

Music Technological Applications in Music Education in Tertiary Institutions in Delta and Edo State, Nigeria



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ABSTRACT: This study focuses on music technological applications to music education in tertiary institutions in Delta and Edo States. The relevance of computer applications in music education has not received sufficient attention. It features some contributions of some scholars on relevant concepts, and empirical findings that have bearing to this study. It equally describes music technological applications, and its uses for music education. The methodology is a survey; the target population is made of students and lecturers of tertiary institutions in Delta and Edo States and involves the use of library research and internet services for relevant literature. The study indicates a few numbers of institutions that apply, and those that plan to apply computer applications to music education in the classroom. Some students express, that computer applications are interestingly engaging. However, majority of the students have not been exposed to computer applications for music education in the classroom. The study concludes that If few (20%) of the lecturers in Delta State University and College of Education, Ekiadolor and a lecturer from Ambrose Ali University could apply some music technological applications to teach. It implies that it is realistic and realisable. Therefore, all the lecturers should endeavour to undergo a self-development programme in their areas of specialization so that it will possibly achieve the same outcome. The study recommends that the yearly computer programme organized by the National commission for Colleges of Education and should relate to and reflect in their course areas.

INTRODUCTION

There is nothing more like active participation without music technological applications to music education. In support of this, Collins (1995) opines: “computer applications have the ability to enhance education because it involves active participation of students. This can reflect the individual needs and experiences of students. This approach has shown in general education literature to positively affect students’ learning” (p. 24). Rudolph (1996) also concurs that “as students are engaged with computer technology, they are bound to discover information more on their own. In addition, technology is an active medium for students and much of technology that are used in a music classroom can be purchased and utilized at home” (p. 21). Conversely, music technological applications have not been fully utilized in the process of learning music in the classroom. Music technological applications for music teaching/learning experiences are basically inventions that are interfaced with computer and devices such as hardware, music software, the internet, storage, hard disk, microphone, puff filter, Musical Instrument Digital Interface (MIDI), Sequencers, CD-ROMs, MP3 e. t. c. The utilization of these computer applications in music education work hand-in-hand with the general goals for computer aided education. In affirmation, Adedeji in Nmadu and Onwuekwe (2020), cites that “today, there is virtually no aspect of musical processes that is not realizable with the computer technology and the internet, including global music teaching, research, marketing, audio, and video recording, editing, mixing, mastering, harmonization and orchestration” (p. 235). According to Onuora-Oguno (2009) “computer applications make distant learning faster; transcription is made easier and neater. Transcribed works can be played back and corrections effected. Illustrations are now easier through power point presentation. Digital library and the use of the internet make research easier” (p. 9). In line with the above, Brando, Wiggins & Pain (2016) highlight that computer applications to music intend to “teach fundamentals of music, such as aural skills, audio and visual information pack. Musical performance applications skills, like pitch skills, rhythm training and feedback of performance, assist analysis of music, musical compositions skills” (p. 1). [Accessed June 26, 2018 from Gold.ac.uk>doc>papers]. All of these music technological applications among others enable the students to have a firm grounding and opportunities to explore musically as to spur musical creativity as in the music industry artists outside school.

In view of the above submissions, whilst there have been studies on the impact and relevance of music technological applications to music education, however, there has been lack of studies indicating that the tertiary institutions nationwide have embarked upon the implementation of computer applications to all round music teaching and learning. Students upon graduation are still finding it difficult to blend with the commercial music in the music industry. Adedeji, (2004) laments:

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Although Nigerian music scholars have contributed in no small measure to the development of music education at the global level through their compositions, research, writings and performances, the field is not progressing as such at home, as evidenced from a number of problems yet unsolved e.g. technological backwardness, the problem of notation, lack of systematized body of theory, lack of sufficient literatures, uncooperative attitudes among colleagues, low level of scholarship in terms of teaching and research and inequality which characterize the standard of regional academic activities (p. 2)

According to Boody in Nmadu, (2014) “the use of technology is suggested as a means of connecting students to meaningful ways; as a way of embracing relevant, existing form of learning related to constructive and a postmodern society” (p. 32). However, this is not to say that the traditional way of teaching /learning of music should entirely be laid outside, but rather be supported with music technological applications. It is on this premise that this study sets to unravel the status of computer applications usage in music education in the tertiary institutions that are offering music in Delta and Edo States.

PURPOSE OF THE STUDY

The purpose of this study is to investigate music technological applications to music teaching/learning in tertiary institutions in Delta and Edo States. The study is guided by the following specific objectives, to:

- i. find out the music technological applications that are used for music education in tertiary institutions in Delta and Edo States;
- ii. establish the need to teach and learn music with music technological applications in tertiary institutions in Delta and Edo States;
- iii. determine the accessibility of music technological applications to the students and music educators in tertiary institutions in Delta and Edo States;
- iv. ascertain the level of computer music software literacy of the students and music educators in tertiary institutions in Delta and Edo States; and
- v. find out the level of commitment of the government and tertiary institutions in the provision of equipment for computer applications to music education in the tertiary institutions in Delta and Edo States;

RESEARCH QUESTIONS

The study is guided by the following research questions:

1. What are the music technological applications used for music education in tertiary institutions in Delta and Edo States?
2. What is the relevance of music technological applications to music education in tertiary institutions in Delta and Edo States?
3. How accessible is music technological applications to the students and the music educators in the tertiary institutions in Delta and Edo States?
4. What level of computer music software literacy do the students and lecturers have?
5. How committed are the government and tertiary institutions in the provision of equipment for music technological applications to music education in tertiary institutions in Delta and Edo States?

The Operational Definition of Terms

The conceptual definitions are based on the following terms, music technological applications, music education.

MUSIC TECHNOLOGICAL APPLICATIONS

In the researcher’s view point, music technological applications are list of inventions associated with computer and devices such as notable music software, hardware, internet, storage devices and others for facilitating teaching and learning in all aspects of music. The applications are installed into the computer mainly to assist learning for music composition, performance, theory, history, recording, editing, analysing, and a host of others. Kessler and Howe in Douglas (2009) briefly characterize computer software as “replacements for conventional human musical activities, an akin to the more general writings of the media theorist” (p. 12). In line with the above, edutechwiki.unige./en/music_education_technology assents:

There exists some specific music software; these are applications that use the MIDI connection between your instrument and computer to help you learn different aspects of music. A music-reading programme may display note, chord, or passage on the screen; you play the displayed notes on the digital piano and the software keeps track of your accuracy and helps you improve. An ear-training application may play for you an interval that you then try to play yourself on the keyboard. The application will tell you what you did right or wrong and help you improve your ear. Other types teach music history and music theory. While many of these applications are geared to specific levels as you progress, or for use by multiple players thematic cataloguing, input and output music writing, recording and reproducing music, musical analysis, musical composition and sound processing. (p. 3). [Accessed July 20, 2018. From edutechwiki.unige./en/music_education_technology]

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An Internet source states that “computer devices refers to inventions related to computers and devices with a central processing unit, such as the hardware and software of computers, the internet and storage devices.” Kessler and Howe in Adedeji (2004) highlight that “computer applications to music include thematic cataloguing, input and output music writing, recording and reproducing music, musical analysis, musical composition and sound processing” (p. 3). In Brando, Wiggins and Pain conception of computer applications, “the applications are classified by activities involved in musical teaching. The categories considered are computer applications intent to; teach fundamentals of music, teach musical performance skills, perform analysis of music, teach musical composition skills.

Nwamara (2006) in his own view states that:

The incorporation of computer technology into musicology is the employment of computer and its associated hardware and software to assist the study, creation, performance and preservation of music (p. 125).

Nwamara (2006) also cites Anyaegbu as believing that “the computer contains software, hardware and interactive devices that help the composer in creating and manipulating representation of musical sounds. (p. 126)

Music Education

According to Nmadu and Onwuekwe (2020) Music education:

Is the acquisition of musical knowledge and skills in a formal or informal setting by one who desires it. In a formal setting, it is a systematically planned programme centered on the three domains of learning (cognitive, affective, and psychomotor) to suit the learner and, upon completion, is awarded a certificate. While in an informal setting, it can be organized outside the four wards of education. It can also be acquired by participation or observation. (p. 237)

Music Technological Applications for Music Teaching/Learning Experiences.

The music technological applications for music teaching/learning are enormous and are applied in all facets of music education. According to Adedeji in Adedeji (2004) “today, there is virtually no aspect of musical processes that is not realizable with the computer technology and internet, including global music teaching, research, marketing, audio, and video recording, editing, mixing, mastering, harmonization and orchestration” (p. 3). Adedeji (2004) cites that “there is over 4,000 music software of different categories. Popular notation software used in Nigeria currently includes Cakewalk series, Sibelius, Finale and Noteworthy Composer. Of them, Sibelius is the most comprehensive, easily operated and less deficient” (p. 3). Nwamara (2006) asserts that “examples of various computer software and hardware that satisfy diverse needs in almost every aspect of Musicology in a million times faster than it used to be initially” (p. 130). Similarly, Onuora-Oguno (2009) points that “today, many software exist that aid transcription of music. Notable amongst them are Finale, Sibelius and the Note worthy composer.”(p. 4)

Here are other forms of music technological applications that are applied in all aspect of music studies and could become staple in the classroom such as Mobile learning or m-learning, E-learning, Music Research, Internet, Drill and Practice Software, Tutorial Software, Sequencing and Recording Software, FL Studio, Sound forge, Nuendo, Reason, Logic Pro, e.t.c. Hardware- Mixer, Musical Instrument Digital Interface (MIDI), CD-ROMs, MP3 players, Wave files, Word processing, Power Point, Microphones, Microphone Filter, Laptops, Table personal Computer (PC), Assistive devices, Sound devices; Sound card, Fire wire card / cord. Handheld devices, iPhone, Tablet, Hard disk, Flash memory devices, Digital audio and Digital video, and a host of others. Similarly, Olorunsogo and Samuel in Olapade and Amole (2018) itemized “iPods, VCD MP3, DVD, CD-ROM, Projector for music players and Software for music production like, Cakewalk, Cubase, Sawpro as well as Software for writing music like Finale, Sibelius and so forth.” (p. 230)

Quinn (2000) explains that “mobile learning is defined as the intersection of mobile computing and e-learning; accessible resources wherever you are, strong research capabilities. E-learning is independent of location in time and in space” (p. 16). Adedeji (2004) asserts “the online study programme is already practised in many developed Countries. This new method of education is variously described as ‘computer-based learning’, ‘web education’, ‘tele-learning’, ‘e-learning’, and ‘tele-tutoring’ (p. 6). It is a common knowledge that there is distance learning where learners obtain certificates at all levels of education through online. This is applicable to music studies; Universities and other bodies of education offer different aspects of music studies at all levels online irrespective of the distance. Upon completion of study, learners are awarded certificates.

According to Onuora-Oguno (2009) “a researcher can make use of various search engines like goggle and search me to obtain relevant information on a research” (p. 5). In Mbanugo’s (2009) viewpoint “music research is motivated by the need for improving and upgrading knowledge about music, the urge for confirming verifying old beliefs about and trends in music” (p. 125). Music technological applications aid music researchers, music scholars and musicologists to gather information for use. With the aid of internet scholars, researchers, musicologist and others are connected to the World; they are able to source or share information. Adedeji (2004) opines that:

The Internet is generally known as the largest computer network covering the World... Some relevant websites are computer-music.com, which deals extensively with every aspect of computer music education, goggle.com, altavista.digital.com, infoseek.com and yahoo.com, where one can search for information on any topic, iwritethemusic.com, which provides music

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resources for composers..... For instance, new generation of Nigerian composers can listen to or view the scores of contemporary art compositions of senior colleague from all over the World via the net and thereby improve themselves. (p. 6)

Drill and Practice is software that the teacher could employ to develop an exercise or task that will provide opportunity for the students to use to learn a new topic or elaborate rehearsal like musical performance skills, pitch skills, rhythm training and feedback of performance. Vazquez-Abad and LaFlour in Wilson (2004) assert Drill and Practice Software education applications as those “in which a learning task is broken into subtasks and then each of these is taken in turn, using feedback to reinforce mastering of each subtasks as well as to correct failure to master” (p. 8). Wilson adds that “most authors also include repetition, previous instruction, and feedback as important or necessary elements of drill and practice.” (p. 8)

Tutorial Software covers the programmes which include more theoretical information and where the subject related terms are presented as explanations, definitions, and questions without establishing an interactive communication between the computer and the student, making music. There exists more specific Software. According to Skinner (2011)

There are applications that use the MIDI (Musical Instruments Digital Interface) connection between the instrument and computer to help learn different aspects of music. A music-reading programme may display a note, chord or passage on the screen; you play the displayed notes on the digital piano and the Software keeps track of your accuracy and helps improve. An ear-training application may play for you an interval that you then try to play yourself on the keyboard. The application will tell you what you did right or wrong and will tell you what you did right or wrong and help you improve ear. Other types teach music history and music theory. While many of these applications are geared to specific levels or ages, some can be set to multiple levels as you progress of these applications are geared to specific levels or ages, some can be set to multiple levels as you progress or for use by multiple players. (p. 1)

Handheld devices include personal digital assistants (PDAs), iPhones, iPads, MP3 players, CD Cassettes, Laptops, flash memory (hard drive) devices, Digital audio and Digital video and others. Bliss (2008) explains that “Sound Devices are simple external sound cards or they can be recording devices like the M-audio ozone and digi-design music creation workstations. These types of devices connect to the computer via USB or fire wire. External music workstations often feature microphone and MIDI jacks and volume and mixing knobs.” (p. 4)

METHODOLOGY

The research methodology employed the use of qualitative tools such as questionnaire for lecturers and students, and interview with Heads of Department of Music in the institutions under study. Stratified sampling technique was utilized due to unequal sample sizes from each stratum. The study is carried out in six tertiary institutions that are offering music studies in Delta and Edo States. They include;

1. Delta State University, Abraka.
2. College of Education, Agbor.
3. College of Education, Warri.
4. University of Benin, Benin-City.
5. Ambrose Ali University, Ekpoma.
6. College of Education, Ekeador.

Table: 1 Total Numbers of Respondents for the Study

SS/N		Head of Department	No of Teachers	Total no. of Students	Total
1.	Delta State University	1	5	30	36
2.	College of Education, Agbor	1	5	15	21
3.	College of Education, Warri	1	4	7	12
4.	University of Benin	1	3	30	34
5.	Ambrose Ali University	1	1	30	32
6.	College of Education, Ekiador	1	3	---	4
	Grand Total	6	21	112	139

Presentation and Analysis of Data

The purpose of this study was to investigate the status of computer applications usage in music teaching/learning in tertiary institutions in Delta and Edo States. The study was guided by some specific objectives stated earlier. The area of this study was six (6) tertiary institutions in Delta and Edo States. There were five (5) questions containing response options, to be answered by the students and lecturers. It contained five (5) fixed-response options. Two to four options were provided to be selected from. A total

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of 112 year one to four students were administered the questionnaire, 64 male and 48 female. Copies of the questionnaire were administered to 21 Lecturers, 11 males, and 10 females. The whole of the questionnaires for students and lecturers were returned the same day of administration as the lecturers in each institutions organized the students to sit in classroom for this purpose. The data obtained for this study is therefore presented and analyzed in accord with the research questions as follows.

Research Question One

What are the computer applications used for music education in the tertiary institutions in Delta and Edo States?

Table 2: Delta State University Students' Responses on the computer applications used for music studies.

VARIABLES	NO	RESPONDENTS	MEAN	STANDARD DEVIATION
Tutorial Software	30	0	0	0
Sibelius, Finale, Noteworthy Composer	30	15	0.5	7
Internet	30	12	0.4	4.48
Digital audio/video	30	5	0.166	0.77
Laptop	30	21	0.7	13.7
Drill and Practice Software	30	5	0.166	0.77

From table 2 above, it is observed that fifteen students make use of Sibelius, Finale, Note worthy composer. Twelve students use the internet for music studies. No student indicated using the tutorial Software to study music. Five students signified using Digital audio/video for music studies. Twenty-one students use the laptop for music studies and five students indicated they use drill and practice software.

Table 3: College of Education, Agbor Students' Responses

VARIABLES	NO	RESPONDENTS	MEAN	STANDARD DEVIATION
Tutorial Software	15	0	0	0
Sibelius, Finale, Note Worthy Composer	15	0	0	0
Internet	15	12	0.8	8.36
Digital audio/video	15	0	0	0
Laptop	15	4	0.26	0.93
Drill and Practice Software	15	0	0	0

In table 3 above, no student use tutorial, Sibelius, Finale and Noteworthy composer. Neither did any student indicate using Digital audio/video, or Drill and practice Software. Twelve students make use of the internet and four students have laptop.

Table 4: College of Education, Warri Students' Responses

VARIABLES	N	RESPONDENTS	MEAN	STANDARD DEVIATION
Tutorial Software	77	0	0	0
Sibelius, Finale, Note Worthy Composer	77	0	0	0
Internet	77	0	0	0
Digital audio/video	77	0	0	0
Laptop	77	0	0	0
Drill and Practice Software	77	0	0	0

From table 4 above, it is glaring that none of the students make use of any of the computer applications stated above.

Table 5: University of Benin Students' Responses

VARIABLES	N	RESPONDENTS	MEAN	STANDARD DEVIATION
Tutorial Software	330	0	0	0
Sibelius, Finale, Note WorthyComposer	330	0	0	0
Internet	330	0	0	0
Digital audio/video	330	0	0	0
Laptop	330	26	0.86	21.06
Drill and Practice Software	330	0	0	0

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Table 5 above, indicates that none of the students make use of the tutorial Software, Sibelius, Finale, internet, Digital audio/video non Drill and Practice Software for music studies. Twenty-six students possess Laptop but not used for music practices.

Table 6: Ambrose Ali University Students' Responses

VARIABLES	N	RESPONDENTS	MEAN	STANDARD DEVIATION
Tutorial Software	30	30	1	28.03
Sibelius,Finale,NoteWorthy Composer	30	0	0	0
Internet	30	0	0	0
Digital audio/video	330	0	0	0
Laptop	30	2	0.06	0.125
Drill and Practice Software	30	0	0	0

Table 6 shows that all respondents use Tutorial Software for music education.

Table 7: Lecturers' Responses on the computer applications used to teach music education

VARIABLES	N	RESPONDENTS	MEAN	STANDARD DEVIATION
Tutorial Software	21	1	0.04	0.043
Sibelius, Finale, NoteWorthy Composer	21	5	0.23	1.08
Internet	21	0	0	0
Digital audio/video	21	3	0.14	0.38
Laptop	21	4	0.19	0.69
Drill and Practice Software	21	1	0.04	0.043
None of the above	21	12	0.57	6.22

From Table 7 above, it shows that only one respondent use tutorial Software to teach music education, five lecturers use Sibelius, Finale or Note worthy Composer to teach. None use the internet. Digital audio/video devices are used by three of the respondents. One respondent applies the drill and practice to teach. Twelve of the respondents do not make use any of the computer applications to teach.

Research Question Two: (RQ2)

What is the relevance of computer applications for music education in tertiary institutions in Delta and Edo State?

(i) Are you inspired to learn music through music technological applications?

Questions below are to find out the relevance of music technological applications for music education in tertiary institutions in Delta and Edo States.

Table 8: Delta State University Students' Responses on their inspirations to learn music through computer applications

Responses	Frequencies	Percentages
Yes	30	100%
No	-	0%
Total	30	100%

All the respondents in table 8 above indicated that all respondents are inspired to learn music through computer applications.

Table 9: College of Education Agbor Students' Responses on their inspirations to learn music through computer applications

Responses	Frequencies	Percentages
Yes	12	80%
No	3	20%
Total	15	100%

Data in table 9 above shows 80% of the respondents are inspired to learn music through computer applications. Three (20%) of the respondents indicated no, this implies that majority of the respondents are inspired to learn music through computer applications.

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Table 10: College of Education Warri Students' Responses on their inspirations to learn music through computer applications

Responses	Frequencies	Percentages
Yes	29	97%
No	1	3%
Total	30	100%

From table 10 above, all the respondents indicated they are inspired to learn through computer applications even though they are not exposed to computer applications.

Table 11: University of Benin Students' Responses on their inspiration to learn music through Computer Applications

Responses	Frequencies	Percentages
Yes	26	87%
No	4	13%
Total	30	100%

From the data above, seventeen (87%) of the respondents are inspired to learn music through computer applications whereas four (13%) of the respondents are not inspired to learn through computer applications. However, almost all the respondents are inspired to learn music through these devices.

Table 12: Ambrose Ali University Students' Responses on their inspiration to learn music through Computer Applications

Responses	Frequencies	Percentages
Yes	7	100%
No	0	0%
Total	7	100%

As seen in the data above, twenty-nine (97%) of the respondents are inspired to learn with the aid of music technological applications. one (3%) of the respondent is not inspired, that notwithstanding, all the respondents except one does not get inspired to learn through music technological applications.

The use of computer applications to learn

Table 13: Delta State University Students' Responses on the areas of music they apply computer applications

VARIABLES	NO.	RESPONDENTS	MEAN	STANDARD DEVIATION
History of Music	30	0	0	0
Music Composition	30	12	0.4	4.48
Record Music	30	18	0.6	10
All of the Above	30	0	0	0
None of the Above	30	0	0	0

The data above indicates no respondent for history of music, 12 respondents for music composition, 18 for record music, 0 for all of the above and 0 for none of the above. It is observed that majority of the respondents apply computer applications to record music. Many uses it for music composition while none use it for all listed.

Table 14: College of Education Agbor Students' Responses on the areas of music they apply computer applications

VARIABLES	NO.	RESPONDENTS	MEAN	STANDARD DEVIATION
History of Music	15	1	0.06	0.058
Music Composition	15	1	0.06	0.058
Record Music	15	8	0.53	3.72
All of the Above	15	0	0	0
None of the Above	15	5	0.33	1.45

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From observation in the data in table 14, there is one respondent for history of music, one also for music composition, eight respondents for recording music. No respondent for all of the above and five respondents indicated for none of the above. This signifies that majority of the respondents use computer application to record music. While 0.33 of the respondents do not use any of the computer applications.

Table 15: College of Education Warri Students' Responses on the areas of music they apply computer applications

VARIABLES	NO	RESPONDENTS	MEAN	STANDARD DEVIATION
History of Music	7	0	0	0
Music Composition	7	0	0	0
Record Music	7	0	0	0
All of the Above	7	0	0	0
None of the Above	7	7	0.23	3.05

As observed from the table 15 above, all the respondents indicated none of the above. Meaning computer applications is not applied in any area of music.

Table 16: University of Benin Students' Responses on the areas of music they apply computer applications

VARIABLES	NNO	RESPONDENTS	MEAN	STANDARD DEVIATION
History of Music	30	0	0	0
Music Composition	30	2	0.06	0.12
Record Music	30	14	0.46	0.41
All of the Above	30	0	0	0
None of the Above	30	14	0.46	0.41

Table 16 above shows that there is no 0 respondent for history of music, two respondents for music composition, fourteen respondents for recording music, 0 for all of the above and fourteen respondents indicated none of the above. There are many respondents that identified with music recording and many as none of the above meaning they do not apply any computer application in any area of music study; very few indicated music composition.

Table 17: Ambrose Ali University Students' Responses on the areas of music they apply computer applications

VARIABLES	NO	RESPONDENTS	MEAN	STANDARD DEVIATION
History of Music	30	6	0.2	1.12
Music Composition	30	0	0	0
Record Music	30	23	0.76	16.48
All of the Above	30	0	0	0
None of the Above	30	1	0.03	0.03

From the data table above, it is noted that six of the respondents apply computer applications for history of music, while no respondent indicated for music composition, twenty-three respondents signified for record music, zero for all of the above, meaning no one signified using any computer applications in any area of music, and one declared none of the above, indicating not using computer application in any area of music. It is discovered that majority use the devices to record music, and six respondents use the computer applications for history of music.

Table 18: Lecturers' Responses on the relevance of computer applications for music education

VARIABLES		RESPONDENTS	MEAN	STANDARD DEVIATION
Enhances teachers' sense of professional development	21	0	0	0
It aids students' and teachers' creative mind	21	0	0	0
Effectuated change and attitude of students to music learning	21	0	0	0
Interconnectivity of music research findings is enhanced	21	0	0	0

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Essential to the musicologist (composer)	21	0	0	0
Enhances visual illustration during teaching	21	0	0	0
All of the above and more	21	21	0.57	6.22

Table 18 above, indicates that all the lecturers agree that computer applications for music education enhances the teacher's sense of professional development. It also aids the students' and teachers' creative mind. It has effected change and attitude of students to music learning. Interconnectivity of music research findings is enhanced through computer applications for music teaching and learning and that it is also essential to the composer as well as enhances visual illustration during teaching.

Research Question Three: (RQ3)

How accessible is computer applications to the students and the music educators in the tertiary institutions in Delta and Edo States?

The following questions are to determine the students' accessibility to computer applications for studying music education.

(i) Do you learn with computer applications in the classroom?

Table 19: Delta State University Students' Responses on Computer Applications Usage in the Classroom

Responses	Frequencies	Percentages
Yes	14	47%
No	16	53%
Total	30	100%

The data in table 19 above, shows that twelve of the respondents claim to learn with computer applications and others eighteen of the respondents disagree. More of the respondents indicated they do not learn with computer applications in the classroom.

Table 20: College of Education Agbor Students' Responses on Computer Applications Usage in the Classroom

Responses	Frequencies	Percentages
Yes	4	27%
No	11	73%
Total	15	100%

From the above data, 4 respondents claimed they use computer applications to learn in the classroom, 11 (73%) accepted not using. It reveals that almost all the respondents do not use computer applications to learn.

Table 21: College of Education Warri Students' Responses on Computer Applications Usage in the Classroom

Responses	Frequencies	Percentages
Yes	0	0%
No	7	100%
Total	7	100%

The data above shows no respondent 0 (0%) indicated they use computer applications to learn in the classroom and all respondents accepted they do not use computer applications to learn music in the classroom. In that case, it is said that the entire respondent does not use computer application to learn music in the classroom.

Table 22: University of Benin Students' Responses on Computer Applications Usage in the Classroom

Responses	Frequencies	Percentages
Yes	29	97%
No	1	3%
Total	30	100%

From the data in table 22, shows no respondent signified learning with computer applications. Thirty of the respondents accepted they do not use computer applications to learn music in the classroom. This implies that all the respondents do not use computer applications to learn music in the classroom.

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Table 23: Ambrose Ali University Students' Responses on Computer Applications Usage in the Classroom

Responses	Frequencies	Percentages
Yes	0	0%
No	30	100%
Total	30	100%

From table 23 above, it is seen that twenty-nine (97%) of the respondents signified using computer applications to learn music in the classroom, one (3%) indicated no. It shows almost all the respondents are using computer applications to learn music in the classroom.

(ii) At what level were you introduced computer applications?

Table 24: Delta State University Students' Responses on the year they were introduced to computer applications

VARIABLES	N	RESPONDENTS	MEAN	STANDARD DEVIATION
Year One	30	0	0	0
Year Two	30	18	0.6	10
Year Three	30	12	0.4	4.48
Year Four	30	0	0	0

The data in table 24 above shows 0 (0%) for year one, 18 (60%) for year two, 12 (40%) and 0 (0%) for year four. This implies that majority (60%) of the respondents were introduced to computer applications at year two level. The others 12 (40%) were introduced to computer applications at year three.

Table 25: College of Education Agbor Students' Responses on the year they were introduced to computer applications

VARIABLES	NO.	RESPONDENTS	MEAN	STANDARD DEVIATION
Year One	15	0	0	0
Year Two	15	0	0	0
Year Three	15	0	0	0

From the data in table 25 above, it reveals that all the respondents were never introduced to computer applications to learn music.

Table 26: College of Education Warri Students' Responses on the year they were introduced to computer applications

VARIABLES	NNO.	RESPONDENTS	MEAN	STANDARD DEVIATION
Year One	7	0	0	0
Year Two	7	0	0	0
Year Three	7	0	0	0

The data in table 26 above indicates that none of the respondents have been introduced to computer applications to study music.

Table 27: University of Benin Students' Responses on the year they were introduced to Computer Applications

VARIABLES	N	RESPONDENTS	MEAN	STANDARD DEVIATION
Year One	30	0	0	0
Year Two	30	0	0	0
Year Three	30	0	0	0
Year Four	30	0	0	0

Based on the data in table 27 above, it is observed that all the respondents from year one to four were not introduced to computer applications to learn music.

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Table 28: Ambrose Ali University Students' Responses on the year they were introduced to Computer Applications

VARIABLES	N	RESPONDENTS	MEAN	STANDARD DEVIATION
Year One	30	30	1	28.3
Year Two	30	0	0	0
Year Three	30	0	0	0
Year Four	30	0	0	0

The data above, shows that all (100%) of the respondents were introduced to computer applications to learn music from year one.

(iii) Does the department have computers for teaching and learning music?

Table 29: Lecturers' Responses on the Departments' Possession of computer

School	Responses	Frequencies	Percentage of population
Delta State University	Yes	5	24
College of Education, Agbor	No	5	24
College of Education, Warri	No	4	19
University of Benin	No	3	14
Ambrose Ali University	No	1	5
College of Education, Ekiadolor	Yes	3	14
	Total	21	100%

From the data in table 29 above, it is observed that Delta State University and College of Education Ekiadolor, making a total of 8 respondents that have computer in their department. The other four department of music like College of Education, Agbor, College of Education, Warri, University of Benin, and Ambrose Ali University do not have. This implies that it is only 2 tertiary institutions in Delta and Edo States that have computers for music studies. Those tertiary institutions that do not have are in the majority.

Does the department have any computer application for music studies?

Table 30: Lecturers' Responses on the Departments' Possession of any computer applications

School	Responses	Frequencies	Percentages of population
Delta State University	Yes	5	24
College of Education, Agbor	No	5	24
College of Education, Warri	No	4	19
University of Benin	No	3	14
Ambrose Ali University	No	1	5
College of Education, Ekiadolor	Yes	3	14
	Total	21	100%

Table 30 above shows that 2 tertiary institutions have computer applications for music studies; they include Delta State University and College of Education, Ekiadolor. The percentage of their population is 38%, while the percentages of the population of those that do not have are 62%. This indicates that, majority of the tertiary institutions in Delta and Edo States do not have computer applications.

Do you use any computer music Software applications to teach the student?

Table 31: Lecturers' Responses on Computer Applications Usage in the Classroom.

Responses	Frequencies	Percentages
Yes	7	33%
No	14	67%
Total	21	100%

As seen above, the respondents that use computer applications to teach music are less than respondents that do not use any. Majority of the respondents fourteen do not apply any computer applications to teach. Minority seven utilizes computer applications to teach.

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If yes, state the computer applications you use

All the seven respondents in table 86 above, that indicated yes stated two music notation software, they include Sibelius and Finale. Sibelius and Finale were all they could list.

In what area of music education does the department apply computer applications?

Table 32: Lecturers' Responses on the areas of music the department apply computer applications.

VARIABLES	NO	RESPONDENTS	MEAN	STANDARD DEVIATION
All	21	0	0	0
Some	21	9	0.42	3.5
None	21	12	0.57	6.2

From the table above, 9 (43%) respondents indicate using computer applications in some music courses. More (57%) of the respondents do not apply computer applications in any area of music education. No respondent signified for using computer applications in all areas of music education.

Does your department have studio where students can learn music?

Table 33: Lecturers' Responses on whether the department have studio

School	Responses	Frequencies	Percentage of population
Delta State University, Abraka.	Yes	5	24
College of Education, Agbor.	Yes	5	24
College of Education, Warri.		4	19
University of Benin, Benin-City.	No	3	14
Ambrose Ali University, Ekpoma.	Yes		5
College of Education, Ekiadolor.	Yes	3	14
	Total	21	100%

As seen in table 33 above, five tertiary institutions in Delta and Edo States have studio where students learn music. Almost all the schools but one does not have. Going by the table the only tertiary institutions yet to have is the University of Benin.

Is the studio functional?

Table 34: Lecturers' Responses on the functionality of the studio

School	Responses	Frequencies	Percentages of population
Delta State University	Yes	5	24
College of Education, Agbor	No	5	24
College of Education, Warri	No	4	19
University of Benin	No	3	14
Ambrose Ali University, Ekpoma	Yes	1	5
College of Education, Ekiadolor	Yes	3	14
	Total	21	100%

From the above data, it shows nine institutions whose studios are functional while twelve are not functional.

Research Question Four: (RQ4)

What level of computer music Software literacy do the students and lecturers have?

The following questions below are to determine the level of computer music Software applications literacy of the students and the lecturers.

(i) Do you have desktop, laptop, both, or none?

Table 35: Delta State University Students' Responses on Possession of Computer.

Variables	Desktop	Laptop	Both	None
Responses	0	21	0	9
Percentage	0%	70%	0%	30%

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The data in table 35 represents the responses of the respondents showing zero possession of desktop, twenty-one respondents possess laptop while nine indicated not having. Most of the respondents possess laptop.

Table 36: College of Education, Agbor Students' Responses on Possession of Computer.

Variables	Desktop	Laptop	Both	None
Responses	0	4	0	11
Percentage	0%	27%	0%	73%

The above data in table 36 reflects the zero possession of desktop, four have of possession of laptop, and eleven of the respondents respectively. It shows that almost all the respondents do not possess desktop, laptop, talk more both.

Table 37: College of Education Warri Students' Responses on Possession of Computer.

Variables	Desktop	Laptop	Both	None
Responses	0	0	0	7
Percentage	0%	0%	0%	100%

The data in table 37, indicates zero possession of desktop, zero possession of laptop and all seven have none of the items listed any. This shows that all the respondents do not have computer.

Table 38: University of Benin Students' Responses on Possession of Computer.

Variables	Desktop	Laptop	Both	None
Responses	0	26	0	4
Percentage	0%	87%	0%	13 %

From table 38 above, the data of the respondents' presents the zero possessions of desktop, twenty-six possession of laptop, and four have none possession of computer. Almost all the respondents have computer.

Table 39: Ambrose Ali University Students' Responses on Possession of Computer.

Responses	Frequencies	Percentages
Yes	30	100%
No	-	0%
Total	30	100%

Table 39 above indicates zero respondents not having computer, while two of the respondents possess, and twenty-eight do not have computer and none indicated having both. As seen above, almost all the respondents signified not having.

(ii) Have you ever heard about computer music Software applications you can use to learn music?

Table 40: Delta State University Students' responses on the awareness of computer music Software applications.

Variables	Desktop	Laptop	Both	None
Responses	0	2	0	28
Percentage	0%	7%	0%	93%

As seen from table 40 above, it is discovered that all the respondents are aware of computer applications for music studies.

Table 41: College of Education, Agbor Students' Responses on the Awareness of Computer music Software Applications.

Responses	Frequencies	Percentages
Yes	9	60%
No	6	40%
Total	15	100%

Table 41 above shows that nine respondents agreed they are aware of computer applications for music studies whereas six respondents are not aware. There are more in number that are aware.

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Table 42: College of Education, Warri Students' Responses on the Awareness of Computer music Software Applications.

Responses	Frequencies	Percentages
Yes	0	0%
No	7	100%
Total	7	100%

From table 42 above, it is discovered that all seven the respondents are not aware of computer applications for music education.

Table 43: University of Benin Students' Responses on Awareness of Computer music Software Applications.

Responses	Frequencies	Percentages
Yes	15	50%
No	15	50%
Total	30	100%

As seen from the above table 43, fifteen respondents agreed they are aware of computer applications for music studies, whereas on the other hand, fifteen respondents are not aware. So many of the respondents are aware and many still not aware.

Table 44: Ambrose Ali University Students' Responses on Awareness of Computer music Software Applications.

Responses	Frequencies	Percentages
Yes	30	100%
No	0	0%
Total	30	100%

Table 44 above shows that all respondents are fully aware of computer music Software applications for music studies.

(iii) If Yes, from where?

Table 45: Delta State University Students' Responses on Possible Sources.

Responses	Frequencies	Percentages
Home	8	27%
School	21	70%
Church	1	3%
None	0	0%
Total	30	100%

Eight respondents claim their source to be from home, while Twenty-one acknowledged school one identified church and zero for none. From all indications, majority of the respondents' source is school.

Table 46: College of Education, Agbor Students' Responses on Possible Sources.

Responses	Frequencies	Percentages
Home	3	20%
School	4	27%
Church	0	0%
None	8	53%
Total	15	100%

The above table 46, reports that three respondents' source is from home, four claim school, zero respondents signified church and eight indicated none. Many of the respondents declared they do not have any source of awareness of computer applications for music studies.

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Table 47: College of Education, Warri Students' Responses on Possible Sources.

Responses	Frequencies	Percentages
Home	0	0%
School	0	0%
Church	0	0%
None	7	100%
Total	7	100%

The respondents' data representation from above Table 47, states home has zero respondents, school also has zero respondents, church equally has zero respondents but those that indicated none were all seven respondents. The whole respondents have no means of being aware.

Table 48: University of Benin Students' on Responses Possible Sources.

Responses	Frequencies	Percentages
Home	3	10%
School	2	7%
Church	0	0%
None	25	83%
Total	30	100%

It is observed from the table 48 above, that the respondents for home as their source were three, those respondents for school were only two, church shows zero while those respondents for none were twenty-five. Majority (83%) had no means of being aware of computer applications for music studies.

Table 49: Ambrose Ali University Students' Possible Sources.

Responses	Frequencies	Percentages
Home	0	0%
School	30	100%
Church	0	0%
None	0	%
Total	30	100%

In table 49 above, it is discovered that there was zero indication for home responses, the school respondents were thirty 30, while church and none had zero respectively. This reveals that all the respondents' source of computer applications knowledge was from school.

(iv) Do you have any computer music Software applications to learn music?

Table 50: Delta State University Students' Responses on the Possession of Computer Software Applications.

Responses	Frequencies	Percentages
Yes	12	40%
No	18	60%
Total	30	100%

As seen on table 50 above, twelve respondents have computer music Software applications, signifying that eighteen of the respondents do not have.

Table 51: College of Education, Agbor Students' Responses on Possession of Computer music Software Applications.

Responses	Frequencies	Percentages
Yes	4	27%
No	11	73%
Total	15	100%

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As seen in table 51 above, four of the respondents identified they have computer applications to learn music. Whereas eleven of the respondents signified they do not have. It means majority of the respondents own computer applications to learn music.

Table 52 College of Education, Warri Students' Responses on Possession of Computer music Software Applications

Responses	Frequencies	Percentages
Yes	0	0%
No	7	100%
Total	7	100%

Table 52 above shows zero respondents possess no computer applications to learn music. While all seven admitted not having computer applications to learn music. All the respondents agreed they do not possess computer applications to learn music.

Table 53: University of Benin Students' Responses on Possession of Computer music Software Applications.

Responses	Frequencies	Percentages
Yes	24	80%
No	6	20%
Total	30	100%

From the data in table 53 above, it is observed that twenty-four correspondents accepted they possess computer applications. Six owned up they do not possess computer applications. Majority of the respondents claimed they have computer applications to learn music.

Table 54 Ambrose Ali University Students' Responses on Possession of Computer music Software Applications

Responses	Frequencies	Percentages
Yes	14	47%
No	16	53%
Total	30	100%

The data in table 54 above shows fourteen of the correspondents have computer applications whereas sixteen correspondents indicated they do not have. The respondents that have computer applications to learn music are more than those who do not have.

Table 55: Lecturers' Responses on Level of Computer Literacy.

Variables	Computer basic & software knowledge	Computer music software expert	Computer basic knowledge	A certificate in computer basic knowledge	No computer knowledge
Respondents	7	1	1	10	2
Percentage	33%	5%	5%	47.5%	9.5%

From table 55 above, it states that seven respondents have computer basic and software knowledge. One respondent signified as a computer music software expert. One respondent signified having a computer basic knowledge. Ten respondents indicated having a certificate in computer basic knowledge. Majority of the respondents have certificate in computer basic knowledge, but without music software basic knowledge. It is noted that only one respondent is a computer music software expert.

Does the department have computers for teaching and learning music?

Table 56: Lecturers' Responses on the Departments' Possession of computer

School	Responses	Frequencies	Percentages of population
Delta State University, Abraka	Yes	5	24
College of Education, Agbor	No	5	24
College of Education, Warri	No	4	19
University of Benin, Benin-City	No	3	14

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Ambrose Ali University, Ekpoma		No	1	5
College of Education, Ekiadolor	Yes		3	14
	Total		21	100%

From the data in table 56 above, it is observed that Delta State University and College of Education Ekiadolor, have computer in their department. The other four department of music like College of Education, Agbor, College of Education, Warri, University of Benin, and Ambrose Ali University do not have computer. This implies that it is only two tertiary institutions in Delta and Edo States that have computers for music studies. Those tertiary institutions that do not have are in the majority.

Does the department have any computer applications for music studies?

Table 57: Lecturers' Responses on the Departments Possession of any computer applications

School	Responses	Frequencies	Percentage of population
Delta State University, Abraka	Yes	5	24
College of Education, Agbor	No	5	24
College of Education, Warri	No	4	19
University of Benin, Benin-City	No	3	14
Ambrose Ali University, Ekpoma	No	1	5
College of Education, Ekiadolor	Yes	3	14
	Total	21	100%

Table 57 above shows that two tertiary institutions have computer applications for music studies; they include Delta State University and College of Education, Ekiadolor. This indicates that, majority of the tertiary institutions in Delta and Edo States do not have computer applications.

Do you use any computer applications to teach the student?

Table 58: Lecturers' Responses on the use of any computer applications to teach.

Responses	Frequencies	Percentages
Yes	7	33%
No	14	67%
Total	21	100%

As seen above, the respondents that use computer applications to teach music are less than respondents that do not use any. Majority of the respondents do not apply any computer applications to teach. Minority utilizes computer applications to teach.

If yes, state the computer applications you use

The seven (7) respondents in table 58 above, who indicated yes, stated two music notations software, as thus, Sibelius and Finale.

In what areas of music education does the department apply computer applications?

Table 59: Lecturers' Responses on the areas of music the department apply computer applications.

Variables	All	Some	None
Respondents	0	9	2
Percentage	0 %	43%	57%

The table above, nine respondents indicated using computer applications in some music courses. More of the respondents do not apply computer applications in any area of music education. No respondent signified using computer applications in all areas of music education.

Research Question Five: (RQ5)

How committed are the government and tertiary institutions in the provision of equipment for computer applications to music education in tertiary institutions in Delta and Edo States?

What have the government and the institution provided for the use of computer applications for music education?

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Table 60: Delta State University Students' Responses on the government and institution's provision of equipment

Variables	Facility	Laptop	Computer(s)	Internet services	Music Software	None
Responses	30	0	30	0	0	0
Percentage	100%	0%	100%	0%	0%	0%

The above data shows that 100% of the respondents signify the government and the institution provided facility and computer for music education. But lack in the provision of laptop, Internet services and music Software.

Table 61: College of Education Agbor, Students' Responses on the government and institution's provision of equipment

Variables	Facility	Laptop	Computer(s)	Internet services	Music Software	None
Responses	-	-	-	-	-	15
Percentage	0%	0%	0%	0%	0%	100%

Table 61 above indicates that there is lack of facilities, laptop, computer, internet services and music Software in the department. This means that the government and the institution did not provide for the use of computer applications for music education.

Table 62: College of Education Warri, Students' Responses on the government and institution's provision of equipment

Variables	Facility	Laptop	Computer(s)	Internet services	Music Software	None
Responses	-	-	-	-	-	7
Percentage	0%	0%	0%	0%	0%	100%

The data above indicates that there is absence of the governments and the institution's provision of equipment for computer applications for music education in the department.

Table 63: University of Benin, Students' Responses on the government and institution's provision of equipment

Variables	Facility	Laptop	Computer(s)	Internet services	Music Software	None
Responses	-	-	-	-	-	30
Percentage	0%	0%	0%	0%	0%	100%

Table 63 above shows that the department has not been provided with any computer applications equipment for the music education. But as the time of data collection it was made known to the researcher by the Head of music department that the provision of the equipment for computer applications for music education is in progress.

Table 64: Ambrose Ali University, Students' Responses on the government and institution's provision of equipment

Variables	Facility	Laptop	Computer(s)	Internet services	Music Software	None
Responses	-	-	-	-	-	30
Percentage	0%	0%	0%	0%	0%	100%

From the above data, 100% of the respondents claimed there is no provision of facility, laptop, computers, internet services non music Software for computer applications for music education.

Table 65: Lecturers' Responses on the governments and institution's provision of equipment

Variables	Facility	Laptop	Computer(s)	Internet services	Music Software	None
Responses	7	-	8	-	-	6
Percentage	33%	0%	38%	0%	0%	29%

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From all indications seven respondents signify they are provided facility while eight have computer whereas six respondents claim they are provided with none of the equipment for computer applications for music education

RESULTS

The discussion on the results in this study will follow the sequence of five research questions as follows:

All the respondents obviously, are aware of computer applications for music education. Conversely, majority of the respondents do not utilize applications of music technology for any music studies. While minority of the respondents apply music software such as Sibelius, and Finale for music composition, Real F.M. for music media students, music performance students, and musicianship in Delta State University. The only respondent at Ambrose Ali University uses personal tutorial software, and at the College of Education, Ekiadolor, it is applied in composition, history of music, production of music album and appreciation of music studies. Majority (80%) of the respondents are inspired to learn music through computer applications. It is observed, that all the lecturers indicated that computer applications for music education enhance the teacher' sense of professional development. It also aids the students' and teachers' creative mind. It has effected change and attitude of students to music learning. Interconnectivity of music research findings is enhanced through computer applications for music teaching and learning and that it is also essential to the composer as well as enhances visual illustration during teaching.

It is observed that Delta Sate University and College of Education Ekiadolor, have access to computer applications in their department. The other four department of music like College of Education, Agbor, College of Education, Warri, University of Benin, and Ambrose Ali University do not have access to applications of music technology, due to the fact that computer applications are not available in the department. This implies that it is only 2 tertiary institutions in Delta and Edo States that have some technological applications for music studies. Those tertiary institutions that do not have are in the majority. In other words, there are no available computer applications for the students and lecturers to access and apply to music education. Some lecturers and students make use of their personal ones.

It is discovered that the lecturers in the tertiary institutions in Delta and Edo States undergo a yearly computer training programme but not related to music education. Majority of the students are not exposed to computer applications particularly music Software. Basically, almost all the lecturers acquired a certificate in computer knowledge but not in this field. While 2 (9.5%) of the lecturers have no computer knowledge.

Minority of the tertiary institutions (Delta State University and College of Education Ekiadolor) have been provided with facility and computer for music education. Whereas majority of the tertiary institutions under study signify they have not been provided with computer applications for music education. In other words, the government and the institutions have not provided technological applications for music education to the majority of the institutions in Delta and Edo State.

CONCLUSION AND RECOMMENDATIONS

Technological applications for music education are pivot to the enhancement of music education in tertiary institutions in Delta and Edo State of Nigeria. It involves an active participation of students as they learn by doing. Technological applications enable students to discover ideas, facts and knowledge for themselves. Students (old or young) are engrossed with one form of technology to another to perform one task or the other. Music technological applications are capable of attracting more students to the field, if these devices are applied in the teaching and learning experiences in classroom. Despite the awareness of music technological applications for music education, tertiary institutions in Delta and Edo States of Nigeria are still lagging behind technologically. Majority of the students and lecturers are not exposed to music technological devices in the classroom in the tertiary institutions studied, as there is no availability of facilities and equipment of music technological devices to support music education. Very few number of lecturers particularly those in music composition, engage students with software such as Sibelius and Finale although the students are being introduced to it at their 300 level which seems rather late to acquire enough knowledge and skills to lead to proficiency. The students should be introduced to music technological applications early, if they must develop all-round in this field and be able to express the knowledge and skills acquired to the next generation of knowledge seekers. If few (20%) of the lecturers in Delta State University and College of Education, Ekiadolor and a lecturer from Ambrose Ali University could apply some music technological applications to teach. It implies that it is realistic and realisable. Therefore, all the lecturers should endeavour to undergo a self development programme in their areas of specialization so that it will possibly achieve the same outcome. The study recommends that the yearly computer programme organized by the National commission for Colleges of Education and National commission for universities should relate to and reflect in their course areas for the furtherance of music education.

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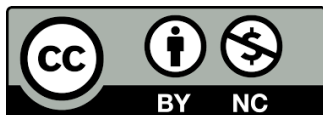
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