Journal of
Education and Practice
(JEP)

Creating Instructional Audios to Enhance University Students' Instruction in the midst of Large Student Numbers

CARI Journals

Journal of Education and Practice
ISSN 2520-467X (Online)
Vol.9, Issue No.1, pp. 61 – 76, 2025
www.carijournals.org

Creating Instructional Audios to Enhance University Students' Instruction in the midst of Large Student Numbers

[1*] Jacob Manu, PhD., [2] Samuel Antwi, PhD.

[1*] Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development

[2] Kwame Nkrumah University of Science and Technology

Accepted: 20th Dec 2024 Received in Revised Form: 20th Jan 2025 Published: 20th Feb 2025

Abstract

Purpose: The purpose of the current study was to investigate the creation and use of instructional audios at the institutions of higher learning in Ghana and the experiences of university students after being exposed to instructional audios based on five multimedia design principles to augment the teaching of the introduction to information and communication technology course (GPD 112, year one course) in the 2022/2023 academic year.

Methodology: With the use of segmentation, personalisation, learner-control, coherence and redundancy principles of multimedia design according to Clark and Mayer (2011), instructional audios were created and shared on students' WhatsApp platform for them to review before the next class. After 10 weeks into the semester, over 1600 learners responded to a 15-item questionnaire.

Findings: The major findings were that: over 97.3% of university students use smartphone. Second, over 70% of students have not been exposed to the use of instructional audios in their teaching and learning process. Third, 84% of the students confirmed that the availability of the instructional audios helped them to learn meaningfully.

Unique contribution to Theory, Policy and Practice: Finally, as much as 88% of the university students indicated their willingness to recommend the use of the instructional audios to their friends. With renewed interest in instructional audios use, students can better understand their lecturers beyond the lecture halls. Other implications for practice are discussed.

Keywords*: Instructional Audios, Segmentation, Personalization, Learner-Control, Instructional Design, Coherence*

Introduction

The use of audios as a means of passing on information from one person to another is as old as man has been around and will forever be useful whenever instruction is needed. In many cultures around the world, oral tradition was used to preserve the culture of the people before the introduction of formal writing. There were situations where important aspects of peoples' lives were carefully composed as stories in songs to make sure the events were remembered (Neuman, 2006). In biblical times, the people of Israel were told to teach their little ones with the God's commandments, church traditions and commentaries indicate that they could retain volumes of information in memory through songs. This happened at a time when it was difficult to come by information. In recent times where knowledge could be accessed at the press of a button, audios should be not being used as a tool to retain or reflect on information only but also to help students think critically in the teaching and learning context (Cozendey & Costa, 2016).

Instructional audios in the classroom seems loosely thought to be more tilted towards behaviorism and as such does not settle well with constructivist paradigm. However, teachers can be flexible and use these audios as partners to help their students learn meaningfully (Jonassen, 2006) since it presents a powerful medium for reaching out to the learners. The use of instructional audios provides a backup learning resource for future review by the students; allows students to do oral presentations; provides effective feedback, creates other forms of knowledge representation (Mayer, 2001; Guha, 2020/2021; Pearson, 2018), allows for individualized learning; appropriate for large class sizes, creates opportunity for self-paced learning; allows easy access to teaching and learning materials; creates alternate assessment modes; allows learners to rehearse lines, creates opportunity for persons with disability (Guha, 2020/2021) audio embedded in slides among others. The use of audios, based on instructional design principles, can be integrated into all aspects of the teaching and learning process. Depending on the discipline and the objective for individual topics, instructional audios are versatile and appropriate for diverse students regardless of the age and diversity according to Guha.

In recent times, the provision of adequate lecture halls and other teaching materials, especially for newly established universities in Ghana, has been a major challenge due to the cutdown on the government's funding for university education (Manu, 2020). Whereas some of the traditional universities have almost adequate infrastructure to support academic work, there are newly established ones that are barely surviving as a result of the government's drastic revenue cuts to the universities (Mucundanyi & Woodley, 2021). The higher student numbers coupled with inadequate academic and residential user facilities makes teaching and learning difficult for both lecturers and students. Manu et al. (2024b) indicated foundational challenges that students face in technology integration. As a result, about half of the students from programmes with higher class sizes (over 200) skip lectures due to the frustrations of overcrowding, inadequate furniture, and poor public address system. Such a trend does not augur well for the students to master the concepts needed for their lives and invariably results in graduating students who are not holistically fit for the world of work.

With the challenges of poor public address system, inadequate lecture halls, among others in some institutions of higher learning in Ghana Manu et al. (2024a), the use of instructional audios can be an immediate intervention to make sure majority of the students benefit from the teaching and learning experience without being physically present at the lecture hall always. Olagbaju and Popoola (2020) in their study reported that there are many gains in students' learning when audio resources are used to support student learning. These audios could be used to provide direct instruction, explain processes, set out tasks, provide feedback, explain procedures, guide performance as well as assess the quality of students' activity among others (Guha, 2021; Kim, 2021; Pearson, 2018; Uijl & Filius, 2022). It was based on these affordances of instructional audios use that the current study investigates the use of instructional audios at the institutions of higher learning in Ghana as well as the experiences of university students after being exposed to instructional audios in the teaching and learning process.

Audio Use in Higher Education

In almost every generation, there has been a means by which audio content is carried from one person to another. Beginning with oral tradition, information was handed down by word of the mouth and recipients of the information needed to be physically present to receive the information. The invention of different devices and media for carrying audio content has paved the way for information to be sent across without the person being physically present to receive direct information. These devices and media came along with a cost and obviously not everyone could afford them. In recent times, the ability of software engineers to create different audio applications that could be installed on personal computers and smartphones has created another milestone where all users of these gadgets can easily access the audios and conveniently study the content at their comfort. There are different types of instructional audios that are used in the teaching and learning environment. The common ones among them are radio broadcasts, interactive radio instruction, podcasts, audiobooks, language laboratories, tape recorders and audio cassettes, teleconferencing and, audio-visual aids (Abdulrahman, Basalama, & Widodo, 2018; Kim, 2021; Remillard & Heck, 2014). The different types of instructional audios offer a wide range of opportunities for educators to select and use the ones that best provide meaningful learning. In the past, the use of radio broadcasts, language laboratories as well as tape recorders and audio cassettes pervaded the audio landscape and contributed immensely to the instructional process (Idris, et al, 2018). However, using these types of instructional audios had challenges like cost of production of audios, inconveniences in production of audios, accessibility of audio content and the proper storage of the audios. For instance, creating a twenty-minute audio for instructional purposes for broadcasting required a crew of experts at the radio station to make produce the audio content.

Impact of audio materials on students' learning

Several studies have documented the impact of audio materials on students' learning especially in the languages (Kartal & Simsek, 2017; Larson, 2015; Liu, Cao, & Wu, 2019; Rahman & Hajar, 2020). Bakosh et al. (2018) examined the use of audios materials in training 16 volunteers in a classroom in the United States of America and reported that, the use of audio materials improved

students' performance in Mathematics, Social Studies, and overall Grade Point Average (GPA) scores. In a study by Idris et al. (2018), similar findings were reported. This study, which looked at the use of audio-visual materials on students learning attainment, reported that using audios improved students' learning. The use of audio materials such as YouTube audios is also reported to significantly improve the overall reading ability (Hamad, Metwally, & Alfaruque, 2019). The use of audio materials such as podcasts was also found to improve students' listening comprehension in a study by Abdulrahman, Basalama, & Widodo (2018). The overall outcome of these studies support the fact that, teaching augmented by the use of audio-assisted instructions, improve students' overall performance of students. Uijl and Filius (2022) looked at using audio, video and e-portofolio to provide feedback to learners. After their study, they reported that the use of audio to provide feedback encouraged deeper learning without necessarily creating cognitive overload for the learners. Kim (2021) did an experimental study with three treatment groups to identify the efficacy of using different aufio modalities in the instructional process. These modalities were e-book, audio-book and e-audio book. The 75 college students in Korea were randomly assigned to these three groups. At the end of the five-week study, the e-audio book outperformed the other two treatment groups after comparing the pretest and posttest for group differences. Again, the e-book, made up of text alone, performed better than the students who received the audio version only of the comprehension passage. This seems to suggest that audios are not always apporpriate for learning tasks that require direct quotations or factual knowledge.

Instructional Audios and Feedback

For many years, the default mode of feedback has been the use of text and random verbal comments in the teaching and learning process. Studies have shown that using instructional audios is more effective than text in terms providing timely, corrective and immediate feedback. Pearson (2018) did an action research purported to improve on summative feedback of his learners. As a form of intervention, the researcher used audio recordings of feedback instead of a written feedback. At the end of the study, the students revealed that it was easier to be engaged with the content of the feedback as compared with the written feedback. The students also indicated their willingness to use the recordings after the class. Using nursing students in their study, Gould and Day (2013), compared written feedback to audio feedback and reported that the nurses saw the audio feedback as comprehesive, easy to understand and supportive as compared to the written feedback. Lunt and Curran (2010) also observed that the learners had significnt improvement in the sharing their opinions and being more engaged in the teaching and learning process. Likewise, Alharbi (2021) did experimental research on the use of audio and written text to provide feedback to language students on an argumentative essay topic. At the end of the study, it was reported that the treatment group, which was given audio feedback out-performed the control group that received the written text only. Heritage (2019) indicated that the use of audio feedback is important in the assessement for learning practices since it creates opportunities for teachers and other stakeholders on how to help the learners improve. A study by Kirwan et al. (2023) found that students receiving audio feedback reported higher satisfaction levels and were more likely to

implement suggested changes in their work and audio feedback in an online learning environment fosters connectivity between students and the lecturer. This aligns with findings from Clark and Mayer (2022), which indicate that audio feedback fosters a more personal connection between instructors and students, enhancing the overall learning experience.

Instructional Audios and Inclusivity

Instructional audio is a powerful tool for promoting accessibility in education. Akay (2021) highlights how audio - visual materials support learners with disabilities or language barriers by providing alternative means of engagement with course content. This inclusivity is vital for ensuring that all students have equal opportunities to succeed in online learning environments. To ensure inclusivity, especially with persons with visual impairment, instructional audios are used in the teaching and learning process. Guha (2021) did a study on how to create audiobooks for children with visual impairment by six graduate school students who were admitted into an early grade programme in one of the universities in India. The graduate students were to work collaboratively and provide feedback on the development of the audios to make sure these learners with visual impairment use the virtual mode to learn. The researcher reported that the development of the audiobooks was time-consuming. However, it paid off as it helped the intended target learners to participate virtually. Csapó et al. (2015) investigated the various audio assistive devices and software applications for persons with visual impairment and reported that there were current developments of various range of audio assistive devices and applications on the market. Likewise, Bhowmick and Hazarika (2017) after creating a database to compile the list of audio asistive devices and software applications reported that there was a significant growth in the area to help people with visual impairment.

Creation of Instructional Audios

Instructional audio plays a crucial role in enhancing engagement and comprehension in online learning environments. According to Akay (2021), the use of visual and audiovisual instructional materials in an online learning environment helps with learners understanding, participation and engagement in learning activities. These materials also cater for individual learners' needs in a learning environment. Bakare (2024) in his study that examined the use of audio-visual materials in promoting the teaching and learning of French language ascertained that, the use of audio – visual materials in the teaching and learning process plays an important role in stimulating learners' interest, motivation and engagement. Despite the benefits of instructional audio tools, challenges remain regarding their integration into education. Cognitive load theory provides valuable insights into how instructional audio and visual materials can be effectively integrated into online learning environments. It is argued that combining text with identical audio can lead to cognitive overload, hindering learning rather than enhancing it. Instead, they recommend using audio to elaborate on key points presented visually, thereby reducing cognitive strain on learners. Technical issues, varying levels of familiarity among educators, and accessibility concerns for certain student populations can hinder effective implementation (Kennedy, 2023).

The researchers wanted the design of the audios to be different from most of the traditional audios that are normally prepared for the students. In other words, there are audios that are designed to provide information to the learners without necessarily factoring into the design how students will be able to relate to the content of the audios. Carter (2012) explained that using any kind of audio must be based on four main principles for the user to obtain the optimum benefits. The principles identified were the "selection of the narrative format, the fleeting nature of spoken words, the environmental soundscape, and the difference between listening and hearing" (p. 54). This researcher further found that presenting audios to students without the required instructional design techniques normally encourages rote memorization of information without deeper reflection on the content under review. For this reason, the researchers designed the audios based on five main multimedia design principles. The principles are segmentation, personalisation, learner-control, coherence and redundancy (Clark & Mayer, 2011). Below is a discussion of the five principles outlined.

Segmentation Principle

At the beginning of the semester, the researchers listed all the topics to be covered and arranged them from known to unknown based on their level of difficulty. At the same time, each of the topics was broken down into several teachable chunks with an average recording time of six minutes per a session addressing an important theme of the topic. This principle of segmentation made it, comparatively, easier for the learners to stay focused when listening to the audios. The researchers used a special file naming system to help them select the files in order. The challenge that cropped up was the inability of the WhatsApp platform to retain the original name of the file after it was downloaded onto the students' device.

Personalization Principle

The personalization principle requires an instruction to have a human touch in a conversational tone. When informal conversation is used instead of a more formal conversation, it allows the learners to follow the audio with less difficulty. In each audio, the researchers would greet the students and ask how they were doing. Again, the researchers would take one minute to review the last audio before adding the new material. Also, in the course of the audio instruction, the researchers would pause, and ask the learners to reflect on certain concepts and possibly respond appropriate. These techniques were adopted to help learners create the impression that there was a coach on the side who could provide the needed instructional support when needed. Another aspect that Ippreciel (2022), looking at what should be the new future for technology integration in the teaching and learning, explained that personalization should look at the individuality of the learners and the attributes that can be harmonized into the teaching and learning process.

Learner-Control Principle

The third principle used in the creation of the audios was the learner-control principle. Here the researchers were mindful of the choice of words, the speed of the audios, the duration of the audios, the clarity of the audios, the size of the audio files and the content areas that the audios covered.

These audios were carefully monitored to ensure learners, especially the novices, do not become overwhelmed with the nature of the materials they are to study. The short duration of each audio made it possible for the students to do self-paced learning without necessarily following the lecturer as it happens in the regular classroom. Skinner (2003) was of the view that the only way for the teacher to take advantage of effective learning was to use mechanical devices.

Coherence Principle

According to Clark and Mayer (2011), the coherence principle provides that designers stick to the goal of the instruction and use it as a lens in the selection of the content of the audios. They further indicated that many designers violate the coherence principle by adding extraneous materials to the content of the audio instead of being straightforward. On this basis, all the audios created for the class were made straight to the point. The researchers paid close attention to removing any form of embellishment that might create cognitive overload for the learners (Sweller, 2010). This principle allowed the researchers to focus more on the salient areas and the meaningful ways the learners could relate to the audios. Again, at the beginning of each audio, the learners were informed of the learning outcomes of the audio content so as to be gatekeepers of what they are to concentrate on even when audios have extraneous content.

Redundancy Principle

The redundancy principle seeks to indicate that designers should use graphics and narrations instead of graphics, narrations and text. In other words, the narrations are meant to provide the needed information on the graphics that are shared with the learners. In respect to this study, the researchers were mindful of choosing the content of the audios carefully in order to avoid repetitions as much as possible so as not to overload the cognition of the learners (Kalyuga et al., 2004; Plass, Moreno, & Brunken, 2010). The audios were devoid of overelaboration and would go straight to the point by as it also reviews the previous audios to make the learning easier. When there are repetitions or concurrent of knowledge in an instruction, it creates unnecessary cognitive overload for the learners (Mayer, 2009; Sweller et al., 2010).

Research Questions

1. What percentage of the university students uses smartphones?
2. What is the nature of instructional audio use in higher education in Ghana?
3. What percentage of students is used to instructional audios in learning?
4. What are the advantages of using instructional audios over traditional lectures?
5. What percentage of students is more likely to recommend the use of the instructional audios to their friends?

Methodology

The researchers used a survey research design for this investigation during the 2022/2023 academic year when 1525 students enrolled in the introduction to Information and Communication class (GPD 112) course. The researchers wanted to know the experiences of the university students

after being exposed to the instructional audios as part of their teaching and learning study guides. At the beginning of the semester, the researchers in collaboration with the course representative created a WhatsApp platform for the class and informed the students officially of the use of the instructional audios and when the audios would be available on their WhatsApp. The university students were informed to download the audios and listen to them at the individual level and in their various groups of ten before the next class. The lecturer provided each set of audios 48 hours before the start of each lesson. The content of the audios was the topical areas to be discussed for the particular lesson. At the group level, the students were tasked to listen to the audios and set multiple-choice and true or false questions on the content of the audios. This was a strategy adopted by the lecturer to make sure groups listen to the audios and discuss the content ahead of the actual class. This weekly activity had an assessment weight of 10% of the total points for the course. At the end of the 10^{th} week in the semester, the researchers administered a 15-item questionnaire to all the students via their WhatsApp platform. The questionnaire was made up of three demographic questions and eleven others on their experiences of the audio. Out of the eleven questions, seven were statements rated on a Likert scale (from strongly disagree [1] to strongly agree [5]) whereas four items were open-ended questions that served as a follower-up to the Likert scale statements. Before the link was shared with the students, the university's ethics review committee was contacted to review the research proposal for approval. Once again, the students were all informed in class of the electronic questionnaire and the need for them to be part of the study. The students were informed that participation in the study was voluntary not compulsory with a consent to participate required the students to complete the survey and submit the responses to the researchers. At the end of the three weeks, after the sharing the link, 1482, representing 97.2%, responded to the survey. However, it was identified during the data screening that some participants did not answer all the questions. In view of that the responses for 52 participants were deleted from the dataset, bringing the total number of participants for the current study down to 1430, representing 93.8%.

Demographics

The researchers wanted to know the gender of the respondents in order to better understand the dynamics in instructional audio use among males and females. Data obtained from all the 1430 university students indicated that 788 of the participants, representing 51.5%, were males whereas the remaining 642, representing 44.9%, were females. A cursory look at the gender difference of 146 (10%) would indicate a drastic increase in the total number of the female population at the university as reported in other studies (Akyina & Manu, 2019; Manu, et al, 2018) where the ratio of gender is around 3:1 for males and females respectively. In this particular situation, the university enrolled students for the first in BSc. Public Health which attracted many of the females more than males and for that matter reducing the gender gap between males and females at the university level. The Table 1 shows the gender distribution of the participants.

Table 1

Gender Distribution of Respondents

Gender	Frequency	Percentage
Male	788	55.1
Female	642	44.9
Total	1430	100

(Field data, 2024)

The researchers solicited data on the age of the respondents. The mean age was 23.5 years whereas the standard deviation was 4.54 years. The deviation suggests that there were students who were considerably older. The researchers further wanted to see the age variable in the below category. Participants from 17-23 years were the majority with 822, representing 57.5%. The ages from 24-27 were 392 participants, representing 27.4%, whereas ages 27 and above had 216 participants of a percentage of 15.1%. Once again, there has been a drastic increase in the number of students who are within the first age category (18-23). This increase is due to the rolling-out of the BSc. Public Health that attracted many of the first-year students coming as direct applicants instead of those who come through matured application, who have to attain the age 25 or above before. For this reason, the mean age as well as the standard deviation had lower scores as compared to other studies (Akyina & Manu, 2019; Manu, et al, 2018). Table 2 represents the age distribution of the participants.

Table 2

Age Distribution of Respondents

Age	Frequency	Percentage
17-23	822	57.5
24-27	392	27.4
28 and above	216	15.1
Total	1430	100

(Field data, 2024)

Results and Discussions

Research Question 1: What percentage of the university students uses smartphones?

The ownership of smartphones at the university level has become a requirement since many of the teaching and learning activities are carried out with these phones. For this reason, the researcher wanted to find out the number of university students using smartphones. Data collected indicated that 1168 of the participants, representing 97.3%, have smartphones. This seems to suggest that majority of the university students are using smartphones and for that matter can fully participate in academic activities that require the use of smartphones. Research indicates that students are already spending more and more time on their phones (Akyina & Manu, 2019; Manu, et al, 2018) and at times at the expense of their academic work. For this reason, lecturers need to take advantage of mobile learning and re-package the teaching and learning activities to include smartphones. Rogowsky et al. (2016) indicated that smartphones can be used effectively in the instructional process as result of the different modalities of knowledge available in the 21st century. It also came to light that not all the university students had smartphone at the time of data collection. The reasons why the 2.7% of the respondents reported not having a smartphone is not in the current study. However, the lesson is clear that not all students own smartphones and for that matter, lecturers who intend to use smartphones in the teaching and learning process should roll-out strategies that will help these few without smartphones to learn meaningfully as well. Also, the current percentage reported in this study shows a significant increase in smartphone ownership among students in the past five years (Manu, et al, 2018) and needs to be encouraged to have 100% ownership of phones for the sake of instructional purposes.

Table 3

Ownership of Smartphone of University Students

Ownership	Frequency	Percentage
Yes (1)	1391	97.3
No (2)	39	2.7
Total	1430	100

Research Question 2: What is the nature of instructional audio use in higher education in Ghana?

The researchers wanted to identify the nature of instructional audio use in higher education in Ghana. After collection and analysis of data to identify whether the students receive instructional audios in their courses, 1158 (81%) of the respondents disagreed to strongly disagreed. In other words, receiving instructional audios in addition to the traditional lectures was not common. Instead, students were given teaching slides and sometimes YouTube links to watch videos related to the topics of the semester. The finding seems to suggest that many of the lecturers have not realized the affordances of using instructional audios in the teaching and learning process and as a result do not take advantage of them to help their students learn meaningfully. The instructional audios are timeless and compatible with different learning methods used at the institutions of

higher learning. Rogowsky et al. (2016) explained that the availability of different ways of knowledge representation has given opportunity to students to use their smartphones, tablets and personal computers in the teaching and learning process.

Research Question 3: What percentage of students is used to instructional audios in learning?

The researchers wanted to know the percentage of students who has used instructional audios at least once before from the other courses offered within the university. The data collected indicated that 1001 respondents (70%) had not been exposed to the use of instructional audios in the other courses they enrolled in the semester. The second question centred on the reasons why lecturers do not usually use audios for the learners. The data revealed that many lecturers would rather recommend that students go to the library to read suggested books and make their own notes. Meanwhile, these instructional audios could have been integrated into the library assignments where students are given specific instructions on the things to do when reviewing suggested reading lists.

Research Question 4: What are the advantages of the use of instructional audios over the traditional lectures?

The researchers wanted to find out the perceived advantages of the using instructional audios over traditional lectures. The data collected indicated that over 1200 participants, representing 84%, affirmed that the availability of the audios afforded them the opportunity to learn the various topics at their own pace. Again, they could download the audios and create a library of it, which is not the case with traditional lectures. Further, the audios were a form of feedback on the various questions they may have. The respondents revealed that many lecturers, due to their busy schedules, seldomly cover all the topics on their course outline. However, the availability of the instructional audios on all the topics provided the same content that should have been given during the live class. Finally, they indicated that the audios could be listened to severally until they have understood the concepts. Also, a similar percentage of the students saw the availability of these audios as backup notes that were informal in nature and easy to understand. The instructional audios provided visible materials that could be used beyond the lecture hall. These responses seemed to indicate that the use of the audios factored into the teaching and learning process differentiation in the learning abilities of the students, which is normally either intentionally or not deliberately missing in the traditional lectures. Based on the current findings, there are many advantages of using the instructional audios to the teachers as well as the students from diverse backgrounds (Guha, 2021; Kim, 2020; Pearson, 2018; Uijl & Filius, 2022).

Research Question 5: What percentage of students is more likely to recommend the use of the instructional audios to their friends?

The researchers wanted to know the level of students' acceptability of the use of audios in the instructional process in order to determine its effectiveness and convenience of use among the students. Three questions were asked on recommending to their peers, expecting instructional audios in the future courses as well as personally sharing their instructional audios with their

friends respectively. After analysis of the data, it was found that 1144 of the students, representing 80%, indicated their willingness to recommend the use of the instructional audios to their friends when learning. In a similar question as to whether they would consider using audios again, 1201 respondents (84%) of the student rated agree to strongly agree to expecting to use the instructional audios in the near future. At the same time, the respondents did indicate that other lecturers should be encouraged to use more instructional audios in order to help their diverse students to learn meaningfully from their courses. What is not clear in this study is the various ways these university students might have benefitted from the use of the instructional audios in terms of the overall performance in class. But one thing is clear. As many as 80% of the students saw something good in the instructional audios and were willing to recommend to friends for their use. The position of the participants to use the audios in the future and also recommend the audios as well is in line with

Conclusion

The current study suggests that the use of instructional audios is not popular in institutions of higher learning in Ghana. The students indicated that it was not common to have audios as part of the teaching and learning materials provided by the lecturers. Nonetheless, there is evidence from the current study that learners are willing to embrace the use of instructional audios as well as have supporting devices and software applications for their use. There are several benefits of using instructional audios. Among them are the provision of backup learning resource for future review by the students; allowing students to do oral presentations; providing effective feedback that allows for individualized learning; appropriate for large class sizes, creates opportunities for self-paced learning; allows easy access to teaching and materials; creates alternate assessment modes; allows learners to rehearse lines, creates opportunity for persons with disability, stimulates learner engagement, etc. The study has shown that instructional audios are still appropriate at the university level due to the different ways they can be used to engage the learners. Effective use of instructional audios will reduce the workload for university teachers and the cognitive load of the learners especially when the design of the audios is based on instructional design guidelines. With the increased enrollment in many Ghanaian universities, especially the newly established ones struggling with adequate lecture halls and computer laboratories, the use of instructional audios could be used to augment the teaching and learning process so as to reduce the cognitive overload created as a result of poor instructional choices coupled with inadequate infrastructure. Thankfully, the smartphone has several pro-education applications that can make it easy for learners on this journey.

Implications for Practice

1. There is an increasing ownership of smartphones among university students in Ghana. For this reason, lecturers should look at the mobile applications that are compatible with the teaching and learning activities so that allow students can use their smartphones more and more in the instructional process.

2. The design of instructional audios must be based on the multimedia principles. For this reason, universities must provide training to the teaching staff to master how to use instructional design principles in creating audios for their students.
3. The majority of students have smartphones, which are compatible with the instructional audios. University lecturers must start exploring the use of these audios to enhance teaching and learning.
4. Students can be trained in the ways that they can also create instructional audios to help them during their group discussions. Many assignments have been written medium over years. However, the use of audios presents another medium that teachers can explore.

References

Abdulrahman, T., Basalama, N., & Widodo, M. R. (2018). The impact of podcasts on EFL students' listening comprehension. *International Journal of Language Education, 2*(2), 23-33.

Akyina, O. K., Manu, J., & Dzamesi, W. Y. J. (2019). Smartphones as partners in teaching and

Alharbi, M. A., (2021). Impact of teacher written vs. audio feedback on EFL undergraduates' writing. *Cypriot Journal of Educational Science. 16*(3), 1141-1153.

Allegro Media Design. (2022). 14 tips to effectively use audio for elearning courses.

and phone use preferences: The perception of a public university in Ghana. *Journal of Education and Practice*, *9*(36), 175-185.

Bakare B. (2024). The use of audio-visual materials in promoting the teaching and learning of French language in Ekiti-State. *International Journal of English Language and Linguistics Research, 12* (2), 1-17. https://doi.org/10.37745/ijellr.13/vol12n1117

Bakosh, L. S., Mortlock, J. M. T., Querstret, D., & Morison, L. (2018). Audio-guided mindfulness training in schools and its effect on academic attainment: Contributing to theory and practice. *Learning and Instruction*, *58*, 34-41.

Bhowmick, A., & Hazarika, S. M. (2017). An insight into assistive technology for the visually impaired and blind people: state-of-the-art and future trends. *Journal on Multimodal User Interfaces, 11*(2), 149-172.

Carter, C. W. (2012). Instructional audio guidelines: Four design principles to consider for every instructional audio design effort. *TECHTRENDS* **56**, 54–58. https://doi.org/10.1007/s11528-012-0615-z

Clark, R. C., & Mayer, R. E. (2011). *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*. (3rd ed.). Wiley & Sons, Inc.

Cozendey, S., & Costa, M. d. P. (2016). The audio description as a physics teaching tool. Journal of Research in Special Educational Needs, 16, 1031- 1034

Csapó, Á., Wersényi, G., Nagy, H., & Stockman, T. (2015). A survey of assistive technologies and applications for blind users on mobile platforms: a review and foundation for research. *Journal on Multimodal User Interfaces, 9*(4), 275-286

Elif, A. (2021). The use of audio-visual materials in the education of students with hearing loss. *International Education Studies, 14*(7), 1 – 11. https://doi.org/10.5539/ies.v14n7p1

Gould, J. & Day, P. (2013) 'Hearing you loud and clear: student perspectives of audio feedback in higher education', Assessment & Evaluation in Higher Education, 38(5), pp.554-566.

Guha, S. (2020/2021). Creating audiobook for children with visual impairment: The collaborative approach leading to virtual learning, International Journal of Technology in Teaching and Learning, *16*(1),37-48.

Hamad, M. M., Metwally, A. A., & Alfaruque, S. Y. (2019). The impact of using YouTubes and audio tracks imitation YATI on improving speaking skills of EFL learners. *English Language Teaching*, *12*(6), 191-198.

Heritage, M. (2019). Feedback for Enhanced English Language Learning. In: X. Gao (Eds.), Second handbook of English language teaching. Springer. https://doi.org/10.1007/978-3-030-02899-2_27

Hilao, M. P., & Wichadee, S. (2017). Gender differences in mobile phone usage for language learning, attitude, and performance. *Turkish Online Journal of Distance Education*, *18*(2), 68-79.

Idris, A. T., Shamsuddin, I. M., Arome, A. T., & Aminu, I. (2018). Use of audio-visual materials in teaching and learning of classification of living things among secondary school students in Sabon Gari LGA of Kaduna State. *Plant, 6*(2), 33-37.

Ippreciel, D. (2022). What should the future of learning look like? Looking back, looking forward. *International Journal of Higher Education, 11*(5), 51-69.

Jonassen, D. H. (2006). *Modeling with technology: Mindtools for conceptual change*. (3rd ed.). Upper Saddle River, NJ: Pearson Education, Inc.

Journal of Education and Development using Information and Communication Technology (IJEDICT), 17(2), 96-103.

Kartal, G., & Simsek, H. (2017). The effects of audiobooks on EFL students' listening comprehension. The Reading Matrix: An International Online Journal, 17(1), 112- 123.

Kennedy, G. M. (2023). Challenges of ICT integration in teachers' education: A case study of the college of education, University of Liberia. *International Journal of Social Science and*

Education Research Studies 3(5). 860 – 870.
https://doi.org/10.55677/ijssers/V03I5Y2023-15

Kim, N-Y., (2021). E-Book, Audio-Book, or E-Audio-Book: The effects of multiple modalities

Kirwan, A., Raftery, S., & Gormley, C. (2023a). Sounds good to me: A qualitative study to explore the use of audio to potentiate the student feedback experience. *Journal of Professional Nursing*, *47*, 25–30. https://doi.org/10.1016/j.profnurs.2023.03.020

Larson, L. C. (2015). E-books and audiobooks: Extending the digital reading experience. The Reading Teacher, 69(2), 169-177.

learning. *International Journal of Academic Research and Reflection*, 7(1), 37-50.

Liu, H., Cao, S., & Wu, S. (2019). An experimental comparison on reading comprehension effect of visual, audio and dual channels. *Proceedings of the Association for Information Science and Technology*, *56*(1), 716-718.

Lunt, T. and Curran, J. (2010) "Are you listening please?" The advantages of electronic audio feedback compared to written feedback', *Assessment & Evaluation in Higher Education, 35*(7), pp.759-769.

Manu, J. (2020). Teachers' perception on the free senior high school policy in Ghana: A Case

Manu, J., Akyina, K. O., Ampomah, R., Antwi, S., & Ansah, G. (2024a). Education and Technology in Ghana: Understanding the Centrality of Technology Integration in the Classroom and Beyond. *American Journal of Educational Research*, *12*(11), 402-412.

Manu, J., Akyina, K. O., Ampomah, R., Antwi, S., & Ansah, G. (2024b). An inventory

Manu, J., Akyina, O. K., Yeboah-Appiagyei, K., & Opoku, P**.** (2018). Fresh university students

Mayer, R. E. (2001). Multimedia learning. New York: Cambridge University Press.

Mayer, R.E. (2009). *Multimedia learning (2nd ed.)*. New York: Cambridge University Press.

Mucundanyi, G., & Woodley, X. (2021). Exploring free digital tools in education. *International*

Neuman, S. B. (Feb./ Mar 2005). Audio books for kids. *Scholastic Parent & Child*, *12*(4), 22-22.

of 21st century digital tools in One district of the Ashanti Region of Ghana: Implications for educational stakeholders. *American Journal of Educational Research, 12*(10), 464-471.

Olagbaju, O. O. & Popoola, A. G. (2020). Effects of audio-visual social media resources supported instruction on learning outcomes in reading. *International Journal of Technology in Education (IJTE), 3*(2), 92-104.

on EFL comprehension. *English Teaching*, *76*(4), 33-52.

Pearson, J. (2018) 'Engaging practical students through audio feedback', *Practitioner Research in Higher Education Journal*, *11*(1), 87-94.

Peprah, O. M. (2016). ICT education in Ghana : An evaluation of challenges associated with the teaching and learning of iCT in Basic Schools in Atwima Nwabiagya District in Ashanti Region. *European Journal of Alternative Education Studies*, *1*(2), 7–27.

Plass, J. L., Moreno, R., & Brünken, R. (2010). Cognitive load theory. New York: Cambridge University Press.

Rahman, A., & Hajar, I. (2020). The effect of audiobook on reading comprehension of the eleventh grade students of SMA Negeri 2 Buru. ELT Worldwide, 7(2), 104-115.

Rogowsky, B. A., Calhoun, B. M., & Tallal, P. (2016). Does modality matter? The effects of reading, listening, and dual modality on comprehension. SAGE Open, 6(3), 1-9.

Skinner, B. F. (2003). *The technology of teaching*. Cambridge, MA: B. F. Skinner Foundation. Retrieved from https://docplayer.net/140248768-The-technology-of-teaching.html.

Study in One of the Municipalities in Ghana. *IJRISS*, *4*(3), 63-70.

Sweller, J. (1999). Instructional design in technical areas. Camberwell, Victoria, Australia: ACER Press.

Sweller, J. (2010). Element interactivity and intrinsic, extraneous, and germane cognitive load. *Educational Psychology Review*, *22*, 123–138.

Sweller, J., Ayres, P. & Kalyuga, S. (2011). Cognitive load theory. New York: Springer.

Uijl, S.G., & Filius, R. M. (2022). The use of video, audio, and e-portfolios to provide feedback. In:

Witchel, H.J., Lee, M.W. (eds) Technologies in biomedical and life sciences education. Methods in Physiology. Springer, Cham. https://doi.org/10.1007/978-3-030-95633-2_9

Journal of Education and Practice
ISSN 2520-467X (Online)
Vol.9, Issue No.1, pp. 61 – 76, 2025
www.carijournals.org