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VISION 2030: VIRTUAL REALITY AND TECHNOLOGICAL APPROACHES IN ART MUSIC EDUCATION IN NIGERIA

Abstract

*As we approach the year 2030, we envision a future where technological advancements are seamlessly integrated into art music education in Nigeria. Although most music educators have been slow to adopt technological approaches in art music education, music educators are pictured to be technologically inclined to be able to explore the technological world and implement these technologies in music teaching, learning and research by the year 2030. What are these technological approaches and how can they be deployed in art music education in Nigeria? Can virtual reality technological conceptualization and formulation be attained in art music education in Nigeria in the year 2030? These are some of the issues this paper attempts to wrestle with and interrogate in the concept of Vision 2030. A mixture of research methods was employed in *eliciting data presentation to cover diverse streams of industry experts*. Research methods adopted were interviews, library sources, and the use of the internet, empirical experiences and participants' observations. Research findings reveal that there are excellent potentials in the use of technology in art music education in Nigeria by the year 2030. This paper recommends the adoption of these technological teaching tools within the music programme as a teaching practicum assessment, as well as a progressive training component for both students and music educators. Integration of these approaches as part of the vision 2030 can ensure that art music education remains innovative, impactful, relevant, engaging, and accessible to all students and aid in proffering solutions to societal needs and challenges in the years to come.*

Key words: Virtual reality, technology, musical software, musical app, art music education.

Introduction

Like many other African countries such as South Africa, Ghana and Kenya, Nigeria has a rich cultural heritage in art music education. However, some institutions in Nigeria have been slow to adopt technological approaches in art music education. This is envisioned to change with the implementation of Vision 2030, a plan to transform Nigeria into a knowledge-based economy by 2030. Consequently, by integrating relevant musical technology in art music education, this will enhance creativity and improve musical skills of students and educators to explore with other

professionals and music enthusiasts across the globe. In education, however, there are different types of technological approaches to support innovation in art music education. Virtual reality (VR) and augmented reality (AR) are undoubtedly transforming music education. Whether being interested in learning how to play the guitar, piano, drums, or any other musical instrument, there are relevant VR or AR-powered applications to help in the development of students' musical skills.

There are different types of musical software and apps that can provide support to the music pedagogical process, such as *Earmaster*, *Bandlab*, *Solfeg*, *Starmaker*, *Noteflight Learn*, *SmartMusic*, *Ableton Live*, *GarageBand*, *Noteworthy*, *Finale*, *Sibelius*, *Cubase*, and many more. Some features of these music technologies enable seamless collaboration between musicians, producers, and professional audio engineers, regardless of their locations. These musical software and apps are envisioned to lead to more innovative ways of teaching and learning of art music education in Nigeria by 2030, and thereby paving way for the students to excel technologically and musically in the future.

In the context of contemporary, and following the trends of 21st century, adopting and integrating technological approaches that are relevant in art music education needs to be explored for the advancement of music education. To this, Nwankpa et al. (2017) envisioned that technological advancement in music education should be embraced in every facet of education, adding that although “the use of technology in music education is not aimed at taking over live performance or playing of musical instrument, singing, scoring and analysis of music with machines, it aids and assists to nurture investigations and improvement in music education” (p. 36).

In buttressing the observation above on technology in music education, it is important to note that technology is meant to assist art music education rather than viewing technology as replacing human interaction and creativity. It is worth noting that applying technology in art music education serves as a tool to solve musical problems, improve the process of music learning, and enhance human life in shaping the modern world of art music education. Nonetheless, technology has been changing the way musicians produce and compose music and has also created more opportunities to enhance the teaching/learning process as opined by Freedman (2017) in Maharaj and Gill (2023).

The thrust of this article is, therefore, that Vision 2030 should enhance teaching, learning and research capability through technological approaches and innovations in art music education in Nigeria. What are these technological approaches and how can they be deployed in art music education in Nigeria? Can virtual reality and technological approaches be attained in art music education in Nigeria in the year 2030? These are the issues this paper attempts to interrogate. This paper defines conceptual terms, stating the problem, methodology and theoretical framework, technological approaches in art music education, musical software and musical apps relevant to art music education, integrating music technology in art music education, challenges and solutions of incorporating technological approaches in art music education.

Statement of the Problem

COVID-19 pandemic wreaked mayhem on educational sector, making physical contacts near impossible between the teachers and the taught, as well as the administrators. Some technological devices such as online technology and zoom, telegram, YouTube and other platforms were employed during that era to sustain the teaching and learning in various institutions. Nweke (2022) also shared a similar thought when she observed that:

The horrendous experience brought upon the world by the deadly COVID-19 pandemic did not only wreak havoc in the economic sectors and health sectors, it also affected the educational sectors. Teaching and learning came to a halt at some point as students were made to sit at home. Some schools, after a while, started online virtual classes; different platforms were therefore used to achieve this purpose, such as Google classroom, Edmodo, telegram, YouTube, LMS, Microsoft team, zoom classroom, and so on (p. 469).

While appraising the use of these online classes and platforms from Nweke's account, it became obvious that these technologies served as assistance towards a continuous and seamless educational engagement. Hence, the questions now are, are these technologies now integrated in art music education? Did they serve their purpose during the COVID-19 era and went into extinction?

According to the hypothesis of Nweke (2022), analysis revealed that most of these platforms were not favorable which was attributed to Nigeria being a developing country. Sudden introduction of a digital lecture format, irrespective of the circumstances surrounding its use, was a contributing factor to poor acceptance of the virtual classes, thereby resulting in poor performance. It also stated further that Creative Art students preferred physical classes over virtual classes, due to the challenges as well as the nature of mobile network. Poor network and poor power supply were challenges that affected the usage of these platforms. Having a stable network to be online without any incessant fluctuations will be of great achievement in exploring these technological approaches in the future.

On the contrary, when issues of technological advancement are brought to view, a typical Nigerian usually has the concern that these technologies are coming to replace or take over the traditional methods associated with musical pedagogy, live performance, singing, playing of musical instruments and so on. The resistance to incorporating technological approaches in art music due to a preference for traditional methods or a fear of technology replacing human music interaction, emotion and musical creativity is a challenge that should be examined. Although this is not the situation as observed in Nweke's account, some of these technological tools helped and assisted to some extent in breaking the distance barriers. Consequently, it is imperative to get involved with the trends in technology, a development which has propelled the reshaping of art music education delivery worldwide.

Definition of Conceptual Terms

Some of these technological terms are defined for proper understanding. These include Virtual Reality (VR), Augmented Reality (AR), Artificial Intelligence (AI), Sound Beam, musical software, musical applications, interactive whiteboards, and digital audio workstations. These provide music learning experiences and innovative instructions capable of engaging the students

while supplementing traditional teaching methods. Virtual reality (VR) refers to a computer-generated simulation of a three-dimensional environment that can be interacted with and explored by a person using special electronic devices, such as a headset with a screen or gloves with sensors. It immerses the user in a simulated world, providing a sense of presence and allowing them to experience and interact with the virtual environment as if it were real. VR can be used for various purposes, including education, therapy, gaming, entertainment, and simulation of real-world scenarios (www.esade.edu).

Technology deals with the application of scientific knowledge and tools to solve problems, improve efficiency, and enhance human life. It includes a wide range of tools, techniques, systems and devices that are designed to fulfill specific purposes. Technology can be found in various fields such as communication, transportation, medicine, education, entertainment, and many others. It plays a crucial role in shaping the transforming societies, economies, and cultures.

Musical software refers to computer programmes or applications that are designed for creating, editing, recording, and playing of music. These software tools can range from simple programmes for composing melodies to complex digital audio workstations (DAWs) that allow for professional-level music orchestration and production. Musical software can include virtual instruments, synthesizers, sequencers, audio editors, and various effects processors, it enables musicians, producers, and composers to create, manipulate, and arrange musical elements digitally, often using MIDI (Musical Instrument Digital Interface) technology. Some popular musical software includes *Ableton Live*, *GarageBand*, *Pro Tools*, *Logic Pro*, *FL studio*, *PreSonus Studio*, *Bandlab*, *Noteflight Learn*, and *SmartMusic*, among others.

A musical app is software designed for creating, editing, and playing music on mobile devices or computers. These apps often include features such as virtual instruments, MIDI support, recording capabilities, and various audio effects. They allow users to compose, produce, and share their music easily, making it accessible to a wide range of musicians and music enthusiasts. Some popular musical apps include *StarMaker*, *tonestro*, *MuseScore*, *Earmaster*, *Solfeg*, *SoundCloud*, *FL Studio Mobile*, *Spotify*, *Deezer*, *Pandora*, and many more.

Music education refers to the teaching and learning of music, typically in a formal setting such as schools or music conservatories. It involves the study and practice of various aspects of music, including theory, history, composition, performance, practical skills and appreciation. Music education aims to develop musical skills, knowledge, and understanding in individuals, fostering their creativity, expression, and appreciation for music. It can be provided through various methods, such as classroom instruction, ensemble participation, private lessons, and extracurricular activities.

Art music education deals with the teaching and learning of music in a formal educational setting, such as schools, colleges, or conservatories, focusing on developing students' knowledge and skills in various aspects of music, including music theory, history, composition, performance, and appreciation. Art music education aims to foster creativity, critical thinking, and a deep understanding and appreciation of different genres and styles of music. It often

includes practical instruction on playing musical instruments, singing, and ensemble performance, with opportunities for students to engage in music-making and artistic expression.

Methodology and theoretical Framework

In eliciting data for this paper, a mixture of research methods was employed, including library search for relevant literature, interviews on field perspectives, the use of internet, and active participation observation in various music technologies relevant to music education that are used by the authors.

This article is based on the theory of Technology Acceptance Model (TAM) propounded by Davis in 1989. The Technology Acceptance Model (TAM) is an information systems theory that models how users come to accept and use a technology. The model affirms that when users are presented with a new technology, there are factors that influence their decision on how and when to use it. These influencing factors are behavioural intentions to use, attitude towards the system and perceived usefulness of the system, perceived ease of use of the system, individual intentions and facilitating or organization conditions. Technology Acceptance Model (TAM) is the most influential extensions of Ajzen and Fishbien's Theory of Reasoned Action (TRA) in the literature. Davis hypothesized that the attitude of a user toward a system was a major determinant of whether the user will actually use or reject the system. The attitude of the user, in turn, was considered to be influenced by two major beliefs: perceived usefulness and perceived ease of use which has a direct influence on perceived usefulness.

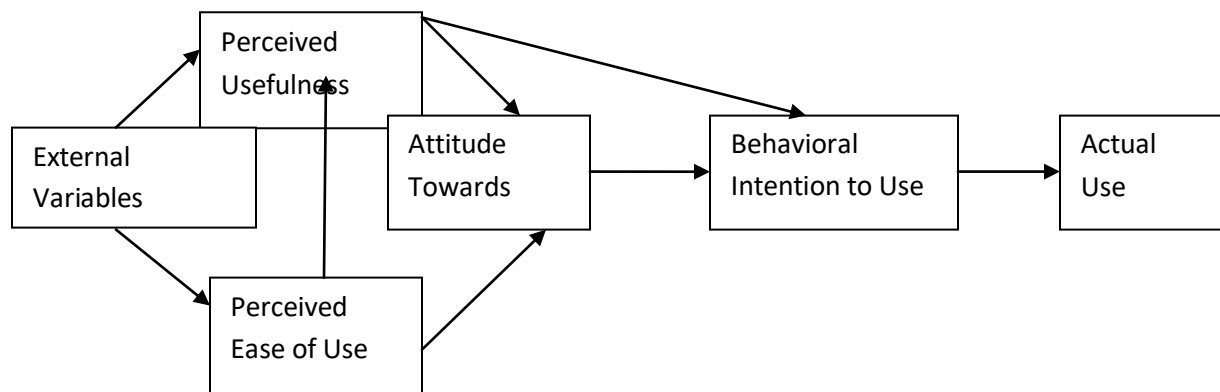


Figure 1. Original technology acceptance model (TAM) (Davis, 1989).

According to Davis, Perceived usefulness (PU) element, as defined above, is relevant to the study because students believe that using a computer system connected them to internet. Using mobile phones and other electronic devices to search for information electronically enhances their academic activities than the physical methods of going to the library. Hence, students can read and search for information to do assignments and research faster with the use of technology.

Perceived Ease-Of-Use (PEOU) is another element in the theory that is relevant to the study. The ability of students to accept and use electronic machine devices will ease their usefulness of Digital Information Resources (DIRs), making learning easier to them as well as influencing their musical academic activities. The efforts to search information are reduced automatically

with the use of technology. The researchers adopted this theory because of its relationship to the problem under investigation of incorporating technological approaches in music education.

Technological Approaches in Art Music Education

Technological approaches in art music education have revolutionized the way students learn and engage with music. These approaches utilize various technological tools and platforms to enhance and provide innovative instruction that engages students through the development of new learning strategies. These musical technologies are essential to the pedagogical approach to music learning. Majority of these music education technologies are accessible, interactive, personalized for students and educators, easily downloaded, and inexpensive. Ekezie (2011) affirmed that,

Computer technology has brought in remarkable influence on almost every aspect of human life. On music, the influence of computer in both theory and practices is always clear. In the art of composition, computer has tremendously helped the composer. With the computer, the composer uses music software like Noteworthy, Finale, Sebelius, Cubase 5, Cakewalk, and Overture to write down and edit his music for the finale product. Because of the global nature of the world, computer with its unlimited resources has made it possible for music written or produced in one country to be heard, performed in another country without difficulties (p. 193).

In a similar vein, Waddell et al. (2019) in Maharaj and Gill (2023:4) postulated that the overall evolution of music education tools and technology is indicative of a few major trends:

- Music technology has evolved in such a way that it has pushed music toward becoming shareable on a larger scale. This can be evidenced in music and education tools like Soundtrap or Google Classroom as well as broader multimedia social platforms like YouTube.
- Music education tools that offer additional practice to supplement classroom learning with specific skills are now available. These tools have paved the way for more self-paced learning, allowing teachers to focus on other key skills.
- There are now newer media platforms, such as virtual reality and augmented reality that showcase potential for enhancing learning both in and outside the classroom. This is done by enhancing collaboration or offering immersive ways of engaging visual learners. The usage of these in music education is currently limited. However, it is noteworthy that major breakthroughs could spur innovations in the way teachers use media as a learning tool.
- Artificial intelligence applications may also act as supplements to teaching and learning. One of the common areas is in aural skills training apps where digital assistants can provide assignments or offer feedback to students at lightning speed. Current usage is also limited but may offer opportunities for innovation as the technology matures.

Hence, one of the most significant technological advancements in art music education is the use of digital music software, artificial intelligence and musical apps. These tools as cited above, allows students to compose, arranges, and produce music using virtual instruments and recording capabilities. Students can experiment with different sounds, create complex compositions, and

even collaborate with others remotely. This technology provides a hands-on and immersive experience, enabling students to explore their creativity and develop their musical skills. These music digital technologies have become so interwoven with today's culture and society that they provide opportunities for collaboration and musical performance which allow students to experience the collaborative nature of music making and thereby develop teamwork skills.

Another technological approach in art music education is the integration of online platforms and resources. Online music platforms offer a vast library of sheet music, recordings, tutorials, and interactive lessons that students can access anytime and anywhere. These platforms provide a wealth of educational materials, allowing students to learn at their own pace and styles. Additionally, online platforms often incorporate gamification elements, making the learning process more engaging and enjoyable for students.

Virtual reality (VR) and augmented reality (AR) technologies have also made their way into art music education. These technologies provide immersive and interactive experiences, allowing students to virtually visit concert halls, music studios, or historical music landmarks. VR and AR can also simulate playing different instruments, providing students with a realistic and hands-on learning experience. No doubt, these technologies enhance students' understanding of music theory, performance techniques, and historical context, making the learning process more engaging and memorable.

Furthermore, technology has enabled the development of online communities and forums dedicated to art music education. These communities bring together students, teachers and professionals from around the world, fostering collaboration, knowledge sharing, and mentorship. Students can receive feedback on their compositions, participate in virtual ensembles, and connect with like-minded individuals who share their passion for music. These online communities provide a supportive and inclusive environment for students to grow and develop their musical abilities.

Therefore, integrating these types of advanced software and apps into music education may open up new possibilities for students to explore their musical creativity, develop their music skills, and connecting with a global community of music enthusiasts, especially at the university level. This notion of the use of technology in music education programmes is echoed by Parasiz (2018) in Maharaj and Gill (2023) that;

Technology use in the field of music education has given a new perspective to the understanding of education. When the tools in music education are combined artfully with technology, this is powerful enough to provide an expanded education for music students and better equip them to enter the music world of the 21st century. In music education, thanks to technology applications, students are motivated and generally become more interested (p. 4).

Music educators should know that having the relevant technological software or apps can make a difference when learning new concept or practicing musical instrument. Whether you are just starting out or you are proficient, technology can still be of great assistance to teach the students

with a greater level of engagement and success. Mouza et al. (2012) in Maharaj and Gill (2023) posited that:

Teachers are no longer required to be the sole source of information but instead they guide students to access information and manage the learning process using digital tools. Educators at the university level must embrace this, as it has become an inevitable requirement that a teacher interested in guiding a student must be versed with technological developments in the field, as well as master and use the technology in the classroom and integrate it with pedagogical practice (p.6).

No doubt, using music technological approaches will complement traditional forms of teaching and learning, and this integration of technology into the art music education will provide a means to increase students' learning engagement.

Music Software and Apps Relevant to Art Music Education

Some technological resources relevant to art music education are yet to be explored. Some of these technologies have been mentioned above, and some are explained here for clarity. The musical software are:

- **BandLab for Education:** This is free online-based music production software that allows students and educators to create music, collaborate with other musicians and share their work. The software works on Windows, Chromebook, Android tablets and iPads. BandLab offers cloud storage for projects, making it easy to access and work on project from anywhere. Teachers can create their own classrooms, invite other classrooms for collaborative projects, and student can create their original music using their tracks or loops available in the software. It includes a multi-tracking editor, virtual instruments, and effect, allowing users to create professionals-quality recordings. The software also features built-in social network, and its users-friendly that is suitable for both beginners and experienced musicians.
- **SmartMusic (also known as MakeMusic Cloud):** This is a music learning website for students and teachers that feature a number of practice tools, musical accompaniment, and an expansive music library. Sight-reading builder was introduced which can be tailored for all types of ensembles and instruments. Teachers can track student progress, collect assignment, and provide feedback. Whether teaching band, choir, strings or general music, SmartMusic is a comprehensive teaching and learning tool that allows integration of technology into classroom www.smartmusic.com
- **Ableton Live:** www.ableton.com Is a popular digital audio workstation (DAW) software used for music production, live performance, and DJ. Some of its key features include a unique session view that allows for flexible and intuitive arrangement of clips, a powerful MIDI sequencing and editing system effective for creative manipulation of composition, a range of built-in audio effects and instruments, and seamless integration with hardware controllers. Ableton Live offers advanced automation and modulation capacities, making it a versatile tool for creative music production.
- **Logic Pro:** A professional digital audio workstation software designed for music production. It offers a wide range of features including multi-track recording, editing, mixing, mastering, and many more, everything from sketching your initial ideas to

producing polished final mixes. It has a vast library of virtual instruments, effects and loops that can be used to create music in various genres. Logic Pro also has advanced MIDI editing capabilities, automation tools, and a powerful mixer with flexible routing options. It supports third-party plug-ins and has a user-friendly interface that makes it easy to use for both beginners and professionals.

- GarageBand: This popular music production software is developed by Apple. It offers a range of features that make it a versatile tool for musicians and producers. Some key features include a wide variety of virtual instruments, such as keyboard, guitars, and drums, allowing users to create their own music. It features a simplified set of options that offers a range of audio effects and editing tools, enabling users to enhance and manipulate their recordings. GarageBand also supports MIDI, allowing users to connect external instruments and controllers for more advanced music production.
- PreSonus software offers a range of features that make it a popular choice among musicians and audio professionals. It provides a user-friendly interface, allowing for easy navigation and workflow. The software offers high quality audio recording and editing capabilities, allowing for music production and composition. PreSonus software supports multi-track recording and mixing, making it suitable for both small-scale projects and larger productions. Additionally, it provides a comprehensive and versatile solution for audio production needs.
- Noteflight Learn: This software is designed for music education. It offers a range of features that make it an ideal tool for teachers and students. With Noteflight Learn, users can create, edit, and share music scores online. It provides a collaborative platform where students can work together on composition and receive feedback from their teachers. The software also includes a vast library of musical symbols and notation options, allowing users to create professional-looking scores. Overall, it offers integration with other music software and supports MIDI input and output. Noteflight Learn create community and private groups (<https://www.noteflight.com/premium>)

The music technological software mentioned above have opened up new possibilities for students to explore their creativity, develop their musical skills, and connect with global community of music enthusiasts. Software assists to inspire the students to grow as musicians and improve their overall performance. Some music technological apps are also part of the increase in exploring art music education. The following are some of the musical apps for consideration:

- EarMaster: This is a comprehensive music theory and ear training app that offers a range of features. It provides interactive exercises to improve musical skills, including rhythm, melody, harmony, and sight-reading. The app offers customizable training programs for beginners to advanced musicians. It includes a vast library of exercises and lessons, with the ability to create personalized exercises. EarMaster also provides detailed statistic and progress tracking to monitor improvement. With its users-friendly interface and extensive features, EarMaster is a valuable tool for musicians of all levels.
- Tonestro is a music learning app that offers a range of features to help students and teachers improve their music skills. The app provides a variety of exercises and lessons to help users learn to play their musical instrument, and also master their voice singing skills ranges from beginner level to professional level. It also includes tuner and metronome to help users stay in tune and keep time. Tonestro also offers a library of

sheet music and backing tracks to practice with. Additionally, the app provides personalized feedback and progress tracking to help users stay motivated and improve their playing.

- Solfeg is a music education app that offers several key features. It provides interactive lessons on music theory, ear training, sight-reading, catering to beginners and advanced learners alike. The app also includes vast library of sheet music and exercises to practice various musical skills. Additionally, Solfeg offers personalized progress tracking, allowing users to monitor their improvement over time. With its user-friendly interface and comprehensive content, Solfeg is an excellent tool for anyone looking to enhance their musical abilities.
- MuseScore is a popular app for music notation and composition. It offers a range of features that make it a valuable tool for musicians and composers. With MuseScore, users can create and edit sheet music, compose original pieces, and arrange existing music. The app provides a wide variety of instruments and sound samples, allowing users to hear their compositions come to life. It also offers playback and recording capabilities, as well as the ability to share and collaborate with others. Overall, MuseScore is a comprehensive and user-friendly app for all music enthusiasts.
- StarMaker is a popular karaoke app that offers a range of exciting features. It allows user to sing and record their favorite songs, with the option to add various audio effects and filters. The app also provides a vast library of songs from different genres and languages, ensuring a wide selection for users. Additionally, StarMaker offers the ability to collaborate with friends and other users, creating duets or group performances. Users can perform live on Starmaker, and can also share their recordings on social media platforms, making it a fun and interactive app for music lovers.
- Spotify is a popular music streaming app that offers a range of features to enhance the users experience. It provides access to a vast library of songs, albums, and playlists from various genres and artists. Users can create personalized playlists, discover new music through recommendations, and follow their favorite artists. The app also allows offline listening, enabling users to download songs and listen to them without an internet connection. Additionally, Spotify offers a social aspect, where users can share and collaborate on playlists with friends, and connect with artists through their profiles.
- Pandora is a popular music streaming app that offers several notable features. It provides personalized music recommendations based on users' preferences and listening history. It allows users to create custom radio stations by selecting their favorite artists, genres and languages. Additionally, it provides offline listening capabilities, ad-free options, and the ability to create and share playlists. Overall, Pandora offers a user-friendly interface and seamless music streaming experience.

This music technology app provides a comprehensive set of different features that cater to the needs of students, teachers, musicians, producers, and performers. Its versatility, flexibility and user-friendly interface make it popular choice for both beginners and experienced professionals in the music industry. The use of these technologies will help students learn music theory, practice their music instrument, and also compose their own music. These music technology programs can be used in the classroom or at home to supplement traditional music education.

Integrating Music Technology in Art Music Education

There are steps needed to incorporate these technologies in art music education to assist students and music educators to explore these tools for massive music creativity, and connect with a global community of music enthusiasts. The following steps should be able to serve as guide:

1. Identify the goals and objectives of integrating music technology in art music education, by determining what specific musical skills and music knowledge you want students and music educators to gain through the use of the technology.
2. Assess the available resources and technological tools. Research and explore various music technology options such as digital audio workstations, MIDI controllers, virtual instruments, music notation software, and recording equipment. Consider the budget and technical requirement for each tool.
3. Provide professional development for teachers. Offer training sessions or workshops to familiarize music educators with the selected technology tools. This will ensure that teachers have the necessary skills and confidence to effectively integrate technology into their lessons.
4. Develop a curriculum that incorporates the selected music technology. Design lesson plans and activities that integrate technology tools into the teaching and learning process. Consider how technology can enhance music composition, performance, analysis, and appreciation.
5. Create a supportive learning environment by setting up a dedicated space in the classroom for music technology, ensuring that all necessary equipment is easily accessible. Encourage collaboration and experimentation with technology among students.
6. Introduce students to music technology gradually. Start with simple musical activities and gradually increase the complexity as students become more comfortable with the music technology. Provide clear instructions and guidance to ensure students understand how to use the tools effectively.
7. Encourage creativity and exploration. Give students opportunities to experiment with different music technology tools and encourage them to explore their own musical ideas. Foster a sense of ownership and personal expression through music technology.
8. Provide opportunities for collaboration and performance. Use technology to facilitate group projects, ensemble performances, and virtual collaborations. This will allow students to experience the collaborative nature of music-making and develop teamwork skills.
9. Assess students' progress and provide feedback. Use a variety of assessment methods, such as performance evaluations, compositions portfolios, and music technology-based projects to measure students learning. Provide constructive feedback to help students improve their skills.
10. Reflect and adapt. Regularly evaluate the effectiveness of integrating music technology in art music education. Seek feedback from students, and other stakeholders to identify areas for improvement and make necessary adjustment to the curriculum and resources.

If these steps are achieved as part of vision 2030, then art music education in Nigeria will soar high within the global community and pave way for students, teachers, and Departments of Music to be recognized.

Challenges of Incorporating Technological Approaches in Art Music Education

It is worthy to note that every successful development or achievement is faced with challenges before it is achieved. To this effect, incorporating musical technology into art music education is expected to face some challenges capable of hindering the actualization of its goals. These challenges include:

- Access to technology: Not all Departments of Music and schools have access to the necessary technology and equipment required for incorporating music technological approaches in art music education. This can create a digital divide and limit the opportunities for students to engage with these approaches.
- Financial cost: Technology can be expensive, and schools may not have the budget to invest in the necessary equipment and software. This can hinder the implementation of technology approaches in art music education.
- Training and expertise: Teachers may not have the necessary training and expertise to effectively incorporate technology into their art music education curriculum. They may require additional professional development to understand how to use these music technologies and integrate it into their teaching practices.
- Integration with traditional methods: Incorporating musical technological approaches in art music education requires finding a balance between traditional teaching methods and new technological tools. It can be challenging to seamlessly integrate technology into the existing curricula and teaching practices.
- Technical issues: Technology can be unreliable and technical issues such as software glitches, hardware malfunction, or internet connectivity problems can disrupt the learning process. This can lead to frustration and hinder the effectiveness of incorporating technological approaches.
- Assessment and evaluation: Assessing and evaluating students learning and progress in a technological environment can be challenging. Traditional assessment methods may not be applicable, and teachers may need to develop new strategies to effectively evaluate student performance and understanding.
- Equity and inclusion: Incorporating technology in art music education may inadvertently create inequities if not all students have equal access to technology or if certain students face barriers in using the technology. It is important to ensure that technological approaches are inclusive and accessible to all students.
- Resistance to change: Some teachers, students and parents may be resistant to incorporating technological approaches in art music education due to a preference for traditional methods or fear of technology replacing human interaction and creativity. Overcoming this resistance and fostering acceptance can be a challenge.
- Pedagogical considerations: incorporating technology in art music education requires careful consideration of pedagogical approaches. Teachers need to ensure that technology enhances the learning experience and does not overshadow the artistic and creative aspects of music education.
- Power supply: One of the greatest challenges in educational engagement and research in Nigeria is grossly inadequate power supply. Institutions and research agencies run for

days without power supply. Often times they resort to power generating sets for a few hours. Technological advancement cannot be fully achieved under this condition.

Solutions to Incorporating Technological Approaches in Art Music Education

Every challenge has a solution when properly implemented will achieve the desired result in solving the problem at hand. Adhering to the suggested solutions will create the desired result and assist toward the vision 2030 of incorporating musical technological approaches in art music education in Nigeria.

- **Limited access to technology:** one of the challenges in incorporating technological approaches in art music education is the limited access to technology. Not all the Departments of Music and schools have access to the necessary equipment or software. To overcome this challenge, Departments of Music and schools can seek grants or funding to invest in technology resources, and also organized live performances to solicit funds. Additionally, partnerships with community organizations or local businesses can provide access to technology resources.
- **Cost implications:** The cost of technology can be a significant challenge for schools and students. Purchasing software, equipment, or maintaining technology infrastructure can be expensive. To address this, schools can explore cost-effective options such as open-source software or utilizing existing technological resources within the school. Additionally, schools can seek partnerships with technology companies or organizations that offer discounted or donated equipment.
- **Lack of teacher training:** Another challenge is the lack of teachers training in using technology for art music education. Many teachers may not be familiar with the latest software or equipment, or perhaps with the latest trends in music technological approaches. To address this, the school can provide professional development opportunities for teachers to learn and enhance their technological skills. This can include workshops, online courses, or collaborations with technology experts.
- **Integration with traditional teaching methods:** Incorporating technology in art music education can be challenging when trying to integrate it with traditional teaching methods. Teachers may struggle to find a balance between using technology and maintaining the core principles of music education. To overcome this challenge, teachers can use Tonestro, Starmaker and other interactive software and apps to blend technology with traditional teaching methods for music theory lessons, applied music, composition and others.
- **Technical difficulties:** Technical difficulties can arise when using technology in art music education, such as software glitches or connectivity issues. To address this challenge, schools can ensure that technology resources are regularly maintained and updated. Teachers can also have a backup plan in case of technical difficulties, such as alternative internet connection, or other activities or materials that can be used if technology fails.
- **Balancing screen time:** Incorporating technology in art music education may increase screen time for students, which can be a concern for some educators and parents. To address this challenge, teachers can incorporate technology in a balanced way, ensuring

that it complements and enhances hands-on music experiences rather than replacing them entirely. Additionally, teachers can encourage students to engage in offline activities, such as playing instruments or participating in group performances, to maintain a well-rounded music education experience.

- Resistance to change: Resistance to change is a common challenge when incorporating technology in any educational setting. Some teachers, students, or parents may be resistant to adopting new technological approaches in art music education. To overcome this challenge, schools can provide clear communication about the benefits of technology in music education, offer training and support to those who are hesitant, and showcase successful examples of technology integration in music education.

By the year 2030, it is the dream of music educators that every Department of Music will incorporate and master the use of these technologies which are relevant for effective music teaching, learning and research, and consequently for the development of the society. It is high time the various Departments of Music in our tertiary institutions lived up to the name 'Department of Music' by stepping up the relevant acquisition of technological know-how and manpower to ensure that art music education in Nigeria achieves its vision in 2030. By the year 2030, professional music enthusiasts will be able to collaborate with music students and educators through these virtual musical technologies, breaking the barriers of distance, and exploring Nigeria's cultural musical idioms.

Field Perspectives

The summary of Questions and Responses from the practitioners interviewed are presented below:

Q. In one statement, what is your vision of art music in 2030?

R. Vision 2030 provides bright prospects in art music education in Nigeria using technological tools with availability of steady power supply.

Q. Leveraging on the current spate of technological development, what do you envision to be the state of technology in art music Education in Nigeria by 2030?

R. With technological development, currently, and with more work and research going on, the following innovations show strong prospects:

- Screen-drop with imaginary writing surface
- Raising the bar in zoom teaching
- Increment of music composition through conceptualization and configuration of themes. In composition there are artificial intelligence (AI) models that compose, with computable data, which are inputted into the computer.
- Adaptation and usage of folk/cultural music for music education.
- Artificial intelligence (AI) attending to questions after physical or robotic lectures.
- Robotic Artificial Intelligence (RAI) would tend to be the lecturer's surrogates. However, the robotic AIs, although not humans to express emotions, can be programmed to feel emotions on a limited scope.
- Automated tuner, and advanced technology used in tuning the violin and other string instruments.

Through AI there would be collaborative efforts in music and fine arts through imaginative inputs of the students. Furthermore, it is projected that students would be better informed by 2030 through data-base development as they would not struggle to get information. Although the yearning for human touch or organic, physical relationship would continue to exist, technological advancements and artificial Intelligence will enable people to learn from institutions irrespective of their locations. Also, in line with modern research and rate of technological advancement, it is envisioned that by 2030 there will be more advanced innovations capable of aiding visually impaired composers, art music creators, and performers in realizing their dreams.

Furthermore, in 2030, it is envisioned that greater awareness would be on the efficacy of music therapy as an ally of medicine with such variegated technological instruments as Guided Imagery and Music (GIM), Soundbeam, Vibro-Acoustic Therapy (VAT) and Vibro-tactile Therapy and apparatus. Through technological approaches in art music education, Musictherapy would provide unique healthcare intervention through well organized therapeutic procedures, combining sound and music as in Cloud Cluster Sound Imagery (CCSI) for effective delivery of healthcare services (Nwankpa, 2013).

Additionally, it is envisioned that in 2030, there would be louder echoes of Africanism and innovations in contemporary art music compositions in Nigeria, reflective of cultural idioms in Nigerian music education, performance and scholarship (Nwankpa, 2022).

Conclusion and Recommendations

This paper examined the technological approaches in art music education in Nigeria as envisioned in 2030. It defined conceptual terms in relation to the study. The need for musical technological approaches in art music education was explained, and how these approaches utilize various technological tools and platforms to enhance and provide innovative instruction that engages students through the development of new learning strategies. Tips and features of selected popular music software and apps relevant to arts music education and steps to integrate them in music education were provided. Nonetheless, challenges that might be experienced while incorporating these technologies were identified, and solutions to these challenges were proffered.

These music technologies consisting of VR, AR, AI, Sound Beam, music software, applications, interactive whiteboards, digital audio workstations and other music learning experiences and applications provide innovative instructions that engage students while supplementing traditional teaching methods. This paper delved into the varied technological approaches and conceptualizations that could be adopted in art music education in Nigeria, highlighting their potential impacts on the future of music education. In eliciting data for this presentation, a mixture of research methods was employed in order to gather information from diverse streams, including interviews with industry experts, library search for relevant literature, the use of internet, and active participation observation.

We hereby submit that if these technologies are researched and incorporated in art music education in Nigeria, they will revolutionize the status in the global world and pave way for the students to rapport with professional musicians across the continents without distance being a

barrier. The adoption of these music technological teaching tools within the music programme will assist as teaching practicum assessment and a progressive training component for both students and music educators. By integrating these approaches, we are optimistic that art music education remains relevant, engaging, and accessible to all students in the years to come. This, in essence, is part of Vision 2030.

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