

COMPUTER APPLICATIONS: A STUDY OF ITS USE IN MUSIC PEDAGOGY IN TERTIARY INSTITUTIONS IN DELTA AND EDO STATES, NIGERIA

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ABSTRACT

This study focuses on computer applications to music pedagogy in tertiary institutions in Delta and Edo States. The relevance of computer applications in music pedagogy has not received sufficient attention and there has been a lack of studies indicating that the tertiary institutions nationwide have embarked on the implementation of computer applications in music pedagogy. It features some contributions of some musicologists, theorists and scholars on relevant concepts, theories and empirical findings that have bearing to this study. It equally describes computer applications, uses and the overwhelming positive influences on music pedagogy. The methodology is a survey; the target population is made of students and lecturers of tertiary institutions who are offering music studies in Delta and Edo States and involves the use of library research and internet services for relevant literature. The study indicates a few institutions that apply, those that plan to apply computer applications to music pedagogy in the classroom. Some students express, that computer applications are interestingly engaging. However, the majority of the students have not been exposed to computer applications for music education in the classroom. The study concludes that as highly practical methods in modern music education, computer applications with their characteristic visual image and interaction provide a new approach to music learning. The study recommends that the contents of music education be reviewed and amended to include realistic processes of integrating computer applications in music education. The institutions that are yet to implement the use of computer applications for music pedagogy should follow the trends. Those whose facilities are not in use, incomplete, in progress or that have inadequate personnel, should step up. Music educators should have personal development in this regard for the furtherance of music education.

Keynotes: computer applications, Music Pedagogy

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Study

Since the time of John Dewey, educational researchers have been advocating for active participation as key component of effective learning. Some educators have embraced the philosophy of learning by doing, which computer applications for music pedagogy offers. There is nothing more like active participation without the application of computer to music pedagogy. 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). In consonance with the above submissions, Onyiuke (2009) states: "computers are useful to students especially music students, in that it enhances the students' attitude towards classroom music, improves their level of musical achievement and comprehension of music concepts. It also boosts the learners' concentration, co-operative learning and level of creativity" (p. 104). Deal & Taylor (2000), on the other hand, assert that "teachers and music technology in practice, use technology to teach music theory, music composition, and music score arrangement as well as for administrative tasks" (p. 8).

Computer 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 Adedeji (2004), 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. 3). 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 computer applications among others enable the students to have a firm grounding and opportunities to explore musically as to spur musical creativity as in the present day artists outside school. In view of the above submissions, whilst there have been studies of the impact and relevance of computer 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. What could be responsible? What is not being done right? Could this be one of them as Adedeji, (2004) laments:

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)

Similarly, Ekwueme in Mbanugo (2006), Bemoans the attitude of music teachers who are not amenable to change as thus “most Nigerian music teachers appear to be lazy, complacent and readily settled for the traditional method of teaching without practical application. This category of teachers resists change and self-development” (p. 43). Dorfman, (2008) also asserts that “teachers lack music technology competence as well as lack understanding of pedagogical techniques of using computer in classroom” (p. 26). Syal in Onyiuke, (2009) also highlights that “music educators find it difficult to successfully implement computers into their music curriculum. They often resort to hit and miss strategy to implement computer into their classroom” (p. 105). With deep sense of realization the researcher urges the music teachers irrespective of age and sex to be courageous and take up the challenge and upgrade their knowledge in computer applications skills for efficiency and competency. 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, the traditional way of teaching /learning cannot entirely be laid outside, but rather be supported with computer 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.

1.2 Statement of the Problem

Despite the awareness of computer applications by music educators in tertiary institutions in Nigeria, there is little indication as to their usage in tertiary institutions. The relevance of computer applications to the field of music education has not received sufficient attention. There has been lack of studies indicating that the tertiary institutions nationwide have embarked on the implementation of computer applications to all round music teaching /learning. Hence this study sets to investigate the computer applications for music pedagogy in Delta and Edo States, to reveal the current developments

1.3 Purpose of the Study

The purpose of this study is to investigate computer applications in 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 computer 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 computer applications in tertiary institutions in Delta and Edo States;
- iii. determine the accessibility of computer 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;
- v. examine the prospects of computer applications to music education in tertiary institutions in Delta and Edo States;

- vi. 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;
- vii. ascertain the problems that militate against effective computer applications to music education in tertiary institutions in Delta and Edo States; and
- viii. proffer solutions to the problems that militate against effective computer applications to music education in Delta and Edo States.

1.4 Significance of the Study

The study will provide an essential overview of the present situation on the status of computer applications usage in the under study institutions. This study will serve as a reference point to researchers. This study's findings will redound to society's benefits considering that computer applications play vital role in music pedagogy today. The greater demand for graduates with computer acquisition skills justifies the need for more effective, life-changing learning/teaching enhancer. Thus, tertiary institutions that apply recommendations made in this study will help develop the students all round intellectually in the sphere of this field and enable students meet up with the demands and trends in music industry globally. Moreover, administrators will be led on what to be emphasized in the institutions' curriculum to improve students' performance as well as acquire appropriate knowledge and skills for the advancement and functional relevance of music pedagogy.

1.5. Research Questions

The study is guided by the following research questions:

1. What are the computer applications used for music education in tertiary institutions in Delta and Edo States?
2. What is the relevance of computer applications to music education in tertiary institutions in Delta and Edo States?
3. How accessible is computer music application 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. What are the prospects of computer applications to music education in tertiary institutions in Delta and Edo States?
6. 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?
7. What are the problems that militate against effective computer applications to music education in tertiary institutions in Delta and Edo States?
8. What are the possible solutions to the problems that militate against effective computer applications to music?

1.6 Scope of Study

The study focuses on the investigation of computer applications to music pedagogy (teaching/learning) in tertiary institutions in Delta and Edo States; The computer applications that are used for music education, the level of computer music software literacy of the

students and music educators, commitment of the government and tertiary institutions in the provision of equipment for computer applications to music education, the problems that militate against effective computer applications to music education and others. The coverage of this study is six (6) tertiary institutions which comprise of Colleges of Education and Universities. Their names and locations include; Delta State University, Abraka, College of Education, Agbor, College of Education, Warri, University of Benin, Benin-City, Ambrose Ali University, Ekpoma, and College of Education, Ekeador. The study targets the following as respondents; music students and music lecturers. All these categories of institutions provide enough grounds for conducting the survey.

CHAPTER TWO

2.0 LITERATURE REVIEW

The overview of computer applications approach to music teaching and learning has been acknowledged and advocated for as a pre-requisite for the advancement of the comparative study of music. Some of these were highlighted in this chapter. The review however, was discussed under:

- i. Conceptual Definition of Terms
- ii. Theoretical Framework
- iii. Empirical Studies
- iv. Summary of Literature Reviewed

2.1.0. The Conceptual Definition of Terms

The conceptual definitions are based on the following terms, computer applications, music pedagogy (teaching and learning).

2.1.1. Computer Applications

In the researcher's view point, computer 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]

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)

2.1.2. Music Pedagogy

Music pedagogy is a development in music education consisting of the systematic and planned teaching and learning of music. It is concerned with the art of teaching and learning to impart musicknowledge to one who requires it by one who possesses that knowledge as well as qualified to impart such knowledge. Hence this work will look into the concepts of teaching and learning in different perspectives.

2.1.2.1. Teaching

There are varieties of concepts of teaching by scholars and psychologists. Some based theirs on traditional concept while some others on modern concept, some as planned activity. Teaching “is an umbrella term that refers to a teacher’s value, attitudes, beliefs and intentions towards teaching”. [Accessed April 15, 2018. From slideshare.net]

Traditional Concept – Teaching is the act of imparting instructions to the learners in the classroom situation. The teacher gives information to the students or one of the students reads from the textbook, while the other students silently follow him in their textbooks.

Modern Concept- Teaching is to cause the pupils to learn and acquire the desired knowledge, skills and desired ways of living in the society. It is a process in which the learner, the teacher, the curriculum and other variables are organized in a systematic and psychological way to attain some pre-determined goals. [Accessed April 15, 2018. From Slideshare.net].

According to Morrison, (2015), teaching is “an intimate contact between a more mature personality and a less mature one which is designed to further the education of the latter” [Accessed April 15, 2018. From <http://www.Slideshare.net>]. Amidon defends teaching as “an interactive process, primarily involving classroom talk, which takes place between teacher and pupil and occurs during certain definable activities. Furthermore, Teaching refers to the learning of specific concept, the nature of concepts or the development of logical reasoning and critical thinking”.) [Accessed April 15, 2018. From <http://www.Slideshare.net>]

In researcher’s perspective: Teaching in education, is impartation of knowledge and skills by one who is trained and qualified to impart such knowledge to a learner who desired that knowledge. Teaching in education, is systematically planned and carried out in different methods, bearing in mind learner, subject matter or content of instruction as well as comprehensive consideration of the entire teaching environment.

2.1.2.2. Learning

In Nmadu (2018) Ezeanolue in Onwuekwe, (2017), diversely cites the concept of learning thus:

Learning is “An adaptation to the environment.” The progressive child moves from one environment to another. Ability to adapt to new environment means that the child has learned the characteristics of that new environment and has successfully adapted or adjusted to it. This is learning. Secondly, he went on, learning can be defined as “a mental process.” Before an individual learns, he must first think. Through thinking, there is an internal change which is evidenced by an observable and perhaps measurable behaviour signifying an improvement on the previous behaviour. External behaviour of the individual emanates from mental process. Thirdly, learning is an acquisition of knowledge, skills and attitudes. This definition indicates that before learning can be said to have occurred, the learner must have registered some facts, skills, and attitudes in his long term memory, the store house of knowledge. Moreover, learning can be defined as a modification of behaviour. This means that an undesirable behaviour or idea can be regulated to suit life’s changing pattern. Furthermore, learning is an elimination of errors. Before learning occurs or during the process of learning several behavioural errors may be encountered. With effective learning taking place, these errors gradually decrease. Many psychologists feel that the most comprehensive definition of learning is that “learning is a relatively permanent change in behaviour resulting from activity, training or experience.” The last word indicates that learning is also experiencing. However, the comprehensive definitions above have three distinct components: (a) that learning is a change in behaviour, but this component is not complete by itself. This is so because not all changes in behaviour can be regarded as learning. When a child is born, his behaviour or activities gradually change from sitting to crawling, to standing, to walking and to running. These are certainly changes in behaviour but they cannot be regarded as learning. They are developmental changes in behaviour. (b)The change must be relatively permanent. Momentary changes in behaviour cannot be regarded as learning. A change in behaviour that can be regarded as learning must persist for a span of time. (c) The change must be due to activity or training. Changes due to fatigue or frustration cannot be regarded as learning. Changes due to drug addiction cannot be regarded as learning. Changes due to alcoholic drink cannot be regarded as learning. Emotional changes in behaviour cannot be regarded as learning. Change of behaviour due to accidents cannot be regarded as learning. (p. 174)

2.1.2.3 Behavioural Concept of Learning

Behavioural concept of learning emerged from an effort to move away from the humanistic tradition of analysis through introspection and interpretation. To make research more impacting and scientific, by directly observable behaviours obviously led to laws of behaviour. According to Bower & Hilgard in Nmadu (2018), for behaviourists:

learning is change in a subject's behaviour or behaviour potential to a given situation brought about by the subject's repeated experiences in that situation, provided that behaviour change cannot be explained on the basis of the subject's native response tendencies, maturation or temporary state (p. 175)

The behaviourists perceive learning as a change in behaviour due to experiences and repeated responses. Ebenebe & Unachukwu also in Nmadu (2018) posit:

This change in behaviour is brought about as a result of stimuli being related to responses according to certain mechanistic principles called conditioning. They further explained that "for them what causes learning to occur is the stimulus (stimuli). The stimuli (environmental agents) act on the learner and cause him to respond or increase the probability of a response of a given type. Behavioural theories thus see learning in terms of connections between stimuli and responses and reinforcement. (p. 175)

2.1.2.4. Cognitive Concept of Learning

The cognitive theories are otherwise known as the cognitive theories of the Gestalt Family. The Gestalt psychology actually originated in Germany during the early part of the Twelfth Century. They are made up of four men in its early developmental stage. They include Max Wertheimer, Wolfgang Kohler, Kurt Koffka and Kurt Lewin. Their theories were seen as opposite of the behavioural theories. The word Gestalt is a German Noun, meaning Pattern, Configuration or whole. These theorists argued that behaviour cannot be understood in terms of its part.

Ebenebe & Unachukwu (1995) point out that "According to cognitivists, we react not to a mere mass of separate details but to a complex organization of stimuli. Consequently, the whole cannot be understood through the analysis of its parts, perception of whole is different from perception of parts" (p. 31). Taettle & Cutietta (2004) affirm:

A number of cognitive theorists developed their ideas in response to behavioural learning theories. Tolman (1932), a behaviourist with cognitive ideas, postulated that learning can occur without reinforcement or changes in behaviour, that there may be intervening variables and individual differences, that behaviour is purposeful and goal oriented, and that learning results in an organized body of information. Ausubel (1968) disagreed with Skinner's claim that an individual must emit an active response in order to learn; he claimed that student might be cognitively active without overt physical action and that expository instruction has its place as long as information is meaningful and can be applied to previous learning. (p. 282)

Summarily, from the cognitive psychologists' view point there were also private changes that took place inside of the learner that the others could not observe. Hence, the private changes in the learner were as essentially a part of learner's learning as the observable ones. The private aspect of learning according to these cognitive psychologists, consist of changes that take place inside the individual's head-in the brain. In support of this, Ebenebe & Unachukwu (1995) state that "reorganizations that take place in the brain, lead to the individual's "seeing" a new pattern of relationships that is what they call gaining "insight". Insight is the key word they use in describing learning. They define learning as a process of gaining new insight or changing old ones. They identify learning with thoughts or conceptualizations. (p. 2)

2. 1. 2.5. Constructivists' Concept of Learning

One prominent theorist known for his constructivist views is Jean Piaget, who focused on how humans make meaning in relation to the interaction between their experiences and their ideas. The constructivist learning theory focus on the learner in thinking about learning (and not on the subject/lesson to be taught) (Hein, 1991:18). In the view of constructivists, learning is a constructive process which the learner is building an internal illustration of knowledge, a personal interpretation of experience. Constructivist learning theories are philosophies which enhance students' logical and conceptual growth. The underlying concept within the constructivism learning theories is the role which experience or connections with the adjoining atmosphere play in students' education. The constructivism learning theories argue that people produce knowledge and form meaning based upon their experiences. (www.teach-nology.com, accessed June 17, 2017)

There were two key concepts within the constructivist learning theories which create the construction of an individual's new knowledge. They are accommodation and assimilation. Assimilating causes the individual to develop new outlooks, rethink what were once misunderstood and evaluate what is important, ultimately altering their perceptions. Accommodation on the other hand is reframing the world and new experiences into the mental capacity already present. Individuals conceive a particular fashion in which the world operates. When things do not operate within that context, they must accommodate and reframe the expectations with outcomes. (www.teach-nology.com, June 17, 2017)

2.2.0. Theoretical Framework

The theoretical framework of this study is hinged on operant/ conditioning learning theory. In Operant conditioning learning theory, learner must do or operate to learn. Without which learning would not occur. The learning theory is centred on reinforcement (reward or punishment) to enhance learning. The learning theory is designed to illustrate the shaping of habits and how reinforcement could be used in the classroom to ensure effective learning. It is based on a positive or negative consequence received by the learner. Hence Onwuekwe (2018) states that:

In a music classroom situation for instance, the learner must actually play keyboard piano in order to learn. A trumpeter who is learning must handle the trumpet; a clarinettist must play the clarinet; a saxophonist must play the saxophone in order to learn. In the same vein, a dancer must dance, a singer must sing in order to learn. When the learner performs appropriately she will be rewarded or reinforced

positively; but if the learner behaves inappropriately, she will be reinforced negatively. (p. 67)

In other words, reward should be given to the student who behaves appropriately while learning in the classroom, to encourage the students to participate while they are learning. Partial reinforcement could be utilized after the evaluations of the week's work and the end of term's work to sustain the student's interest for the subject. Upholding the above, Ebenebe and Unachukwu in Onwuekwe (2018) say:

Motivation embodies all those factors, which increase and decrease the vigour of an individual's activity – what teachers often refer to as effort. The willingness to put effort into learning is a product of many factors ranging from the student's personality and abilities to characteristics of particular learning tasks, incentives for learning and settings (p. 65)

This theory also creates an enabling atmosphere for learning as it helps to checkmate and modify the students' behaviour. For instance, in a situation where a music educator is busy imparting knowledge, some students are in one corner disturbing with noise and another student busy manipulating his/her handset. What is the music educator supposed to do? Another example is where some of the students are actively involved in the learning process and giving the correct answers to questions being asked in the classroom. What is expected of the music educator? Both actions attract consequences which is reinforcement (reward and punishment). From the general perspective, the learner must do or operate in order to learn. When the learner is involved and performs appropriately, he/she would be rewarded positively; conversely, if the learner behaves inappropriately, he/she will attract negative reinforcement (punishment). Nmadu (2018) states that "through operant conditioning an association is made between behaviour and a consequence for that behaviour. When a desirable result follows an action, the behaviour becomes more likely to occur again in the future. Responses followed by adverse outcomes, on the other hand, become less likely to happen again in the future" (p. 177). Kendrain Nmadu (2018) opines that:

Skinner describes operant conditioning as the process in which learning can occur through reinforcement and punishment. More specifically by forming an association between a certain behaviour and the consequences of that behaviour you learn. For instance, if a parent rewards their child with praise everytime they pick up their toys, the desired behaviour is consistently reinforced. As a result, the child will become more likely to clean up messes. Kendra also highlights that reinforcement schedules are important in operant conditioning. This process seems fairly straight forward – simply observe a behaviour and then offer a reward or punishment. However, Skinner discovered that the timing of these reward and punishment have an important influence on how quickly a new behaviour is acquired and the strength of the corresponding response. Continuous reinforcement involves rewarding every single instance of a behaviour. It is often utilized at the beginning of the operant conditioning process. But as the behaviour is learned, the schedule might switch to one of a partial reinforcement. This involves offering a reward after a number of responses or after a period of time has elapsed. Sometimes partial reinforcement occurs on a consistent or fixed schedule. In other instances, a variable and unpredictable number of responses or time must occur before the reinforcement is delivered. (p. 177)

However, this learning theory will be considered in relationship with the computer applications for teaching/learning of music; showing how this learning theory is applied while using the computer applications for teaching/learning of music and vis-a-vis. Onwuekwe, (2017) in lecture note states some educational implications of operant conditioning as:

The learner must do or operate in order to learn. When the learner performs appropriately, it would be rewarded or reinforced positively; but if the learner behaves inappropriately, it will be reinforced negatively. It is also noteworthy that reinforcement depends upon student's activity or the response of the learner. This can psychologically be said that "Reinforcement is contingent upon response." In other words, reward depends upon the learner's activity or participation. Given a stimulus, like food, the subject will repeat the behaviour in order to receive the reward again. (p. 21)

When given a stimulus like food, praise or gift, the subject will repeat the behaviour in order to receive a reward again. If given a negative stimulus, like an electric shock, the subjects will modify their behaviour. The idea of behaviour modification resulted from Skinner's work.

In applying Skinner's operant conditioning, Kennedy (2012), proffers that reinforcing the stimulus such as gold stars for exceptional performance or achieving a certain computer skill is behaviour shaping activity directly controlled by the teacher. Kennedy further states, "Drill and practice software gives a student an immediate response for each question or problem answered correctly. This reinforcement is a skill shaping activity" (p. 2). Drill and Practice Software can as well be applied in line with this learning theory in other areas of music studies such as theory of music, history of music and others; when the learner behaves appropriately or inappropriately. Nart, (2016) opines that Drill and Practice Software allow the students to practice and the students are both able to measure and evaluate student's basic knowledge on the music history and music theory. Students also perform works regarding musical listening, reading, writing and musical form, or harmonic analysis (p. 80). This can provide a more persistent learning since it allows a drill and practice at one's pace. Students can also get feedback by using keyboard. For instance, reward such as gift or praise could be given to students (learners) who use the correct fingering in the skill of piano playing, or students who have acquired the skills of mastering the art of playing piano.

Pavlov's theory proposed that memory consists of two separate but interrelated codes for processing information -verbal and visual. The interrelations and connections of the two systems allow for dual coding of information. Dual coding promotes knowledge comprehension and retention. Verbal system specializes in processing and storing linguistic information (words, sentences and so on). Visual system specializes in processing and storing image or "picture-like" representations. In applying dual-coding, provide a visual Power Point presentation to present facts to students that include visual pictures along with written text in format. When giving student instructions on how to use any particular software, try to include snapshots from the programme so as to help the student learn how to use software; when developing assignments for students try to give them a visual picture as an example to explain activities for students. (Kennedy, 2012).This can be applied when teaching/learning music fundamentals such as audio and visual skills and information pack. This will attract

students' attention and arouse their interest as well as make students to retain knowledge. Tutorial Software, Drill and Practice Software, Game Software, Sequencing and Recording Software can be applied to achieve the purpose of this learning theory for music education. For example, Tutorial Software could be used to engage students to write on life history and works of some music composers like Bach, Handel, Hayden, and so on. As the students comply they are duly rewarded. This will strengthen students' study life as well as strengthen students' behaviour. As they would be engaged carrying out research on the assignment using the Tutorial Software or the Internet to access information.

When teaching and learning with software programming, such as Notation Software, Sequencings Software or Game Software in the classroom, as the students are learning by operating on any given task. For instance, student who got how to read the music notated or chord symbols, reinforcement could be given to encourage and to sustain the students' interest. These software programming are good for learning musical composition, all musical elements and enables music to be written, edited, arranged, listened to, recorded and produced in line with the principles. In line with the above submissions, Williams (2004) reveals that:

For the most advanced students, let them use a professional music Sequencing Software like Cakewalk Home Studio, eMagic's Logic Education, or Tracktion (Raw Material Software). Here the students can use sound samples and loops, but also take advantage of recording their own patterns using MIDI instruments, keyboard, guitar and vocal recordings. For example, rearranging music for voices (OTL Standard 4B: Students arrange piece for voices or instruments other than for those which the pieces were written.' He further explains that this activity is designed to encourage students to arrange instrumental music compositions for SATB voices in style of the Swingle Singers... Any music notation Software will support this activity. (p. 4)

In applying this learning theory in line with Williams' statement above, a student who attempts and correctly rearranges the music piece for voices deserves reward/incentives such as compliments, praise, hand shake, and so on.

2.2.1. In applying the theory to classroom

It is evidenced that the learning theory sighted in this study without doubts seems most appropriate for adoption into classroom. The theory collaborates with the computer applications for music teaching/learning experiences in the classroom. The pair has the tendencies to encourage students' study life. They both complement each other in shaping the students' behaviour as desired outcome is achieved. The theory and the computer applications involve active participation of students thereby, promoting active participation amongst students instead of being passive in the classroom. It spurs the students to learn and to give the desired behaviour.

2.3.0. Empirical Framework

This section of the study features successful studies on computer applications for music teaching/ learning by some notable music educators like Adedeji, Garcia, Nwamara, Onuora-Oguno, Onwuekwe, Onyiuke, Williams and others under the following:

1. Computer Applications Devices for Music Teaching/Learning.
2. The Uses of Computer Applications for Music Teaching/Learning.
3. The Relevance of Computer Applications for Music Teaching/Learning.
4. Possible Solutions to those factors that militate against effective application of computer applications to music education in Delta and Edo States.

2.3.1. Computer Applications Devices for Music Teaching/Learning.

The computer applications devices 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 computer 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). Computer 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 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 you to 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 c 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)

2.3.2. The Uses of Computer Applications for Music Teaching/Learning

The uses of computer applications for music studies cannot be over emphasised as it assists in enhancing music and learning as well as in the achievement of specific objectives of music education. Below are some of the uses of computer applications for music teaching / learning;

Internet has made available necessary information for music studies. According to Adedeji (2004)

Latest and update teaching materials in most subjects are available on the Internet....the African Journals Online (AJOL) comprises past and current editions of African electronic journals... The students can no longer complain of shortage of textbooks with the availability of the Internet. Adedeji further states that “these new ways of learning from the Internet are complementary to traditional classroom teaching rather than taking its place. (p. 6)

Muro in Nwamara (2006) expresses Sequencer as:

...a device that records and plays backperforming information. Sequencers make it possible to change or edit almost any aspect of this information... a Sequencer also makes it possible to save or store performance information, usually on a computer disk. The storage capability will allow you to retrieve the data and play back any song at a later time without having to re-record, the music. A Sequencer therefore is a device that can record, edit, store and play back digital data that represents a musical performance (p. 132).

With the aid of this computer application (Sequencer), the teacher will be able to lead the students on how to use the Sequencer for music performance skills, edit, store, save and produce music. Nwamara (2006) emphasizes that in the recent times, it will be extremely difficult if not impossible for every average Nigerian musicologist to claim ignorance of the availability of varieties of possibilities in the art of music making and creation, using computer technology. He further points that:

In performance, the sequencer which is a computer aided device makes it possible for few individuals to play roles that would have required a large number of performers or even an orchestra under normal circumstances.... Apart from aiding performance, the computer also helps to improve and control the texture of sound and accuracy of pitches in performances. (p. 131)

Onuora-Oguno (2009) finds that the uses of computer applications to music pedagogy are numerous even in the area of composition. He highlights that:

In using a computer as a tool in composition, the composer programmes the computer to produce pitches, rhythms, tone colours and musical elements and to screen these elements through criteria also chosen by the composer. The output may be transcribed for performance by conventional instruments or fed into another device for conversion into sound. The composer's input, in the form of mathematical functions, is translated by the computer into synthesized musical sounds that are stored in digital form and can be played back at will. Computer can be programmed to produce music in traditional styles and instrumental colours, its principal attraction to composers has been its ability to expand the previously available range of musical elements such as tone colours and pitches and the new approaches to musical form it makes possible. (p. 4)

In line with the forerunning, Randel in Onwuekwe (2010) highlights some musical uses of computer as thus:

- i. Digital computers can store, process, sort, and selectively retrieve large quantities of data at very high speed. This has made them useful to musicologists preparing indexes and thematic catalogs.
- ii. When a single work or body of works is numerically represented and stored in a computer, it is possible for a theorist to pose questions of style that can be answered only by the massive and rapid sifting of data made possible by computers.
- iii. Computers are always used for acoustical analysis where the sampled sound can be studied in terms of their harmonic and amplitude structure.
- iv. It is possible to print music with computer system from stored data, from keyboard performance, and in some cases from actual microphone recordings. (p. 444)

Onwuekwe (2010) on the hand enumerates the uses of the computer in music composition as these:

- i. The first use of computers was to compose or assist composers in creating works for instrument or electro-acoustic performance.
- ii. The most significant use of the computers has been to synthesize sound waves. Store as numbers, the sound wave are converted into voltages that drive loudspeakers.
- iii. Although computers can also be used to control analogue synthesizers and other sound equipment such as mixers, direct digital synthesis has most interested composers because all sounds can be recorded, synthesized, and modified in this way.
- iv. Computers can be used for musical score writing. This could be characterized as an Information-translating function. Several programmes are now achieving modest success at producing a traditional written score from some other form of information about a piece of music. The other form may be a list of symbols entered on a typewriter keyboard, or in some cases it can even be the audible sound of live music reaching a microphone connected to the computer.
- v. Many types of software like Finale, Voyetra, Sibelius, Score writer and others abound today. These help the composer to write down his scores and make necessary corrections and/or adjustments during the course of a musical composition. (p. 445)

There are Hardware devices such as varieties of Instruments that can be interfaced with computer to have meaningful musical practices skills. Skinner (2011) asserts that:

A range of instruments can be connected to a computer or via another device called MIDI interface. That is, the instruments can play sounds on the computer and the other way round. A computer can play sounds on an instrument that can produce sounds (like a digital piano). The device that sends message is called a controller, i.e. the keyboard is a controller that sends MIDI messages to another sound producing device. Many kinds of keyboards (from cheap to expensive) are MIDI capable. Some of the keyboards include built-in educational technology and that is often based on MIDI or a related standard. A typical example is a keyboard that can play part of a partition (e.g. the right hand), display the music sheet and then follow the student when he or she is playing the left part. When the student makes a mistake, the keyboard could then stop, wait and signal the error. (p. 2)



Music Producer explaining to the Researcher the functions of some computer applications in the production of music. Muzik Blaze Studio, Asaba.

According to the music producer Wilson (2019)

The MIDI (controller) is used for the input of musical notes to the computer system. The computer serves as the engine room where all the data will be processed and stored. When Software like Cubase is installed into the computer system it becomes Digital audio recording. The recording, mixing and mastering of every audio file take place in the computer. The Mixer is equipment that splits and channels audio for a better sound. The voices and instruments are fine tuned. The Microphone inputs voices and instruments (sound waves) into the system. The Puff Filter filters sounds; it reduces frequencies of unwanted sounds that get into the Microphone. The Sound Monitor otherwise referred to as monitor is also used to check and balance the loudness, softness, intensity etc of the audio sound. He further explained that the Monitor is different from the general speakers. The Sound Card connects the Microphone, Monitors and the Computer together to boost the quality of the general audio after recording. The Sound Card contains varieties of instrumental sounds.

Similarly, Williams (2004) says “a laptop computer can now become a complete recording studio with just the installation of a Software package. The Software synthesizers offer the production of any sound imaginable” (p. 4).

CD-ROMs are packaged multimedia encyclopaedia containing information about any aspect of music, typically, history and style. An MP3 player is an electronic device that can play digital audio files. It is a type of portable media player. CD quality (wave) files that take up much less space on a computer hard drive. Generally speaking, with wireless handheld devices such as personal digital assistants (PDAs), iPhones, iPads, MP3 players, CD Cassettes, Laptops, Hard Disk, flash memory (hard drive) devices, Digital audio and Digital video and others, students can access the internet, check mail, play and store music and other important information. They have options for storing and playing digital books and music. They have ability to record voice notes and a word processing feature. These options allow students with visual impairments to employ the devices as a PAD and digital book player or pair it with Braille keyboard for note taking and internet access. Blog provides communication between teacher and students. Page (2011) agrees that:

There are several ways assistive devices can be used in music, by using special computer programmes, music teachers can convert music notation to Braille, enabling blind students to participate in music classes. For those with severe motor disabilities, special devices can be attached to valve instruments such as the tuba or trumpet so that they may be played by the disabled. (p. 2)

Page further states that “assistive devices allow the disable to become more independent recording or playing their own music, learning an instrument and even communicating with assisted keyboard”(p. 3). Assistive devices for music studies have made learning an easy and stress free task for the physically challenged students. It provides an active participation for the physically challenge students as it is important for every student. Another computer applications device for music teaching/learning is Sound devices. Kerman in Nnamani (2007) concurs that “technology has available to compose every sound in the universe as source materials.” (p. 77) Sound beam in Wikibook (2010) is a device which uses sensor technology to translate body movement into digitally generated sound and image. Furthermore, Wikibook explains that the sound beam device enables students with severe disabilities-cognitive and or motor to participate in music making. Emphasizing that, the most important feature of any assistive technology for music is that it is content driven and not just making sound. Pen drive device, is a cigarette-lighter-sized hard drive. Reilly in Alperis (2004) echoes that “Pen drive is a device that allows recording at concerts, an e-music live device that is inserted into the USB port of computer after concert without burning CDs of live performances” (p. 4)

Computer applications can also be used for record keeping for efficient and proper documentation. This will avoid missing of documents and littering of papers. In Onuora-Oguno’s view point:

Data of students and staff of an institution can be fed into computers and stored for easy reference when required. The sequence of class attendance can easily be monitored from such a data base. Prototype of results sheets fed into the computer also facilitates the delivery of examination results. Lecturers involve just punch in the grades of students after a test and the results are ready. Information such as students’ curriculum vitae and record of academic activities can be called up from a data base. Storing of data in a computer makes for easy accessibility and is aesthetically pleasing. (p. 5)

Tutorial Software provides visual and auditory content about music styles, music types, music history, famous composers, music instruments and others. This can be used to learn these music contents. Nart, (2016) asserts “these programmes can also be used with CD – DVD, they can also be run on the Internet or be used upon installing them on computer” (p. 80). Onyiuke states that “there are software that when installed in the computer, can serve as a tutor for learning the piano, electric keyboard, guitar, saxophone, and many other musical instruments” (p. 104)

Power Point is another computer application that is being used in presentations in the classroom, examination hall or anywhere else. Onyiuke (2009) states that:

In the area of teaching, there are pedagogical tools that are used by music educators who want to share ideas and information with large or small group of students. The electronic white board is a computer implement. This could be utilized by music educators in teaching music theory. It is a presentation device, which interfaces with a computer through a digital projector where they can be seen, and users can control the software both from the computer and from the board. (p. 103)

Heatcote in Onuora-Oguno (2009) reveals some areas of music teaching/learning where Power Point can be used to aid presentation as “aural perception, theory of music, music appreciation, history of music, and general classroom presentation can be enhanced by the usage of Power Point. Microsoft power point is the leading graphics presentation package. Power Point could be used to create, design and organize professional presentation quickly and easily.” (p. 6)

Internet has made music teaching / learning easier as information, textbooks, journals and others are accessible on the Internet. The teachers and students can access the Internet to gather information and updates on music studies. Onuora-Oguno (2009) hints that “digital library and the use of the Internet make research easier” (p. 9). Similarly, Adedeji (2004) clearly states that “the students can no longer complaint of shortage textbooks with the availability of the Internet” (p. 6). Mbanugo (2009) notes that “Internet allows such findings to reach people far and near within the shortest possible time.” (p. 128)

Music research through computer applications provides information to questions that are beyond one’s musical knowledge. According to Mbanugo (2009) “music research serves the purpose of prescribing and directing further research and growth of knowledge about music.” (p. 125)

Onuora-Oguno asserts that “the use of the World Wide Web otherwise known as the www helps the researcher have access to information on Internet.”(p. 5)

E-learning often referred to as distance-learning is made convenient through WAN (Wide Area Network), Online music education, Online interactive services and so on. Adedeji (2009) explains that “WAN also enhances distances-learning programmes. Sandwich, weekend and evening part-time lectures are more effective and less hazardous through WAN.” (p. 5)

2.3.3. The Relevance of Computer Applications for Music Teaching/Learning

Computer applications for music teaching/learning have profoundly remade every facet of musical practices. These devices have accelerated the rate of change in this field and in our society. An Internet source, Garcia (2003) states that:

The use of technology in music education has effected change and attitude of students to music learning. Embracing technology and using it to meet music education objectives has empowered students by giving them more control and access to their own (music) education while exploring interest close to their hearts and by becoming musically literate in the process. The use of music technology has the potential to strengthen the position of music in schools. Technology opened the doors to more students. It allowed them to experience music making as easily as if they were playing in a sandbox. Technological innovations in music have allowed for the same kind of opportunities for general music education for students. What a teacher uses at school to teach can be purchased and used by students at home and teachers. This notion levels the playing field for students and teachers and expands the possibilities, definition and role of music programmes – enriching them and students for better. (n. p)

There are potentials in the computer applications for the teacher and students that need to be harnessed to aid teachers' and students' creative mind. It is observed that the present generation students like to embrace all the things in the ambit of these modern devices. Nwamara (2006) expresses that:

The teaching and study of music, proper and careful incorporation of computer technology enhances the teachers' sense of professional development and personal growth as computer technology provides the music teacher with tools for the development of skills and knowledge. Such tools include various computer software and hardware that satisfy diverse needs in almost every aspect of musicology. It also benefits the students whom these skills and knowledge are being transferred to. (p. 130)

He further states that "in composition, production and preservation of music, the usefulness and importance of computer technology is very conspicuous and quite overwhelming. Computer technology is very essential to the musicologist (composer) from the time he conceives his ideas till he finalizes / rounds off his creative jobs." (p. 130)

Stressing the relevance of computer applications for music education Onyiuke (2009) notes

Computers are playing an increasingly important role in education for both the teacher and the student. Their uses enable each student to develop at his or her own pace and make the whole learning process more flexible. Computer aids to music education have been a major component of the Western pedagogical process. (p. 103)

Onyiuke further explains that:

In the area of teaching, there are pedagogical tools that are used by music educators who want to share ideas and information with large or small group of students. Computer usage in and out of the classroom has gone a long way in enhancing the

students' learning experiences. The computer can act as a member or coach and observe the use of the medium of students. Computers are generally useful to students especially music students in that it enhances the student's attitudes towards classroom music, improves their level of musical achievements and comprehension of musical concepts. Computer also boosts the learners' concentration, cooperative learning and level of creativity. (p. 104)

Onuora-Oguno (2009) asserts that:

Power Point presentation enhances visual illustration during teaching. Distant learning has been made easier with the use of power point and email services. A teacher handling history of music can easily play back musical examples of various eras through a media player. The teaching of virtually every course in music studies has been enhanced through audio and visual aid made easy by computer application. (p. 6)

Power Point plays a very important role for both teachers and students in these areas; teaching, seminars, project defence, theses defence, dissertation defence and so on. A presentation with Power Point makes the presentation very easy, organized, efficient and legible for all to see and read through.

According to Mbanugo (2009)

Interconnectivity of music research findings is enhanced now than ever before. Music research now has a key role in promoting musical knowledge at National and International levels. People everywhere can now afford to share the general wisdom or knowledge that music researchers have gleaned from research. Interchange of music research findings, no doubt, serves to sensitize personnel to musical orientations across the World. (p. 128)

Onuora-Oguno (2009) hints that "Illustrations of the growth of computer aided research include the appearance of the periodical Computer Music Journals, the formation of the Computer Music Association, made up of hundreds of members, and the holding each year of the International Computer Music Conference." (p. 5)

Buttressing the impact of Internet for music teaching/learning Adedeji in Mbanugo (2009) highlights that "Current information on Nigerian; vis-a- vis other country's music can now be put on the Internet for World consumption... (and) global open for a on music are available on the net, which allow academics from all parts of the World to participate in seminars, conferences and other academic discussions. (p. 128)

According Onuora-Oguno (2009) "The computer machinery is flexible and precise, and can yield wide variety of musical applications" (p. 3). The relevance of computer applications for music teaching/learning is boundless. These devices offer the music teacher and students many opportunities in support of music learning and music creativity. Even the physically challenged can benefit from these applications making them feel confident and fulfilled meeting their desires and aspirations. Computer applications have made it possible for music students and music educators to access and to reach out to the World at any time. Internet has made acquisition of knowledge stress free and without distant barrier. Students can explore

the potentials of computer applications, acquire the appropriate skills and become competent in this field. The accessibility of the Internet and music research findings has contributed immensely to the success of this study.

2.3.4. Possible Solutions to the Problems against Effective Computer Applications to Music

The problems notwithstanding, the use of computer applications for music teaching/learning cannot be neglected because these devices have the potential to strengthen the position of music in tertiary institutions in Delta and Edo States. Moreover, we are living in the World dominated with technology. In everything that has to do with music involves the use of computer applications in one way or the other. In every problem there is a solution, the solutions lies in the hands of the Federal government, State governments, Tertiary institutions, parents and the music educators. They are saddled with the responsibility for accomplishment of effective use of computer applications for music teaching/learning. At the first place, the aims and objectives of the National Policy on Education (1981, 2004) for adopting music is thus:

For the acquisition of appropriate skills, abilities and competence both mental and physical as equipment for the individual to live in and contribute to the development of his society.

If the students must accomplish this set aims and objectives, there must be provisions of equipments and facilities with which the expected acquisition of appropriate skills would be passed. Ibekwe (2009) Emphasizes “ that education is the biggest industry a country can be boastful of demands that constructive planning and adequate implementation of policies should be strongly and gallantly adhered to” (p. 15) It is the responsibility of the governments to adhere to the policies and make available all the necessary apparatus for effective transfer of knowledge. The financial commitment for the training of the teachers for the acquisition of the appropriate skills, the supply of required computer applications for teachers and students is the responsibility of the Federal government but in the absence of the Federal government, the States takes responsible like in the cases of Ambrose Ali University, Delta State University, and the Colleges of Education under study. Since the governments yearly set aside some money to fund education, the tertiary institutions should prepare their budget yearly bearing in mind the needs of the school. It is based on this that the Heads of the Department of Music should also present the needs of the department to the appropriate authority to do the needful. If the authority seems not to respond, the Head of the Department should intensify efforts until the needs are met for effective teaching/learning and the furtherance of music education.

In other to encourage aesthetic creative and musical activities, it is imperative the school governments/authorities employ qualified staff or instructors and make available facilities to that effect. Upholding this view, Onyiuke (2009) points out that “Computer literacy should be made compulsory for all teachers in the school. It should serve as a pre-requisite for employment for teachers” (p. 106). Since according to Onyiuke (2009) “there are music educators not being literate. Actually, one cannot give what one does not have.” (p. 105)

It is pertinent that teachers attain a degree of proficiency in computer applications this field, so as to impact to the students the appropriate knowledge and skills. Hence Onyiuke (2009)

suggests that “In-service training and workshops on computer should be organized for teachers both music Nigeria.” (p. 106)

Before the curriculum of music is revisited, the music educators on their own initiative can introduce students to computer applications for music teaching / learning. They can buy some of these devices, if they must enhance their teaching. Encouraging the musicologists Nwamara (2006) states that “musicologists should wake from their slumber; face the musical challenges of their immediate environments, employing the use of computer technology maximally to elevate the ranking of our music in Nigeria communities, Africa and the World.” (p. 135)

The tertiary institutions responsible for the curriculum planning such as National Commission for Colleges of Education (NCCE), National Universities Commission (NUC) should reflect in the curriculum the needs, desires and aspirations of the students and the societal values. They should consider the potentials of computer applications for music education as it enhances the general music learning and as it assists to achieve the set objectives of music education. 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)

The music scholars, musicologists and others should sensitize the NCCE, NUC, school community and associations through campaigns, workshops, seminars and rigorous research, in Delta and Edo States. For computer applications to be integrated into the curriculum there must have been several attempts made through the above mentioned channels.

Summarily, as seen in the submissions above, it is noted that the learning theory in this study believes that one must do or operate to acquire knowledge and that should be reinforced (rewarded) for continuity. On the other hand, computer applications for music teaching / learning enable the students to get involved in learning. As students operate these devices to acquire knowledge and the desirable behaviour is achieved, it attracts reinforcement in one way or the other. An internet source in Onwuekwe (2018) says that:

Students who like to love to read are intrinsically motivated to read-there is something about reading that they enjoy and that makes them want to do it even if there is no reward for it. Extrinsic motivation comes from sources external to the student and the task. It can be through praise, recognition, or a system of rewards. For a example, for students who do not enjoy reading, a token economy involving stickers or a class store may prompt them to read more often (p. 66)

Onwuekwe (2018) asserts that “Extrinsic motivators can also help to develop intrinsic motivation” (p. 66). Operant/classical learning theory and computer applications work hand-hand as they both encourage intrinsic and extrinsic motivation in students for life-long learning. They also have the ability to aid learning by achieving the set objectives of music education as well as the operant/classical conditioning learning theory’s aim.

2.4. Summary of Literature Review

The researcher has been able to search out some concepts, theories and empirical findings that are relevant to this study. The conceptual framework are basically the terms used in this study such as computer applications, teaching and learning in which it is discovered that computer applications for music teaching and learning are hardware, music software, internet, e-learning and others used in all spheres of music studies. The theoretical framework, discussed the Operant /classical conditioning learning theory as it uses reinforcement for the shaping of habits and how reinforcement could be used in the classroom to ensure effective learning. The learning theory in collaboration with computer applications for music teaching/learning illustrated how students can learn by doing and at the same time attract reinforcement (reward). The empirical framework shows some musicologists' works hinged on computer applications; devices, uses, relevance and possible solutions to those factors that militate against effective application of the devices. The study highlighted the relevance and impact of the computer applications to music teaching and learning and how the theory in this study has found acceptance and applicable to computer applications to music education in the classroom. It has been established in this study that the utilization of computer applications is in line with the general goals of music education and that of the computer aided education by researchers to increase the motivation of the students, expand the teaching methods, and develop self- learning skills and others. This can be considered as positive outcomes for both the music students and the music educators and the tertiary institutions in particular.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

This research methodology describes the procedure and methods that are used in the collection of the data for the research. 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 researcher applied the use of mean and standard deviation and frequencies, and percentage for analysis.

3.1. Research Design

The design of this research is a survey. This survey aims at investigating the computer applications in music teaching/learning; how computer applications aid to strengthen students' learning initiatives, as well as students and lecturers having their information competence improved. The design involves the use of questionnaire for lecturers and students, and interviews with the Heads of Department of Music in the institutions under study.

3.2. Area of Study

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, Ekeadolor.

3.3. Population of the Study

The population of the study comprises of all the tertiary institutions that are offering music studies in Delta and Edo states. The target population of 139 made up of music lecturers and music students, interviews were held with the Heads of Department of Music in the tertiary institutions in Delta and Edo States to authenticate the responses from the questionnaire.

3.4 Sample and Sampling Technique

The selection of sample size of students and lecturers of Music Department of the tertiary institutions that are offering music in Delta and Edo States was made. The sample selection was based on their music curricula content analysis relevant to this study. Stratified sampling technique was utilized due to unequal sample sizes from each population.

Table 1: Names of Tertiary Institutions, Town and State.

S/N	Name of Tertiary Institution	Town	State
1	Delta State University	Abraka	Delta
2	College of Education	Agbor	Delta
3	College of Education	Warri	Delta
4	University of Benin	Benin-city	Edo
5	Ambrose Ali University	Ekpoma	Edo
6	College of Education	Ekiadolor	Edo

The researcher visited the institutions to notify the Heads of Departments in charge and music lecturers. Date and time were scheduled for the questionnaire and interview; calls were made to remind participants of the appointed date and time. The music lecturers assisted to select the participants (students) who were administered the questionnaire. Copies of questionnaire were also given to the lecturers to answer. The oral interview was conducted, one-on-one basis, with the Heads of the Department of Music of the tertiary institutions. The survey was categorized and involved the administration of questionnaire to two groups and interview with one group as follows:

- (a) Music Lecturers' questionnaire
- (b) Music Students' questionnaire and
- (c) Interview with the Heads of the Department of music.

Table: 2 Total Numbers of Respondents for the Study

S/N	Name of Tertiary Institution	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	1	4	7	12

	Education, Warri				
4	University of Benin	1	3	30	34
5	Ambrose Ali University	1	1	30	32
6	College of Education, Ekiadolor	1	3	---	4
	Grand Total	6	21	112	139

For obvious reasons, College of Education, Ekiadolor has no students and so the researcher could not administer questionnaire but to three (3) lecturers only. Ambrose Ali University has only one lecturer in music unit. College of Education, Warri has a total of seven (7) music students in the music department. The sum total of the respondents for the study is one hundred and third-nine (139).

3.5 Instruments for Data Collection

The instruments for data collection of this research study are questionnaires for the students and lecturers and interview with the Head of Departments of Music. Each respondent was given a copy of the questionnaire, requiring them to tick their gender, class and answers to the questions. There were fifteen (15) questions containing response options to be answered by the students. The questions in the questionnaire for the lecturers contained nine (9) fixed-response options while one was an open-ended response. Two to four options were provided to be selected from. The researcher considered a number of factors before developing the instrument under the guide of the supervisor. The instruments aimed to find out about lecturers' and students' knowledge and utilizations of computer applications to music education, as well as the application of reinforcement while teaching/learning and the resultant impact.

3.6 Validation of the Instrument

In order to ensure the validity of the instrument, the instrument was guided by the topic, purpose of study, research questions, the entire questionnaires and interview questions to aid the researcher in determining which items can actually elicit the information they intended to elicit. The supervisor and musicologists that is, the experts in this field were consulted to review the questions in terms of clarity, appropriateness of the language used as well as the instructions to the respondents. The validation process ensured both the face validity and content of the questionnaires. Having validated the questionnaires, the next was to carry out a pilot test on the sample of the intended respondents. This enabled the researcher to understand how the respondents could react to the questions in terms of clarity, ambiguity and coverage.

3.7 Method of Data Collection

With the assistance of the Heads of the Department of Music of the tertiary institutions in Delta and Edo States, who organized a suitable environment where questionnaire was administered and collected the same day it was given to the students. The questionnaire given to the lecturers were also collected as a result of having earlier established rapport. The researcher was equipped with audio recorder for an oral interview that was held personally

with the Heads of Department of Music. Other sources (secondary) of data collection were journals, textbooks and internet.

3.8 Method of Data Analysis

The researcher employed the use of descriptive analysis applying qualitative data analysis to achieve the objectives and research questions of this study. The researcher applied the use of frequencies, mean and standard deviation to analyze the data of the respondents and using summarising words as ‘many’, ‘most’, ‘almost’, ‘all’, ‘majority’ and ‘minority’ for qualitative information. The table of content comprises the items, the number of respondents, mean and the standard deviation and frequencies, and percentage for analysis. Below is the pattern used for analyzing the data.

$\bar{x} = \frac{(\sum x)}{n}$, (pronounced “x bar”) signifies the mean; x is each of the values of urinary lead; n is the number of these values; and σ , the Greek capital sigma (our “S”) denotes “sum of”. The formula for standard deviation is

$$\sigma = \sqrt{\frac{\sum(X - \mu)^2}{N}}$$

X - The Value in the data distribution

μ - The population Mean

N - Total Number of Observations

Table 3: Sample of Students’ Distribution of Questionnaire by Instruction and Copies Returned

S/N	School	Number of Questionnaire Issued	Number of Questionnaire Returned
1.	Delta State University	30	30
2.	College of Education, Agbor	15	15
3.	College of Education, Warri	7	7
4.	University of Benin	30	30
5.	Ambrose Ali University	30	30
6.	College of Education, Ekiadolor	–	–
	Total	112	112

From the Table 3 above the number one item is Delta State University having thirty (30) respondents. The second item is College of Education, Agbor with fifteen (15) respondents and the College of Education having seven (7). The next is University of Benin having thirty (30) respondents, thirty respondents from Ambrose Ali University and College of Education, Ekiadolor with no respondent due to temporal non admissions of students into the school.

Table 4: Students’ Distribution by Gender

Item	Number of Questionnaire Issued	Number of Questionnaire Returned
Male	64	64
Female	48	48
Total	112	112

Table 5: Students Distribution by Level

Item	Questionnaire Issued	Questionnaire Returned
Year One	12	12
Year Two	55	55
Year Three	24	24
Year Four	21	21
Total	112	112

Table 6: Lecturers’ Distribution by Gender

Item	Number of Questionnaire Issued	Number of Questionnaire Returned
Male	11	11
Female	10	10
Total	21	21

Table 7: Number of Lecturers’ Distribution of the Questionnaire and Number of Copies Returned

S/N	School	Number of Questionnaire Issued	Number of Questionnaire Returned
1.	Delta State University	5	5
2.	College of Education, Agbor	5	5
3.	College of Education, Warri	4	4
4.	University of Benin	3	3
5.	Ambrose Ali University	1	1
6.	College of Education, Ekiadolor	3	3
	Total	21	21

CHAPTER FOUR**4.0 PRESENTATION AND ANALYSIS OF DATA****4.1. Overview**

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 in chapter one. The area of this study was six (6) tertiary institutions in Delta and Edo States. There were fifteen (15) questions containing response options to be answered by the students. The questions in the questionnaire for the lecturers contained nine (9) fixed-response options while one was an open-ended response. Two to four options were provided to be selected from. A total 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 data obtained for this study is therefore presented and analyzed in accord with the research questions as follows.

4.2. Data Analysis

The findings from the data analysis have been arranged in tabular form with the responses based on the questions asked. The data analysis starts with the students.

4.3. Analysis of Students Questionnaire**4.3.1. Research Question One: (RQ1)**

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

Table 8: Delta State University Students' Responses on the computer applications used for music studies

VARIABLES	N	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 8 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 9: College of Education, Agbor Students' Responses

VARIABLES	N	RESPONDENTS	MEAN	STANDARD DEVIATION
Tutorial Software	15	0	0	0
Sibelius,Finale,NoteWorthy 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 9 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 10: College of Education, Warri Students' Responses

VARIABLES	N	RESPONDENTS	MEAN	STANDARD DEVIATION
Tutorial Software	7	0	0	0
Sibelius,Finale,NoteWorthy Composer	7	0	0	0
Internet	7	0	0	0
Digital audio/video	7	0	0	0
Laptop	7	0	0	0
Drill and Practice Software	7	0	0	0

From table 10 above, it is glaring that none of the students make use of any of the computer applications stated above.

Table 11: University of Benin Students' Responses

VARIABLES	N	RESPONDENTS	MEAN	STANDARD DEVIATION
Tutorial Software	30	0	0	0
Sibelius,Finale,NoteWorthy Composer	30	0	0	0
Internet	30	0	0	0
Digital audio/video	30	0	0	0
Laptop	30	26	0.86	21.06
Drill and Practice Software	30	0	0	0

Table 11 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 12: 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	30	0	0	0
Laptop	30	2	0.06	0.125
Drill and Practice Software	30	0	0	0

Table 12 shows that all respondents use Tutorial Software for music education.

Table13: 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 13 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 make use of none of the computer applications to teach.

4.3.2. Research Question Two: (RQ2)

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

Are you inspired to learn music through computer applications?

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

Table 14: 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 14 above indicated that they are inspired to learn music through computer applications. There was no respondent that signified that they are not inspired to learn through computer applications.

Table 15: 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 15 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.

Table 16: College of Education Warri Students' Responses on their inspirations to learn music through computer applications

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

From table 16 above, all the respondents indicated they are inspired to learn through computer applications even though they are not exposed to computer applications.

Table 17: 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 inspired to learn music through these devices.

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

The use of computer applications to learn

Table 18: Delta State University Students’ Responses on the areas of music they apply computer applications

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

The data above indicates no (0%) respondents for the history of music, 12 (40%) respondents for music composition, 18 (60%) for record music, 0 (0%) for all of the above and 0 (0%) for none of the above. It is observed that the majority of the respondents apply computer applications to record music. Many use it for music composition while none use it for all listed.

Table 19: College of Education Agbor Students’ Responses on the areas of music they apply computer applications

VARIABLES	N	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

From observation in the data in table 20, there is one respondent for the 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 33% of the respondents use not any of the computer applications.

Table 20: College of Education Warri Students’ Responses on the areas of music they apply computer applications

VARIABLES	N	RESPONDENTS	MEAN	STANDARD DEVIATION
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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

As observed from the table 21 above, all the respondents indicated none of the above. Meaning computer applications is not applied in any area of music.

Table 21: University of Benin Students' Responses on the areas of music they apply computer applications

VARIABLES	N	RESPONDENTS	MEAN	STANDARD DEVIATION
History of Music	30	0	0	0
Music Composition	30	0	0	0
Record Music	30	0	0	0
All of the Above	30	0	0	0
None of the Above	30	7	0.23	3.05

As observed from the table 21 above, all the respondents indicated none of the above. Meaning computer applications is not applied in any area of music.

Table 22: University of Benin Students' Responses on the areas of music they apply computer applications

VARIABLES	N	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 22 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 who indicated none of the above. There are many respondents that identified with music recording and many as none of the above; very few indicated music composition.

Table 23: Ambrose Ali University Students' Responses on the areas of music they apply computer applications

VARIABLES	N	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
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From the data in table 23 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 and one declared none of the above. It is discovered that majority use the devices to record music, and not than 2 use the computer applications for history of music.

Table 24: Lecturers’ Responses on the relevance of computer applications for music education

VARIABLES	N	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
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 24 above, indicates that all the lecturers agree that computer applications for music education enhances the teacher’ sense of professional development. It also aids the students’ and teachers’ creative mind. It has effectuated 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.

4.3.3. 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.

Do you learn with computer applications in the classroom?

Table 25: 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 25 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 26: 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 agree they use computer applications to learn in the classroom, 11 (73%) disagree. It reveals that almost all the respondents do not use computer applications to learn.

Table 27: 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 agreed they do not use computer applications to learn music in the classroom. In that case, it is said that all the respondent does not use computer application to learn music in the classroom.

Table 28: University of Benin Students' Responses on Computer Applications Usage in the Classroom

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

Table 29: Ambrose Ali University Students' Responses on Computer Applications Usage in the Classroom

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

From table 29 above, it is seen that twenty-nine (97%) of the respondents agreed the use computer applications 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.

At what level have you introduced computer applications?

Table 30: 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 30 above shows 0 (0%) for year one, 18 (60%) for year two, 12 (40%) and 0 (0%) for year four. This implies that the majority (60%) of the respondents were introduced to computer applications at year two level. The other 12 (40%) were introduced to computer applications at year three.

Table 31: College of Education Agbor Students’ Responses on the year they were introduced to computer applications

VARIABLES	N	RESPONDENTS	MEAN	STANDARD DEVIATION
Year One	5	0	0	0
Year Two	5	0	0	0
Year Three	5	0	0	0

The data in table 31 above, it reveals that all the respondents were never introduced to computer applications to learn music.

Table 32: College of Education Warri Students’ Responses on the year they were introduced to computer applications

VARIABLES	N	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 32 above indicates that none of the respondents has been introduced to computer applications to study music.

Table 33: University of Benin Students’ Responses on the year they were introduced to Computer Applications

VARIABLES	N	RESPONDENTS	MEAN	STANDARD DEVIATION
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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 33 above, it is observed that all the respondents from year one to four were not introduced to computer applications to learn music.

Table 34: 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.

Does the department have computers for teaching and learning music?

Table 35: Lecturers’ Responses on the Departments’ Possession of computer

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%

From the data in table 35 above, it is observed that Delta Sate 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 36: 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 36 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 37: 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. The majority of the respondents fourteen do not apply any computer applications to teach. Minority seven utilizes computer applications to teach.

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 38: Lecturers’ Responses on the areas of music the department apply computer applications.

VARIABLES	N	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 39: Lecturers’ Responses on whether the department have studio

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

As seen in table 39 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 40: Lecturers’ Responses on the functionality of the studio

School	Responses	Frequencies	Percentages of population
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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	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.

4.3.4. 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.

Where did you learn music first? Home School Church

Table 41: Delta State University Students' Responses on First Knowledge of Music

Responses	Frequencies	Percentages
Home	12	40%
School	15	50%
Church	3	10%
Total	30	100%

As seen from the data above, the responses states that twelve respondents' first knowledge of music was from home, fifteen had their first music knowledge was from school and three was from church. Indicating that majority first knowledge of music was from school.

Table 42: College of Education, Agbor Students' Responses on First Knowledge of Music

Responses	Frequencies	Percentages
Home	6	40%
School	3	20%
Church	6	40%

Total	15	100%
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It is observed in table 9 that six of the respondents had their first knowledge of music at home, while three claimed school and six indicated church. From all indication minority had theirs in school.

Table 43: College of Education, Warri Students’ Responses on First Knowledge of Music

Responses	Frequencies	Percentages
Home	3	43%
School	--	0%
Church	4	57%
Total	7	100%

From the above table, the responses from Warri students show that three, first had knowledge of music from home, while none indicated school and more respondents four were church.

Table 44: University of Benin Students’ Responses on First Knowledge of Music

Responses	Frequencies	Percentages
Home	5	17%
School	15	50%
Church	10	33%
Total	30	100%

Table 44 shows the responses of the University of Benin, where five respondents identified having their first knowledge of music from home, fifteen got theirs from school and ten from church. It is observed that majority had their first knowledge of music from school.

Table 45: Ambrose Ali University Students’ Responses on First Knowledge of Music

Responses	Frequencies	Percentages
Home	3	10%
School	15	50%
Church	12	40%
Total	30	100%

The table 45 above states that the responses from the Ambrose Ali University as three respondents indicated home as their first place of music knowledge, fifteen and the others twelve was from church. Half of the respondents had their first exposure to music in school.

Do you have desktop, laptop, both, or none?

Table 46: Delta State University Students’ Responses on Possession of Computer.

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

The data in table 46 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 47: 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 47 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 48: 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 48, 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 49: 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 49 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 50: Ambrose Ali University Students' Responses possession of Computer.

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

Table 50 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.

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

Table 51: Delta State University Students' responses on the awareness of computermusic Software applications.

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

As seen from table 51 above, it is discovered that all the respondents are aware of computer applications for music studies.

Table 52: 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 52 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.

Table 53: College of Education, Warri Students' Responses on the Awareness of Computermusic SoftwareApplications.

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

From table 53 above, it is discovered that all seven respondents are not aware of computer applications for music education.

Table 54: 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 54, 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 55: 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 55 above shows that all respondents are fully aware of computer music Software applications for music studies.

If Yes, from where?

Table 56: 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 57: 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 57, 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.

Table 58: 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 58, states home has zero respondents, the 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 59: University of Benin Students' on ResponsesPossible 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 59 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 60: 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 60 above, it is discovered 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 were exposed to computer applications from school.

Do you have any computer music Software applications to learn music?

Table 61: 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 61 above, twelve respondents have computer music Software applications, signifying that eighteen of the respondents do not have.

Table 62: 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%

As seen in table 62 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 63 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 63 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 64: 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 64 above, it is observed that twenty-four correspondents accepted they possess computer applications. Six owned up they do not possess computer applications. The majority of the respondents claimed they have computer applications to learn music.

Table 65 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 65 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 66: Lecturers’ Responses on Level of Computer Literacy.

Variables	A certificate in computer knowledge	Computer basic & software basic knowledge	Computer music software expert	A certificate in computer knowledge & music software basic knowledge	Computer basic knowledge	No computer knowledge
Respondents	11	1	1	2	4	2
Percentage	52%	5%	5%	9.5%	19%	9.5%

From table 66 above, it states that respondents who have certificate in computer knowledge are eleven, only one respondent has computer basic and music software knowledge. Another one respondent identified computer music software expert. Two respondents signified for a certificate in computer knowledge and music software basic knowledge, for computer basic knowledge respondents are four and two respondents signified for no computer knowledge. The majority of the respondents have certificate in computer knowledge, but without music software basic knowledge. Only two respondents have computer knowledge certificates and music basic knowledge software. It is noted that only one respondent is a computer music software expert.

Does the department have computers for teaching and learning music?

Table 67: Lecturers’ Responses on the Departments’ Possession of computer able 66: Lecturers’ Responses on Level of Computer Literacy

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%

From the data in table 67 above, it is observed that Delta State University and College of Education Ekiadolor, making a total of eight respondents that have computers in their department. The other four departments 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 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 68: Lecturers’ Responses on the Department's 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 68 above shows that two tertiary institutions have computer applications for music studies; they include Delta State University and College of Education, Ekiadolor. The number of respondents that have computer applications are eight, while the number of respondents of those who do not have are thirteen. 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 69: 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 All the seven (7) respondents in table 69 above, who indicated yes, stated two music notations software, they include Sibelius and Finale. In what area of music of music education does the department apply computer applications?

Table70: Lecturers’ Responses on the areas of music the department apply computer applications.

Variables	All	Some	None
Respondents	0	9	12
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 for using computer applications in all areas of music education.

4.3.5. Research Question Five: (RQ5)

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

Table71: Delta State University Students’ Responses on their perception of computer applications for music education.

Variables	Not often interesting	Interestingly engaging	I cannot tell because I do not use it	An enhancer
Respondents	3	12	4	11
Percentage	10%	40%	13%	37%

From table 71 above, three respondents perceive that the devices are not often interesting, whereas twelve respondents find them interestingly interesting, four respondents could not explain because they have never used them. Eleven respondents perceive to be an enhancer. In other words, twelve respondents expressed it is engaging, some other respondents eleven asses it as an enhancer, to some they are not always interesting and four respondents are no exposed to them hence cannot tell.

Table 72: College of Education Agbor Students’ Responses on their perception of computer applications for music education.

Variables	Not often interesting	Interestingly engaging	Cannot tell because I do not use them	An enhancer
Respondents	0	6	11	0
Percentage	0%	40%	60%	0%

From table 72 above, it reveals zero respondents signified for not being often interesting, six of the respondents indicated interestingly engaging, eleven could not tell because they are not exposed to computer applications and none for an enhancer. The majority of the respondents could not express their perception about computer applications because they have never used them.

Table 73: College of Education Warri Students’ Responses on their perception of computer applications for music education.

Variables	Not often interesting	Interestingly engaging	Cannot tell because I do not use them	An enhancer
Respondents	0	0	7	0
Percentage	0%	0%	100%	0%

The data in table 90 above presents that all (100%) the respondents have never used the devices; hence they could not express their perception of computer applications for music studies.

Table 74: University of Benin Students’ Responses on their perception of computer applications for music education.

Variables	Not often interesting	Interestingly engaging	Cannot tell because I do not use them	An enhancer
Respondents	2	6	22	0
Percentage	7%	20%	73%	0%

From the above data in table 74 above, two respondents find computer applications not often interesting, six find them interesting engaging, majority of the respondents could not express how they perceived due to lack of exposure to computer applications.

Table 75: Ambrose Ali University Students’ Responses on their perception of computer applications for music education.

Variables	Not often interesting	Interestingly engaging	Cannot tell because I do not use them	Enhancer
Respondents	8	12	0	10
Percentage	27%	40%	0%	33%

The table 75 above shows that eight respondents find computer applications not often interesting, whereas twelve others signified finding them interestingly engaging, and ten respondents see them as enhancer. It is noteworthy that all the respondents are well exposed to computer application as none signified not using them.

Table 76: Lecturers’ Responses on the prospects of computer applications for music education.

Variables	Opens the doors to more students	It would improve students’ level of musical achievements	Strengthen the position of music studies in schools	Provides the music teacher with tools for the development of skills and knowledge	Students and teachers will acquire the appropriate skills and become competent in this field	Meets with the set objectives of music education and by becoming musically literate in the process	All of the above and more
Respondents	-	-	-	-	-	-	21
Percentage	-	-	-	-	-	-	100%

From table 76 above, it is observed that 100% of the respondents agreed to all the listed prospects and countless potential of the computer applications for music education in tertiary institutions, particularly in Delta and Edo States.

4.3.6. Research Question Six: (RQ6)

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

Table 77: 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%
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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 78: 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 78 above indicates that there is lack of facilities, laptops, computers, internet services and music Software in the department

Table 79: 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 the absence of the governments and the institution’s provision of equipment for computer applications for music education in the department.

Table 80: the 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 80 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 81: Ambrose AliUniversity, 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 the facility, laptop, computers, internet services non-music Software for computer applications for music education.

Table 82: Lecturers’ Responses on the governments and institution provision of equipment

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

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.

4.3.7. Research Question Seven: (RQ7)

What are the problems that militate against effective computer applications to music education in tertiary institutions in Delta and Edo States?

Table 83: Lecturers’ responses on the problems that militate against effective computer applications to music education

Variables	Lack/inadequate Facility	Inappropriate acquisition of skills and knowledge	Insufficient Competent personnel	Lack/inadequate funding	Non integration of computer applications for Music education into scheme of work	Lack of maintenance culture	Non-in-service Programmes In this field
Responses	21	21	21	21	21	21	21

Percentage	100 %	100%	100%	100%	100%	100%	100%
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Table 83 above clearly states that 100% of the respondents agree that Lack/inadequate provision of facility militate against effective computer applications to music education. They also point out the inappropriate acquisition skills and knowledge. The 100% assert insufficient competent personnel militate against effective use of computer applications for music education. All the respondents maintain that the lack/inadequate funding and lack of maintenance culture have advent effect as well. Finally, none in-service programmes also militate against the effective computer applications to music education in Delta and Edo States.

4.5.0. Interview with Lecturers

Here are the responses to the questions posed to the lecturers on personal communication held with the six heads of the department of music in the tertiary institutions in Delta and Edo States under study.

The interview highlighted on the following areas.

- (a) Contents of music courses.
- (b) Knowledge and usage of computer applications by the students and the lecturers in the department.
- (c) Level of computer applications literacy.
- (d) Availability of the equipment and facilities to facilitate the effective use of computer applications.
- (e) Accessibility of computer applications to students and lecturers.
- (f) Commitment of the government, institutions and the heads of the department in provision of equipment for computer applications in music education.

4.5.1. Research Question One

What Are The Contents Of Music Education In Tertiary Institutions In Delta And Edo States?

With the aid of the document analysis of the handbook of Music Department of the tertiary institutions in Delta and Edo States, it is observed that the music contents are basically; rudiment and theory of music, musicianship, composition, analysis, applied music, African music studies and appreciation respectively. According to Delta State University handbook, students are introduced to computer basic knowledge from year two (first semester only), in year three the students begin to apply computer applications Software like Sibelius and Finale for composition. In their second semester they go on 6-month students' industrial work experience scheme (SIWES) in their school environment in their specialised field; music media, music production, music composition and musicianship. In year four, in their stress area courses, each student is required to choose from courses in the appropriate stress area applicable to him / her. So that is where music technology studies come in; exposing the students further to different computer applications for music studies. Colleges of Education,

Agbor and Warri have no music course content that requires computer applications for music studies.

On other hand, the University of Benin has Music Unit where their music contents are the rudiments of music and theory of music. The Head of the Department said she is intensifying effort (meetings with the appropriate school authority) to have all the necessary equipment and facilities including Hardware and Software. For now, no music study content requires computer applications for music study. Similarly, Ambrose Ali University has a music unit, with the same music course content but the only lecturer in the unit, on his own uses computer applications to teach music from year one to year four. The College of Education, Ekiadolor has the same music course contents like the other two colleges of education mentioned above. But what distinguished the later is that with the assistance of the school authority they have a studio where students can learn and record music album or CD cassettes.

4.5.2. Research Question Two

Knowledge and Usage of Computer Applications By The Students And The Lecturers In The Department

(a) Are you aware of computer applications for music studies?

All the respondents obviously, are aware of computer applications for music education. The respondents include; Layade of the Delta State University, Uche of the College of Education, Agbor, Dick-Duvwarovwo of the College of Education, Warri, Mokwunyei of University of Benin, Aluede of Ambrose Ali University and Aibuedefe of the College of Education, Ekiadolor.

(b) Does the department utilize computer applications for music studies?

Majority of the respondents accepted they do not utilize computer applications for any music studies. While minority of the respondents apply computer applications for music studies, among who are Layade of the Delta State University, Aluede of Ambrose Ali University and Aibuedefe of the College of Education, Ekiadolor. According to Uche of the College of Education, Agbor and Dick-Duvwarovwo of the College of Education, Warri, it is not included in their curriculum. Mokwunyei of University of Benin, said she is working hard towards having every equipment and facilities for computer applications that covers all aspect of music studies, she said it in progress.

(c) In what areas of music education is the computer applications applied?

In response to the posed, Layade of the Delta State University mentioned; Real F.M. for music media students, music performance students, composition students and musicianship. Aluede of Ambrose Ali University said it is applied in aspects of rudiments of music, and Aibuedefe of the College of Education, Ekiadolor mentioned it is applied in composition, history of music and appreciation of music studies.

4.5.3. Research Question Three

Level of Computer Applications Literacy.

(a) What is the level of computer applications literacy the lecturers?

Layade of the Delta State University, answered that she is computer applications expert although not all the lecturers in the department are computer applications literate due to their area of studies, but there are computer applications basic knowledge literate lecturers in music media, music performance, composition, and musicianship. As for Uche of the College of Education, Agbor and Dick-Duvwarovwo of the College of Education, Warri and Aibuedefe of the College of Education, Ekiadolor said all the lecturers have certificate in computer but not related to music as it is one of their criteria for promotion. This is organised by the schools' authority yearly. At the University of Benin, there is no certified computer literate; however, they have computer basic knowledge and computer applications basic knowledge. Similarly, Aluede of Ambrose Ali University is exposed to basic computer applications knowledge.

Summarily, all the Colleges of Education in this study are certified computer literates and yearly upgrade although not in relation to music education. There are some lecturers with basic computer applications knowledge in Delta State University just like there are lecturers without computer knowledge. The lecturers in the two understudy Universities in Edo State have only basic computer applications knowledge no certificate in any computer knowledge non in computer applications.

4.5.4. Availability of the Equipment and Facilities to Facilitate the Effective Use of Computer Applications.

Majority of the tertiary institutions in Delta and Edo States are not equipped neither have they facilities to facilitate the effective use of computer applications. Except the Delta State University, and the College of Education, Ekiadolor that have some equipment and facilities to this effect, though to some areas of music studies. The Colleges of Education, Agbor and Warri lack equipment and facilities and so does University of Benin. In Ambrose Ali University, the only lecturer in the music unit uses his personal hard and software for now. According to Mokwunyei of University of Benin, the provision for such equipment and facilities are in progress.

4.5.5. Research Question Five

Accessibility of Computer Applications to Students and Lecturers.

In Delta State University, the students and lecturers have access to computer applications, as the students and lecturers indicated in their responses. The students are made to attend a 6-month Students Industrial Work Experience within the University. The Colleges of Education, Agbor and Warrilack equipment and facilities so the students and lecturers have no access to what they do not have. According to Mokwunyei of University of Benin, she said 'hopefully' they will have all computer applications. In Aluedes' words "I use my personal one and the students I have taught over time had theirs." The College of Education, Ekiadolor has equipment and facilities that students and lecturers access.

4.5.6. Research Question Six

Commitment of the Government, Institutions and the Heads of the Department in Provision of Equipment for Computer Applications in Music Education.

In Delta State University, the government provided a multipurpose studio; FM radio where music media, performance students practice. They have musicianship lab and performance studio. There is no presence of the government nor the institutions' in the music department of Colleges of Education in Agbor and Warri; lack of equipment and facilities. Noticed they lacked Colleges maintenance culture. The two music studios are non functional. As at the time of this study, the Head of Department of Music, University of Benin in support of the school authority is working towards acquiring the equipment and facilities for computer applications and others for music education. The government has not shown any interest in music unit of the Ambrose Ali University; no equipments and facilities. College of Education, Ekiadolor is well equipped by the government; hence some students could produce albums before graduation.

4.6 Summary of Findings

4.6.1. The summary of Findings for Research Question One

What are the computer applications used for musical education in the tertiary institutions in Delta and Edo State?

It is discovered that 50% of the students and lecturers of Delta State University make use of Sibelius, Finale, Note worthy composer. 40% of the students use the internet for music studies. No student indicated using the tutorial Software to study music, 17% of the students signified using Digital audio/video for music studies and 70% use the laptop for music studies. The Colleges of Education in Delta (Agbor and Warri) have none of the computer applications to teach music. Whereas their counterpart (College of Education, Ekiadolor), make use of computer applications to teach the students music. The University of Benin has none of computer applications for music education never the less, it was told the researcher that it is in progress. At the Ambrose Ali University, the students are taught the rudiments of music with lecturers' personal Tutorial Software. In all the tertiary institutions in Delta and Edo States computer applications is not applied in all area of music.

4.6.2. The summary of Findings for Research Question Two

The relevance of computer applications for musical education in the tertiary institutions in Delta and Edo State?

Majority (80%) of the respondents are inspired to learn music through computer applications.

It is observed in table 24, that all the lecturers indicated that computer applications for music education enhances 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.

4.6.3. The summary of Findings for Research Question Three

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

From the data in table 35, it is observed that Delta State 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, 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 computers 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.

4.6.4. The summary of Findings for Research Question Four

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

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.

4.6.5. The summary of Findings for Research Question Five

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

40% of the students in the tertiary institutions under study find computer applications for music education interestingly engaging and an enhancer to their study. Majority (60%) could not express the prospect due to the lack of exposure to computer applications for music education. From table 76 above, it is observed that 100% of the respondents agreed to all the listed prospects and countless potential of the computer applications for music education in tertiary institutions particularly in Delta and Edo States.

4.6.6. The summary of Findings for Research Question Six

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?

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 computer applications to the majority.

4.6.7. The summary of Findings for Research Question Seven

What are the problems that militate against effective computer applications to music education in tertiary institutions in Delta and Edo States?

From table 82 above, it clearly states that 100% of the respondents agree that Lack/inadequate provision of facility militate against effective computer applications to music education. They also point out the inappropriate acquisition of skills and knowledge. The 100% assert also that insufficient competent personnel militate against effective use of computer applications for music education. All the respondents maintain that the lack/inadequate funding and lack of maintenance culture have advent effect as well. Finally, none in-service programmes in this field also militate against the effective computer applications to music education in Delta and Edo States.

CHAPTER FIVE

5.0 DISCUSSION OF FINDINGS, SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussion of Findings

In the world today, every sphere of education has moved to the utilization of computer applications to aid teaching/learning experiences. It is however amazing, that inspite of advancement and sophisticated presence of computer applications in all fields of studies and music studies in particular, as well as much emphasis on the impacts and relevance of computer applications for music teaching/learning (Adedji, 2004; Nwamara, 2006; Onuora-Oguno, 2009; Onwuekwe, 2010, 2017, 2018 and others) almost all the tertiary institutions in Delta and Edo States in this study are not yet exposed to computer applications for music teaching / learning. The discussion on the findings in this study will follow the sequence of six research questions as:

- i. Level of computer applications literacy of the lectures and students.
- ii. Accessibility of computer applications to the lecturers and students.
- iii. Computer applications used for music educations in the tertiary institutions.
- iv. The extent the lecturers and the students maximize the potentials of computer applications for music teaching/learning
- v. The level of commitment of the government and the institutions in the provision of equipment and facilities for computer applications for music teaching/learning in Delta and Edo States.
- vi. The use of reinforcement during teaching/learning process in the classroom.
- vii. Level of computer applications literacy of the lectures and students.

The level of computer applications literacy among the lecturers in tertiary institutions in Delta and Edo States is generally poor. Only one of the respondents indicated being an expert in computer applications for music education. All the respondents in the Colleges of

Education in Delta State lack computer applications knowledge however, they are only exposed to computer knowledge backed up with certificate to show for it, but not related to computer applications for music teaching/learning. This is because they are compelled to go through the training programme yearly without which they will not be promoted. Almost all the lecturers are computer applications illiterate except for few who have computer applications basic knowledge and they teach the students with computer applications during learning processes like some lecturers in Delta University, and Ambrose Ali University. If almost all the lecturers are computer applications illiterate it then means that almost all the students would be computer applications illiterate, because the lecturer cannot impart what he /she does not possess. The fact is, there is mass computer applications backwardness in tertiary institutions in Delta and Edo States.

(ii) Accessibility of computer applications to the lecturers and students.

Almost all the tertiary institutions in Delta and Edo States do not have computer in their department for music studies except two schools (Delta State University and College of Education, Ekiadolor). The lecturer in Ambrose Ali University makes use of his personal computer and computer applications to teach. There is no presence of computer applications in majority of these tertiary institutions. In other words, there is no accessibility of computer applications for music teaching/learning for lecturers and students in tertiary institutions in Delta and Edo States with the exception of only two schools amongst them.

(iii) Areas of music studies computer applications are used in the tertiary institutions.

There are few schools (Delta State University, Ambrose Ali University and College of Education, Ekiadolor) that apply computer applications to teach the students in the classroom. They use it for composition, music history, musicianship, music media, music performance, music appreciation, music recording/album production. This is indicative that computer applications are not applied in all the music courses in these tertiary institutions in Delta and Edo States.

(iv) The extent the lecturers and the students have maximized the prospects of computer applications for music teaching/learning

As have seen in the forerunning, the lecturers and the students have not maximized half the potentials of computer applications for music teaching/learning. Majority of the institutions are lagging behind computer applications wise.

(v) The level of commitment of the government and the institutions in the provision of Equipment and Facilities for Computer Applications in Music Teaching/Learning in Delta and Edo States.

The non-availability of equipment and facilities of computer applications for music teaching / learning in these tertiary institutions reflects on the level of commitment of the government and that of the institutions in the provision of computer applications. In the University of Benin, efforts were being made by the school authority to provide equipment and facilities of computer applications for all music studies. According to the Head of the Department of Music Unit, their provision is in progress. The only lecturer in Ambrose Ali University

complained that he has written to the school authority through the Head of the Department for computer applications facilities twice and has not received any answer as at the time of this investigation. Some of the schools particularly the Colleges of Education, have no plans for computer applications for music teaching / learning experiences and that the studio they have are not maintained, at the time of this study, these studios are non-functional. The Heads of the Department seem helpless on what to do to revamp the studio, since they are not getting attention from the government and the institution.

(vi) The use of reinforcement during teaching/learning process in the classroom.

The essence of using reinforcement in this study is to establish how it promotes learning and brings the wanted behaviour in the students. From the general perspective operant/classical conditioning learning theory, the learner must do or operate in order to learn. As they do they receive incentives. When the learner is involved and performs appropriately, he/she would be rewarded positively; conversely, if the learner behaves inappropriately, he/she will attract negative reinforcement (punishment). When the students were asked if they receive any form of incentive or commendations during learning process, 60% of the respondents signified they receive while 40% claimed they never received any. When asked how often they receive it almost all of them stated not regular. Then asked further, on how they feel whenever they are commended. All the respondents (100%) in this study indicated it inspires them to learn more. This implies that reinforcement promotes study habits. When the students who indicated they have received punishment were asked why, they stated it was for unwanted behaviour. By this, it helps bring the right behaviour in the students in the classroom. It was observed that the majority of the lecturers use reinforcement in the classroom. But few of the lecturers indicated they use it whenever they remember. It is worthy of note that reinforcement propels the students to learn and very vital in the learning life of a student. Upholding the above, Ebenebe and Unachukwu in Onwuekwe (2018) say:

Motivation embodies all those factors, which increase and decrease the vigour of an individual's activity – what teachers often refer to as effort. The willingness to put effort into learning is a product of many factors ranging from the student's personality and abilities to characteristics of particular learning tasks, incentives for learning and settings (p. 65)

5.2 Summary

The study focuses on computer applications for music pedagogy. The purpose was to investigate computer applications in tertiary institutions in Delta and Edo States. It highlights some views and contributions of scholars, theorists and musicologists on relevant concepts, theories and empirical findings relevant to this study. The design of the study is a survey; the target population is made of students and lecturers of tertiary institutions who are offering music studies in Delta and Edo State and library research for relevant literature, internet services and chance talks are the methodologies applied for this study. It was discovered that; the majority of the tertiary institutions in Delta and Edo States lack equipment and facilities for computer applications in the departments of music. All the colleges of education lecturers in Delta and Edo States have certificate in computer knowledge but not related to music education neither are they exposed to computer applications for music education. Few lecturers (43%) have the basic computer applications knowledge that they apply in their subject area. The students perceive computer applications as engaging and enhancer to their

musical practices. The findings in this study necessitated the recommendations and suggestions for further studies made in this work.

5.3 Conclusions

Music education globally has moved towards the use of computer applications in all spheres of music education. We are living in the world where computer applications dominate; everything that has to do with music involve the use of computer applications in one way or the other. Despite the much highlights and emphasis on the relevance and impact of computer applications on music studies by some notable musicologists. The tertiary institutions that are offering music studies, in Delta and Edo States are still lagging behind in these developments. Looking into their music education contents it was observed that the music contents are basically; rudiments and theory of music, musicianship, composition, analysis, applied music, African music studies and appreciation. As highly practical methods in the modern music education, computer applications with their characteristic visual image and interaction, provide a new approach to music learner. Therefore, the contents of music education should be reviewed and amended to include realistic processes of integrating computer applications for music pedagogy. The institutions who are yet to implement the use of computer applications to music education should follow the trends and those whose facilities are not in use, incomplete, in progress or that have inadequate personnel should step up and music educators should a personal development in this regard for the furtherance of music education.

Delta State University seems to gradually integrate computer applications judging by their music education contents; Real FM for their music media, performance and production and management students, and this takes place in their 300 level which seems a little late starting. College of education Ekiadolor and Music Unit Ambrose Ali University the lecturers on their own initiative apply computer applications to teach students. With the assistance of the government Music Department Ekiadolor established a standard studio where students learn and record album. This implies that if few of these tertiary institutions can do it, it is then realistic and realisable. It is worthy of note, that almost all the students indicated they do not receive reinforcement from lecturers in the process of learning. All the students signified that when they receive reinforcement it makes them want to learn more. In line with the above, Onwuekwe (2018) asserts that “in a music classroom situation.... When the learner performs appropriately, she will be rewarded or reinforced positively” (p. 67). It is imperative to praise, recognize or commend wanted behaviour or responses from the students. As this helps to promote learning, as it is seen that all the students in the tertiary institutions in Delta and Edo States concurred. It is observed that no attempt is being made by the government, some institutions or some heads of department in the provision of equipments and facilities for effective and efficient application of computer applications to support the conventional way of teaching / learning. The studio some claimed they have is not functional. It was observed that some of the studios were well furnished but could not be maintained

5.3. Recommendations

On the basis of the findings in this study, the following recommendations are proffered

- i. Heads of Department of music of the tertiary institutions in Delta and Edo States should create a forum for regular upward review on the existing and the implementation of computer applications to aid music studies.
- ii. The tertiary institutions' commissions responsible for the curriculum planning, such as National Commission for Colleges of Education (NCCE), National Universities Commission (NUC) should liaise with and in conjunction with the Heads of Department of Music, to reflect in the curriculum the needs, desires and aspirations of the students and the social-economic values. They should consider the potentials of computer applications for music education as it enhances the general music learning and as it assists to achieve the set objectives of music education.
- iii. The yearly computer programme organized by the National commission for Colleges of Education should relate to and reflect in their course areas.
- iv. The heads of department should sensitize the appropriate authority in their institution, of the relevance and the need for computer applications and to solicit for their support.
- v. As the Nigerian Musicologists are striving for the upgrade, functional relevance of music education in Nigeria, they should also compel all department of music in tertiary institutions in Nigeria to implement the use of computer applications for music teaching / learning as it is obtainable globally.
- vi. Employ computer applications experts that would assist in the in-training of music lecturers to enhance their teaching. Experts by the approval of the authority in the tertiary institutions should assist in the planning and the integration of computer applications for music teaching/learning.
- vii. The institutions that are yet to implement the use of computer applications for music pedagogy should follow the trends. Those whose facilities are not in use, incomplete, in progress or that have inadequate personnel should step up.
- viii. Music educators should have a personal development in this regard for the furtherance of music education.
- ix. The lecturers should adopt the use of reinforcement in their teaching to promote learning and for effective classroom management.
- x. Heads of department should endeavour take inventories of items acquired and develop maintenance culture.
- xi. Finally, the heads of department of music should subscribe through online with the institutions or organizations that will have them access their facilities. LikeeMedia Playing Music Made Easy <https://www.emediamusic.com/music-education-software/music-education-for-schools.html> Enquiries (888)3633424 Mon- Fri 9am-5pm. Arpegew www.arpegemusic.com/music-education-software.htm Pizzicato developed for many aspects of music education.

5.4 Suggestions for Further Studies

This research has not in any way covered the study that is required for computer applications. However, this can serve as a foundation for further research. This may include computer illiteracy a hindrance against effectiveness and efficiency, integrating computer applications to music education, strategies for effective use of computer applications in the classroom, embracing computer applications for music studies, computer applications: an enhancer of music education and enhancing music education through computer applications. The missing

link is the non inclusion of computer applications in music curriculum in tertiary institutions in Nigeria.

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