video demonstration of a process (or an instrument) by a scientist gives more real time 8 knowledge than a theoretical explanation. There is no doubt educators consider multimedia as a great tool to improve student learning.

Here are a few benefits of using multimedia in classroom:

• Multimedia empowers students to create and design rather than absorb representations created by others.

• It improves reflective thinking.

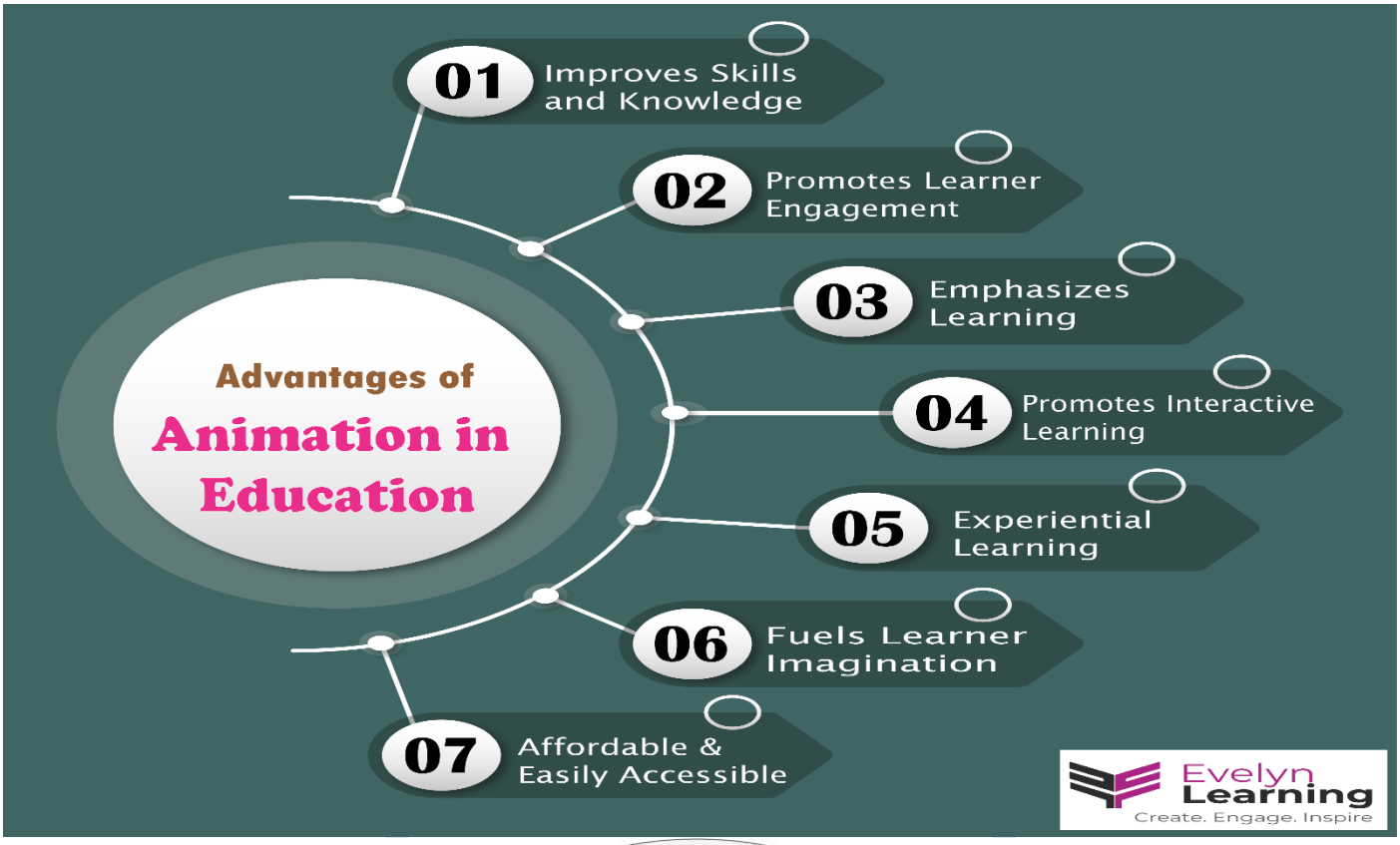
• It also provides students with suitable learning resources according to their learning styles and abilities.

Most of the educators and administrators are adopting latest educational technologies in order to reach the 21st century learning standards. Of all those tech approaches, usage of multimedia is one of the great tools to engage students.
Let's hear what educators suggest about new ways of using multimedia in classroom below:

Personalized Learning using Multimedia Resources: Multimedia resources help different learners meet their learning needs. As we know, different students have different learning styles, educators can easily provide them with suitable learning resources using multimedia. Educators use YouTube to provide visual learners with online videos, podcasts for auditory learners and interactive games for tactile learners. Multimedia resources make everything easy for students to learn in their comfortable learning style. Unlike traditional approaches, in which only the teachers used to lead the entire classroom delivering long lectures at the same pace, the use of multimedia results in personalization of learning.

Group Learning: Multimedia tools such as blogs, social networks and wikis enable students to work together in learning a particular concept. Students use these to share their works with others, give feedbacks on others' works and discuss among others a particular topic. It can be done through either blogging or micro blogging (Tweets). Using these multimedia tools, educators can engage students in several works and watch them collaborating with each other, peer assessing each other's works and learning as a group.

Improve Presentation skills: Using storyboarding, videos and slideshows is a great way to improve student learning, because it allows them to engage with text in a very visual way aided by multimedia. Multimedia tools enable students to express their ideas and works in concise ways that capture the attention of the audience and they develop an ability to communicate thoughts and concepts through a variety of resources, including text and recorded narrations. Giving students a wider choice of software and tools to present their work is an effective approach as it allows learners to decide on the style of presentation that best suits their personality. This is also a way to allow the learners to engage in their education in a more personalized way and also improve their creativity, critical thinking and reflective thoughts.



Animation-based learning allows teachers to easily describe or explain complex topics that most learners find difficult to understand. Using animation enables students to visualise and understand complex subjects or processes. Multimedia content helps to vary and enhance the learning process, and leads to better knowledge retention. Educational video can provide more opportunities for students to engage with the content. Students around the world can learn from course content made available through video. Animation in education makes use of visuals for learning. It presents abstract concepts through visuals to provide learners a clear picture of the lesson. For instance, educators can create animated videos to teach cell biology in science class. Multimedia is multiple forms of digital media, such as videos, images, audio, texts, etc. Animation refers to a type of multimedia that provides the viewers with an illusion of pictures moving in a sequential manner.

Conclusion-Educational animations are animations produced for the specific purpose of fostering learning. It is associated with educational technology with the way it supports teaching and learning through the use of technological tools to facilitate learning and to improve performance. It provides students with an opportunity

to feel a different classroom environment to the pursuit of knowledge, discovery and experience. The teacher can use audio-video multimedia applications/CDs in absence of a computer/internet facility so that students can get benefits. Access to quality education is still a major bottleneck in developing countries. Efforts at opening the access to a large majority of citizens in developing nations have explored different strategies including the use of multimedia technology. This paper provides a systematic review of different multimedia tools in the teaching and learning processes with a view to examining how multimedia technologies have proven to be a veritable strategy for bridging the gap in the provision of unrestricted access to quality education and improved learners' performance.

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