AWARENESS AND UTILIZATION OF ARTIFICIAL INTELLIGENCE IN TEACHING OF MUSIC EDUCATION AMONG MUSIC LECTURERS IN TERTIARY INSTITUTIONS IN NIGERIA.

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Abstract
It is no more news that technology has made the entire teaching and learning process easier and music education is not left out. One of such technological advancement is Artificial Intelligence (AI). Unfortunately, this advancement in technology which is common in developed countries cannot be said to be the same in underdeveloped or developing countries like Nigeria. Hence, this paper sought to investigate the level of awareness and utilization of artificial intelligence in teaching of music education among lecturers in tertiary institutions in Nigeria. The study adopted the descriptive survey design. The population of the study consisted of 326 music education lecturers of Federal Universities in Nigeria. The sample size for the study was 34 music education lecturers from six (6) Federal Universities in the six south-south states in Nigeria drawn using Multi-stage sampling procedure. An instrument named "AI Awareness and Utilization Questionnaire" (AI-AUQ) was used in the study. Factor analysis was used to validate the instrument while Cronbach Alpha was used in determining a reliability index of 0.84 for AI-AUQ. Administration of the instrument was done face to face with the help of three trained field assistants. Data collected were analyzed using item by item analysis, one-sample t-test and independent t-test. Findings revealed that there were significant awareness ($p=0.03<0.05$) of AI music applications among lecturers. Also, there was no significant level of utilization of AI application by lecturers ($P=0.20>0.05$). Finally, there was significant differences in the awareness level of male and female lecturers ($P=0.001<0.05$) as male lecturers were more aware of music related AI than females. Based on the findings, it was recommended among others that more orientation should be given to lecturers as well as more exposures on AI.
Keywords: Artificial Intelligence, Awareness, Utilization, Music Education

Introduction

Music education is a field of practice in which educators are trained for careers as elementary or secondary music teachers, school or music conservatory ensemble directors. To Adebiyi (2014, 12), it is also a research area in which scholars do original research on ways of teaching and learning music.
Music education in Nigeria has a rich history, with traditional music playing a significant role in the country's cultural heritage (Adebiyi, 2014, 16).It is evident that music education is taking place in schools and institutions across the world to varying degrees. The content and quality of that education also varies although the importance of music to children is widely recognized and acknowledged. Even though there may be some setbacks in some areas of music education, the fact remains clearly about the benefits music education to students of all ages.

Sylvanus (2018) observed that music is an integral part of Nigerian culture, with various traditional music styles and instruments with the traditional music often learned through apprenticeship, community, and family. However, the introduction of western music to Nigeria through colonialism, led to the establishment of formal music education programmers. Hence, music is taught in schools, from primary to tertiary levels though with limited resources, inadequate infrastructure, and a shortage of qualified music teachers (Sylvanus, 2018).According to Fagbile (2019), the current form of music education, however takes off from the Nigerian National Policy on Education in 1987, which states that "the Federal Government, realizing the importance of arts and culture in the development of science and technology, has given Arts and Cultural education their legitimate right in the nation's educational system from the primary, post-primary and post-secondary institutions with their educational goals clearly stipulated. Historically, Adebiyi (2014) argued that the teaching of music education especially in tertiary institutions began with the establishment of the FelaSowande's School of Music which was later renamed the Department of Music In 1960 in the University of Nigeria, Nsukka in Enugu state. Obviously, it is seen that music education is gaining popularity, with increasing demand for music programmmes and institutions. Based on this, the widespread calls for incorporating technology, such as music software and digital tools, is becoming more prevalent.

Fox, Vaidyanathan and Breese (2024) stated that with the increasing maturity of artificial intelligence (AI) technology, its application in the field of educational management has become an important way to improve the quality and efficiency of education. In particular, in music education management, the introduction of AI

technology has brought revolutionary changes to the traditional education model. The use of artificial intelligence in music education breached the conventional paradigm of music education, particularly electronic music and innovative music software in private colleges, which has significantly enhanced the standard of teaching music and the teaching model for music education (Fox et 'al, 2024). According to Sánchez-Jara, González-Gutiérrez, Rodríguez and Syroyid (2024), the integration of Artificial Intelligence (AI) in music education has the potential to revolutionize the way music is taught and learned.

Okpeki and Onyenye (2024).The integration of Artificial Intelligence (AI) in education has revolutionized the way teaching and learning occur. Music education, as a vital part of the curriculum in tertiary institutions, can benefit significantly from AI-powered tools and technologies. Nigeria's tertiary education system faces challenges such as limited resources, inadequate infrastructure, and a growing student population. The incorporation of AI in music education could potentially address some of these challenges by enhancing teaching effectiveness, personalizing learning experiences, and increasing student engagement. However, the awareness and utilization of AI in music education among music lecturers in Nigeria remain largely unexplored. Pachet, et al (2020) noted that the dream of using machines to compose music automatically has long been a subject of investigation, by musicians and scientists. Since the 60s, many researchers used virtually all existing artificial intelligence techniques at hand to solve music generation problems. However, little convincing music was produced with these technologies. A landmark result in machine music generation is the Illiac Suite, released to the public in 1956 (Carr, 2020). This piece showed that Markov chains of a rudimentary species (first order, augmented with basic generate-and-test methods)could be used to produce interesting music. However, the technology developed for that occasion lacked many fundamental features, to make it actually useable for concrete, professional musical projects. Notably, the experiment involved generate-and-test methods to satisfy various constraints imposed by the authors. Also, the low order of the Markovchain did not produce convincing style imitation. In spite of these many weaknesses, the Illiac suite remains today a remarkable music piece that can still be listened to with interest.Just like the Liliac using the Markov chain, the introduction of Artificial Intelligence (AI) has transformed the music industry, offering various tools for creation, production, and analysis. In terms of composition of music, there are AI powered tools like the Amper Music.

The Amper music is an AI music composition platform that allows users to create custom music tracks. Amper Music is a cloud-based, supervised AI/ML music creation tool that allows musicians and composers to develop music through a variety of inputs (Amper Music (2018).With the software, musicians define the objective function that the creation tool will solved by specifying parameters like mood, style, instrumentation, tempo, and song length. The software will produce content through Intelligence (AI) / Machine Learning (ML), at which point artists can modify the AI/ML generated content to produce unique, royalty-free content. Amper can also be accessed through existing Adobe software as a downloadable panel, further reducing artists' switching costs.

AIVA is also an AI-powered music composition tool that can create original music pieces. The tool was created in February 2016, AIVA specializes in classical and symphonic music composition. According to the AIVA (2016), it became the world's first virtual composer to be recognized by the Society of Music Authors, Composers and Editors(SACEM). The TF1 News (2017) which is a France leading TV group maintained that by reading a large collection of existing works of classical music (written by human composers such as Bach, Beethoven, Mozart) AIVA is capable of detecting regularities in music and on this base composing on its own. The algorithm Artificial Intelligence Virtual Artist (AIVA) is based on deep learning and reinforcement learning architectures. The "La musiqueClassique recompose (2017) also opined that since January 2019, the company offers a commercial product, Music Engine, capable of generating short (up to 3 minutes) compositions in various styles (rock, pop, jazz, fantasy, shanty, tango, 20th century cinematic, modern cinematic, and Chinese).

There is also the invention of the Flow machines. This is an AI-powered music composition tool that uses machine learning algorithms to generate music.The Flow Machines project aimed at addressing the core technical issues at stake when generating sequences in a given style. In some sense, it addressed the two main weaknesses of the Markov chains used in the Illiac Suite: the low order (and the poor style imitation quality) and the controllability, that is, the capacity to force generated sequences to satisfy various criteria, not captured by Markov model. More precisely, the main motivation for Flow Machines stemmed from the Continuator project. Pachet (2003) stated that the Continuator was the first interactive system to enable real-time music dialogues with a Markov model. The project was quite successful in the research community, and led to two main threads of investigation: jazz and music education. Jazz experiments were conducted notably with GyrgyKurtagJr and Bernard Lubat, leading to various concerts at the Uzeste festival (2000-2004) and many insights concerning the issues related to control (Pachet (2003). The education experiments consisted in studying how these free-form

interactions with a machine learning component could be exploited for early age music education. Promising initial experiments led to an ambitious project (the Miror project) about so-called "reflexive interactions". During this project, the Continuator system was improved and extended, to handle various types of simple constraints. An interesting variant of the Continuator for music composition, called MIROR-Impro was designed, deployed and tested, with which children could generate fully-fledged music compositions, built from music generated from their own doodling (Rowe, Triantafyllaki & Pachet, 2014). It was shown also that children could clearly recognize their own style in the material generated by the system (Khatchatourov, Pachet & Rowe, 2016), a property considered as fundamental for achieving reflexive interaction. Apart from using AI tools for the composition of music, there are other tools which aids in the production of music some of which include the LANDR, iZotope, Audioset among others.

LANDRAudio is a cloud-based music creation platform developed by MixGenius, an artificial intelligence company based in Montreal, Quebec. Hayes (2014) noted that since its launch with its flagship automated mastering service in 2014, LANDR has expanded its offerings to include distribution services, a music samples library, virtual studio technology (VSTs) and plug-ins, a service marketplace for musicians, and online video conferencing. LANDR is an AI-powered music mastering platform that uses machine learning algorithms to master audio tracks. Historically, MixGenius launched an automated mastering service in 2014 under the name LANDR, meant to represent the left and right audio channels. The engine, developed through several years, was built by analyzing thousands of mastered tracks and by doing research and analysis on the workflows of mastering engineers. The engine performs the standard mastering processes, such as equalization, dynamic compression, audio excitement or saturation, and limiting/maximizing (Hayes, 2014).
The company, now mainly referred to as LANDR Audio, continues to add services to their platform with the goal of bridging the gap between Do-it-Yourself (DIY) musicians and the professional music market under Chief Executive Officer (CEO) Pascal Pilon. LANDR has also created educational materials to help musicians improve their music production skills. Their educational content is disseminated through their blog, social media, and YouTube channel. Traditional music mastering is a post-production process by which a mastering engineer cleans up and normalizes an audio track to achieve a uniform and consistent master recording from which copies can be reliably made. The LANDR AI engine recreates this process to produce release-ready masters that conform to, both, physical and digital distribution quality standards. The LANDR engine analyzes uploaded tracks and creates a mastering chain catered to the style and genre of that track. Users can then use presets or choose to customize their masters using various settings and features. Users can also choose the file format of their final master or master in batches for consistent sound across multi-track releases. The engine offers various output formats, though Waveform Audio File Format (WAVs) are the standard choice for music distribution.

Apart from these, there are other technologies AI-powered technologies like iZotope which is a suite of AI-powered audio processing tools, including noise reduction, EQ, and compression. There is the "Audioset" which is a google-developed AI-powered audio processing tool that can analyze and process audio. In terms of production, Hayes (2014) also pointed to music analysis AI-powered technologies like the "Music Information Retrieval"- an AI-powered tools that can analyze music metadata, such as genre, mood, and tempo. The "Audio fingerprinting which is also an AI-powered tools that can identify and match audio tracks. The "Music recommendation"- another AI-powered music recommendation systems that suggest music based on user preferences. Others in terms of performance may include AI-powered instruments which uses AI instruments to generate music or enhance performance, the "Live performance tools which can analyze and respond to live music performances. It may also include the Lyrics generation- AI-powered tools that can generate song lyrics, Music visualization-AI-powered tools that can create visualizations based on music as well as the Music education tool which uses AI to provide music lessons, feedback, and analysis.

Additionally, Fox, Vaidyanathan and Breese (2024) stated that there are several music creation tools. Music creation tools include hardware and software to cater to the different needs and preferences of musicians, producers, and composers and to facilitate composition, production, recording, and editing of music. Music creation hardware and software can be categorized as follows: Digital Audio Workstations, audio plugins, and mobile apps- Ableton Live and FL Studio are examples of software platforms used for music production. Such software offers features such as MIDI sequencing, audio recording, mixing, and mastering. Audio Plugins, another software, enhances the functionality of Digital Audio Workstations by providing additional effects. Equalizers, compressors, reverbs, and synthesizers are examples of audio plugins. Waves, FabFilter, and Soundtoys are firms who produce popular plugins used by professionals worldwide. As musicians increasingly use smartphones and tablets, a number of popular music creation apps, such as GarageBand have also become popular. Hardware synthesizers and controllers- With the software, hardware becomes necessary. Several hardware synthesizers and MIDI controllers offer assistance with music creation. Roland, Moog, and Novation

produce synthesizers, drum machines, and MIDI controllers. Virtual instruments and sample libraries Firms such as Native Instruments and Spectrasonics are offering virtual instruments with libraries as samples for musicians to access various sounds and other effects for their compositions.

Based on these facts, Okpeki and Onyenye (2024) studied Awareness and Usage of Artificial Intelligence (AI) in Promoting Music Broadcast on Radio in Warri, Nigeria. Thus, the study establishes the extent to which the radio station in Warri, Nigeria has become AI compliant in relaying music. To determine the AI awareness level and extent of usage in music promotion on radio stations, the researcher conducted interview sessions using four (4) radio stations, forty-one (41) on Air Personalities (OAP). A Self Respondent Interview Research Instrument was administered via email contact. The study was guided by three (3) research questions. Data were analyzed with the aid of percentage calculation measure to decide the level of awareness and usage of the AI tools connected to music broadcast on radio. The study found that respondents show low level of awareness of significant AI tools and thus could not deploy AI technologies for broadcast of music.

Bludov (2024)surveyed 1,500 producers. It was revealed that 33.2% were aware and are impressed with AI tools, while 15.7% found them lacking. Looking ahead, 30.1% plan to try AI tools, but 21% show no interest. Notably, 25.76% are intrigued by future AI-powered mixing and mastering plugins. Deruty, et al (2022) wrote on the Development and Practice of AI Technology for Contemporary Popular MusicProduction. The researchers identified usage patterns as well as issues and challenges that arise in practical use of the tools. Based on this we formulate some recommendations and validation criteria for the development of AI technology for contemporary Popular Music.

The researcher has observed that despite the growing importance of artificial intelligence (AI) in education, there is a dearth of knowledge on the awareness and utilization of AI in teaching music education among music lecturers in tertiary institutions in Nigeria. The integration of AI in music education has the potential to enhance teaching and learning outcomes, but its adoption and effective use depends on the awareness, attitudes, and competencies of music lecturers. Unfortunately, with the literature reviewed so far, it is certain that no much study has been done on the level of awareness and uses of these AI tools by lecturers especially in tertiary institution. This had created a gap which the current study sought to fill. Hence, the present study aimed at investigating awareness and utilization of artificial intelligence in teaching of music education among music lecturers in tertiary institutions in Nigeria. Specifically, the objectives were to;

1. Investigate the level of awareness of AI music applications by music lecturers in tertiary institutions in Nigeria.
2. Investigate the level of utilization of AI music applications by music lecturers in tertiary institutions in Nigeria.
3. Investigate the influence of gender on the level of awareness of AI music applications by music lecturers in tertiary institution sin Nigeria.

The following research questions were also asked to guide the study;

1. To what extent is the level of awareness of AI music applications by music lecturers in tertiary institutions in Nigeria.
2. What is extent of utilization of AI music applications by music lecturers in tertiary institutions in Nigeria.
3. What is the influence of gender on the level of awareness of AI music applications by music lecturers in tertiary institutions in Nigeria.

The following hypotheses were also tested in the study;

1. There is no significant level of awareness of AI music applications by music lecturers in tertiary institutions in Nigeria.
2. There is no significants level of utilization of AI music applications by music lecturers in tertiary institutions in Nigeria.
3. There is no significance difference in the level of awareness of AI music applications by male and female music lecturers in tertiary institutions in Nigeria.

Methodology

The researcher in the study adopted the descriptive survey design. The population of the study consisted of 326 music education lecturers from Federal Universities in south-south Nigeria. The sample size for the study was 34 music education lecturers from six (6) Federal Universities in the six south-south states in Nigeria drawn using Multi-stage sampling procedure. The researcher used purposive sampling technique to select six conventional Federal Universities from the six states making up the south-south. After this, purposive sampling was also employed to focus on lecturers in music departments in these institutions. Non proportionate sampling technique was also used to draw six music lecturers in each of the institution. This gave a total of 36 respondents. The researcher developed an instrument titled “AI Awareness and Utilization Questionnaire” (AI-

AUQ) was used in the study. The instrument was designed or patterned after the 4–point Likert scale where a list of AI music tool are displayed in the four sub-section which seek to know the level of awareness. The second sub-section also sought to know the extent of utilization of AI music applications. The instrument also has a demographic section which indicates the gender of the respondents. Factor analysis was used to validate the instrument while Cronbach Alpha was used in determining a reliability index of 0.84 for AI-AUQ. This was achieved by issuing the questionnaire to 20 respondents who were not part of the target sample. After their response, the instrument was collected, collated and subjected to Cronbach Alpha analysis. Administration of the instrument was done face to face with the help of three trained field assistants. Data collected were analyzed using item by item analysis, one-sample t-test and independent t-test. From the items analysis, Nwankwo (2016) opined that the following depicts the extents of a Likert scale range: 0-1.0 (Very Low Extent),1.01-2.5 (Low Extent), 2.51-3.5= (High Extent), 3.51 &Above= (Very High Extent). The present study also based its range on the above.

Result

Research Question One: To what extent is the awareness of AI music applications by music lecturers in tertiary institutions in Nigeria.

Table 1; showing item by mean, standard deviation and criterion mean analysis of extent of awareness of AI music applications by music lecturers in tertiary institutions in Nigeria.

S/N	I have knowledge of the following Music AI tool	SA	A	D	SD	x̄	Std. D	Remark
1	LANDR	11	12	4	9	**2.69**	0.83	Agree
2	NoteFlight	9	5	14	8	**2.41**	0.77	Disagree
3	Music21:	15	13	3	5	**3.05**	0.93	Agree
4	Amper Music	17	10	5	4	**3.11**	0.82	Agree
5	Yousician:	7	15	3	11	**2.50**	0.81	Agree
6	Fender Play	12	8	4	12	**2.55**	0.77	Agree
7	Practice Guitar:	21	9	6	0	**3.41**	0.73	Agree
8	Mix Tutor	12	10	6	8	**2.72**	0.82	Agree
9	Artiphon	6	9	14	7	**2.38**	0.72	Disagree
10	Soundtrap	11	13	6	6	**2.80**	0.82	Agree
11	Musition	12	11	7	6	**2.80**	0.77	Agree
	Grand Mean					**2.76**		**High Extent**

***Note**: **0-1.0** (Very Low Extent), **1.01-2.5** (Low Extent), **2.51-3.5=** (High Extent), **3.51 & Above** = (Very High Extent)*

The analysis in the table reveals that items 1, 3, 4, 5, 6, 7, 8, 10 and 11 with mean values of 2.69, 3.05, 3.11, 2.50, 2.55, 3.41, 2.72, 2.80 and 2.80 respectively were agreed on because they were up to the criteria of 2.50. On the other hand, items 2 and 9 with mean values of 2.41 and 2.38 were disagreed on. This means that music lecturers are aware of LANDR, Music21, Amper Music, Yousician, Fender Play, Practice Guitar, Mix Tutor, Soundtrap as well as Musition AI applications. In all a grand mean of 2.76 was calculated. With the score range, it is seen that music lecturers are aware of AI music application to a high extent.

Hypothesis One: There is no significant level of awareness of AI music applications by music lecturers in tertiary institutions in Nigeria.

Table 2: shows one sample t-test analysis of the level of awareness of AI music applications by music lecturers in tertiary institutions in Nigeria.

Variables	N	Mean	Std.D	Df	T	Sig	Result
Awareness of AI	36	12.34	3.25	34	2.32	0.02	Significant (Reject Ho)

From the analysis in table 1, it is seen that the mean awareness level of lecturers is 12.34 with a standard deviation values of 3.25. The calculated t is 2.32 while the sig value is 0.02. Hence, since sig (P = 0.02 < 0.05) is less than 0.05 alpha, the null hypothesis is rejected meaning that There is a significant level of awareness of AI music applications by music lecturers in tertiary institutions in Nigeria.

Research Question Two: What is the extent of utilization of AI music applications by music lecturers in tertiary institutions in Nigeria.

Table 3; showing item by mean, standard deviation and criterion mean analysis of extent of utilization of AI music applications by music lecturers in tertiary institutions in Nigeria.

S/N	How often do you use the following AI Music tools?	SA	A	D	SD	x̄	Std. D	Remark
1	LANDR	7	3	16	10	**1.86**	0.83	Disagree
2	NoteFlight	6	4	9	17	**1.97**	0.77	Disagree
3	Music21:	2	4	13	17	**1.75**	0.93	Disagree
4	Amper Music	6	7	8	15	**2.11**	0.82	Disagree
5	Yousician	8	14	7	7	**2.63**	0.81	Agree
6	Fender Play	6	6	12	12	**2.16**	0.77	Disagree
7	Practice Guitar	4	9	14	9	**2.22**	0.73	Disagree
8	Mix Tutor	8	1	17	10	**2.19**	0.82	Disagree
9	Artiphon	3	2	14	17	**1.75**	0.72	Disagree
10	Soundtrap	4	6	12	14	**2.0**	0.82	Disagree
11	Musition	8	16	10	2	**2.83**	0.77	Agree
	Grand Mean					**2.13**		**Low Extent**

***Note**: **0-1.0** (Very Low Extent), **1.01-2.5** (Low Extent), **2.51-3.5=** (High Extent), **3.51 & Above** = (Very High Extent)*

The analysis shows that items 1, 2, 3, 4, 6, 6, 7, 8, 9 and 10 with mean scores of 1.86, 1.97, 1.75, 2.11, 2.16, 2.22, 2.19, 1.75, and 2.0 respectively were disagreed on because there were not up to the criterion mean score of 2.50. On the other hand, items 5 and 11 with mean values of 2.63 and 2.83 respectively were agreed on. This means that music lecturers are only aware of "Yousician and Musition" as AI application used in the teaching of music.

Hypothesis Two: There is no significant level of utilization of AI music applications by music lecturers in tertiary institutions in Nigeria.

Table 4: shows one sample t-test analysis of the level of utilization of AI music applications by music lecturers in tertiary institutions in Nigeria.

Variables	N	Mean	Std.D	Df	T	Sig	Result
Utilization of AI	36	4.32	5.14	34	1.48	0.23	Insignificant (Retain Ho)

From the analysis in table 4, it is seen that the mean utilization level of lecturers is 4.32 with a standard deviation values of 5.14. The calculated t is 1.48 while the sig value is 0.23. Hence, since sig (P = 0.23> 0.05) is greater than 0.05 alpha, the null hypothesis is retained meaning that There is no significant level of utilization of AI music applications by music lecturers in tertiary institutions in Nigeria.

Research Question Three: What is the influence of gender on the level of awareness of AI music applications by music lecturers in tertiary institutions in Nigeria?

Hypothesis Three: There is no significance difference in the level of awareness of AI music applications by male and female music lecturers in tertiary institutions in Nigeria.

Table 5; showing independent t-test analysis of difference in the level of awareness of AI music applications by male and female music lecturers in tertiary institutions in Nigeria

	Gender	N	$\bar{x}$	Std.D	T	A	Sig	Result
Awareness	**Male**	16	10.17	4.23	1.65	0.05	0.002	Significant
	Female	20	3.54	3.59				Reject H0

Table 4 review answers to research question three. The table indicates that male responding were 16 while female were 20. Their mean and standard deviation values were 10.17; 4.23 and 3.54;3.59 respectively. These mean values indicate that male music lecturers are more aware of AI Music tools than their female counterparts in tertiary institutions. The calculated t- value was 1.65 while the sig value of 0.02. Hence, since the sig ($p=0.002<0.05$) is less than 0.05 alpha, the null hypotheses is rejected meaning that there is a significance difference in the level of awareness of AI music applications by male and female music lecturers in tertiary institutions in Nigeria.

Discussion of Findings

Based on findings one, it is revealed that there is a significant level of awareness of AI music applications among music lecturers in tertiary institutions in Nigeria. This finding means that Music lecturers are knowledgeable about AI-powered music tools, such as composition, production, and analysis software. It also means that they have good understanding of AI's potential since they recognize the benefits and limitations of AI in music education, such as enhancing creativity, improving efficiency, or changing traditional music-making processes. Again, this awareness suggests that music lecturers might be open to incorporating AI music applications into their teaching practices, curriculum, or research and that awareness of AI music applications could lead to innovative teaching methods, enhancing student engagement and learning outcomes. The finding of the study is not surprising to the researcher because to the best of her knowledge, the problem with teaching music may not be lack of awareness of instructional materials but on its usability. The findings of the study is similar to that reported earlier by Okpeki and Onyenye (2024) who found significant level of awareness of AI music tools by music teachers.

From research finding two, it was reported that there is no significant level of utilization of AI music applications by music lecturers in tertiary institutions in Nigeria. The finding that there is no significant level of utilization of AI music applications by music lecturers in tertiary institutions in Nigeria is noteworthy. This implies that despite the awareness of AI music applications, the lack of utilization suggests that there are underlying issues that need to be addressed. Again, the possible explanation to this could be due to limited access to necessary resources, such as hardware, software, or internet connectivity. It could also be that music lecturers might not have received adequate training or support to effectively integrate AI music applications into their teaching and research. On the other hand, it could mean that some music lecturers might be resistant to adopting new technologies, preferring traditional methods and approaches. Finally, the absence of institutional support, policies, or guidelines might hinder the adoption and utilization of AI music applications. The finding of the study is expected by the researcher because the poor utilization could be due to the obvious lack of awareness and training as well as the fact that they might not have access to necessary hardware, software, or internet connectivity to utilize AI music applications. It could also be as a result of technical problems like as compatibility issues or software glitches, might discourage lecturers from using AI music applications. The findings of the study also is in line with that of Bludov (2024) and Derutyet'al. (2022) who reported poor level of usage of AI music tools.

From findings three, it is revealed that there is a significant difference in the level of awareness of AI music applications by male and female music lecturers in tertiary institutions in Nigeria. This finding suggests that gender plays a role in shaping awareness levels. The meaning to this is that societal and cultural norms might influence men's and women's access to technology, education, and career opportunities, leading to differences in awareness levels. Also, male music lecturers might have more exposure to AI music applications through their work, research, or personal interests, contributing to higher awareness levels and this may be accounted for by gender stereotypes and biases which may affect women's participation in music technology, leading to lower awareness levels. On the contrary, the findings of Okpeki and Onyenye (2024) reported earlier did not identify any differences in awareness level based on gender.

Conclusion

This study investigated the awareness and utilization of artificial intelligence (AI) in teaching music education among music lecturers in tertiary institutions in Nigeria. The findings revealed that while music lecturers have a significant level of awareness about AI music applications, there is a notable gap in their utilization of these tools. Additionally, there are significant differences in awareness levels between male and female music lecturers.

Recommendations

Based on the findings, the following recommendations are made;

1. Lecturers should continue to research on the best AI music applications in order to achieve more effectiveness in teaching music. Also, continuous awareness and sensitization should be sustained.
2. There should be targeted support for utilization like workshops, mentorship, and peer support to encourage lecturers to integrate AI music tools into their teaching practices.
3. Stakeholders should also address gender disparities by developing targeted initiatives to support female lecturers, such as training programs tailored to their needs, mentorship opportunities as well as resources and support to build confidence and skills in using AI music tools.

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