A CRITICAL ANALYSIS OF EDUCATIONAL SOFTWARE AND EFFECTIVENESS OF COMMUNICATION MODELS PROCESS IN TEACHING SECONDARY SCHOOL STUDENTS IN IMO STATE

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ABSTRACT

Educational software has a lot of advantages in the educational sector and mostly for students. Some of the functions include tracking and reporting on the learner's progress through online education software. This enables offering more personalized content based on the experience and achievements of a particular student. It also helps you improve the course or program content to make it more suitable for the needs and expertise level of most students. The study is to analyse the effect of educational software on the communication model in secondary school. The study contains three concepts, which are the concept of education; the concept of educational software; and the concept of communication model. The concept of education is one of the concepts that does not have an actual befitting definition. Different points of view of what education could mean are inclusive in the study. The study further identifies the types of communication models, which are basically three: the linear model of communication, the interactive model of communication, and the transaction model of communication. The linear model has only one person as a source of information (sender) and the other as the recipient of the information (receiver). The interactive model is distinguished by its two-way nature: in the mode of communication, both parties act as sender and receiver. In the transaction model, unlike other models, both parties are known as communicators. The types of educational software and their respective uses are stated in the study. Finally, the impact of educational software in the communication model process in teaching. From the study, it is concluded that educational software has a great advantage in the communication model used in teaching. The educational software increases students' attention in learning processes, reducing the disadvantages of the communication model by eliminating the most serious threat to the communication process, noise. It was further recommended that the use of educational software should be further implemented in the communication model of teaching, especially in primary and secondary schools.

KEYWORDS: Educational Software, Communication models process, Secondary School, Students and Imo State.

Introduction

The word "education" is derived from the Latin words "educare, educere, educo, and educum". "Educare" means to bring up or to nourish. "Educere" means to draw out or to manifest. "Educo" means to lead out of and "Educatum" means Act of teaching or instruction. The terms "educare" or "educere" mainly indicate the development of the latent faculties of the child. However, a child is unaware of these possibilities (Goutam 2017). The word "education" is reserved for frameworks created with the considered and conscious intent to educate. This definition also understands education as a process and not a place. It is a purposeful activity that can happen within a wide range of frameworks and not only in buildings called schools.

Information and communication technologies (ICT) bring new opportunities to make teaching and learning more effective and attractive. The computer is used not only to review (practice) the study materials and to create and enhance the skills and habits for the algorithmic solving of different tasks, but it can also significantly facilitate the development of a student's individual work through the individualization of tasks (Majherová, Palásthy, and Gunčaga, 2014). It is possible to assign each student a task of varying difficulties and with different time amounts that is needed for its solution. It is also possible to use computers while solving application tasks from actual practice, which are usually difficult because of time-consuming numerical computations. These computations can be carried out by computers using appropriate pedagogical software, creating opportunities for education to focus on the understanding of discussed concepts as well as their application in practice. The concepts can be actively sought by students, whether through individual or group work (Majherová, Palásthy and Gunčaga, 2014).

Communication is a complex process, and it is difficult to determine where or with whom a communication encounter starts and ends (Ashman, 2021). It can sometimes be helpful to consider different communication models. According to Kapur (2020), a model can be defined as the visual representation that identifies, classifies, and describes various parts of the process. In the communication process, the main features include sender, message, media, and receiver. There is a strong association between these features. Models of communication simplify the process by providing a visual representation of the various aspects of a communication encounter. Some models explain communication in more detail than others, but even the most complex model still doesn't recreate what we experience in even a moment of a communication encounter. Models still serve a valuable purpose for students of communication because they allow us to see specific concepts and steps within the process of communication, define communication, and apply communication concepts.

Concept of Education

Defining the term "education" seems easy and difficult at the same time. It is easy to understand when considering that education includes everything that an individual learns from birth to death. It is difficult because the word "education" does not simply refer to a concept but also to a product (the cost of education), an institution (school, college, or university), or a system (national education). The word "education" comes from the Latin "educo," which means "to lead out of, to bring forward." "Education is about the transfer of knowledge" (Shepard, 2005). "Education is the social institution responsible for the systematic transmission of knowledge, skills, and cultural values within a formally organized structure." (Kendall, 2002, p. 210).

The western views of education by different educationist is as follows (Goutam 2017):

- Education develops in the body and soul of the pupil all the beauty and all the perfection he is capable of. Plato
- Education is the creation of sound mind in a sound body. It develops man's faculty specially his mind so that he may be able to enjoy the contemplation of supreme truth, goodness and beauty. Aristotle
- Education is the child's development from within. Rousseau
- Education is enfoldment of what is already enfolded in the germ. It is the process through which the child makes the internal-external. Froebel
- Education is the harmonious and progressive development of all the innate powers and faculties of man- physical, intellectual and moral. Pestalozzi
- Education is the development of good moral character. J. F. Herbert
- Education is not a preparation for life, but rather it is life. Education is the process of learning through the continuous reconstruction of experiences. It is the development of all those capacities in the individual which will enable him to control his environment and fulfill his possibilities. John Dewey
- Education is the complete development of the individuality of the child so that he can make an original contribution to human life according to the best of his capacity. T. P. Nunn

Education may be defined as a positive, conscious or unconscious, psychological, sociological, scientific, and philosophical process, which brings about the development of the individual to the fullest extent and also the maximum development of society in such a way that both enjoy maximum happiness and prosperity. Education, in the wider sense, is a life-long process. It is a continuous process. Life is a continuous process of growth and development, and so education is also a continuous process. An individual learns through his experiences, which are acquired throughout his life. Education is not

merely the collection of some information. It is the acquired experience of life in the social and natural environment. It encompasses all knowledge and experiences gained during infancy, childhood, boyhood, adolescence, youth, manhood, or old age through any educational medium--the press, travels, clubs, nature--both formally and informally.

Concept of Educational Software

Education software is computer software with the primary purpose of teaching or self-learning. Using computer software and hardware in education and training goes back to the early 40s, when American researchers were able to develop flight simulators that used analog computers for generating simulated onboard instrument data. According to Nagata (2017), educational software integrates multimedia content and provides users with a high interactivity level. These two features distinguish them from traditional teaching practices. Multimedia content such as graphics, pictures, and sound helps engage students in their lessons. For example, when it comes to learning history, students could go back and watch videos or other online-based content related to it. Furthermore, online education software benefits teachers, allowing them to better connect with the students and help them keep students interested in a lesson. Finally, it also promotes a productive learning environment.

The first example of educational software is Baltie (http://www.sgpsys.com/en/whatisbaltie.asp). Baltie is an educational, graphic-oriented visual programming tool for kids, youth, and adults. Baltie is also the name of the main character of this software-a little wizard keen to execute miscellaneous commands and to conjure pictures (tiles) in his environment. With Baltie's help, children will quickly grasp computer programs. Baltie can also be used for exercising logical thinking. It makes no demands on a child's knowledge; its only requirements are playfulness and imagination. Gülseçen et al. (2013) showed that a children's programming environment is a way from the first touch with the computer, through the understanding of its working, to mastering the most important methods of software creation.

The second piece of software, which we will present, is Imagine. Imagine (http://imagine.input.sk/) originated in 2001 as an indirect successor to the Comenius Logo. It is an object-language-driven event. "The hero" (a main character) is a turtle, which can change its shape and move to the area. The aim of the authors was to create a modern programming environment that is easy to control for an experienced user but also for an absolute beginner – a pupil at primary or secondary school. The advantage for younger pupils is that they may not write a coherent program that focuses on the solutions of all possible situations, but many small sub-programs, sometimes referred to as "one statement," that will be automatically called during various events, for example, a mouse click, drawing, collision with other objects, etc. It is possible to define different subroutines for the various objects and their events. The environment has an integrated simple editor for background graphics, multimedia, and the internet. An interesting new feature is the possibility to publish the projects on the Web. Using the Imagine plug-in,

we can run the finished projects from the network in an Internet browser. The Imagine component is also a bitmap editor that is used to prepare the images, especially for the LogoMotion shapes of turtles, but also to create great-looking animations. Imagine has two languages Variations-Slovak and English (Majherová, Palásthy, and Gunčaga, 2014).

Concept of Communication Model

According to Kobiruzzaman (2022), communication models refer to the conceptual frameworks or theories that explain the ways of human communication. It also represents the entire process of communication between the sender and the receiver. The communication model tries to answer the 5Ws and 1H questions; for example, what is communication? Who is involved in this process? When does it happen? Where does it take place? Why does it occur? And finally, how does communication happen? Furthermore, communication models explain the elements of the communication process, for example, context, sender, receiver, encoding, decoding, channel, message, feedback, and noise. These are the components of communication that describe the entire process of communication. However, some communication models do not have all these elements or features. For example, the linear model of communication does not have feedback. The communication model also explains the factors that prevent effective communication, known as barriers or noise in communication. Communication barriers or communication noises bar effective communication processes.

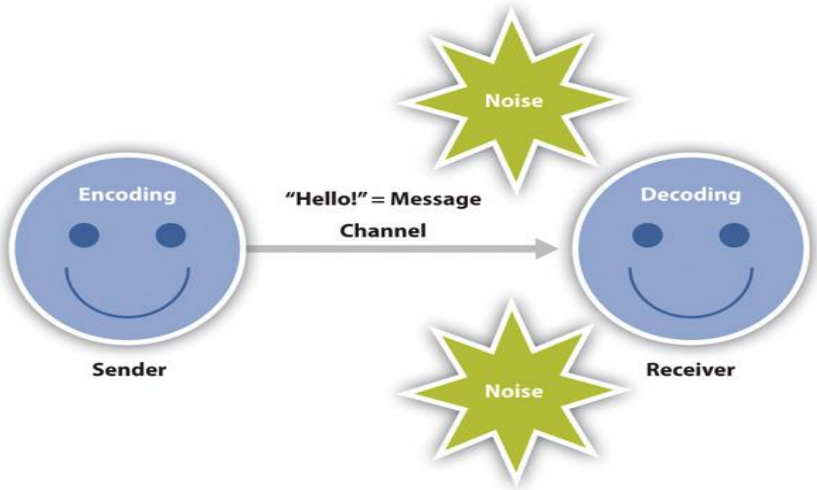
The models of communication are regarded as important concepts that help in understanding the processes of communication. Like the nature and concept of communication, the models of communication are also regarded as crucial. There has been extensive research conducted on the models of communication. But there is no single theory or model that has found general acceptance (Kapur, 2020). The models of communication have the main objective of generating information among individuals in terms of important concepts of communication. When understanding the models of communication, it is vital to understand what each model means. A model is referred to as a graphic representation, which is designed to provide an explanation in terms of the ways in which the variable works. It is a plan, pattern, representation, or description that is designed to depict the structure as well as the functioning of objects, systems, and concepts. A model of communication provides a convenient way of generating information in terms of a graphical checklist of various elements (Unit 1: Models and Processes of Communication, n.d.).

Types of Communication Models

There are three main types of communication models, which include: the linear model of communication; the interactive model of communication; and the transactional model of communication.

Linear Model of Communication

The linear or transmission model of communication, as shown in the figure below, describes communication as a linear, one-way process in which a sender intentionally transmits a message to a receiver (Ellis & McClintock, 1990). This model focuses on the sender and message within a communication encounter. Although the receiver is included in the model, this role is viewed as more of a target or end point rather than part of an ongoing process. We are left to presume that the receiver either successfully receives and understands the message or does not. The scholars who designed this model extended on a linear model proposed by Aristotle centuries before that included a speaker, message, and hearer. They were also influenced by the introduction and spread of new communication technologies at the time, such as telegraphy and radio, and these technical influences can most likely be seen within the model (Shannon & Weaver, 1949). Think of how a radio message is sent from a person in the radio studio to you listening in your car. The sender is the radio announcer who encodes a verbal message that is transmitted by a radio tower through electromagnetic waves (the channel) and eventually reaches your (the receiver's) ears via an antenna and speakers in order to be decoded. The radio announcer doesn't really know if you received their message or not, but if the equipment is working and the channel is free of static, then there is a good chance that the message was successfully received (Ashman, 2021).



The Linear Model of Communication

Example of Linear or Transmission Model

- *Aristotle Model of Communication*

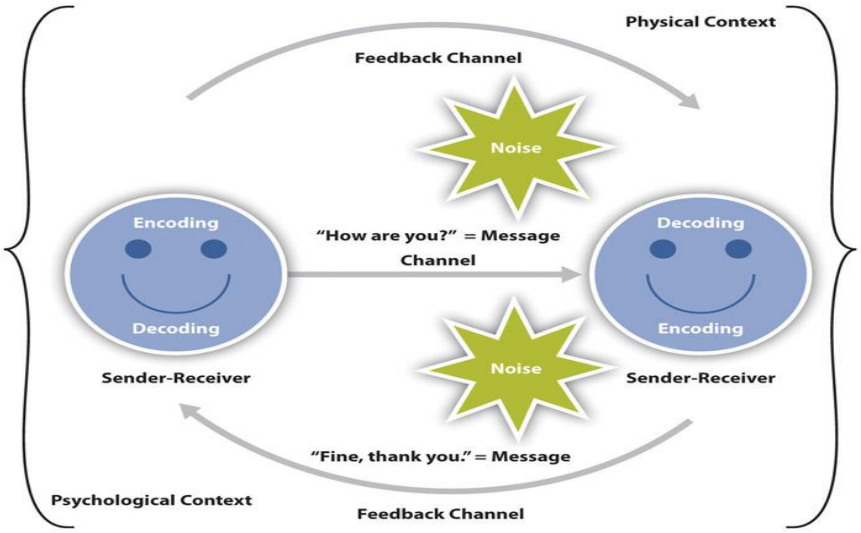
Aristotle's communication model refers to the communication model with the speaker, speech, occasion, audience, and effect elements. In 300 BC, Aristotle developed a linear communication model that mainly focuses on the speaker and messages. Controversially, it is also known as the first model of communication. Aristotle's model of communication consists of five elements of the primary communication process, such

as: speaker, speech, occasion, audience, and effect. The speaker plays a crucial role in communication because the speaker sets the message for delivery. However, the speech of the speaker is a message that might vary on occasion.

For example, a political leader (speaker/sender) delivers a speech to persuade voters to vote for him. The political leader is the most important person here who is providing the message or information. The speech is the message that the leader delivers to influence the voters to vote for him. The election is the occasion, and the speech or message of the speaker is set based on the occasion. A political leader might not deliver the same kind of speech before and after the election. Finally, the effect refers to the level of motivation of the voters, whether they are motivated to cast a vote for him or not.

Interactive Model of Communication

The interactive or interaction model of communication, as shown in the figure below, describes communication as a process in which participants alternate positions as sender and receiver and generate meaning by sending messages and receiving feedback within physical and psychological contexts (Schramm, 1997). Rather than illustrating communication as a linear, one-way process, the interactive model incorporates feedback, which makes communication a more interactive, two-way process. Feedback includes messages sent in response to other messages. For example, your instructor may respond to a point you raise during class discussion, or you may point to the sofa when your roommate asks you where the remote control is. The inclusion of a feedback loop also leads to a more complex understanding of the roles of participants in a communication encounter. Rather than having one sender, one message, and one receiver, this model has two sender-receivers who exchange messages (Ashman, 2021). Each participant alternates roles as sender and receiver in order to keep a communication encounter going.



The Interactive Model of Communication

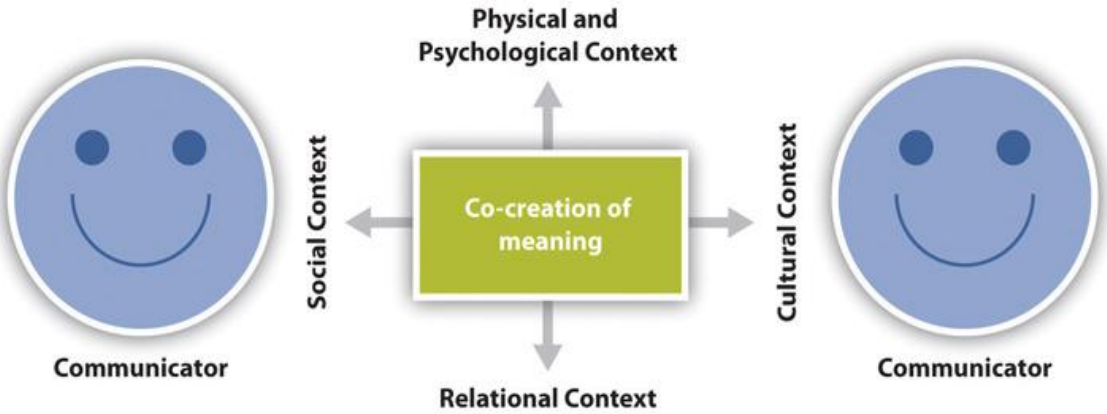
Example of Interactive Model

- *Osgood-Schramm Model of Communication*

The Osgood-Schramm Model provides a two-way form of communication. However, Wilbur Schramm adopted the concept from the theory of another scientist, Charles Egerton Osgood. Osgood proposed that the communication process be circular rather than linear. So, the person plays a role as both the sender and receiver of the message simultaneously. The person receives the message and interprets it to provide feedback. Therefore, it is known as the Osgood-Schramm Model of communication. The elements of the Osgood-Schramm Model are: interpreter, encoder, decoder, and message.

Transactional Model of Communication

According to Ashman (2021), the transitional model of communication seems like a two-way process of communication with immediate feedback. Simultaneous feedback is the essential component of the transitional models of communication. So, the communication process will not become transactional if there is no feedback. The feedback is direct and very fast. The receiver is compelled to provide instant feedback. The major difference between the interactive and transactional models is the nature of indirect and direct feedback. The roles of sender and receiver in the transaction model of communication differ significantly from the other models. Instead of labeling participants as senders and receivers, the people in a communication encounter are referred to as communicators. Unlike the interactive model, which suggests that participants alternate positions as sender and receiver, the transaction model suggests that we are simultaneously senders and receivers.



Transactional Model of Communication

Example of Transactional Model

- *Barnlund's Transactional Model*

In 1970, Dean Barnlund introduced the transactional communication model. The author formed this model based on public, private, and behavioral cues. Barnlund's

transactional model refers to the multi-layered communication process with feedback. For effective communication, the sender and receiver exchange roles, and thus message sending and receiving occur reciprocally between sender and receiver. The eight elements of Barnlund's communication model are person, encoding, decoding, public cues, private cues, verbal, behavioral cues, nonverbal behavioral cues, and message.

Types of Educational Software and the Uses

There are numerous educational software packages available for various subjects. However, educational software firms have started to create educational apps for students and teachers to utilize as a teaching and learning tool. The following is the kind of educational software that an educational institution must implement (Nagata, 2017).

Authoring System: This helps teachers in developing their own instructional software. They could build electronic flash cards from index cards for teaching children specific concepts. Furthermore, they could build multimedia content such as lessons, reviews, and tutorials. One could even consider web alternatives, since web authoring systems help teachers build multimedia content that could be used on a website.

Graphic Software: Students could use graphic software for capturing, creating, and changing images that are available on the web, on the program itself, or online images available. It is particularly useful for building online presentations.

Reference Software: Teachers could include reference software in research projects. Reference software allows students access thesaurus, encyclopedia, atlases, and dictionaries.

Tutorial Software: Through tutorial software, teachers could teach students new lessons and give them a platform through which they could learn the lessons at their own pace. Tutorial software consists of giving students new information for learning, giving them time to practice it, and evaluating their performance.

Educational Games: There are several educational gaming softwares available. Education software companies combine gaming and education into one. This kind of software is very effective for younger children since it motivates them to learn.

Simulations: Simulations software lets teachers teach students via virtual experience. For example, students could use this software to acquire experience of flying a plane.

Drill and Practice Software: Teachers could include drill and practice software for strengthening the current skill set of students. This software is beneficial when teachers prepare students for tests and exams.

Math Problem Solving Software: This kind of software makes it possible for math teachers to strengthen the students' problem solving skills. Furthermore, science teachers could use this software for doing science experiments.

Utility Software: A utility software aids teachers in preparing quizzes, tests, and even serves as a grading book. Teachers who are non-tech would find this software easy to learn and use.

Special Needs Software: Online education software also includes special software that is developed for addressing the needs of a student who has special needs. The system is combined with assistive software that provides students with special needs an effective learning platform. Examples include speech synthesizers, computers that read text aloud, and multimedia software that targets certain learning disabilities. Definitely, educational institutions have become more diverse, and thus they could not risk being simple education temples. Using educational software has become vital for schools at present.

The Impact of Educational Software on the Communication Models Process used in Teaching

The communication model used in teaching is perhaps the most important segment that largely determines the outcome and effectiveness of the process. Shannon (1948) presented the communication process as a model with eight discrete components. The source of information is the person who creates the message to be transferred to someone else. When it comes to teaching in the classroom, the source of information is usually a teacher, but it can be a textbook author or creator of educational software. According to Pećanac, Lambić and Marić (2011), the message in the process of teaching includes teaching materials from a subject. A transmitter converts a message into a form that is portable. The signal is converted into a form of message that can be transmitted between two people. The signal is transmitted over the channel, and channels that are commonly used are air for the transmission of sound (speech), light for the transmission of video, radio waves, paper, etc. Noise is a secondary signal that negatively affects the transmission of useful signals. The concept of noise has previously been associated with technical difficulties in the transmission of messages, whereas today it is more of a metaphor for the problems that occur in effective listening (Foulger, 2004). Noise is an important factor when it comes to the process of teaching in the classroom.

Furthermore, Pećanac, Lambić and Marić (2011) stated that it is obvious that the use of educational software in teaching creates positive effects. The use of educational software has a greater effect on certain communication models in teaching than on others. When it comes to communication models with the use of educational software, the difference in effectiveness among them is noticeable since it can be seen from the responses of students that, in their opinion, the less effective communication models (the communication model where the teacher is the accomplice in the transfer of information, the model with the highest influence of noise, and a high degree of freedom) achieve a greater improvement in the effectiveness of teaching with the use of educational software. A particularly interesting fact is that students believe that when traditional teaching (the communication model where the teacher is the only source of

information) uses educational software, it greatly eliminates the disadvantages of such communication. The view of students that use educational software in teaching eliminates almost all disadvantages that may arise from a lack of communication in student-teacher and student-student relationships. This view is entirely logical if one bears in mind that quality educational software can provide the same amount of useful data as a teacher who is in the classroom. Educational software used to be CD-ROM editions with plenty of multimedia content, but today this type of software usually relies on the use of the Internet and provides its users with easy and fast access to the information. Using educational software would reduce the need for frequent teacher explanations (which reduces noise in the communication process), because the students could get some answers independently with the help of educational software. It would also reduce the difference in the ability, among students with different levels of prior knowledge, to follow the class instruction (Becker, 2001). In order for the positive effects of educational software use to be achieved, it is necessary that each student (or group of 2-3 students) can use a computer in the classroom.

Conclusion

Communication is a continuous process that involves sending and receiving information, verbal and nonverbal communication, and the primary goal is exchanging ideas. Teachers in the teaching process can use multiple communication models, each of which has its own advantages and disadvantages. The results of the survey conducted among future teachers show that the use of educational software in teaching can largely eliminate these disadvantages. Of course, in order for the educational software to be used to improve the effectiveness of the communication model in teaching, certain technical requirements must be met. The perfect situation would be if every student in the classroom could use one computer with an Internet connection and appropriate educational software. Educational software has proven to be of benefit to the communication model process in teaching. The educational software maximizes the interest and attention of the students during the teaching process, providing a better understanding of the students. It is also seen in the study that educational software eliminates the greatest threat to the communication process, which is noise (any signal or sound opposing the signal or sound carrying useful information).

Recommendations

The following is therefore recommended:

1. The use of educational software should be further implemented in the communication model of teaching, especially in primary and secondary schools.
2. Teachers and pupils/students should be educated on the importance and uses of educational software.

3. The suitable software should be made available for learners that will aid their learning process. Due to the fact that educational software encourages students to study.

4. Teachers should practice different models of communication process especially, interactive and transactional models.

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