

Students' Aches with Instructional Audios' Integration in Teaching and Learning

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ABSTRACT

The current study aimed to identify the challenges students go through when using instructional audios for learning purposes. The researchers surveyed 1350 university students in one of the public universities in Ghana. This follow-up study on the use of instructional audios among university students sought to capture the lived possible challenges that the students went through as they used the instructional audios prepared for their class. After administering and analyzing a nineteen-item Likert scale, four major findings emerged from the study. First, the university students did not experience any challenges in relation to the quality of the instructional audios used in the courseware. Second, poor internet connectivity was one of the main setbacks university students encountered in their attempt to access the instructional audios. Third, access to the instructional audios was not inclusive in nature since the university students needed to pay for downloading them. Finally, 3.5% of university students had neither smartphones nor personal computers to access the instructional audios. Implications for practice are discussed.

Keywords: instructional audios, challenges, internet connectivity, phone ownership, mobile learning

INTRODUCTION

The 21st century presents several learner-friendly software applications that make it possible for teachers at higher education institutions of learning to integrate into the teaching and learning experience. Though it continues to receive some level of attention, the integration of instructional audio into education is yet to be mainstreamed in the educational discourse compared to text. Mobile learning has made it easy for educators to design their instructions, focusing on using instructional audio for personalized learning. This has made it possible for learning to continue even beyond the classroom (Manu & Antwi, 2025). In today's instructional technology environments, audios have the potential to serve as a dynamic medium to enhance engagement, accessibility, and personalized learning. Instructional audios come in various forms, ranging from radio broadcasts, interactive radio instruction, podcasts, audiobooks, language laboratories, tape recorders, and audio cassettes. These media provide educators with choices and the opportunity to use different tools (Idris et al., 2018; Kim, 2021; Remillard & Heck, 2014). Traditions such as storytelling were very instrumental to knowledge delivery, as seen in Ghanaian culture, where stories and songs were used to deliver instructions and preserve the cultural heritage of the people through oral tradition (Asamoah-Poku, 2024). However, the full potential of instructional audio can only be realized with the necessary policy support in its integration.

The invention of radio, cassettes, and digital platforms has redefined the role of audio, enabling scalable and interactive learning. Audio materials cater for auditory learners and reinforce visual content through dual coding (Clark & Mayer, 2016; Idris, et al., 2018). Instructional audios shared via WhatsApp in Ghanaian universities improved the comprehension of 84% of students, as five selected multimedia principles were used (Manu & Antwi, 2025). The COVID-19 pandemic has accelerated the shift in learning modality towards digital platforms, making enhanced sound quality a vital requirement in these digital learning spaces. In a study on music learning on digital platforms, Keast and Sanchez (2020) proved that high-performance microphones and headphones greatly improved sound quality in online lessons, hence a more productive learning experience. However, the true power of instructional audios lies in their ability to bridge the gaps in learners with disabilities and those with different linguistic backgrounds. Audiobooks tailored to visually impaired students in India (Guha, 2021)

as well as language labs in Nigerian distance learning (Eje et al., 2016) are a testament to how audio helps in enhancing inclusivity in education. In addition, instructional audios help learners to study away from classrooms and are used to counteract infrastructure challenges in areas with limited resources.

Despite the countless benefits that instructional audios bring in educational contexts, there are genuine challenges that confront users. There are accessibility barriers experienced by students with hearing impairments as well as those with inadequate access to essential devices, leading to inequality as well as a contradiction with universal design principles (Clark & Mayer, 2016). Research reports that many teachers lack the technical competence to use technology in education, especially when designing high-quality instructional audio (Ocak & Karafil, 2021). In addition, overemphasizing instructional audios can lead to cognitive overload, particularly with learners with varied learning styles in that multi-modal formats tend to be more effective in recall (Mayer, 2020; Sweller et al., 2011). Learner engagement can wane without interactivity or visual elements, reducing opportunities for real-time feedback (Guo et al., 2014; Hattie, 2008), while cultural and linguistic disparities, such as accents or jargon, may alienate non-native speakers (Park et al., 2017; Gunawardena et al., 2009), and assessing learner engagement or academic integrity in audio-based environments remains problematic (Dee & Jacob, 2012; Means et al., 2013).

According to Ahmad and Halim (2024), using audio-visual materials play a significant role in enhancing learner motivation, engagement, and satisfaction. A study by Bakare (2024) examined the use of audio-visual materials in promoting the teaching and learning of the French language ascertained that using audio-visual materials in the teaching and learning process plays an important role in stimulating learners' interest, motivation and engagement. Despite the potential of instructional audios in education, challenges persist in its integration. These challenges, ranging from technical issues to pedagogical limitations, can impact the effectiveness of audio as a teaching tool. This review explores the barriers and challenges associated with using audios in educational settings, drawing insights from various studies and contexts.

The use of instructional audios in scholarly discourse is not prevalent as the text format. The textbook remains a staple in many academic and non-academic libraries. In contrast, quality instructional audios that have the capacity to provide more details in a conversational and informal tone remains less explored. The availability and ease of production of books have led to the need to make more copies of these reading materials. Unfortunately, it seems this level of attention has not been given to the audio medium in keeping information in academia as a mainstream educational resource. However, it is obvious to note that the majority of learners are able to understand and easy relate to spoken words more than written text. This is due to the fact that the learners are able to present the information in an informal nature, which is good for instructional purposes. There seems to be a dwindled interest in researching into the various ways instructional audios can be used to augment the activities of the classroom. As it has been the practice for textbooks to be made available to learners due to the availability of papers, publishing and publication houses, the availability of smartphones and personal computers, especially at the higher level (Manu et al., 2018), should cause educators and academics to start thinking about the best ways audio content can be shared with learners.

Among the universities in Ghana and other parts of the sub-Saharan Africa, the use of instructional audios in the teaching and learning environment is yet to be fully explored. (Manu & Antwi, 2025). Many university students who have not been exposed to instructional audios in the teaching and learning process. The few lecturers who make an effort to use these audios also design them in such a way that learners have challenges using them. Eventually, the use of these instructional audios creates cognitive overload for the learners due to the poor design (Sweller & Kalyuga, 2011). As the enrolment numbers of higher education in Ghana keep on soaring in the midst of inadequate infrastructure coupled with inadequate lecturers to handle specialized disciplines, a need exists for policy-makers, educators, researchers and other stakeholders of education to make a conscious effort to explore the affordances that instructional audios bring to the teaching and learning process. It is against this backdrop that the current study seeks to investigate the challenges of using instructional audios in the teaching and learning environment. Such insight will be relevant to those who intend to use instructional audios in their teaching and learning experience, and underscores the crucial role of policy support in this integration.

Lack of Adequate Funding

One of the primary challenges is the insufficient financial resources allocated by governments and school

authorities for purchasing audio-visual materials (Enekwe et al., 2021). This lack of funding directly impacts the availability and quality of teaching materials especially regarding using audio or audio-visual materials in teaching and learning. Another issue with funding is the mismanagement or misappropriation of funds meant for purchasing educational materials (Indra, 2024). When funds are mismanaged or misappropriated, schools may struggle to acquire necessary educational materials. This leads to a lack of resources that can hinder effective teaching and learning. For instance, without adequate audio aids, teachers may find it challenging to engage students who benefit from auditory learning methods (Chukwu, 2021). The absence of such resources can create an inequitable learning environment where only some students have access to quality materials. Again, high-quality instructional audios demand investment in recording equipment, software, and skilled personnel. Furthermore, proprietary platforms for hosting and distributing audio content are often cost-prohibitive, forcing educators to use free but limited alternatives (Bates, 2023).

Adomako and Fafunwa (2023) were of the view that many equally important needs have to be addressed by governments in addition to providing adequate technology for teaching and learning purposes. In many cases, governments are more likely to address the urgent ones and relegate technology issues to the background. Boadi et al. (2023) added that in a situation where funds are available for a particular technology, bureaucratic procurement rules make it difficult to supply the required technological resources within the period they would have served the best purpose.

Poor Internet Connectivity

In order to effectively use audio in teaching and learning, the right technology must be available for teachers or facilitators to work with. Another problem affecting the use of audio in teaching and learning is the unavailability of the required equipment. A major resource to consider when integrating or using audio in teaching and learning is internet connectivity. There are however poor internet connections in our schools (Munje & Jita, 2020). Unstable internet connectivity is a challenge that extends beyond the boundaries of one country (Arrieta, 2020; Habibi et al., 2020). Apart from the above, there is a huge disparity in the distribution of internet connectivity between the urban areas and the rural communities (Kenny & Hill, 2022). This further worsens the digital divide of the country unless a conscious effort is made to ensure that the less endowed areas are also provided with adequate technologies similar to what the privileged ones receive. Likewise, Nti and Asare (2022) lamented on the frequent power outages as well as unstable internet connection works as against the efficient integration of technology into the teaching and learning process.

Inadequate Essential Technologies

In a systematic review to understand the centrality of technology integration in the classroom and beyond, Manu et al. (2024a) identified that there were several issues of inadequate technologies at the various levels of the Ghanaian educational system. Among the challenges highlighted were inadequate personal computers, poor internet connectivity, power supply outages, inadequate technology support staff, among others. The researchers concluded that there was a need for the central government and other stakeholders of education to give priority to providing these resources for the proper integration of technology. Narrowing the issues to ascertain the foundational reasons for poor technology proficiency, especially among university students, a follow-up study observed that the basic level of education did not have the essential technologies to help the school pupils develop the required technology competencies (Manu et al., 2024b). It was observed that most schools in the municipal investigated did not have computer laboratories. Again, many of the classrooms were not connected to electricity. Further, the only six primary schools with computer laboratories did not have internet connectivity. The researchers recommended that the government and education stakeholders consider a comprehensive national long-term technology use policy devoid of political colors as a lens to tackle the subject of technology proficiency and integration in Ghana. In underfunded schools where basic technologies may be available, the lack of specialized tools, such as noise-canceling headphones and audio editing software, often results in poor-quality recordings with background noise or unclear narration (Ahmed et al., 2024). Boadi et al. Boadi, Sarpong and Mensah (2023) explained that inadequate capital, which leads to poor technological infrastructure and poor participation of the stakeholders in education creates challenges in the learning the various technologies. As a result, many university students demonstrate limited proficiency in technology use and struggle in many instances when taking technology-related courses.

Poor Design of the Audio Instruction

The design of the instruction itself can pose barriers to the effective use of audio aids. Poorly organized instructional content can make it challenging for students to follow along with audio materials, particularly if they lack clear guidance on engaging with these resources (Shihundu, 2014). Baticulon et al. (2021) reported that many students reported challenges with disorganized e-content and inadequate instructional support during the transition to online learning prompted by the COVID-19 pandemic. When creating the audio for feedback purposes, there is the need to choose words strategically to convey the intended information accurately (Walker, 2009). Failure to do this denies the students the ability to grasp the essence of the instructional audios. Tying into the choice of words to carry the intended information is the ideal time or duration for the instructional audios. Cavanaugh and Song (2014) reported that there was a need for designers to be mindful of the time involved in order to ensure high-quality audio content. Many designers are more likely to struggle with keeping their instructional audios short and straight to the point to help the learners stay focused. Learners should be given the flexibility of choosing which aspect of the content to review at anytime without necessarily going through the entire information, which is a form of cognitive overload (Sweller & Kalyuga, 2011).

Mayer's (2020) multimedia learning principles emphasize the importance of coherence, signaling, and segmenting to reduce extraneous cognitive load in students. Moreno and Mayer (2000) found that learners exposed to poorly structured audio lectures scored 20% lower on retention tests than those who received segmented, well-signaled content. Similarly, Wang and Wong (2018) reported that disjointed audio narratives increased mental fatigue, particularly in complex subjects such as science technology engineering and mathematics (STEM). Students engaging with audio recordings with technical flaws such as echoes often record frustration and reduced motivation (Jones, 2020). Instructional audios designed for learners to interact passively limits students' engagement. Instructional audios devoid of interactive elements such as embedded questions, reflection prompts, or conversational tones foster disengagement (Brame, 2016; Ice et al., 2019).

Teacher Preparedness

Teacher preparedness is crucial for the effective integration of audio materials into educational settings. However, recent studies indicate that many educators face significant challenges in this area due to inadequate training and limited resources. A study conducted by Omulando (2022) in Kenya highlighted that 71.4% of English teachers felt insufficiently trained to integrate technology into teaching speaking skills. This shows that teachers' unpreparedness to use technology in their instructional delivery is a barrier to using audio in teaching and learning. According to Darkwa and Agyei (2021), teachers in Ghana agree that using audio-visual materials can enhance lesson delivery. However, these teachers prior to a workshop lacked the skills needed to integrate technology into their lessons effectively. However, after the workshop, they shared their experiences in meaningful ways they were ready to integrate audio and visual content into the teaching and learning process. Nkengbeza et al. (2022) pointed out that using audio and other audio-visual materials will be hindered without the necessary training for teachers to effectively integrate technology into their teaching. Tondeur et al. (2023) emphasized that teachers often lack guidance on aligning audio content with learning objectives, such as selecting appropriate podcasts or designing interactive listening activities. Low self-efficacy in using technology also influences teachers' desire to use audios as instructional resource. Bandura's social cognitive theory suggests that teachers' belief in their ability to succeed with new tools shapes their willingness to experiment (Bandura, 2003; Lippke, 2020). Teachers with mentorship opportunities demonstrated higher confidence and innovation in adopting audio for instruction (Darling-Hammond et al., 2006).

Again, many educational institutions do not provide adequate training programs for their students on the use of audio in their learning, leaving students unprepared to utilize audio technologies effectively. For instance, an article published on Lis Education Network by Ashikuzzaman (2024), highlighted that lack of proper training can complicate the use of audio-visual materials to learn. Research indicates that students who receive targeted training in audio tools show improved engagement and academic performance compared to those who do not (Knapp et al., 2023). This points to the need for educational institutions to prioritize training in audio technologies as part of their curriculum. Furthermore, as they do, there is a corresponding need to provide the different ways learners can access these audios and the capacity to store them easily.

Environmental Factors

Environmental factors can also play a role in the barriers to using audio in education. Learners from different backgrounds may have varying levels of support at home for engaging with audio resources (Mtebe et al., 2016). For example, students without a quiet or dedicated study space may struggle to concentrate while using audio materials. Moreover, distractions from family members or other environmental factors can detract the learners' attention from the effectiveness of using audio in teaching and learning experiences (Kara, 2021). Background noise disrupts auditory processing and reduces comprehension, particularly for learners in urban or crowded settings (Goldschagg & Bekker, 2021). Likewise, the background surrounding the design of the instructional audio should be devoid of noise to communicate what the audio seeks to communicate clearly. For example, recording audios in noisy areas or intentionally adding background music could be a possible source of distractions, which would not allow the learners to get the needed concentration when listening to the audios due to extraneous cognitive overload (Sweller & Kalyuga, 2011). Again, it is important to contextualize the content of the audios by citing examples and scenarios that fall within the frame of reference of the learners. Providing examples and illustrations that are out of context does not allow the learners to grasp the content fully.

Language and Other Cultural Factors

Language can be a major limitation to the use of audio in teaching and learning. According to an article published on the Alandis Travel website, language barriers include miscommunication, limited vocabulary and difficulty with cultural nuances (Pilar, 2024). When these factors are not considered in creating audio for teaching and learning, the target audience could find difficulties understanding the selected language. In a study conducted by Teane (2019), it was found that teachers who were less proficient in the English language found it difficult to teach CAPS Grade 10 Life Sciences content. Also, it was found that learners recorded poor performances due to the language barrier.

In many cases, verbal communication (audios) has been the major means of exchanging messages. During conversations, the sender is expected to speak informally to the receiver with all the non-verbal cues for easy understanding. This scenario is exemplified in the modality principle where certain aspects of the instruction should be presented in the form of narration instead of on-screen text (Clark & Mayer, 2016).

Another aspect of the language that can create a challenge for the learners is the rate at which the speaker talks. The pace an instructor uses in an audio can be a barrier to audio use. Fast-paced audio disrupts learners' ability to process information by overwhelming their working memory, particularly when complex concepts are delivered too quickly (Chen et al., 2024; De Jong, 2010; Sweller, 2021). Empirical studies corroborate this, demonstrating that speeds exceeding 1.25x–1.5x impair retention and note-taking efficiency, especially in STEM and language learning contexts (Yang et al., 2020). Learners with auditory processing disorder and limited prior knowledge may require slower playback audio, whereas advanced learners may tolerate a faster playback speed without any cognitive overload (Liu & Jia, 2024).

Fortunately, many audio applications have an in-built setting to allow the user to adjust the speed of the audio at whatever speed is appropriate for him or her. At the same time, many audio creators and recipients are usually mindful of the amount of data that has to be spent on downloading the audios. The slower the speed of the audio, the more data the learner would need to download. Ertmer and Ottenbreit-Leftwich (2010) believed that the teachers' attitudes and beliefs toward using ICT tools and the supposed benefits, to a greater extent, determine how well teachers would integrate technology.

Research Questions

- To what extent were students prepared to use instructional audios for learning?
- In what way was the network a major issue for accessing the instructional audios?
- To what extent did university students spend on downloading the audios?
- What challenges did students encounter in relation with the nature of the instructional audios?
- What challenges did university students encounter in relation with the quality of the phones that they used to access the audios?

METHODOLOGY

The current study aimed to identify the challenges university students faced as a follow-up study on using instructional audios in one of their classes. The researchers used descriptive survey research design to collect data from the respondents. This research design was appropriate since the researchers wanted to create an opportunity for the entire cohort of students to participate in the study and share their lived experiences after using the instructional audios. Thus, the use of the class population instead of a sample. The researchers designed their own instrument. The instrument was made up of five (5) sections. The first section had three demographic items on gender, age and ownership of smartphones. The second section had five questions on the preparations that the researchers did before the instructional audios were shared with the university students. The third section had two items on the network of the school and the amount of money spent in accessing the instructional audios. The fourth section had six items centered on the challenges university students encountered due to the nature of the audios whereas the last section had three items on the quality of students' phones. The researchers intentionally analyzed the items one after the other to elicit basic things that possibly fight against the use of these instructional audios. Yet, the researchers checked the Cronbach Alpha of the five and six-item constructs and they all fell within the acceptable range of the reliability index of .91 and .95 for the second and fourth sections' items respectively. The higher reliability indices ensured the items were consistent in eliciting the desired responses from the participants.

Adhering to the guidelines of the ethics committee of the university, an ethical clearance letter was obtained to conduct the study. The content of the permission letter was discussed with the students, ensuring the legitimacy and relevance of the study. In all, the researchers discussed the content of the instrument with the prospective participants and indicated to them how to respond to the items. At the same time, they were informed that submitting their responses after filling out the survey was a form of consent to participate in the study. The researchers collected data over a four-week period from the students.

Demographic Information

As indicated elsewhere, the researchers wanted to identify the gender of the participants, especially due to the introduction of a new health program that led to the enrolment of the higher number of females. In the past few years, the gender ratio of males and females stood at 3:1 (Akyina & Manu, 2019; Manu et al, 2018). With a total of 1350 participants, 696 were males, representing 51.6% whiles 654 were females, representing 48.48%. The results suggest that the population of the female university students is almost at par with population of male students. This finding on gender is a sharp deviation from the gender distribution of the university for the past one decade. Again, in comparison with Manu and Antwi (2025), the population of the females keeps on appreciating in this university. Table 1 has details of the results.

Table 1 Gender Distribution of Respondents

Gender	Frequency	Percentage
Female	654	48.4
Male	695	51.6
Total	1350	100

(Field data, 2025)

The age of the students was another demographic data the researchers were interested in due to the fact that majority of the students gained admission through the direct admission instead of the matured entrance mode, which was always characterize with older students. The current study had an average age of 22.7 with a standard deviation of 3.56. Once again, the results indicate that there has been a sharp age difference of over one year between the current study and past studies (Akyina & Manu, 2019; Manu & Antwi, 2025; Manu et al., 2018). The standard deviation of three and half years seems to suggest that younger students have been enrolled in comparison with the past years. In terms of the age categories based on university students below 24 years, 24-27, and above 27 years, the percentages were 57.2%, 27.3%, and 15.3% respectively. From the age categories,

there was not much difference.

Table 2 Age Distribution of Respondents

Age	Frequency	Percentage
17-23	774	57.2
24-27	369	27.3
28 and above	207	15.3
Missing	4	0.3
Total	1350	100

(Field data, 2025)

Since the use of instructional audios is mainly accessed by the university students via phone, it was important for the researchers to collect data on the ownership of smartphones among the students. The data indicated that 1303 university students, representing 96.5% have smartphones where 47 students, representing 3.5% did not own a smartphone. The higher number of students with smartphones continues to be a demonstration that mobile learning has a place in the teaching and learning process at the university level and for that reason, lecturers should be encouraged to plant their lessons within that space. However, the few students of 3.5% without smartphones seem to suggest that there are always exceptions in our classrooms and lecture halls who cannot meet the minimum expectations and therefore requires thinking outside the box to roll-out appropriate interventions for them in order to participate fully in the teaching and learning experience. Table 3 has details of phone ownership among university students.

Table 3 Ownership of Smartphone of University Students

Ownership	Frequency	Percentage
Yes (1)	1303	96.5
No (2)	47	3.5
Total	1350	100

(Field data, 2025)

RESULTS AND DISCUSSIONS

Research Question 1: To what extent were students prepared to use the instructional audios for learning?

To elicit data on the preparatory activities that went in before the instructional audios were shared among the students on the platform, five items (section two of the instrument ranging from k1-k5). The items were: k1. I am aware of audios created and sent to the platform by my lecturer; k2. I am informed that audios on lectures are on WhatsApp as well; k3. I had instruction on how to download the audios on the platform; k4. The audios were available on time to students; and k5. The availability of the audios was announced to the whole class. The frequencies of the responses have been displayed on the table below.

Table 4 Knowledge of University Students on Instructional Audios Availability

Items	Mean	SD
k1 I am aware of audios created and sent to the platform by my lecturer	4.26	1.46
k2 I am informed that audios on lectures are on WhatsApp as well	4.19	1.48

k3	I had instruction on how to download the audios on the platform	3.91	1.60
k4	The audios were available on time to students	4.06	1.51
k5	The availability of the audios was announced to the whole class	4.21	1.45

From Table 4, the item k1 had the highest mean of 4.26 (1.46), indicating that the participants agree to strongly agree that they were adequately aware of the intention of the lecturers to provide instructional audios as part of the courseware. The item that had the least mean with the highest standard deviation was k3. Though the 3.91 (1.60) was close to agree, yet it creates the impression that the instruction on how to download these instructional audios was not clear to some of the participants. For this reason, it was more likely for such students to have challenges in accessing the audios and participating fully in the teaching and learning. Besides the instruction on the download item, the mean scores for the rest of the items were rated more than 4.0, signifying that the university students had adequate knowledge on the availability of the instructional audios as part of the course materials. Touray et al. (2013) in a systematic literature review identified a number of challenges associated with the integration of technology in the teaching and learning process. Providing adequate ground rules before the use of a particular technology tool serves as advanced organiser for the learners to anticipate lines of actions and not be overwhelmed in the course of the process. Knapp et al. (2023) reiterated the need for the designers and developers to provide adequate training to the users of their technologies. These training sessions usually provide house cleaning specifics of the tool, when it is available, how to download, and many more.

Research Question 2: In what way was the network a major issue for accessing the instructional audios?

From a sub-Saharan Africa context where the internet connectivity has not been the best, the researchers wanted to know the extent to which access to internet and its reliability played a role in the use of the instructional audios. To answer this question, only one item (n1. My network did not give me problems when downloading) was used to collect data from the participants. The descriptive statistical procedure indicated that the network item has a mean score of 3.56 (1.70). This finding seems to indicate that the university students could not agree that the internet was not a challenge when accessing the instructional audios. This question was important to the researchers due to the fact that internet connectivity has been an issue in many parts of the country and continues to be the burdens of some of the sub-Saharan African countries. The failure of the students to download the instructional audios on time, as a result of poor internet connectivity, could easily defeat the purpose of integrating the audios into the teaching and learning process. The nature of internet connectivity in Ghana and many sub-Saharan African continues to pose learning challenges for schools and other institutions that require the use of the internet and its resources (Kenny & Hill, 2022; Nti & Asare, 2022; Osei & Osei, 2023). The current finding on issues of the internet connectivity is prevalent and need to be looked into by the stakeholders.

Research Question 3: To what extent did university students spend on downloading the audios?

The researchers wanted to identify whether the university students spent money downloading the instructional audios or they used the free internet access on campus to download the audios. After the data collection and analysis, the findings indicated that the mean score was 3.98 with a standard deviation of 1.58. The mean score, which is almost 4.0 seems to suggest that the participants agree on spending some amount of money in accessing the instructional audios instead of using the campus internet system to access the audios free of charge. This finding brings to light two important things that have to be taken into consideration. First, the idea of students having to spend in order to access the instructional audios is not inclusive enough since those who could not afford to buy the required data will be denied of the audio content meant for the teaching and learning experiences. Second, it is a wake-up on management of institutions to make sure the mandated students services are rendered as required and periodically checked to ascertain their effectiveness. Kwarteng (2023) found that many teachers and students are not able to participate actively in the digital space due to the expenses incurred on using some of the technology tools. Again, Manu et al. (2024b) commented that the central government struggles with the provision of adequate technological infrastructure as required and this leads to inadequacy of the tools for use. Further, Boadi et al. (2023) intimated that the ability to assemble the required technological resources will require huge sums of money, which in a way, attests to the inadequacies of resources in the system (Eze et al., 2020).

Research Question 4: What challenges did students encounter in relation with the nature of the instructional audios?

Going through the literature, the researchers observed that there are some minor issues that can imperceptibly affect the quality of the audios in spite of the amount of money and time put in the preparation of the audios. For this reason, the researchers wanted to know the challenges university students encountered with the length of the audios, sound quality, speed of the audio, logical presentation of audios, ability to follow the audios as well as the coverage of the relevant areas on the course outline. After running the descriptive statistical procedure, the Table 5 has details on the mean scores and their respective standard deviations.

Table 5 Challenges Related to Nature of the Audios

	Items	Mean	SD
q1	The length of the audios was ok for easy download	4.26	1.46
q2	The sound of the audios was clear	4.15	1.46
q3	The speed of the audios was appropriate	4.22	1.42
q4	The lecturer presented the audios logically	4.18	1.44
q5	I had no difficulty following the audios	4.02	1.51
q6	The audios covered all the topics on the course outline	3.27	1.75

Among the six items on the challenges learners might possibly encounter when using the instructional audios, the length of audios had the least rated in terms of a reverse-coding. With 4.26 and a standard deviation of 1.46, it was clear that the students did not have issues with the length of the instructional audios. Short and straight to the point audios are easily downloadable and helps the learners to stay focused since the audios discuss one aspect of the topic at a time. The sixth item has the worst rating within the neutral region where the participants neither disagreed to agree on whether the instructional audios covered all the topics on the course outline. With a mean score of 3.27 and 1.75 standard deviation, it seemed the participants were worried on the amount of content the instructional audios provided to them. Obviously, they received less content from the audios than expected for the semester. The other four items on the sound of the audios, speed of the audios, logic of the audios and ability to follow the audios all had mean scores ranging from 4.02 to 4.22 with similar standard deviations indicating the agreement of the participants that the instructional audios did not pose challenges in terms of these areas. The findings here seem to suggest that the participants were comfortable with the design of the instructional audios and did not have issues with them. This might be due to the design of the audios, which was based on five out of the 12 principles of multimedia (Clark & Mayer, 2016; Mayer, 2020). On the flipside, learners are more likely to struggle if instructional audios are disorganised and devoid of instructional design principles (Baticulon et al., 2021).

Research Question 5: What challenges did university students encounter in relation with the quality of the phones that they used to access the audios?

The researchers also wanted to know the extent to which the type of the phone owned by the student could be a possible hindrance in benefitting from the instructional audios. Here, three items were used. These items are: p1. My phone was compatible with the WhatsApp application; p2. My phone was okay to let me listen to all the audios; and p3. The audios were not easily corrupted on my phone. After running the statistical procedure, the table below has details of the mean scores and standard deviation.

Table 6 Challenges Related to the Nature of the Smartphones

	Items	Mean	SD
q1	My phone was compatible with the WhatsApp application	4.10	1.49

q2	My phone was okay to let me listen to all the audios	4.18	1.46
q3	The audios were not easily corrupted on my phone	4.11	1.72

From Table 6, the mean scores of the three items exceeded the 4.0, indicating that the university students agree that the nature of their phones did not create any impediment in their way when accessing the instructional audios. It is important for users of instructional audios to make sure their students possess phones that will be compatible with the applications or platforms being used. Again, statistics on Table 3 indicates that 3.5% of the students did not have smartphone during the semester in focus. Putting the data on smartphone together, it is right to suggest that there were few people who might have had issues using their phones to access the instructional audios since the mean scores were not rated 5.0. At the same time, the 3.5% of the students who possibly do not have access to smartphones due to several reasons, obviously, will have a challenge benefitting from the instruction. This will require an intervention ahead of time by the lecturer when planning to roll-out an instructional audios class.

CONCLUSION

The current study sought to identify the possible challenges university students encountered when exposed to the use of instructional audios as part of their courseware. As a follow-up study on Manu and Antwi (2025), the current findings seem to indicate that poor internet connectivity, students' expenses on data to download audios and not owning a smartphone (3.5%) were some of the challenges that the university students encountered in accessing the instructional audios. From the findings, the quality of the instructional audios was appropriate and the preparatory activities undertaken by the researchers also helped out. However, the challenges encountered dwelt more on university students access to the audios. In spite of the quality of the instructional audios, if learners are not able to access the materials due to network issues or cost of downloading, the purpose of using the instructional audios will be defeated. Again, the participants did not experience challenges using the audios due to the multimedia principles used in the design of the instructional audios. It is, therefore, important for designers and developers of instructional audios to pay close attention to instructional design principles, especially when using multimedia, which are carefully aligned to how the human brain picks information (Clark & Mayer, 2016; Mayer, 2020).

The use of instructional audios has not received the required attention in the teaching and learning process as compared to the use of text. Instructional audios, in comparison with text, takes much bigger space on smartphones, personal computers and other storage devices. However, instructional audios mimic normal conversations and as a result makes it easier for the learners to understand the content. Especially in Ghana, where the enrolment levels at the tertiary is sky-rocketing due to the introduction of the free senior high school policy, there are many yet to be gained advantages from instructional audios. But before this feat could be reached, there is the need for designers and audio content creators to use multimedia principles in creating the audios so that the use of these audios would not create cognitive overload for the users. A need exists to replicate this study across different universities in Ghana since the current study was conducted in one institution.

Implications for Practice

Based on the findings from the current study, the following are the implications for practice as teachers at the tertiary level make conscious effort to integrate instructional audios into the teaching and learning process.

- That the quality of the instructional audios, in terms of length, speed, sound, among others, are relevant areas designers and developers should be mindful of so as to reduce the number of challenges the users might encounter.
- That poor internet connectivity continues to remain a major setback when using instructional audios. As 21st century learners make conscious effort to explore digital content like instructional audios in the teaching and learning process, a need exists for stakeholders of education to revisit the issues of internet connectivity and proactively tackle this deficiency. Its availability will go a long way to impact positively the access of electronic content.

- That the use of instructional audios remains promising in the teaching and learning process due to their informal and conversational qualities they possess. It looks like it is time for serious conversation to start on how instructional audios can be used as a mainstream learning material like text, which has become the default for academic learning materials.
- And that there are still few students who, no matter the situation, might not have smartphones and personal computers to access digital materials. It is not appropriate to exclude them from the teaching and learning experience. As a requirement for inclusivity, higher education teachers who intend to use instructional audios should make provision for the few students who do not own these devices in order to fully participate in the instructional process.

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