

AUDIO-VISUAL AIDS AS TOOLS FOR IMPROVED TEACHING AND LAERNING OF BIOLOGY INNIGERIAN SECONDARY SCHOOLS

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Abstract

This paper gives highlights on the effective use of audio-visual aids employed in the teaching of Biology in secondary schools of Kano State, Nigeria. The paper also highlights the definition and scope of teaching aids, the pros and cons of audio visual aids and the classification of teaching aids which includes specimen, diagrams, television, interactive whiteboard, flash cards etc. the idea of Interactive Whiteboard being important for effective teaching in view of facilitating the teaching process at schools through stimulating dialogue and discussion during teaching in addition to attracting students' attention and concentration in class. The paper concluded that audio visual aids are an important tool of teaching learning process, and they make teaching-learning process more successful and interesting. The knowledge about the correct use of audio-visual aids enhances the understanding of the students in the classroom and helps improve teachers' role in realizing the learning outcomes. It further recommended that appropriate use of audio visual aids is a skill; therefore, teachers should be trained in use of traditional as well as new technology based through pre-service programmes and in-service teachers' professional development programs.

Keywords: *Audio, Aids, Effective teaching, Visual*

Introduction

As present education is under constant changing and multiplicity in policies, methods and procedures can be clearly observed. At different levels of education system, change is always welcomed as per required but change should always be in harmony with certain aspects i.e. society, religion, state etc. The recent changes happening in education are being widely discussed, both among educators and in political circles. (Padgurskytė, 2022). The present situation calls for comprehensive change in almost every level of education so that practical and dynamic approach can be given to existing and new field of education. The crux of this modern education is to awaken the hidden curiosity and interest of the learner, nourishing his behaviours, attitudes and beliefs in order to develop basic and essential skills of lifelong learning and ability to think critically and to judge himself and others in a more beneficial manner. Students should be given confidence to ask, inquire, explore and be creative and initiators. Infect an inquisitive mind is the beginning to lifelong learning that surely leads to success (Sidorova, 2022).

Before modern education was incorporated, students were passive listeners and teachers were autonomous body who knows what, when and how of education. But in recent years, superiority is shifted towards students. Use of audio-visual aids is preferred as they are considered as 85% of whole teaching and learning (Nzewuihe, 2011). They keep the individual learner focused on what is being taught by the teacher in the classroom session. Audio-visual aids make a lesson or a lecture more interesting and a memorable experience not only for students but for teachers as well. They play a vibrant role in focusing the attention of individual student towards the teacher or the topic. Audio-visual aids are materials used by the teacher in order to facilitate the teaching and learning process (Waad & Younus, 2022). Human beings' five senses are the doorway for effective learning, especially seeing, hearing and touching brings maximum knowledge for the individual. Audio-visual aids are most effective tools for developing flawless communication and interaction between student and content as well as student and teacher. These aids not only help to save the time of teacher but also help in developing and arousing curiosity, creativity and motivation. It emphasises on the comprehension of knowledge and concept as well as keeps working on developing sound foundations for higher and further studies.

The history of audio-visual Aids indicates that people were learning through their sense perception almost since the dawn of human civilization. Infact the concept of using audio-visual aids to communicate has long been used when man was hunting for food in jungles, they track and run after the wild animals, while chasing and going deep in to jungle; man places a kind of symbol stone or any other identified piece of mark that can help the other members to follow the exact path (Kumalasari & Setiawan, 2023). Archaeologist discovers different cave paintings that almost depict the whole civilization. The people of that time utilise carving and painting to communicate their culture and traditions to coming generations. In the same manner, Egyptian pyramids and sphinx represents the statue of a Pharaoh with the body of lion and a human race.

Definition of Teaching Aids

In educational literature more than few terms can be used, alternatively, for audio-visual aid i.e. educational technology, audio-video media, and instructional technology, learning resources, audio-video equipment, communication technology and educational media (Selvi, 2007). Basically, all these terminologies lead to the same edge i.e. teaching aids that are widely used by teachers, facilitators and tutors to complement their words that ultimately helps learner to improve learning and to stay focused, clear and curious always. In early years the only term used for teaching aids was audio-visual aids but with the advancement and opening of new horizons in the field of electronic technology and communication media, new and improved equipment and aids for teaching and learning was developed, instead of mere teaching aids improved terms were used i.e. educational or instructional technology etc. (Marleni, 2023). Audio-visual aids are good means of communicating with people and students. Audio-visual aids facilitate and assist the regular and traditional teaching session. They help in maintaining and retaining student's interest almost till the very end of the classroom session. Most of the students agreed and strongly agreed, that learning with Audio-visual aids media brought some benefits to their learning experiences (Indrayanti & Romadhon, 2023).

The use of audio-visual aids in classroom or other training sessions improves the performance of the students. When a teacher gives maximum exposure along with different perspectives; using variety of audio-visual aids for particular concept maximum students receives success in comprehending such lecture. Audio-visual aids are tool or mechanics used to facilitate the learning experience of the individual and to make it more realistic and dynamic (Maulida & Hadi, 2022).

Integration of Technology in Biology Education

Johnson and Anderson (2022) suggest that online multimedia platforms provide dynamic visual representations and real-world examples, fostering deeper comprehension and knowledge retention. Bangroo and Amir (2023) emphasizes the significance of well-crafted visual aids in education, particularly in enhancing the understanding of intricate scientific concepts. Integrating technology into Biology education has the potential to greatly enhance the learning experience for both learners and teachers. It is necessary to incorporate emerging technologies in the teaching and learning process due to the evolving educational landscape. Several emerging technologies, including machine learning, virtual reality, simulations, robotics, and tablets could be integrated into teaching and learning practices. Proper implementation of these technologies holds promise for enriching the learning experience. While studies on technology integration in specific biology studies are limited, it was found that incorporating technology into biology education significantly improves learning outcomes. Teaching approaches and strategies in Biological Sciences classroom teaching is an event where in an educator exchanges knowledge with learners. Teaching is seen as the process of imparting knowledge and experience through communication such as a lecture. For educators to start teaching, they need to select an appropriate instructional strategy that will inform their teaching. Some of the approaches that inform teaching include interaction, collaborative, experiential and facilitation. Therefore, instructional strategies are the techniques educators employ to assist learners in becoming independent and strategic (Ncisana, Sibisi, Munyuku, & Masha, 2024).

Pros of Audio-Visual Aids

An old Chinese proverb goes like one picture had more worth than thousand words, indeed if teacher uses words along with pictures students are better able to grip the crux of the concept earlier. When an audio-visual aid is practiced by the teacher, there must be some benefits and advantages of using it. Some commonly known pros of using audio-visual aids are expressed in opinions of following scholars: Audio Visual aids are teaching tools used by teachers as a motivating technique for increasing learner's attention span.

(Sudarsan & R, 2022) Helps in comprehension by bringing the child in direct contact with the concept and how it actually works in real life situations (Selvi, 2007). Student is more attentive, motivated and interested as compared to that classroom session that is in function without the use of audio-visual aids (Sharma & Upadhyi, 2008). Conceptualizing is clearer and concrete as the use of audio-visual aids appeals, activates and utilizes the five senses of individual student i.e. see, hear, touch, taste and smell (Jimoh, 2009). While, use of audio-visual aids provide freedom to the students i.e. students discuss, comment and express their opinion which they cannot while a typical teacher lecture is in progress; at the same time this discussion helps them in developing language other than mother tongue, gaining confidence by probing and showing tolerance to opposite opinions (Sharma & Upadhyi, 2008).

Gillani (2005) advocates that audio-visual aids provide basic means of planning, organizing and invigorating the curriculum. The basic aim of education must be to lead students towards self-learning and lifelong learning and this aim can be achieved through the use of audio-visual aids as it improves the learning capacities of individual students i.e. learning experience that is worth memorable (Sharma & Upadhyi, 2008). Retention rate of the students increases by the use of audio-visual aids (Indrayanti & Romadhon, 2023). Activity based learning leads to critical thinking, reasoning, creativity and the development of inquisitive mind which is the real aim of education. Audiovisual aids entail activity for teacher as well as for students that keep them attentive and motivate them to think and inquire resulting in deep comprehension about what is being taught (Gillani, 2005). Handling and manipulating of audio-visual aids by students help them develop working habits (Selvi, 2007). Use of audio-visual aids provides students with opportunities to think speak and interact without fear and hesitation with teacher and peers resulting in students' personality development (Jimoh, 2009). Audio-visual aids help in maintaining the class discipline as every of the student is focused and attentive towards learning. When teacher lecture the students, they get bored and start whispering that brings indiscipline in the classroom (Indrayanti & Romadhon, 2023).

Cons of Audio-Visual Aids

Using of audio-visual aids seems very essential in today's education; individuals of 21st century belong to virtual age brackets. They experience video games, online learning and computerized programming ranging from classroom learning to every shopping mall. It is often experienced in daily life that children love to watch an educational movie than to read a book. To meet this end teacher incorporates audio-visual aids i.e. models, video presentation, power point slides show etc. in the classroom sessions. But all these and other teaching aids carry along with them many disadvantages, therefore along with merits one must keep the demerits of using audio-visual aids in mind. (Tayirova, 2023) By an effective and timely use of audio-visual aids one can better able to eliminate following deserting aspect of using audio-visual aids in classroom: While any specific audiovisual aid is in operation for say, Over Head projector; any technical problem may hit all of sudden. Projector bulb may burn out. Desired sound and color missed while using a multimedia or if using a Digital Video Disc (DVD) or Compact Disc (CD) they may not well-match your players. (Tayirova, 2023) Therefore possibility of technical problems is higher (Gillani, 2005). Critiques believe that audio-visual aids carry high rate of attractiveness that results in child being diverted from desired path of learning and lost in recreation and fantasy (Sharma & Upadhyi, 2008).

Most of the schools suffer budget constraints and as the fact is clear i.e. audio-visual aids are expensive; it is impossible to make adequate availability of such aids in every classroom (Tayirova, 2023). Kieffer & Cochran (2005) states that activity supplemented by audio-visual aids is completely mere waste of time and resources if choice of desired audio-visual aids is not possible. Suppose a teacher is to teach about specific culture of a particular area using a map is a wasteful activity rather charts with pictures of traditional dresses, food and life style among others can be beneficial.

Preparing audio-visual aids require substantial amount of time. Making your very own transparencies, slides, films, posters, charts or any other teaching aid is very time taking. While arranging them teacher totally overlooks the importance of developing clear and well-organized lesson plan (Sharma & Upadhyi, 2008). Displaying too many of audio-visual aids simultaneously in a single class can be very confusing for students and even for teachers' as well. Concepts can overlap and can lead to misunderstanding and poor retention (Dawadi, 2022). Selection of appropriate audio-visual aids in relation with the age group of students is very rare. Often teachers are not aware about particular audio-visual aids that are most suitable for young kids,

grown-ups and higher-grade students. Suppose flashcards and pictorials are good for young taught but if a teacher selects them for 9th grade level it will surely be not appropriate. Teachers when use audio-visual aids overlook the aspect of explanation rather consider audio-visual aids as self-explanatory. But explanation at every level of learning is a must. Suppose if a diagram of heart is shown to the students and if it is wrongly labeled, instead of passing concrete concept it will lead to misinformation (Dawadi, 2022).

The human being is curious by nature so as student too. Students are always enthusiastic and eager to see, touch and hear new things. When a teacher chooses to supplement the lecture with audio-visual aid; managing the class happened to be very difficult task. Suppose if a teacher is to show model of atom, then controlling the excitement of the students is must, and if not, the teachers' effort goes in vain (Gillani, 2005). Using inappropriate audio-visual films creates aggression and develops destructive behaviors in students. A common practice at toddlers' school is to use cartoon films. Children adopt maximum of violence from those cartoon movies. Therefore, the uses of such audio-visual aids are strongly criticized by psychologist and educationist (Selvi, 2007).

Classification of Teaching Aids

Using audio-visual aids and other technologies developed in this modern scientific era for the purpose of achieving concrete education proves beneficial for teacher and student and educational system as whole. Teaching aids can be classified based on their use in teaching and learning process. (Malik, Mittal, Singh, & Rana, 2022) It brings diversification in methods of instruction. They are equally useful at all levels of education. Appropriate use of audio-visual aids in teaching of English, Geography, History, Science, Languages, Art, Agriculture and many other technical and vocational subjects is increasing day by day. Selvi (2007) contend that audio-visual aids and their use are not only limited to educational purposes rather if we go back in history, we find Martin Luther suggesting to use empty walls for the promotion of Protestant movement. In fact, this idea leads to the invention of writing board or black board which is used today in almost every school worldwide. Some other social objectives are also achieved through the use of audio-visual aids i.e. in an awareness campaign about Human Immunodeficiency Virus (HIV) audio-visual aids are used. While studying the broad umbrella term of audio-visual aids, one can easily come across different types of audio-visual equipment ranging from simple hand-made charts to highly sophisticated projectors. In the broadest sense audio visual aids can be categorized under two heads which are the:

1. Projected Aids
2. Non-Projected Aids

Audio-visual material contributes valuable experiences for teachers and students. Almost every form of instruction is based on verbalism, but the use of audio-visual aids minimizes the verbalism and facilitates students to concentrate and motivate them towards abstract thinking and imagination to better understand the concept.

Projected Aids According to (Wittich & Schukkaer, 2007) projected aids involve an enlarged image of the material or text projected on a screen which is at a distance from the projector. While using projected aids (film strips, slide projector, overhead projection, opaque projection) the room is either totally dark or may be partially dark. The bright colors and images on the screen catch the attention; sound and motion will make presentation more dynamic as compared to non-projected aids. Projected aids are equally effective for every age group as well as small or large group. Equipment used for projection requires eclectic power. A clean white wall can be effectively used for front projection. Projected aids include:

Interactive Whiteboard (IWB): captured the interest of teachers in view of facilitating the teaching process at schools through stimulating dialogue and discussion during teaching in addition to attracting students' attention and concentration throughout the class. For the purpose of identifying the contribution of the IWB in improving students' performance; a comparison between the scores in the IWB exams and retrieval exercises with their scores in the exams of three semesters taught through traditional lectures for a Vocational Education Technology course alongside with evaluating questionnaires for the students' perception. (Haroon, Omar, & Walaa, 2022)

Augmented Reality (AR): is a technology that can turn virtual objects in the form of two dimensions (2D) or three dimensions (3D) into an object that looks real, then able to display objects in real-time. Using AR technology, you can visualize learning material into 3D objects to make it easier to understand when using it as a learning medium. (Sukirman,2023)

Smartboards: Smartboards integrate touch-sensitive displays with interactive features, enabling teachers to draw, write, and manipulate digital content. Transfer of knowledge to future generations has always been performed by people since existence of early humans. Today, with the developments in technology, education is presented in several ways and through a wide variety of tools such as two- or three-dimensional learning contents, animations, video conference lessons and interactive applications. Parallel to these developments, smartboards, tablets, virtual laboratories and cooperative learning environments have resulted in more innovative solutions in teacher training and changed the way of teaching. (Murat Yalman, 2021)

Graphic Aids: Graphic aids are commonly used to describe ideas and concept with little or no verbalism. Like other teaching aids graphic aids helps student to better understand and retain the information. Some basic types of graphics aids are: Photographs & Pictures A picture or photograph gives an accurate concept or idea of any object or concept. Good photograph can effectively communicate the whole story without using a single word. Pictures and photographs can be colored as well as black & white. Colored pictures and photographs are relatively more eye-catching (Gillani, 2005).

Flash Cards: Gillani (2005) describes flashcards as potential medium of visual education. If a teacher is to introduce new words, using flashcards can meet the purpose. They commonly involve photographs and pictures to communicate a new idea or a word. They are widely used at toddlers' level and elementary schools. Flashcards are usually in a large number and they are flashed to the students' one by one while teacher verbally explains what is contained. Charts: Charts are widely used visual/graphical aids to present concepts and ideas that are complicated and that cannot be comprehended easily by just mere words no matter written or oral. Charts are mixture of different types of graphics i.e. pictures, diagrams, cartoons, graphs, written text or drawings. Teacher usually restricts one idea per chart and thus making concept clear without ambiguity.

Diagram: Diagram is a simple and explanatory drawing showing inter-relation and explaining ideas and concepts by using lines, symbols and geometrical forms. Diagrams go beyond mere representation rather they are self-explanatory or self-describing (Thomas & Kobayashi, 1997). Poster is a pictorial representation of an idea or concept in striking bold colors to attract the viewer. Posters are usually displayed out in open for the purpose of awareness in general public. Posters not only serve as a means to decor the class rather it stimulates interest in students to learn about different countries, art, historical places, science, industries and whatever the posters are about (Kieffer & Cochran, 2005). Posters are likely to bring the learner to first two steps i.e. attention & interest and to go through them as well. Poster is not meant to educate rather stimulating interest and action immediately is the ultimate goal. White/Marker Board: White boards are large white sheets of plastic material with a clean clear surface to facilitate writing or drawing while using felt pens or erasable markers available in different colors. Flannel/Felt Board Flat panels of heavy cardboard: Masonite board or plywood are utilized and flannel cloth is stretched and glued over the surface to make a felt/flannel board. Graphic materials i.e. pictures, writing on a hard paper, photographs etc. can be placed on flannel board by using sand papers pasted on their backs and they are called as flannel graphs. Specimens. Specimen can be a part, sample or small piece of the real object. Even a tiny piece of real object stimulates interest in students to learn more and more i.e. specimen of a leaf or birds feather can be very eye catching and stimulating.

Field Trips/Study Tours: Gillani (2005) says that field trips provide opportunity to observe natural beauty, industries and their operations and many other places that are of interest to teacher and student. Children respond better about any theory they have learned when they see how it works in real world. Field trips and study tours should be arranged in advance and later they must be followed up by a discussion or report to retain information gathered. Exhibitions: Exhibitions are not mere gathering of display material rather they are a comprehensive source of information. Exhibitions are planned to communicate some valuable concept to community, parents and students. When students go through or participate in exhibitions, they express themselves and their display material, this not only helps in speech training rather confidence and tolerance to opposite opinion can be observed. Infact conducting exhibitions increases cooperative efforts along with

focus on ethical, cultural, disciplinary, vocational and aesthetical values. Some largely used audio & visual aids are discussed here under: Radio and Television Educational broadcast is an old concept developed during the period of 1960s and 1970s when a suggestion to broadcast school was welcomed. By broadcasting lessons thousands of learners can be educated (Thomas & Kobayashi, 1997). Through radio and television programmes education to any age group can be targeted.

Conclusion

Audio-visual aids are an important tool of teaching learning process, and they make teaching-learning process more successful and interesting. The knowledge about the correct use of audiovisual aids enhances the understanding of the students in the classroom and helps improve teachers' role in realizing the learning outcomes. Teacher may likely to motivate student better with the use of audio-visual aids in teaching learning process. Use of audio-visual aid helps in supplementing the attention level of the students while increasing their understanding and intellectual capacity.

Suggestions

Based on the conclusion of the study, the following recommendations are made:

1. Appropriate use of audio-visual aids is a skill; therefore, teachers may be trained in use of traditional as well as new technology based through pre-service programs and in-service teachers' professional development programs.
2. Teachers may be encouraged to use audio-visual aids in order to enhance the interest and motivation of the students and keep them attentive in the class.
3. Curriculum planners and policy makers may realize the importance and effectiveness of audio-visual aids and can make it a part of the teacher education programs so that teachers are trained in proper use of audio-visual aids.
4. Special funds and grants may be reserved for provision of latest audio-visual aids (subject-wise) to secondary schools.
5. This research article has opened new horizons for other researchers to study the importance and use of audio-visual aids on the same lines in other subjects of the curricula taught at different levels of education and find out effects of use of audio-visual aids on students' learning and their motivation for learning.

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