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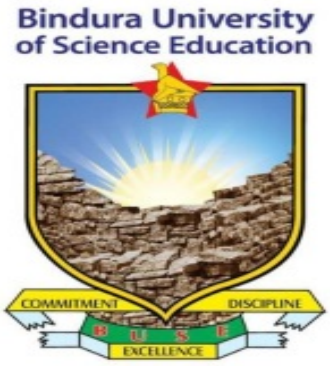


# AN ASSESSMENT OF ACCESS AND USE OF WHATSAPP AUDIO IN THE TEACHING AND LEARNING OF STATISTICS AT ADVANCED LEVEL: A CASE OF MBAZA HIGH SCHOOL IN MUTASA DISTRICT

**BY**

**TAGARIRA FAINA**

**REG NO. B225506B**

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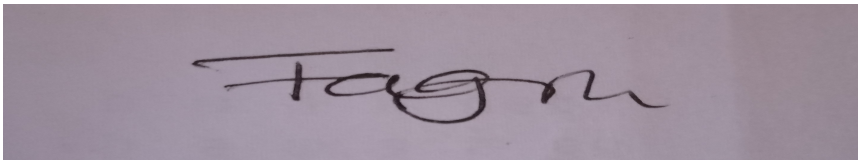

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## DEDICATION

This study is dedicated to my family and friends who encouraged me through all circumstances to reach beyond the stars I am so thankful. I want also to thank my sons who always keep encouraging me to push harder. To my colleagues I am thankful for all the encouragement you have given me.

## ABSTRACT

This study focused on investigating the access and use of Whatsapp audio in the teaching and learning of Statistics at Advanced Level and to recommend what is needed to improve students' collaborative learning and performance since social networking applications were extremely popular among younger users and were prevalent across the globe.The study adopted a qualitative method using a case study design. Both teachers and learners were purposively sampled for in-depth interviews and focus group discussions. It emerged in the study that the use of Whatsapp audio provided a scaffolding mechanism for students to access explanations, examples and guidance from their instructors or more experienced peers. The audio format of Whatsapp was particularly helpful in supporting the gradual development of statistical reasoning and problem-solving skills, as it offered more personalised and dynamic support compared to statistic, textual resources. The study also found out that Whatsapp audio was effective in enhancing student engagement and understanding of statistical concepts. The majority of the interviewed study participants agreed that through the use of Whatsapp audio there was improved accessibility to content and flexibility of instruction transfer between the learners and the instructors.

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# CHAPTER 1: INTRODUCTION AND BACKGROUND TO THE STUDY

## 1.0 Introduction

In recent years, the use of technology in education has become increasingly prevalent. One such technology that has gained popularity is Whatsapp. Whatsapp is messaging applications that allow users to send text, images, and audio messages. This study shall aim to assess the access and use of Whatsapp audio in the teaching and learning of Statistics at Advanced level. Social networking applications are extremely popular among younger users and are prevalent across the globe because they provide accessible socialization. Every day there is an increase in the number of users of such networking forums, which predominantly provide interaction opportunities to individuals and groups to understand different worldviews and discuss evolving and differing thought processes .The scope of such networking soft wares and applications has entered the sphere of education (Aktas and Can, 2019).

## 1.1 Background of the study

(Enyama, D et al, 2021) propounded that the implementation of e-learning using Whatsapp started in the Covid-19 Pandemic era in order to palliate to the lockdown and cover academic program. In recent years, there has been a growing trend of using mobile technology to enhance education. Whatsapp, one of the most popular messaging applications, has the potential to play a significant role in mobile learning. Whatsapp allows users to send and receive audio messages, which can be used to share information and communicate in a virtual, convenient and flexible way. However, there has been little research into the use of Whatsapp audio messaging in the teaching and learning of Statistics at Advanced level. Whatsapp audio enhance learning through alternative views and critical thinking. (Brookhart, 2010). He went on to say that Whatsapp audio allows student to create

new ideas, reflect on materials, and evaluate comments, fostering problem solving and critical thinking skills. This interactive platform supports the development of higher order thinking skills (HOTS) by encouraging collaborative learning, knowledge construction, and active participation in the learning process.

Advancement of technology has given new dimensions to teaching and learning of Statistics at Advanced level as well. It expands teaching and learning beyond classrooms and the convectional chalk and talk. Ministry of Primary and Secondary education (MOPSE) Advanced level statistics syllabus is a document with one of the key objectives as to enable learners to use and communicate, visualize scientific information, to develop critical thinking and problem solving skills that will enable them to meaningfully interact with the environment and real life situations.

It is apparent in this juncture that the researcher will carry out this research to elicit information on the access and use of Whatsapp audio in the teaching and learning of statistics at Advanced level. Meaningful and effective learning does not occur only by use of textbook and direct instruction. Okefunji (2013) propounded that in 2023, Whatsapp use in higher education learning environment can positively impact academic performance and team effectiveness. The author also stressed out that audio material like Whatsapp audios when effectively used can lessen major weaknesses of verbalism, humanize and vitalize subject matter, providing interesting approach to new topics and give initial correct impressions, economic time in learning, supply concrete materials needed, stimulate the initiative of the learners.

Bouhnik and Deshen, 2014 explored the use of Whatsapp as a learning tool between teachers and learners, highlighting its potential in facilitating communication and collaboration outside of the classroom. Similarly, a study by (Yuzbasioglu et al, 2020) made emphasis on the role of Whatsapp

in promoting interactive teaching and learning, when it also serves as a valuable tool in enhancing language learning and facilitating communication between teachers and learners. Mobile phones in particular have been found to be useful tools for teaching and learning. Research evidences abound affirmations that using mobile technology for learning is highly motivating; particularly with the advent and popularity of the social media (DeMonte, 2019). However, in any group of adults like the advanced level, there will be a wide range of individual differences, thus the individualization of learning experiences is important in many situation. This means that the instruction should be at learners' own pace (Hughey, 2020). This can only be made possible by through the use of mobile technologies such as the mobile phones and particularly the social media for example the Whatsapp audio and messaging which has become very popular today.

### 1.2 Statement of the Problem

Despite the potential of Whatsapp audio messaging to enhance the teaching and learning of statistics at Advanced level, there is limited knowledge about its effectiveness. Barhoumi (2015) and Bhatt and Arshad (2016). The use of Whatsapp audio messaging may present both opportunities and challenges for teachers and students. The use of Whatsapp audios promotes the limitations of remote and virtual teaching and learning. Internet connection in Mutasa sometimes is not a problem and there is more network penetration for example people around there use Netone, Econet and Telecel. Network boosters for both Netone and Econet are there. It is therefore possible that teachers and learners adopt the use of Whatsapp in the teaching and learning of statistics at Advanced level. It is not clear how Whatsapp audio messaging should be used to maximize its benefits and minimize its drawbacks. This study shall aim to assess the access and use of Whatsapp audio messaging in the teaching and learning of statistics at Advanced level, in

order to identify best practices and areas for improvement. However, this study seeks to assess the access and use of Whatsapp audio.

### 1.3 Research Objectives

The study shall aim to investigate on the access and use of Whatsapp audio in the teaching and learning of statistics at Advanced level at Mbaza High School.

To achieve this study aim, the following research objectives shall be outline:

1. To explore the perceptions of both teachers and students towards the use of Whatsapp audio in the classroom

2. To identify potential barriers to the use of Whatsapp audio in the teaching and learning of Statistics at A level.

3. To assess the effectiveness of Whatsapp audio in enhancing student engagement and understanding of statistical concepts.

4 . To provide recommendations for enhancing the integration of Whatsapp audio in statistics education at the A level.

### 1.4 Research Questions

The study shall aim to address the following research questions:

1. What are the perceptions of both teachers and students towards the use of Whatsapp audio in the classroom

2. What are the potential barriers to the use of Whatsapp audio in the teaching and learning of Statistics at A level.

3. what is the effectiveness of Whatsapp audio in enhancing student engagement and understanding of statistical concepts.

4 . what are the recommendations for enhancing the integration of Whatsapp audio in statistics education at the A level.

**1.5 Significance of the Study**

Significance to Students: Provides an alternative, potentially more engaging mode of learning statistics compared to traditional lecture-based methods. Allows students to access course materials and lessons at their own pace and convenience through WhatsApp audio. May cater to different learning styles and preferences, especially for students who benefit from auditory input. Enhances accessibility of statistics education for students who may have difficulties with written materials or attending in-person classes

Significance to Instructors: Explores innovative ways to leverage ubiquitous mobile messaging apps like WhatsApp to supplement statistics instruction. Offers insights into the effectiveness and feasibility of integrating WhatsApp audio into the teaching of advanced-level statistics courses. Can inform the development of more dynamic, technology-enhanced pedagogical approaches in statistics education. Generates data and findings that can guide instructors on best practices for using WhatsApp audio to support student learning

Significance to the Field: Contributes to the growing body of research on the application of mobile learning technologies in statistics and STEM education. Provides empirical evidence on the benefits, challenges, and practical considerations of using WhatsApp audio for teaching advanced statistics. Informs the design of future statistics courses and learning materials that leverage

popular social messaging platforms. Promotes the exploration of additional ways in which readily available mobile apps can be harnessed to enhance statistics education

Overall, this research has the potential to yield valuable insights that can benefit students, instructors, and the broader field of statistics education by examining an innovative approach to delivering advanced-level statistics content and supporting student learning.

**1.6 Delimitations**

Scope of Whatsapp Usage: Focusing solely on the use of Whatsapp audio for teaching statistics at the A level limits the study to a specific communication medium and subject matter, potentially overlooking other teaching methods and subjects.

Participant Demographics. The study may be limited to specific demographics of students and educators using Whatsapp for statistical education, potentially excluding valuable insights from a broader range of users.

Technological Constraints. The research may not consider technological limitations that could affect the effectiveness of using Whatsapp audio for teaching statistics, such as internet connectivity issues or device compatibility.

Educational Environment

The study may not account for variations in educational settings, teaching styles, or curriculum requirements that could impact the implementation and outcomes of using Whatsapp audio for statistical education.

### 1.7 Limitations

Sample size and selection bias: The study may have a relatively small sample size of participants, which could limit the generalizability of the findings. There may also be selection bias, where the participants who choose to use WhatsApp audio may differ systematically from those who do not, affecting the representativeness of the sample. To minimize this: Recruit a larger, more diverse sample of participants to increase the statistical power and representativeness of the findings. Use random sampling or other techniques to reduce selection bias.

Confounding factors: Other factors, such as the instructor's teaching style, students' prior knowledge and motivation, access to technology, etc. may also influence the effectiveness of WhatsApp audio in learning statistics. These confounding factors may not be adequately accounted for in the study design. To minimize this: Implement a more robust experimental design, such as a randomized controlled trial, to better isolate the effect of WhatsApp audio usage. Collect data on potential confounding variables and statistically control for them in the analysis.

Subjective measures and self-reported data: The study may rely heavily on subjective measures, such as student perceptions and self-reported learning outcomes, which can be prone to bias. To minimize this: Incorporate more objective measures of learning, such as standardized test scores or performance on specific statistical tasks, to complement the subjective data.

Technological limitations and accessibility: The use of WhatsApp audio may be limited by factors such as data connectivity, device compatibility, or student familiarity with the technology. To minimize this: Assess the technological infrastructure and digital literacy of the target population, and provide necessary support or alternative options to ensure equitable access and participation.

Sustainability and scalability: The study may not address the long-term sustainability of using WhatsApp audio in teaching and learning, or the feasibility of scaling up the approach to larger class sizes or different educational contexts. To minimize this: Examine the logistical and administrative challenges of implementing WhatsApp audio on a larger scale, and consider strategies for long-term integration and sustainability within the educational system.

By addressing these potential limitations and incorporating appropriate research design and data collection methods, the study can provide more robust and generalizable insights into the effectiveness of using WhatsApp audio in teaching and learning statistics at the advanced level.

# CHAPTER 2: LITERATURE REVIEW AND THEORATICAL FRAMEWORK

## 2.0 Introduction

## 2.1 Theoretical Framework

### Connectivism Theory

Siemens (2005) and Downes (2005) argued that traditional learning theories, such as behaviorism, cognitivism, and constructivism, do not adequately address the impact of technology and the internet on the way we learn and acquire knowledge in the digital age. Connectivism emphasizes the importance of creating and navigating connections between diverse information sources, ideas, and people to facilitate learning and knowledge creation. In the context of the proposed study, the use of WhatsApp audio can be seen as a way to facilitate these networked connections and knowledge-sharing among advanced-level statistics students and their instructors. Students can use WhatsApp audio to access explanations, examples, and discussions from their peers and instructors, allowing them to collectively build and refine their understanding of statistical concepts. The ability to easily create, share, and discuss audio recordings related to statistics topics aligns with the connectivist principle of "learning as a process of connecting specialized nodes or information sources. Connectivism is a learning theory proposed by George Siemens (2005) and Stephen Downes (2005) to address the limitations of traditional learning theories in the digital age. Learning and knowledge reside in the diversity of opinions and connections across a network. The ability to learn and know is more critical than the static knowledge itself. Learning is a process of connecting specialized nodes or information sources. The use of WhatsApp audio in teaching and learning statistics at the advanced level aligns with the connectivist approach, as it enables students to access and share information, connect with peers and instructors, and collaboratively construct knowledge within a digital network. The ability to create, share, and discuss statistical

concepts and applications through WhatsApp audio can foster a more dynamic and networked learning environment, which is a key tenet of connectivism.

**Graduated Theory**

Bruner's (1976) graduated theory, based on Vygotsky's (1978) concept of the Zone of Proximal Development (ZPD), suggests that learners can achieve higher levels of understanding with the support of more knowledgeable others. In the context of this study, the use of WhatsApp audio can provide a scaffolding mechanism for students to access explanations, examples, and guidance from their instructors or more experienced peers. The audio format of WhatsApp may be particularly helpful in supporting the gradual development of statistical reasoning and problem-solving skills, as it can offer more personalized and dynamic support compared to static textual resources. Students can listen to audio explanations, ask clarifying questions, and receive real-time feedback, allowing them to progress from reliance on external support to more independent problem-solving and understanding of statistical concepts. The graduated theory suggests that this scaffolding process facilitated by WhatsApp audio can help students move through their ZPD and develop more advanced statistical competencies. The graduated theory suggests that learners can achieve higher levels of understanding with the support of more knowledgeable others, gradually transitioning from reliance on external support to independent problem-solving. The use of WhatsApp audio in teaching and learning statistics at the advanced level can be viewed through the lens of the graduated theory, as it can provide a scaffolding mechanism for students to access explanations, examples, and guidance from their instructors or more experienced peers. The audio format of WhatsApp may be particularly helpful in supporting the gradual development of statistical reasoning and problem-solving skills, as it can offer more personalized and dynamic support compared to static textual resources. By integrating the connectivism theory and the

graduated theory, the proposed study on the use of WhatsApp audio in teaching and learning statistics at the advanced level can establish a robust theoretical foundation that addresses the dynamic, networked, and scaffolded nature of learning in the digital age.

## 2.2 Conceptual framework

### Conceptualization of WhatsApp

Aburezeq and Ishtaiwa (2013) defined WhatsApp as a cross-platform mobile messaging app that permits users to chat in real-time without having to pay for short message service (SMS). The application (WhatsApp) is usually used on certain cell phones and computers (Sivakumar 2016). The users only need to connect to the internet or buy data bundles in order to use it. Simui, Mwewa, Chota, Kakana, Mundende, Thompson, Mwanza, Ndhlovu and Namangala (2018) concur that users need internet and data in order to utilise WhatsApp. Ta'amneh (2017) defines WhatsApp as a social media that allows users to access and share information. WhatsApp is a tool for information sharing. Srivastava and Kiran (2018) postulate that WhatsApp is quick and fast; users can update status photos or videos and send their location by using Global Positioning System (GPS). This is a crucial feature of WhatsApp especially if a person is unsure about the place that they are travelling to; they can ask for a location pin to be sent. Some students put their useful information on their statuses which helps viewers to learn and get information from the status updated.

Maíz-Arévalo (2018) argues that usually a WhatsApp user prefers to choose the picture and status that other users see when they chat on WhatsApp. This helps to identify the person you are intending to send a message to. As elucidated by Robin, Yanenz and McCo (2019) WhatsApp is an application that offers messaging and calls, in an easy, safe and trusted way of communicating worldwide. According to Martins (2019), WhatsApp is undoubtedly the most current and attractive

social media among smartphone users and can be used for a variety of different interesting functions. WhatsApp is an application that enables users to receive information instantly and respond. Receiving information quickly encourages people to use the application. Barhoumi (2015) explains that WhatsApp is a free application tool, however, people must buy data bundles in order to use it. Tawia et al. (2014) suggests that students enjoy to be on WhatsApp since it costs less. This happens because the majority of students are unemployed and still financially dependent on their parents; they themselves cannot afford expensive social media. This dependency increases the utilisation of WhatsApp among students.

WhatsApp consists of different functions such as text messages, attaching images, audio files, video files, links to web addresses and it can be used to facilitate communication (Sayan, 2016). "WhatsApp, a mobile instant messaging application, has reached 500 million users worldwide, sharing 700 million photos and 100 million videos daily" (Acton & Koum, 2014: 12). In the South African context, Mofolere (2016) argues that although numerous social media have been introduced in the country, few have been as widely received as WhatsApp. Mofolere (2016:615) states that "today WhatsApp is used in South Africa by 15 million subscribers compared to Facebook with 9 million." Dhimmar and Irfan (2019) state that WhatsApp is an effective application that allows the flow of ideas and information. WhatsApp is a suitable tool for information sharing and ideas it can be used as a teaching and learning tool. Several studies have been conducted about the utilisation of WhatsApp for teaching and learning in higher educations however, there is a gap as few studies have solely investigated the UoTs.

**Use of WhatsApp for teaching and learning**

WhatsApp is being utilised for different purposes in the teaching and learning process. It is used in different ways such as teaching and learning, as a collaborative tool, and WhatsApp as a

communication tool. The tool is utilised as a platform to improve English and it is accessible and an available tool.

**WhatsApp as a teaching and learning tool**

Although WhatsApp is mainly used for communication, students and lecturers in HEI's are using it for sharing information and to facilitate teaching and learning. Gon and Rawekar (2017) and Chaka and Govender (2017) argue that WhatsApp enables learning beyond the classroom border and high availability of lecturers to students' questions can potentially enhance the learning process.

Rambe and Bere (2013) agree that WhatsApp is a useful resource in South African HEI's because lecturers use it extensively to reach out to all students. WhatsApp offers university students the opportunity to send messages without limits and create study groups which can engage in academic forums. Familiarity with WhatsApp means no training is needed on how to use WhatsApp

Buhari, Ahmad and HadiAshara (2014) postulate that WhatsApp is widely used as a social media platform among polytechnic students in Nigeria to facilitate teaching and learning. Students regularly exchange information and learning by using WhatsApp as a learning tool. They like the platform to facilitate their learning because it enables knowledge sharing and interactive learning in groups to occur. According to Ta'amneh (2017) a group of students who learnt using WhatsApp, performed better than students who learnt using the traditional face-to-face technique. Social media are used to improve pedagogical practices, information access and communication in HEI's (Rambe & Chipunza, 2015). According to Nanda (2019) WhatsApp plays a pivotal role in improving learning to assist slow learners by stimulating their interest and developing communication among students. Rosenberg and Asterhan (2018) postulate that students feel free to express themselves on WhatsApp compared to face-to-face encounters in the classroom because

the application allows them to be invisible within a group. WhatsApp suits diffident students who prefer a textual interface (Rosenberg & Asterhan, 2018). The platform accommodates all students including those who are shy, slow learners, and fast learners.

Chipunza and Rambe (2013:331) postulate that "students at a South African university perceived WhatsApp as a level for bridging to peer-generated resources, heightening on-task behaviours and promoting important context free-learning." Manan (2017) states that WhatsApp plays a critical part in motivating students to learn. Robles et al. (2019) argues that WhatsApp can be used as a tool for distance learning. Newby, Stepich, Lehman and Russell (2000:210) explain distance learning as "an organised instructional program in which teacher and learners are physically separated." In that context, WhatsApp saves transport costs and travelling times. Cetikata (2017) elaborates that the gadget should not be disregarded because it has the potential of a natural educational technology and the qualities to contribute to education positively. Amry (2014) contends that students in universities are content to use WhatsApp as an educational tool. WhatsApp plays a crucial role for students and offers lecturers skills to upgrade the level of competence in order to successfully achieve a more studentcentered learning environment and have more differentiated instruction (Sayan, 2016)

Rosenberg and Asterhan (2018) proclaim that WhatsApp allows students to help each other for example uploading homework, complete tasks, share answers and solutions. Urien, Erro-Garces and Osca (2019) state that different members are responsible for providing specific information on certain aspects. Ujakpa, Heukelman, Lazarus, Neiss and Rukanda (2018) agrees and adds that WhatsApp helps students to access the learning materials that are sent by lecturers, activities and to schedule group discussions. However, researchers such as Yusuf, Adams and Dingley (2016) have reported that sharing course-related materials online increases absenteeism because students

do not see the need to be present on campus if they can receive all the required materials on WhatsApp.

Using WhatsApp Messenger in the UK education system has proved to have numerous advantages for undergraduate nurses. These include: increasing the accessibility of resources for test preparation and providing a platform for explanation of unclear aspects of the course (Yusuf et al., 2016). Mellat and Khademi (2015: 23) concur that "WhatsApp provides students with the ability to exchange text messages, images, videos, and voice notes with their classmates and from lecturers to students." Such an exchange of vital information in higher education is linked to learning as opposed to the old talk-and-chalk traditional teaching methods. The use of such technology enables students to have access to all relevant educational information communicated to them by other classmates and lecturers in their conversations (Barhoumi, 2015).

Bansal and Joshi (2014) posit that in India students welcome WhatsApp as a learning tool that has the potential to enable them to interact with lecturers, share learning material and easy access of information. Students in India agree that learning through WhatsApp has educational benefits such as: immediate feedback to the problem, learning on the move, deeper clarity on issues, and quick revision of previously learnt topics. Bouhnik and Deshden (2014: 20) contend that "many of the students indicate that they also use the private channel to send their teachers personal messages, such as questions or requests for help with a variety of issues." These students are not comfortable with sending messages on group-chats, because WhatsApp is an accommodative tool for groups and individuals and it becomes easier for them to use it.

Kamel Boulos, Giustini and Wheeler (2016) state that in the UK, WhatsApp assisted students to develop a 'social presence' among first-year undergraduate radiography students. The use of

WhatsApp provides students with a platform to demonstrate characteristics relevant to the development of 'social presence'. Students use the WhatsApp platform for sharing their college timetable. The use of WhatsApp in the UK was praised for allowing students to find and utilise resources such as journal articles, whilst simultaneously participating in an interactive group discussion (Raiman, Antbring & Mahmood, 2017). Martins (2019: 16) used WhatsApp in a health care education and applauded the social media stating:

the use of mobile applications has been shown to be useful for educational purposes. Using WhatsApp in the primary health care education setting has demonstrated a number of benefits for undergraduate nurses. These include the usefulness of the application for integrating theory and clinical practice; increasing the availability of resources for test preparation and providing a platform for clarification of uncertain aspects of the course.

A study by Urien et al. (2019) study revealed that candidates in the Business Administration and Engineering Faculties regarded WhatsApp as helpful. They achieved impressive results in their specialisation subjects. This indicates that WhatsApp has a positive impact on academic performance of university students. A study conducted by Eberechukwu and Queendarline (2018:19) revealed that "candidates strongly agreed that the use of WhatsApp group-chat for education together with social life in the university boost their academic performance."

**2.3 Perceptions to the use of WhatsApp audio in the teaching and learning of Statistics at A level.**

Technological Limitations: Audio quality and compatibility issues: Students may experience problems with the clarity and playback of WhatsApp audio recordings, especially on older or low-end devices (Prasad & Rao, 2019). Connectivity and access challenges: Unreliable internet

connectivity or limited mobile data plans may hinder the ability of students to consistently access and download audio files (Bouhnik & Deshen, 2014). Lack of integration with learning management systems: The lack of seamless integration between WhatsApp and institutional learning platforms can make it difficult to organize and access audio materials within the broader course context (Al-Jundi et al., 2021).

**Privacy and Security Concerns:**

Use of personal messaging apps for academic purposes: Students and instructors may have reservations about using a personal messaging app like WhatsApp for educational activities, which can raise privacy issues and blur the boundaries between professional and private spheres (Amry, 2014). Data privacy and protection: There may be concerns about the security and confidentiality of student information and academic content shared through third-party messaging apps (Amry, 2014).

Pedagogical Challenges: Difficulty in providing effective feedback: The asynchronous nature of WhatsApp audio messages may make it challenging for instructors to provide timely and meaningful feedback to students on their statistical work or understanding (Bouhnik & Deshen, 2014). Lack of interactivity and collaboration: The one-way communication inherent in WhatsApp audio recordings may limit opportunities for interactive discussions, peer-to-peer learning, and collaborative problem-solving among students (Prasad & Rao, 2019). Increased time and effort for instructors: Creating and managing a large number of audio recordings can add to the workload and time commitment of instructors, potentially hindering their adoption of this technology (Bouhnik & Deshen, 2014).

Student Engagement and Learning Preferences: Varying student preferences and learning styles: Some students may prefer more traditional learning modalities, such as written materials or in-

person lectures, over audio-based content (Abdous et al., 2012). Potential for overreliance on audio materials: Over-emphasis on WhatsApp audio recordings may lead to a passive learning approach, limiting opportunities for active engagement with statistical concepts and problem-solving (Prasad & Rao, 2019). To address these potential barriers, researchers suggest exploring integration with institutional learning management systems, providing training and support for both instructors and students, and adopting a blended approach that combines WhatsApp audio with other teaching and learning strategies (Al-Jundi et al., 2021; Bouhnik & Deshen, 2014).

### 2.4 The effectiveness of using WhatsApp audio in enhancing student engagement and understanding of statistical concepts

**Improved Accessibility and Flexibility:**

Studies have shown that the asynchronous nature of WhatsApp audio recordings can provide students with increased accessibility and flexibility in accessing learning materials (Bouhnik & Deshen, 2014; Prasad & Rao, 2019). Students can listen to the audio lessons at their own pace, revisit concepts they find challenging, and engage with the content at their convenience, which can foster better understanding of statistical concepts.

**Enhanced Engagement and Motivation:**

The use of WhatsApp audio has been associated with increased student engagement and motivation in learning statistics (Amry, 2014; Prasad & Rao, 2019). The personalized nature of audio recordings, where instructors can provide personalized explanations and feedback, can make the learning experience more engaging and meaningful for students.

**Improved Comprehension and Retention:**

Studies suggest that the auditory modality can be particularly effective for learning and retaining statistical concepts, as it can complement the visual representations and mathematical formulas typically used in statistics instruction (Abdous et al., 2012; Al-Jundi et al., 2021). The ability to

repeatedly listen to audio recordings can help students better internalize and apply statistical principles and techniques.

**Bridging Learning Gaps:**

WhatsApp audio can be used to address the diverse learning needs and preferences of students, particularly those who may struggle with traditional lecture-based or text-based learning (Bouhnik & Deshen, 2014; Prasad & Rao, 2019). The personalized and on-demand nature of audio recordings can help cater to students with different learning styles, such as auditory learners, and provide additional support for those who need reinforcement or clarification of statistical concepts.

**Collaborative Learning Opportunities:**

While the primary use of WhatsApp audio has been for one-way communication from instructor to student, some studies have explored the potential for using it to facilitate collaborative learning experiences (Amry, 2014; Al-Jundi et al., 2021). For example, students can share audio recordings of their problem-solving strategies or discussions, which can lead to peer-to-peer learning and the exchange of diverse perspectives on statistical concepts.

## 2.5 Recommendations for enhancing the integration of Whatsapp audio in statistics education at the A level.

**Instructional Design and Integration:**

Ensure that the use of WhatsApp audio is strategically integrated into the overall instructional design and learning activities (Bouhnik & Deshen, 2014). Align the audio recordings with specific learning objectives, concepts, and problem-solving exercises to create a cohesive learning experience. Provide clear guidelines and instructions to students on how to effectively use the WhatsApp audio resources and integrate them with other learning materials.

**Content Development and Delivery:**

Develop high-quality audio recordings that provide clear, concise, and engaging explanations of statistical concepts and problem-solving strategies (Prasad & Rao, 2019). Encourage instructors to use a conversational tone, provide relevant examples, and address common student misconceptions in the audio recordings. Incorporate interactive elements, such as guiding questions or pauses for student reflection, to promote active engagement and learning.

**Accessibility and Flexibility:**

Ensure that the WhatsApp audio recordings are readily accessible to all students, including those with diverse learning needs or limited access to technology (Bouhnik & Deshen, 2014). Provide alternative options, such as transcripts or subtitles, to cater to students with different preferences or accessibility requirements. Encourage students to use the audio recordings at their own pace, revisit them as needed, and integrate them with other learning resources, such as textbooks or online materials.

**Feedback and Evaluation:**

Implement mechanisms for students to provide feedback on the effectiveness and usability of the WhatsApp audio resources (Amry, 2014). Analyze student performance data, such as quiz scores or assignment grades, to assess the impact of the audio recordings on student understanding and learning outcomes. Use the feedback and performance data to continuously refine and improve the design and delivery of the WhatsApp audio resources.

**Collaborative and Social Learning:**

Explore opportunities for students to engage in collaborative learning activities using WhatsApp audio (Al-Jundi et al., 2021). Encourage students to share their own audio recordings of problem-solving strategies or discussions, fostering peer-to-peer learning and the exchange of

diverse perspectives. Facilitate group discussions or study sessions where students can collectively listen to and discuss the audio recordings, promoting active engagement and knowledge sharing.

**Faculty Development and Support:**

Provide training and support for instructors to effectively integrate WhatsApp audio into their statistics courses (Bouhnik & Deshen, 2014). Offer guidance on best practices for creating high-quality audio recordings, managing the technology, and incorporating the audio resources into their teaching strategies. Encourage a collaborative approach where instructors can share their experiences, insights, and resources for using WhatsApp audio effectively. By implementing these recommendations, institutions can enhance the integration of WhatsApp audio in statistics education and maximize its potential to improve student engagement, understanding, and learning outcomes.

# CHAPTER 3: RESEARCH METHODOLOGY

## 3.0 Introduction

This chapter is going to focus on the research methodology, research methodology looks at one's choice of appropriate methods for studying the social phenomena of interest in a scientific way. In the case of the current study, the main purposes of the research were to provide a deep assessment of access and use of WhatsApp audio in the Teaching and Learning of Statistics at Advanced Level.

## 3.1 Research Design

A research approach can be viewed as a plan of action giving direction on how the research would be conducted efficiently and systematically (Mohajan, 2017). The researcher adopted a qualitative research approach that focused on the an assessment of access and use of Whatsapp audio in the Teaching and Learning of Statistics at Advanced Level due to its ability to unearth insider`s viewpoints. The goal is to explore the assessment of access and use of Whatsapp audio in the Teaching and Learning of Statistics at Advanced Level. "Qualitative research is an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human phenomenon or problem. The process of research involves emerging questions and procedures, data typically collected in the participant's setting, data analysis inductively building from particulars to general themes and the researcher making interpretations of the meaning of the data" (Cresswell, 2014:3. Natural context thus means that there is no environmental manipulation, alteration and influencing by any form of external conditions which may affect the general results and conclusions to be deduced.

According to Terre Blanche, Durrheim and Painter (2006), the qualitative approach is appropriate if the reality to be studied is that of people's subjective experiences. Qualitative data collection,

refers to the process of gathering non-numerical information or data that provides insights into the subjective experiences, beliefs, opinions and behaviours of individuals or groups. It incorporates a variety of strategies that looks to depict, make an interpretation of, translate, and find a sense of peace with the significance of specific pretty much normally happening peculiarities in the social world. The researcher sought to use interviews as one of the tools of collecting data. In-depth interviews were conducted with the assessment of access and use of Whatsapp audio in the Teaching and Learning of Statistics. The researcher also used qualitative document analysis to have a background and record of cases in line with the research in questions.

### 3.2 Population

According to Rubin and Babbie (1993) a target population is an aggregation from which a sample is selected. The target population for this study will be teachers and students between the age of 18-40 who are at teaching and learning of statistics at advanced level.

### 3.3 Sampling

A purposive sampling technique will be employed to identify and recruit participants for the study. Sithole (2003:17) describes a sample as part of the population under study. Sampling is a process, whereby one makes estimates about a population based on information content in portion of the entire population. The researcher will work closely with the teachers and students towards an assessment of access and use of Whatsapp audio in the Teaching and Learning of Statistics at Advanced Level.

### 3.4 Data Collection Methods

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes (Whitney, Lind, Wahl, 1998). The study is going to make use

of in-depth interviews, qualitative document analysis and focus group discussions to collect data. Interviews are going to be conducted with the social workers, ministry representative and clients. The focus group is also going to be conducted with the women and men to compliment the interviews and have a full understanding of the responses.

**Interviews**

According to Edward and Holland (2013), interviews are beneficial because they enable direct communication between the researcher and the participants. In this instance, the key informants' spoken and nonverbal cues during the interviews were interpreted by the researcher. It is important to remember, though, that conducting in-depth interviews has the drawback of being expensive and time-consuming. Similarly, Cresswell (2012) noted that conducting interviews is expensive since it necessitates the researcher to travel and gather unprocessed data from the participants. Considering that the researcher needs to follow up with the research participants, this takes time. An interview is expensive since it needs to be conducted using pricey audio tapping equipment (Alshenqueti, 2014). In certain situations, such as one-on-one interviews, the researcher must travel in order to conduct the interview. According to Cresswell (2012), there might be an issue with the equipment used when conducting interviews. Some equipment can be expensive to operate and demand a high degree of technical proficiency.

**Focus Group Discussions**

The focus group discussions in this study engaged a total of 10 participants who reside who are at Mbaza high school. The researcher conducted 3 focused grouped discussions with 5 participants in each focus group discussion. Each focus group discussion mainly focused on the research questions and specific thematic areas which were brought forward by the researcher. Like participant observations, focus groups allowed the researcher to observe a process that is often of

profound importance to qualitative investigations (Berg, 2001). However it can be argued that a focus group discussion has been criticised as the group exerts a pressure on its participants to conform to a socially acceptable view point and not to talk about divergent views or experiences (Ritchie and Lewis, 2009). Focus group discussions were considered the most effective in this study because of a number of reasons including that the study was focus on one particular variable. A group setting allowed participants to cooperate and share ideas towards answering the pertinent aspects of the research questions. More so, focus groups allowed internal and external critiquing of ideas among focus participants. This was crucial as it enabled the researcher to identify both consensus and non-consensus issues pertaining to the research subject. This researcher was aware of the potential benefits of using in-depth interviews, however these were not possible due to resource and time constraints.

**Document Analysis**

Document analysis is a qualitative research method that involves examining written, visual, or electronic documents to extract meaningful insights, patterns, and themes related to a particular research topic. Researchers need to carefully select relevant documents that offer insights into the assessment of access and use of Whatsapp audio in the Teaching and Learning of Statistics at Advanced Level. These may include survivor stories, personal accounts, counseling reports, academic articles, policy documents, and community publications. Researchers should thoroughly read and analyze the selected documents to gain an understanding of the content, context, and key themes related to the teaching and learning of statistics at advanced level. This step involves identifying relevant passages, quotes, and data that shed light on experiences. It can complement other data collection methods such as interviews and focus groups, enhancing the depth and

breadth of understanding of access and use of Whatsapp audio in the Teaching and Learning of Statistics at Advanced Level.

### 3.5 Research Instruments

#### Interview Guide

An interview guide was employed by the researcher as a tool for gathering qualitative research data. This method was used because it made depth possible by allowing respondents to be questioned and have their responses expanded. Rubin and Babbie (2011) developed an interview guide wherein the investigator prepares and poses questions in a consistent order to maximize response comparability and guarantee that information is obtained from all participants on all pertinent topics. Three important informants who were knowledgeable about the assessment of access and use of Whatsapp audio in the Teaching and Learning of Statistics at Advanced Level.

#### Focus Group Discussion Guide

The researcher decided to conduct focus groups of an assessment of access and use of Whatsapp audio in the Teaching and Learning of Statistics at Advanced Level using a focus group discussion guide. A focus group discussion can be defined as an overview style designed for small groups (Berg 2001). By employing this methodology, scholars aim to acquire knowledge via discourse regarding conscious, semi-conscious, and unconscious psychological and socio-cultural traits and mechanisms across diverse populations (Cresswell, 2012). The information discussed during the discussions was gathered by the researcher using the focus group discussion guide. A focus group discussion guide include introduction and introductory activities, statement of the basic rules or guidelines for the interview, short question and answer discussions, special activities or exercises and guidance for dealing with sensitive issues (Berg, 2001).

### 3.7 Ethical considerations

Ethical considerations in research are a set of principles that guide your research designs and practices. Scientists and researchers must always adhere to a certain code of conduct when collecting data from people (Bhandari 2021).

#### Informed consent

Informed consent is one of the founding principles of research ethics. Its intent is that human participants can enter research freely (voluntarily) with full information about what it means for them to take part, and that they give consent before they enter the research. NASW (2014) defines informed consent as seeking permission before one acts. Participants in this research will be verbally informed on the purpose of the research and will be asked to sign an informed consent form showing their consent.

#### Confidentiality

The ethical duty of confidentiality refers to the obligation of an individual or organization to safeguard entrusted information. Fulfilling the ethical duty of confidentiality is essential to the trust relationship between researcher and participant, and to the integrity of the research project. The researcher will not disclose any private information of the participants to the public or third parties. The researcher will also protect this information from unauthorized access, use, disclosure, modification, loss or theft.

### 3.8 Conclusion

Through a comprehensive qualitative research methodology employing document analysis, focus group discussions, and interviews, this study aims to provide a nuanced understanding of the psychological impact of gender-based violence in informal marriages within urban settlements in Shamva District. By rigorously analyzing data, respecting ethical considerations, and capturing

diverse perspectives, the research seeks to shed light on the psychological repercussions of GBV in this specific context.

## CHAPTER 4: DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

### 4.0 Introduction

An assessment of access and use of Whatsapp audio in the Teaching and Learning of Statistics at Advanced Level: A Case of Mbaza High School

This chapter presents the findings that were obtained from interviews and focus group discussions. Participants were selected through purposive sampling. The participants included students and teachers (male&female). These participants were selected at Mbiza High School. To analyze data the researcher adopted thematic analysis. The process of data analysis made reference to the research findings presented in chapter two (literature review and theoretical framework).

### 4.1 The perceptions of both teachers and students towards the use of WhatsApp audio in the classroom

This study found out that there are many perceptions of both teachers and students towards the use of WhatsApp audio in the classroom. Some interviewed participants noted that the use of WhatsApp is essential in improving statistical students.

One of the participants alluded that:

*"Utilizing WhatsApp is an important tool as it allows for quick, informal audio explanations and feedback for students."*

Another female teacher participant posits that:

*"The use of WhatsApp audios is an important and creative method that can supplement written materials or in person lectures."*

A male teacher pinpointed that:

*"In as much as learning is concerned WhatsApp audios are significant in that it enables more personalized and interactive communication"*

A male A level student alluded that:

*"WhatsApp audios are essential because audios are more engaging and easier to follow than text"*

Another student stipulated that:

*"Personally I appreciate the personalized feedback and interaction with the instructor and convenient to access audio lessons on the go via mobile devices."*

A female teacher was critical when he alluded that:

*"Even though the use of WhatsApp is important there is also concerns about maintaining professional boundaries and appropriate use of messaging apps."*

Another participant commented that:

*"Technical issues with audio quality, connectivity, or access for some students and time commitment required to record and send individual audio messages might be challenging."*

From the verbatim above, it can be noted that there are many potential benefits and potential challenges towards the perceptions of both teachers and students towards the use of WhatsApp audio. The researcher noted that that there was an agreement towards the use of WhatsApp audio as it can improve the learning of statistics among the students.

### 4.2 The effectiveness of using WhatsApp audio in enhancing student engagement and understanding of statistical concepts

The researcher found out that WhatsApp audio is effective in enhancing student engagement and understanding statistical concepts. Most of the participants agreed that through the use of audio there is improved accessibility and flexibility.

#### 4.2.1 Improved accessibility and flexibility

Improved accessibility and flexibility was found out to be one of the effective way of utilizing WhatsApp audio recordings in enhancing understanding statistical concepts. One of the participants posits that:

*"The asynchronous nature of WhatsApp audio recordings can provide students with increased accessibility and flexibility in accessing learning materials"*

Another participant was of the view that:

*"Students can listen to the audio lessons at their own pace, revisit concepts they find challenging, and engage with the content at their convenience, which can foster better understanding of statistical concepts"*

From the findings above it was noted that improved accessibility and flexibility is an important evidence to show that the use of WhatsApp audio recordings are crucial and effective in enhancing understanding of statistical concepts. This concurs with Bouhnik and Deshen (2024) who noted that the asynchronous nature of WhatsApp audio recordings can provide students with increased accessibility and flexibility in accessing learning materials.

#### 4.2.2 Enhanced engagement and motivation

The effectiveness of WhatsApp audio recordings was highly appreciated through enhanced engagement and motivation. One participant pinpointed that:

*"The use of WhatsApp audio has been associated with increased student engagement and motivation in learning statistics"*

Another respondent noted that:

*"The personalized nature of audio recordings, where instructors can provide personalized explanations and feedback, can make the learning experience more engaging and meaningful for students."*

From the findings above it can be noted that the use of WhatsApp audio recordings is crucial as it enhance enhanced engagement and motivation when learning statistics. This is supported by Army (2014) who posits that the use of WhatsApp audio has been associated with increased student engagement and motivation in learning statistics

### 4.2.3 Improved comprehension and retention

One participant from a focus group discussion alluded that:

*"The auditory modality can be particularly effective for learning and retaining statistical concepts, as it can complement the visual representations and mathematical formulas typically used in statistics instruction"*

Another participant stipulated that:

*"The ability to repeatedly listen to audio recordings can help students better internalize and apply statistical principles and techniques."*

### 4.2.4 Bridging learning Gaps

One female participant postulated that:

*"WhatsApp audio can be used to address the diverse learning needs and preferences of students, particularly those who may struggle with traditional lecture-based or text-based learning"*

Another participant was of the view that:

*"The personalized and on-demand nature of audio recordings can help cater to students with different learning styles, such as auditory learners, and provide additional support for those who need reinforcement or clarification of statistical concepts"*

Research findings indicated that the use of WhatsApp audio recordings is effective in enhancing student engagement and understanding of statistical concept since they are able to bridge learning gap. WhatsApp audio can be used to address the diverse learning needs and preferences of students, particularly those who may struggle with traditional lecture-based or text-based learning (Bouhnik & Deshen, 2014; Prasad & Rao, 2019).

## 4.3 Recommendations for enhancing the integration of WhatsApp audio in statistics education at the A level.

The researcher found out that there are various recommendations for enhancing the integration of WhatsApp audio in statistical education at A level. These include instructional design and integration, content development and delivery, accessibility and flexibility, feedback and evaluation, collaborative and social learning and faculty development and support.

### 4.3.1 Instructional design and Integration

One participant alluded that:

*"It is essential to ensure that the use of WhatsApp audio is strategically integrated into the overall instructional design and learning activities"*

Another participant commented that:

*"I suggest that there should be an alignment of audio recordings with specific learning objectives, concepts, and problem-solving exercises to create a cohesive learning experience. Provide clear guidelines and instructions to students on how to effectively use the WhatsApp audio resources and integrate them with other learning materials"*

From the research findings above it can be noted that instructional design and integration is an important recommendation for enhancing the integration of WhatsApp audio in statistics education at the A level. This is supported by Bouhnik & Deshen, (2014) who pinpointed that ensure that the use of WhatsApp audio is strategically integrated into the overall instructional design and learning activities.

### 4.3.2 Content development and delivery

One participant from a focus group discussion stipulated that:

*"Develop high-quality audio recordings that provide clear, concise, and engaging explanations of statistical concepts and problem-solving strategies"*

Another participant recommended that:

*"Encourage instructors to use a conversational tone, provide relevant examples, and address common student misconceptions in the audio recordings. Incorporate interactive elements, such as guiding questions or pauses for student reflection, to promote active engagement and learning."*

From the research findings it can be noted that content development and delivery is a recommendation that can be utilized for the enhancement of integration of WhatsApp audio in statistics education at the A level. This concurs with Prasad and Rao (2019) who argued that develop high-quality audio recordings that provide clear, concise, and engaging explanations of statistical concepts and problem-solving strategies.

### 4.3.3 Accessibility and flexibility

One of the participants in an interview argued that:

*"It is essential to ensure that the WhatsApp audio recordings are readily accessible to all students, including those with diverse learning needs or limited access to technology"*

A female respondent lamented that:

*"It is crucial to provide alternative options, such as transcripts or subtitles, to cater to students with different preferences or accessibility requirements"*

The researcher found out that the use of WhatsApp audio recordings should be accessible and flexible to all the students. This is supported by Bouhnik and Deshen (2014) who noted that they should encourage students to use the audio recordings at their own pace, revisit them as needed, and integrate them with other learning resources, such as textbooks or online materials. Ensure that the WhatsApp audio recordings are readily accessible to all students, including those with diverse learning needs or limited access to technology.

### 4.3.4 Feedback and Evaluation

One participant from a focus group discussion posits that:

*"Implement mechanisms for students to provide feedback on the effectiveness and usability of the WhatsApp audio resources"*

Another participant noted that:

*"Analyse student performance data, such as quiz scores or assignment grades, to assess the impact of the audio recordings on student understanding and learning outcomes"*

A female participant commented that:

*"Use the feedback and performance data to continuously refine and improve the design and delivery of the WhatsApp audio resources."*

### 4.3.5 Collaborative and social learning

One participant commented that:

*"Encourage students to share their own audio recordings of problem-solving strategies or discussions, fostering peer-to-peer learning and the exchange of diverse perspectives*"

Another participant was of the view that:

*"Facilitate group discussions or study sessions where students can collectively listen to and discuss the audio recordings, promoting active engagement and knowledge sharing."*

From the research findings it can be noted that collaborative and social learning are also important recommendations for enhancing the integration of WhatsApp audio in statistics education at the A level. This is supported by Al-Jundi et al., (2021) who suggested that it is important to explore opportunities for students to engage in collaborative learning activities using WhatsApp audio.

### 4.4 Chapter Summary

The research results collected from the interviews and focus group discussions were discussed in this chapter. The findings were discussed in relation to the literature review.

# CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

## 5.0 Introduction

This chapter serves to present a summary of findings from a study that sought to explore on the impact of urban transport system on commuters. The findings of the study were utilized to make conclusions and inferences in relation to issues observed. Recommendations were also offered integral the impact of urban transport system on commuters.

## 5.1 Summary of findings

This study find out that there are many perceptions of both teachers and students towards the use of WhatsApp audio in the classroom.

This study find out that there are many perceptions of both ansd teachers and students towards the use of WhatsApp audio in the classroom. Some interviewed participants noted that the use of WhatsApp is essential in improving statistical students. It can be noted that there are many potential benefits and potential challenges towards the perceptions of both teachers and students towards the use of WhatsApp audio. The researcher noted that that there was an agreement towards the use of WhatsApp audio as it can improve the learning of statistics among the students

The study also found out that WhatsApp audio is effective in enhancing student engagement and understanding statistical concepts. Most of the participants agreed that through the use of audio there is improved accessibility and flexibility. Notably, the improved accessibility and flexibility is an important evidence to show that the use of WhatsApp audio recordings are crucial and effective in enhancing understanding of statistical concepts. The effectiveness of WhatsApp audio recordings was highly appreciated through enhanced engagement and motivation. The use of WhatsApp audio recordings is crucial as it enhance enhanced engagement and motivation when learning statistics. The use of WhatsApp audio has been associated with increased student

engagement and motivation in learning statistics. It has been noted that WhatsApp audio recordings are effective as they bring comprehension and retention to the students. Research findings indicated that the use of WhatsApp audio recordings is effective in enhancing student engagement and understanding of statistical concept since they are able to bridge learning gap. WhatsApp audio can be used to address the diverse learning needs and preferences of students, particularly those who may struggle with traditional lecture-based or text-based learning.

The researcher found out that there are various recommendations for enhancing the integration of WhatsApp audio in statistical education at A level. These include instructional design and integration, content development and delivery, accessibility and flexibility, feedback and evaluation, collaborative and social learning and faculty development and support. It can be noted that instructional design and integration is an important recommendation for enhancing the integration of WhatsApp audio in statistics education at the A level. It can be noted that content development and delivery is a recommendation that can be utilized for the enhancement of integration of WhatsApp audio in statistics education at the A level.

### 5.2 Conclusion

This study find out that there are many perceptions of both teachers and students towards the use of WhatsApp audio in the classroom. The use of WhatsApp is essential in improving statistical students. It can be noted that there are many potential benefits and potential challenges towards the perceptions of both teachers and students towards the use of WhatsApp audio

The study also concluded that the use of WhatsApp audio in enhancing student engagement and understanding is effective. As a result the research findings concluded that Bridging learning Gaps, Improved comprehension and retention, Enhanced engagement and motivation, improved

accessibility and flexibility are the factual evidence that shows the effectiveness of WhatsApp audios.

Notably, from the research findings it has been found out that there are various recommendations for enhancing the integration of WhatsApp audio in statistical education at A level. These include instructional design and integration, content development and delivery, accessibility and flexibility, feedback and evaluation, collaborative and social learning and faculty development and support. It can be noted that instructional design and integration is an important recommendation for enhancing the integration of WhatsApp audio in statistics education at the A level. It can be noted that content development and delivery is a recommendation that can be utilized for the enhancement of integration of WhatsApp audio in statistics education at the A level.

**5.3 Recommendations**

- Future studies should assess the impact of using WhatsApp audio on students' learning outcomes in statistics courses. This could involve comparing the academic performance, comprehension, and retention of concepts between students who used WhatsApp audio and those who did not.

- Researchers should evaluate the usability and accessibility of WhatsApp audio for advanced-level statistics students. This may include factors such as ease of use, integration with course materials, availability of features, and accessibility for students with disabilities.

- Conducting interviews, focus groups, or surveys with students and instructors can provide valuable qualitative insights into the perceived benefits, challenges, and overall experiences of using WhatsApp audio for statistics education.

- Future studies could explore how WhatsApp audio can be leveraged in different contexts, such as for remote or blended learning, individual tutoring, peer-to-peer discussions, and office hours.

- Research is needed to understand the factors that influence the adoption and implementation of WhatsApp audio by instructors and institutions. This could include exploring barriers, motivators, and best practices for integrating this technology into the teaching and learning of statistics.

- It would be helpful to compare the use of WhatsApp audio with other audio or video technologies, such as pre-recorded lectures, podcasts, or video conferencing, to understand the relative strengths and weaknesses of each approach for statistics education.

- Future studies could investigate the feasibility and benefits of integrating WhatsApp audio functionality within learning management systems (LMS) used in advanced-level statistics courses.

- Longitudinal studies are needed to understand the long-term impact of using WhatsApp audio on student engagement, retention, and academic performance in statistics. Additionally, research is required to assess the scalability of this approach for larger class sizes or across multiple institutions.

- Examine Ethical and Privacy Considerations: Researchers should address the ethical and privacy implications of using WhatsApp audio for educational purposes, such as data privacy, security, and the appropriate use of student information.

Based on the findings from future studies, researchers should aim to develop best practices and guidelines for the effective use of WhatsApp audio in the teaching and learning of statistics at the advanced level.

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## APPENDIX B: INFORMED CONSENT FORM

SAMED

P Bag 1020
BINDURA
ZIMBABWE

Tel: 0271 - 7531 ext 1038
Fax: 263 - 71 - 7616

BINDURA UNIVERSITY OF SCIENCE EDUCATION

Date: 09/04/24

TO WHOM IT MAY CONCERN

NAME: TAGARIRA FAINA REGISTRATION NUMBER: B2255068

PROGRAMME: HB PART: 2:2

This memo serves to confirm that the above is a bona fide student at Bindura University of Science Education in the Faculty of Science Education.

The student has to undertake research and thereafter present a Research Project in partial fulfillment of the programme. The research topic is:

In this regard, the department kindly requests your permission to allow the student to carry out his/her research in your institutions.

Your co-operation and assistance is greatly appreciated.

Thank you

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