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Multimedia instructional materials in teaching basic science concepts for students with hearing impairment

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Abstract
Purpose: The purpose of this study was to examine the impact of multimedia instructional materials in teaching basic science concepts to students with hearing impairment in Nasarawa State.
Methodology/approach: The study used a questionnaire to collect responses from respondents. Sixty (60) students were sampled, and simple percentages, means, and standard deviations were used to analyze the findings.
Results/Findings: The findings of the study showed that the use of multimedia is important, as many students with hearing impairment did understand what was taught. In addition, multimedia instructional materials aid student retention during examinations. When multimedia materials were used by the students, they were motivated by their use during science lessons. The respondents' responses also identified many challenges facing the use of multimedia instructional materials in teaching science.
Limitations: The scope of this study must be expanded.
Contribution: This study shows the impact of multimedia instructional materials in teaching basic science concepts and effective modern methods for students with hearing impairment.
Recommendations: The study recommends that students at all levels of education should be given adequate information on the impact of multimedia instructional materials on the teaching of basic science to learners with hearing impairment in order to promote the interest of these students in science subjects.
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1. Introduction

IDEA (2004) defines hearing impairment as impairment in hearing, whether permanent or fluctuating, which has a negative impact on a child's academic achievement. Hearing impairment is described as a severe impairment that interferes with a child's ability to process linguistic information through hearing, whether or not they are hearing with amplification. Hearing impairment can thus be understood as a condition that precludes a person from hearing sounds in all or most forms. On the other hand, individuals with hearing loss typically react to auditory cues such as speech. When any component of the ear or auditory (hearing) system does not function normally, hearing loss can occur.

According to Hardman, Drew, and Egan (2008), a student with hearing impairment is a person whose hearing loss is measured in decibels (dB) and is greater than 90 dB. The amount of sound that a person can hear, as well as the pitch or frequency of the sound, has an impact on hearing loss and deafness. The author continues by stating that two phrases are frequently used to describe the severity of a person's

hearing impairment: deafness and hearing difficulty (or partial hearing). People with hearing impairment cannot perceive speech through the ear; instead, they receive most of their information from their vision (Heward & Wood, 2006). Children's hearing loss is so severe that it interferes with their ability to receive linguistic information through hearing, which has a negative impact on their academic achievement. Hardman claims that those who have hearing loss have a limited but mostly functional sense of hearing. According to Angel (2016), individuals with hearing impairment require educational programs that include four different communication teaching methods. The four types of communication are auditory, oral, manual, and total communication. It is critical to understand that none of the four, not even a combination of methods, can adequately address the specific needs of all persons with hearing impairments, but some of them are used to convey information.

On the other hand, multimedia, according to some sources, is formally defined as a plural term that describes the combination of visual and aural display from several sources given in a single presentation. It is most frequently used to refer to text, music, animation, moving visuals, and sound. As the term "Multimedia" is used more frequently, the hyphen is less frequently employed, resulting in the compound word "Multimedia." There are many ways to deliver multimedia, and a good example is websites. Another is CD-Rom. Presentations and promotions using media are common examples. The demand for involvement from multimedia is rising (Van Gog, 2014). Dedicated hardware and specialized software are typically required to create high-quality multimedia. The industry is slowly adopting standards and methods that enable distribution outside the sphere of specialized computers because of the desire for higher responsiveness and quicker delivery. It was pointed out that the terms hypertext and hypermedia are often used synonymously.

Regrettably, this also applies to hypermedia and multimedia. Several years ago, there was a clear distinction between the two terms, with hypermedia referring to a presentation where a computer was used to control a peripheral device, typically a videodisc player, and multimedia referring to a presentation that was self-contained and displayed the associated media on the computer. In this instance, a high-definition video monitor was used to display data from the videodisc rather than from a computer screen. The existence of presentation multimedia and interactive multimedia, two separate subtypes of multimedia, further complicates this matter. Business professionals are leading users of multimedia presentations (Van Gog, 2014). To create a presentation that is then recorded on video tape for use as promotional material, the computer is utilized to control multiple media, including sound, graphics, animation, and video. The key advantage of this approach over creating such materials using conventional methods is that they are substantially less expensive because they do not always require specialized employees. This can be seen in the production of computer-generated animated movies, which can be done at a fraction of the expense of traditional animation that employs groups of highly skilled animators. While the usage of such multimedia is typically restricted to the commercial world, some believe that it could play a role in education, though not as a method of instruction, but rather as a mechanism for students to communicate what they have learned. Interactive multimedia is the category of multimedia most frequently used in education. As the term implies, information can be obtained nonlinearly owing to user interaction.

According to Bradford and Hamer (2022), science is the study of the natural and physical universe through observations and experiments. We are surrounded by science. Science is what makes you available. . Science also applies to the process of air production. All three things like eating, drinking, and dressing are founded on science. Another field of science, astronomy, is visible when looking into the atmosphere. You cannot avoid it. One of the most significant subjects of study in our environment is science. Scientific concepts, according to Kampourakis (2018), play a crucial part in science and can be thought of as organized mental representations of the natural world. They can be associated with processes (like "photosynthesis" or "adaptation"), observable entities (like "mammal" or "mountain"), or unobservable entities (like "atom" or "gene"). Any discussion of science must, therefore, include concepts, the meaning of which should be understood by all participants. However, this should not be taken for granted in science education or science itself. In contrast, ambiguity is possible because of characteristics that are built into the concepts themselves. There are at least three things to consider: (1) the meaning of certain terms in the common language differs from the corresponding scientific

concepts; (2) many of the scientific concepts are metaphors or relate to metaphors; and (3) the same scientific concept can have various interpretations depending on the context in which it is used (Schneider, Krajcik, Marx, & Soloway, 2002).

2. Literature review

The ear is a physical organ utilized for hearing. Learning about the world is made possible through hearing. Regardless of how loud the noise is, someone who is unable to hear anything around them is more likely to experience auditory issues. It is a visible physical tissue disease or defect that may impair the proper operation of the organ system to which that tissue belongs. Hearing loss is a disability that can affect the ability of an entire personality to function successfully, regardless of when it initially appears (Angel, 2016). Okeke (2018) lists the Conference of Executives of American Schools for the Deaf's committee of nomenclature's definition of "deaf" as one of the earliest attempts to define hearing impairment, which states that the people with hearing impairment are whose sense of hearing is non-functional for day-to-day life. Additionally, they assert that regardless of whether they wear hearing aids, those with hearing impairments still have a functional sense of hearing. The committee divides hearing impairment into two categories as follows: (1) congenitally deaf (those who are born with hearing loss), and (2) adventurously deaf (those who were not born deaf but later acquired hearing loss as a result of a disease or injury).

Deafness and hearing impairment are both types of disabilities, although they are not the same. According to the Individuals with Disabilities Education Act (IDEA), hearing impairment is defined as an impairment in hearing, whether permanent or fluctuating, that adversely affects a child's performance in education but is not included under the definition of "deafness." To understand what kinds of disabilities are termed hearing impairments, one must first understand what deafness is. According to Satyaprakasha and Sudhanshu (2014), hearing impairment is defined as hearing loss below 90 dB and deafness is defined as hearing loss beyond 90 dB. It should be clarified that hearing loss and impairment are synonymous. It is regarded as the most prevalent congenital defect in infants and is more than twice as prevalent as other disorders like sickle cell disease, hypothyroidism, phenylketonuria, and galactosemia that are checked for at birth. Additionally, it affects newborns more than twice as frequently as other congenital disorders do. It is one of the most common sensory disorders and is caused by issues with the conductivity and/or sensor-neuronal systems of the ear. The handicap may be postnatally caused by inherited factors, trauma, or disease, or it may be congenitally caused or have an early or late onset. According to Finitzo and Crumley (1999), hearing loss can be either pre-lingual (occurring prior to the development of speech and language) or post-lingual (occurring following the development of speech and language).

The United Nations on the Rights of Persons with Disabilities (UN, n.d) portrays people with hearing impairments as visual creatures whose eyes serve as gateways to the world of information (Dagbo, 2016). A crucial point raised by Dagbo (2016) is that children with hearing loss are not non-contributors to society. Whether a concept is simple or sophisticated, such as science, it can still learn a range of concepts. All that is needed to explain the concept to them in a way that they can understand is the tool or set of symbols.

Multimedia and information and communication technology (ICT) commonly intersect. The technology used for information and communication (ICT) has been around for some time. ICT appears to have significantly altered many aspects of life. Nowadays, everyone participates in the era of information and communication. ICT is more creative and can enhance deep-learning methodologies (UKEssays, 2018). The phrase "communication technology" refers to any technology that is used to produce, store, and distribute information (including business data, video, audio, still images, text, and photos) across high-speed communication networks that also transport sound and video. The term "multimedia" refers to communication techniques that incorporate more than one of these (Fiorella & Mayer, 2016).

Thus, a system of information transmission that blends various communication styles is described as multimedia. Multimedia can contain text, audio, video, still photos, sounds, animations, images, and interactive information. Any combination of the aforementioned can be included in computer-generated

information (Bada, Adekomi, & Ojo, 2012). Bada et al. (2012) define multimedia as the interesting concoction of computer hardware and software that permits the integration of text resources, audio, animation, graphics, and video to make potent presentations on a cost-effective desktop computer. Quah (2023) identified a particular program called Wakelet using the function as a contributor to identify students' understanding of the topics studied by the students. According to Mantiri (2014), what differentiates multimedia is the presence of texts, images, music, animation, and video, some or all of which are organized into a coherent program. As can be seen from these definitions, multimedia entails the transmission of information or its presentation over a number of channels. Some or all of these components (such as sound, animation, text, audio, images, graphics, and video) can be used to provide an easy and effective teaching method for science classrooms.

According to Allen (1966), multimedia systems are a common term for media combinations. Simply said, "Multimedia" means "Many Media." To help learners achieve predetermined and desired behavioral objectives, the term "multimedia" refers to the use of appropriate and carefully selected varieties of learning experiences that are presented to learners through carefully selected instructional strategies that build upon and support one another. The use of multimedia learning experiences is justified because they provide a natural setting for learning. Learning can be accelerated by using all senses. Although sensory experiences serve as the foundation for intellectual engagement in formal educational settings, learners' sensitivity to sensory inputs differs.

Multimedia learning has the advantage of appealing to unique learners, their rate of learning, their interests, and their level of readiness. Additionally, perception of stimuli, whether aural, visual, tactile, or affective, by the learner is the first step in a series of behaviors that lead to cognition and conceptualization. These early learning experiences must be trustworthy, accurate, and understandable. Inaccurate initial sensory perceptions may prevent learners from developing accurate conceptualizations and understanding. A skillfully structured presentation of information employing a variety of media should keep the learner's conscious attention focused on live stimuli thanks to the various types of aids now available. Multimedia is utilized as instructional material in the teaching and learning processes. Therefore, discussing multimedia instructional materials is essential.

Teachers in secondary schools are under pressure to provide their students with better and more productive learning environments and educational opportunities. Their principal's accountability is very significant and determines the value of student learning consequences (Siswanto, Hasan, Sowiyah, & Ridwan, 2020). Institutional aims that are largely attained in schools through teaching include the enhancement of students' knowledge and learning, and their engagement in the learning community as a means of preparing them for life as citizens. Educators continually seek to improve the efficiency of their instructional activities. The emphasis in higher education has shifted from being an instructor to employing learner-centered pedagogical strategies. Information technology solutions, such as decision-support systems and expert systems, have been developed to assist educators and students in developing higher-order cognitive abilities. Another tool that has been highlighted as beneficial to teachers in controlling the teaching-learning process is multimedia instructional resources. According to Yamauchi (2008), multimedia instructional materials include one or more media in addition to textual content such as graphics, video, animation, photographs, and sound.

The phrase "multimedia instructional materials" describes computer-based training that conveys a learning message using a range of media, such as presentations, web-based manuals, and online tutorials. Additionally, it entails the use of a range of media such as presentations, tutorials, and guides to communicate instructional information. Education professionals have been paying close attention to instructional systems and technologies to enhance students' learning. Teachers have begun to consider the benefits and disadvantages of many conventional methods of instructing and training students and professionals, as well as the possible benefits of educational technologies. As a result, teachers have begun modifying their curricula to incorporate new teaching techniques. Bartlett and Strough (2003) claim that more schools are using instructional technology such computer-assisted case-based instruction, simulation techniques, and multimedia presentations. Roy (2023) and Amiri, Khademi, Khafri, Akbari, and Jangjoo (2022) asserted that a lot of educational institutions worldwide had

improved in the provision of online programmes for on-campus and off-campus learners throughout the Covid-19 epidemic, hence the need to pay attention to virtual and e-learning is felt more than ever before.

By mixing text, graphics, animation, and other media into one package, teachers can use multimedia to provide comprehensive information to their students, which will help them accomplish their particular course objectives. Bartlett and Strough (2003) claim that multimedia provides the natural and intuitive linking of instructional material with other related topics in addition to the dynamic, highly interactive illustration of complex processes. Multimedia-based training is efficient and successful because of three things it features video/audio production, which enhances a learner's interaction with the course material by requiring less effort to bridge the gap between the learners and the information being processed; it allows students autonomy in choosing how they want to complete their assignments; and self-paced learning, which allows students to avoid the group instructional setting, which frequently impedes some people's natural progression.

According to Aly, Elen, and Willems (2004), multimedia formats may be advantageous to professors in multi-section courses in addition to being beneficial to students because they guarantee uniformity in lecture content across sections. Multimedia, which has been labeled as the next big thing in technology, is one of the most well-liked and effective training options. The current study investigates these impacts to evaluate how new multimedia instructional materials affect students' knowledge and opinions of instruction in a multi-sectional course. Students had the opportunity to directly experience these consequences in the lab component of Iowa State University's Quantity Food Production and Service Management Experience course. In this laboratory setting, students manage, prepare, and serve lunch for the general public. Students who successfully complete the course are expected to be able to administer, manufacture, and service high-quality meals in a real-world context. The students in this Quantity Food Production laboratory received traditional (instructor-led) instructions on service operations and beverage preparation during the first three orientation sessions. Until the start of the fall of 2007, the only source of support for the information that students heard during orientation sessions was the orientation programs themselves (Abdulhamid, 2010).

According to Taber (2019b), a concept provides a framework for comprehending certain features of the outer world. Taber (2019a) contends that if concepts are mental beings, Taber (2019a)they can only exist in our minds and cannot be directly observed from an objective point of view. Numerous studies have been conducted to investigate students' conceptual grasp of science concepts; however, these investigations have used indirect methods because it is impossible to directly study the mind. Even when we participate in introspection or when we reflect on our own thoughts, it may be impossible to fully express how we absorb an idea and how we apply it, sometimes even effortlessly. There are many concepts that are effectively used to communicate between different scientists because they all share a sufficiently similar concept to be in effect referring to the same thing, even though there are probably examples and situations where they would disagree on how the concept should be understood and applied. However, there are sometimes substantial differences in how different scientists use the same concept label, especially when concepts are still being developed. According to Baierlein (1990), models and cause-and-effect are two of the essential principles of science (Adoyo, 2007): Structure and Function, Organization, and Consistency and Change (Duit, 2014).

The goal of multimedia educational resources for students with hearing impairment is to assist them in developing the skills needed for future higher education or the digital world, which makes it easier for them to find employment in the future. According to Ramscar, Hendrix, Love, and Baayen (2013), every student with special educational needs has benefited greatly from the use of multimedia instructional materials. Future students with hearing impairments will also need to have analytical and critical thinking skills. Teaching tools with a multimedia component that supports the ideas and abilities of students with hearing impairments. Students with hearing impairments will not be reliant on the teacher since the learning environment will shift from teacher-centered to student-centered. According to Huang (2009), the purpose of multimedia educational resources is to give students special needs, such as those with hearing impairment, a productive learning environment that in turn enhances their

academic achievement. Additionally, multimedia instructional tools are intended to enhance current curricula and pedagogy for teaching and learning (Ghavifekr & Rosdy, 2015).

2.1 Problem Statements

The way a teacher imparts knowledge to his students will have an impact on how they cognitively develop. The concept that a teacher is trying to teach students will be simpler for the pupils to understand if the instructor uses appropriate and good instructional materials. This is necessary to teach science concepts such as object/system, nature/characteristics, cause/effect, equation/mathematical expression, and condition/reference frame in a way that would help the students grasp them. As a result, the students conclude that the subject is straightforward. Students with hearing loss frequently struggle to study in a classroom setting. The main reason is that they are disabled in some way, notably with one of their fundamental receptive abilities, hearing, which impedes their ability to assimilate. They require instructional resources that make studying and teaching more engaging for them in this area.

The justification provided above demonstrates that it is not entirely appropriate to place all the blame on students who struggle with scientific ideas. Instead, it is important to evaluate both the teaching approaches utilized by instructors and, most likely, the teaching aids themselves. Due to a lack of available instructional materials, ineffective underutilization of the few available teaching resources, and a lack of availability of relevant instructional materials, a significant portion of projected learning results in basic science topics in our secondary schools have not been realized. The researchers decided to conduct this study because it was difficult for students with hearing difficulties to comprehend fundamental scientific ideas. In light of this, the researchers believe it appropriate to conduct this study on the effectiveness of multimedia instructional tools for teaching fundamental scientific principles to students with hearing impairment in Nasarawa.

2.2 Objectives of the Study

The research aims to:

1. examined the importance of multimedia instructional materials in the teaching and learning of basic science concepts for students with hearing impairments in secondary schools.
2. examine the extent that the use of multimedia instructional materials motivate interest of science concepts in students who are hearing impaired during teaching-learning process,
3. assess the challenges facing the use of multimedia instructional materials in teaching basic science concepts to students with hearing impairment,
4. suggested a possible solution to the challenges facing the use of multimedia instructional materials in teaching basic science concepts to learners with hearing impairment.

2.3 Research Questions

1. What are the basic science concepts used in teaching students with hearing impairments?
2. To what extent does the use of multimedia materials motivate interest in science concepts in students who are hearing-impaired during the teaching-learning process?
3. What are the challenges facing the use of multimedia instructional materials in teaching basic science concepts to learners with hearing impairments in secondary schools?
4. What are the suggested solutions to the challenges facing the use of multimedia instructional materials in teaching basic science concepts to learners with hearing impairments in secondary school?

3. Methodology

The descriptive survey design was the research method chosen for this study. This is used to describe the impact of multimedia instructional materials in teaching basic science concepts to students with hearing impairment in Nasarawa State. The study's intended population was secondary school students in Nasarawa. JSS 1 through 3 students were included in the study's target population. The respondents were chosen at random by the researchers using a simple random sampling technique from the chosen Nasarawa State schools. Twenty students were randomly recruited from each of three schools. The schools are called:

1. LGEA Central Primary, Assakio

2. Pilot Science Primary School
3. Pilot Primary School New Karshi

The Impact of Multimedia Instructional Materials in Teaching Basic Science Concepts to Students with Hearing Impairment" served as the main research instrument for this study. Two sections (A and B) were created for the instrument. Section A is responsible for gathering biographical data on respondents, and Section B, which is divided into four parts, is responsible for gathering responses to questions that were developed specifically for this study. The four options listed are Strongly Agree (SA), agree (A), disagree (D), and Strongly Disagree (SD), and respondents were required to select one.

After it was created, the study questionnaire was given to a group of specialists who evaluated it, gave helpful feedback for revisions, and made recommendations to ensure the instrument's validity. After making any necessary modifications, the supervisor also reviewed the questionnaire before administering it to the respondents. The researchers individually distributed 60 questionnaires to respondents. They will also work with research assistants to visit the selected classes in Nasarawa State to distribute the instruments to the students. To guarantee a 100% return rate, the questionnaires were collected immediately after completion. Simple percentages, means, and standard deviations were used to analyze the data gathered for the study. This was done so that a layperson could evaluate the findings using calculations.

4. Results and Discussions

Research Question 1: What are the basic science concepts used to teach students with hearing impairments?

Table 1. Basic science concepts in teaching students with hearing impairment

S/N	ITEM	SA	A	D	SD	TOTAL	X	S.D	
DECISION									
1	I can easily understand causes and effect naturally without the use of multimedia instructional materials	18(72)	7(14)	19(38)	16(16)	60	2.33	5.43	Rejected
2.	The use of multimedia instructional materials presents a better model for the scientific concept that I am learning.	33(132)	22(66)	3(6)	2(2)	60	3.43	11.76	Accepted
3	Multimedia instructional materials allows me to see how change occurs in some happenstances like evaporation	31(124)	11(33)	16(32)	2(2)	60	3.18	10.11	Accepted
4	The structure and function that occurs in diffusion cannot be understood except with the aid of multimedia instructional materials	22(88)	20(60)	13(26)	5(5)	60	2.98	8.88	Accepted
5.	The use of multimedia instructional materials will allow students to always remember organization in basic science concept	30(120)	18(54)	7(14)	5(5)	60	3.22	10.37	Accepted

In item 1 of Table 1 above, the mean score of 2.33(5.43) of respondents agreed that they could easily understand causes and effects naturally without the use of multimedia instructional materials. This indicates that students cannot easily understand the causes and effects naturally without the use of multimedia instructional materials. In item 2, the mean score of 3.43(11.76) of the respondents agreed

that the use of multimedia instructional materials presents a better model for the scientific concepts they were learning. This means that most of the students affirmed that the use of multimedia instructional materials presents a better model for the scientific concepts they are learning. In item 3, the mean score of 3.18(10.11) of respondents agreed that multimedia instructional materials allow them to see how change occurs in some instances like evaporation, which indicates that many of them opined that multimedia instructional materials allow them to see how change occurs in some situations such as evaporation. Moreover, in item 4, the mean score of 2.98(8.88) of respondents agreed that the structure and function that occurs in diffusion cannot be understood except with the aid of multimedia instructional materials, this indicate that majority of the students confirmed that the structure and function that occurs in diffusion cannot be understood except with the aid of multimedia instructional materials. In item 5, the mean score of 3.22(1037) of respondents agreed that the use of multimedia instructional materials will allow students to always remember the organization in basic science concepts. This indicates that many of them opined that the use of multimedia instructional materials will allow students to always remember the organization of basic science concepts.

Research Question 2: To what extent does the use of multimedia materials motivate interest in science concepts in students who are hearing-impaired during the teaching-learning process?

Table 2. Multimedia instructional materials motivating the interest of science concepts in students who are hearing impaired during teaching-learning process

S/N	ITEM	SA	A	D	SD	TOTAL	X	S.D	DECISION
6	Children with hearing impairment do find class with the use of multimedia instructional materials in teaching science concept interesting	20(80)	16(48)	17(34)	7(7)	60	2.82	7.95	Accepted
7	The use of multimedia Instructionall materials always make students with hearing impairment perform better in science examination	20(80)	18(54)	12(24)	10(10)	60	2.8	7.84	Accepted
8	The use of multimedia instructional materials always reduce the stress of interpreter while teaching basic science concept	18(72)	14(42)	16(32)	12(12)	60	2.63	6.92	Accepted
9	Lessons taught with multimedia instructional materials often stays in my long term memory than the one taught without multimedia instructional materials	28(122)	22(66)	6(12)	4(4)	60	3.23	10.43	Accepted
10	The use of multimedia instructional materials always reduce note writing of learners with hearing impairment	25(100)	10(30)	17(34)	8(8)	60	2.87	8.24	Accepted

Item 6 of Table 2 shows that the mean score of 2.82(7.95) of the respondents agreed that children with hearing impairment do find class with the use of multimedia instructional materials in teaching science concepts interesting, which indicates that most of the children with hearing impairment do find class taught with the use of multimedia instructional materials in teaching science concepts. In item 7, the mean score of 2.80(7.84) of the respondents agreed that the use of multimedia instructional materials always make students with hearing impairment perform better in science examination, this indicates that many of them affirmed that the use of multimedia instructional materials always make students

with hearing impairment perform better in science examination. For item 8, the mean score of 2.63(6.96) of the respondents agreed that the use of multimedia instructional materials always reduces the stress of interpreters while teaching basic science concepts. This means that when multimedia instructional materials are used to teach basic science concepts, it always reduces the stress of interpreters. Moreso, in item 9, the mean score of 3.23(10.43) respondents agreed that lessons taught with multimedia instructional materials often stays in my long term memory than the one taught without multimedia instructional materials, this indicates that majority of them believed that lessons taught with multimedia instructional materials often stays in my long term memory than the one taught without multimedia instructional materials. For item 10, the mean score of 2.87(8.24) respondents agreed that the use of multimedia instructional materials always reduced the note writing of learners with hearing impairment. This indicates that most students confirmed that the use of multimedia instructional materials always reduced the note writing of learners with hearing impairment.

Research Question 3: What are the challenges facing the use of multimedia instructional materials in teaching basic science concepts to learners with hearing impairments in secondary school?

Table 3. Challenges facing the use of multimedia instructional materials in teaching basic science concepts to learners with hearing impairment in secondary schools

S/N	ITEM	SA	A	D	SD	TOTAL	X	S.D	DECISION
11	There is always power failure in my school which use to interrupt the use of multimedia instructional material in science class	20(80)	27(81)	17(34)	7(7)	60	3.37	11.36	Accepted
12	The period for teaching science subject is not enough to set multimedia instructional materials	25(100)	24(72)	11(22)	0(0)	60	3.23	10.43	Accepted
13	There is no enough space in setting multimedia instructional material	24(96)	16(48)	12(24)	8(8)	60	2.93	8.58	Accepted
14	School management do not appreciate the use of multimedia instructional materials in teaching	16(63	8(24)	20(40)	16(16)	60	2.35	5.52	Accepted
15	Amount used for purchasing multimedia instructional materials is too much	17(68)	14(42)	16(32)	13(13)	60	2.58	6.66	Accepted

In item 11 of Table 3, the mean of 3.37(11.36) respondents agreed that there is always power failure in their school, which is used to interrupt the use of multimedia instructional material in science class, indicating that most of the students confirmed that there is always power failure in my school, which is used to interrupt the use of multimedia instructional material in science class. In Item 12, the mean of 3.23(10.43) of respondents agreed that the period for teaching science subjects was not enough to set multimedia instructional materials. This indicates that most students opined that the period for teaching science subjects was not sufficient to set multimedia instructional materials. In item 13, the mean of 2.93(8.58) respondents agreed that there was not enough space in setting multimedia instructional material. This indicates that many of them supported the lack of space in setting up multimedia instructional materials. Moreover, in item 14, the mean of 2.35(5.52) respondents agreed that school management does not appreciate the use of multimedia instructional materials in teaching. This indicates that most students affirmed that school management appreciated the use of multimedia instructional materials. In item 15, the mean of 2.58(6.66) of respondents agreed that the amount used for purchasing multimedia instructional materials was too high, indicating that more than average respondents believed that the amount used for purchasing multimedia instructional materials was too high.

4.1 Discussions

The findings of the respondents show that the students cannot easily understand the causes and effects naturally without the use of multimedia instructional materials, and as a result, the use of multimedia instructional materials presents a better model for scientific concepts they are learning. In addition, many of the students opined that multimedia instructional materials allow them to see how change occurs in some situations, such as evaporation, and the majority of the students confirmed that the structure and function that occurs in diffusion cannot be understood except with the aid of multimedia instructional materials, and this will allow students to always remember the organization in basic science concepts. The findings also established that students with hearing impairment find classes taught with the use of multimedia instructional materials in teaching science concepts; as a result, they perform better on science examinations. In addition, when multimedia instructional materials are used for teaching basic science concepts, it always reduces the stress of interpreters and impairs them; they need to be taught using appropriate materials. The teacher, in his or her teaching method, may have been a major source of students' poor academic performance in Basic Science. The teaching and learning of basic science concepts over the years has been delivered mechanically or by rote learning, which makes instruction teacher-centered. Hardly can vital abstract contents in basic science be effectively communicated to learners who are theoretically hearing impaired. They must be taught using relevant materials. The teacher's method of teaching may have been a major source of students' poor academic performance in Basic Science. Most teachers still prefer using the 'chalk and talk' method to instruct learners. Although Multimedia can facilitate meaningful learning of basic scientific concepts, it is rarely used, whereas this method is considered a good strategy for improving cognition. A good deal of expected learning outcomes are not realized in basic science concepts in our secondary schools as a result of the non- availability of instructional materials and the lack of effective utilization of appropriate teaching materials.

5. Conclusion

Based on the results of this study, the following researchers have suggested:

1. The stakeholders in the field of education have adopted research on the impact of multimedia instructional materials in teaching fundamental science concepts to students with hearing impairment in Nasarawa State.
2. To make learning more engaging and simpler for students, the federal government should support all secondary schools by offering multimedia instructional tools.
3. To encourage these students' interest in science subjects, educators at all levels of education should provide them with sufficient information about how multimedia instructional materials affect the teaching of basic science to students with hearing impairment.
4. The Nigerian (federal) government should support this effort by allocating and releasing sufficient funds to invest in widespread Internet connectivity, the purchase and installation of ICT infrastructure, and the integration of multimedia instructional materials in secondary schools as a project that embraces development in education.
5. Additionally, schools must work to ensure the usability, availability, and dependability of multimedia learning environments so that all scientific labs and staff offices have computers connected to the Internet and the right tools for accessing a variety of electronic materials.
6. In order for schools and others to afford the purchase of these ICT facilities and accessories because the cost will be reduced, the Federal Government can also assist by subsidizing or lowering tariffs on importation of ICT facilities.
7. One of the many issues that teachers must deal with today is how to effectively and meaningfully integrate technology into the curriculum. It is also advised that teachers at all levels be exposed to a variety of training and development skills in the use of these high-technology facilities.
8. If issues emerge, there must be sufficient, qualified, and experienced ICT technical professionals.

Due to the impact of multimedia instructional materials in teaching basic science concepts to students with hearing impairment in Nasarawa State, the following areas may be the subject of future research:

1. Using multimedia instructional materials to teach basic science to secondary school students with hearing impairments presents both challenges and opportunities.
2. This study could be repeated in other Nigerian states by future researchers.
3. Future studies should expand the sample size from 60 to 100 patients.

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