PROSEPCTS AND CHALLENGES IN USING VIRTUAL MUSICAL INSTRUMENTS IN SELECT RECORDING STUDIOS IN BENIN CITY, NIGERIA

BY

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A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF THEATRE ARTS (MUSIC PROGRAMME) FACULTY OF ARTS, UNIVERSITY OF BENIN, BENIN CITY, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF ARTS DEGREE, B.A IN MUSIC, UNIVERSITY OF BENIN, BENIN CITY.

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DECLARATION

I declare that this project is based on the study undertaken by me, Okoduwa, Prosper Osose, in the Department of Theatre Arts (Music Programme) under the supervision of Dr. P.O Odogbor. All views are products of my personal research, and where the views of others have been used and expressed, they were duly acknowledged.

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Okoduwa Prosper Osose

CERTIFICATION

I certify that this project was undertaken by Okoduwa, Prosper Osose (MAT. NO. ART2000888) under my supervision.

_____ _____

_____ **Dr P.O Odogbor**

Date

Project Supervisor

DEDICATION

I dedicate this project to God Almighty.

ACKNOWLEDGEMENTS

I wish to acknowledge God Almighty for being my source of inspiration, for His divine strength, provision and protection all through my years in the university.

My sincere gratitude goes to my project supervisor, Dr P.O Odogbor for his guidance, suggestions, support and worthy contributions toward the successful completion of this work.

My profound gratitude goes to my beloved parents, Mr. Victor Okoduwa and Mrs. Omo Okoduwa for making provisions and sacrifices towards ensuring that I get the best of education, showering me with endless love and support throughout my stay in the university. I thank all my family members who have in one way or the other contributed to my upkeep financially and otherwise.

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ABSTRACT

Advancement in technology has changed the way in which music is now produced and consumed. Over the years, the production of music has gone through several eras and these eras have had significant influences on how music was made and consumed. From the analog era where physical instruments were needed for recording to the digital era where, virtual instruments are used to replace the need for physical instruments. Considering how recent and evolved these developments of the virtual musical softwares are, it is probable that much scholarly work has not been written on it, especially within the concepts of the engineers and producers experiences. Hence, this work is meant to fill that gap.

This research project explores the prospects and challenges associated with the adoption and integration of virtual musical instruments in recording studios in Benin City, Nigeria. Through the use of a qualitative methodology such as the interview, this study examines the impact of virtual musical instrument on the workflow, cost-efficiency, and artistic output of local recording studios. Key findings highlight the potential for virtual musical instrument to democratize music production by providing access to a wide array of high-quality sounds and instruments at a fraction of the cost of traditional hardware. However, the research also identifies significant challenges, including technical limitations, and resistance from traditional musicians and producers. The study concludes with recommendations for overcoming these challenges and maximizing the benefits of virtual musical instruments in the context of Benin City's vibrant music scene.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

According to George Tanev and, Adrijan Bozinovski (182), Music production in the 21st century is heavily based on the use of high-performance computer-based systems, and the increasing production of software applications that not only provide high quality digital sound processing, but are also capable of pristinely emulating tons of sample and high-end hardware devices used in the music industry throughout history. One of the good of this development is to enable the integration of as much musical equipment as possible into one single device. Virtual Studio Technology (VST) developed by Steinberg; a software production company based in Germany, was a major highlight as well as the leading achievements in this domain.

Prior to 1996, digital music had been made using the Digital Audio Workstation (DAW) to control keyboards and samplers, via a Musical Instrumental Digital Interface (MIDI) and then routing all their external hardware through a traditional mixing desk. With the release of Cubase 3.02 in 1996, Steinberg announced the virtual studio Technology (VST) interface specification which allowed the use of software instruments and effects inside a DAW.

In 1999, Steinberg updated their VST specification allowing VST plugins to receive MIDI data. This upgrade saw the birth of the Virtual Studio Technology Instrument (VSTi) which made it possible to recreate the keyboards, synths and drum machine in the software. The first VST instrument, a polyphonic virtual synthesizer was called ‘Neon’.

A virtual instrument (or VSTi) is a tool for generating sounds. It typically receives MIDI data as an input, either from the Piano roll of your DAW or from your MIDI keyboard or other device. The two main kinds of virtual instruments are synthesizers and sample-based instruments.

VST synthesizers generate audio from scratch, based on MIDI input while sample-based VST instruments emulate real world instruments. They trigger chunks of pre-existing audio.

The VST plugin was developed by Steinburg to enable a complete studio to be created in a software. It has since given rise to other plugins like Apple's AU (which was created exclusively for macOS and OSX), Avid's RTAS and AAX.

The power of VST plugins is in their broad compatibility. While VST was developed by Steinberg, anyone can use the VST standard to develop plugin instruments and effects.

1.2 Statement of the Problem

Due to the evolution of technology, the integration of virtual musical instruments in recording studios has significantly transformed the music production landscape, offering a wide range of benefits such as cost effectiveness, versatility, and accessibility to a wide range of sounds. However, considering how recent these developments of the virtual musical instruments are, it is probable that much has not been written on it scholarly, especially within the concept that the engineers and producers experience themselves and this work is used to fill this gap in knowledge. Hence, this research aims to explore the prospects and challenges associated with the use of virtual musical instruments, using recording studios in Benin City as a case study.

1.3 Objectives of the Study

The primary objective of this study is to examine prospects and challenges in the use of virtual musical instrument in music production among studios in Benin City. The specific objectives are to;

Highlight what constitute virtual musical instrument

Discuss the perspectives of studio owners and engineer to the use of virtual musical instrument

Describe how virtual musical instruments are used

Highlight the prospect and challenges associated with the use of virtual musical instruments

1.4 Research Questions

This study is guided by the questions highlighted subsequently;

What are virtual musical instruments?

What are the implications of virtual musical instruments on the quality, authenticity, and originality of music production?

What are the technical considerations and requirement needed for the effective use of virtual musical instruments?

What are the primary benefits and challenges faced by musicians, producers, and engineers, when utilizing virtual instruments in the process of music production?

1.5 Significance of the Study

This study is significant in several ways. Firstly, it examines the prospects and challenges of using virtual musical instrument in recording studios in Benin City, observing how this method of instrumentation affects the quality, authenticity and originality of music production.

Secondly, due to the evolution of technology over the years, this study aims to reveal the technical considerations and requirement needed to optimize the use of virtual musical instruments.

1.6 Scope of the Study

This research is limited to investigating the opportunities and obstacles related to the utilization of virtual musical instruments, specifically in Benin City, Nigeria. It involves examining the advantages, limitations, impact on music production, quality, acceptance by musicians and producers,

technological infrastructure and potentials for enhancing the music industry in Benin city. This study would focus on understanding how virtual instruments are integrated into the music production process in Benin city, Nigeria, and its implication on the local music scene.

1.7 Limitations of the Study

The study experienced some limitations during the process of research. These are discussed as follows;

As a result of limited professional studios in Benin city, it was difficult to access necessary information/data on the research topic.

The unavailability of reliable books and materials on information relating to the use of virtual musical instruments posed a limitation to the study.

1.8 Definition of Terms

Prospects: According to Merriam Webster Dictionary, prospect means possibility. Hence, in the context of this study, prospect refers to the potentials and possibilities of the virtual musical instrument during music production.

Challenges: According to Merriam Webster Dictionary, challenges mean a stimulating task or problem. Hence in the context of this study, challenges refer to the difficulties or problems encountered while utilizing virtual musical instruments in recording studios.

Virtual: According to Merriam Webster Dictionary, virtual mean occurring or existing primarily online. Hence, in the context of this study, virtual refers to digital simulations that are created and manipulated using software.

Musical instruments: According to Merriam Webster Dictionary, a musical instrument is a device used to make musical sounds.

Recording Studios: According to Collins Dictionary, a recording studio is a room where musical sounds are made and captured.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 The Concepts of Recording and Production

Recording and production are essential ways to capture, manipulate, and enhance sound to create a final musical product. Sound which is the foundation of music creation was described by Davis and Jones as “a class of physical kinetic energy called acoustic energy” (1).

According to Huber and Runstein “When a recording is made, we are actually capturing and storing sound so that an original event can be recreated at a later date” (33). Hence, the process of editing, mixing and mastering the captured sound is referred to as Production.

The world of modern music and sound production is multifaceted. It’s an exciting world of creative individuals such as musicians, engineers, producers, manufacturers, and business people who are experts in such fields as music, acoustics, electronics, production, broadcast media, multimedia, marketing, graphics, law, and the day-to-day workings of the business of music. The combined effort of these talented people works together to create a marketable music (Huber and Runstein 1).

2.2 Origin and Development of Music Recording

Mark Katz has helped to prove that the sole purpose of inventing music recording was to preserve musical performances for posterity. In his words “When sound is recorded and preserved in a physical medium, however, the listener’s consumption needs not end when the singing is over, for the music can be separated from the performer and be replayed without the artist's consent” (10). However, the quality of the recorded sound and its repeatability has progressed in waves driven by the invention and commercial introduction of new technologies.

There are four kinds of sound recording technologies that have emerged so far since the evolution of sound recording; Mechanical or acoustic recording, electronic recording, Magnetic recording, and Digital recording (Thaker 57).

2.2.1 Mechanical or acoustic recording

The Phonautograph is a mechanical sound recording tool created by French Inventor, Eduard-Leon Scott. The design was a cone-shaped speaker/microphone attached to a sharp point that touches the surface of paper. This tool was patented by Scott on March 25, 1857, and believed to be used in the 1860s opera concerts to play French folklore music. According to Yerodin, the phonautograph paved the way for the future inventors who introduced to the world not only better capable sound recording devices, but also sound reproducing devices. Only a few decades after Scott's innovation, the world was presented with the ground breaking device made by Thomas Edison that would change the way we listen to music and the landscape of music industry- Phonograph (45).

In mechanical or acoustic recording, sound groove on the recorded medium (wax or other medium) were produced by mechanical vibrations of a needle, which was connected as stylus to one end to the membrane and the other end to large horn that employed as a microphone. In this recording process, sound was recorded as a visual image into the membrane or the recording medium (Thaker 57-58).

2.2.2 Electronic Recording

Electronic or electrical recording emerged as a result of scientific experiments and innovations. In the electrical recording progression, sound is recorded using electronic devices such as microphones amplifiers and other appropriate equipment such as electrical record cutters rather than phonograph horn that was used to record sound mechanically. This was initially recorded by the Colombia Record Company and the Victor Talking Machine Company in 1924. The sound quality of electrical recordings did

not have harsh sound like in Mechanical recordings and it improved the sound quality of recordings. However, the technology of electrical recording did not change the practice of live group performance (Thaker 58).

2.2.3 Magnetic Recording

Due to some practical issues and certain technical reasons, scientists interested in sound recording were not satisfied with the previously invented recording technologies. As a result, they have attempted to find out new ways of advanced recording technologies and devices other than the traditional Phonograph recording. Thus, it would not be incorrect to say that all the early recording devices originated as consequences of the development of telephone machines. In 1898, a telephone technician in Danish called Valdermar Paulsen was able to produce the first wire recording device with the aid of the theory of magnetism and electricity which emerged within the time frame of 1820 to 1873. This was the first attempt made by a Scientist to record sound on a stee wire as a practical form of magnetic recording. Even though he failed in 1898 to obtain a patent for his invention, he had obtained a patent for the prototype magnetic recording device known as Telegraphone around 1910. The same method and process was followed by other inventors of "Recording sound on a tape" with certain modifications during 1950s (Thaker 69).

The German company "Allgemeine Elekrizitatsgesellschaft" manufactured recording equipment named Magnetophone in 1930. Even though sound was recorded on a coated paper in its early ages in Magnetophone, the paper medium was transferred to a polyester magnetic tape medium in 1953. The sound quality of the Magnetophone was better than previously used device such as wire recorders. Magnetophone was really employed to record and broadcast war affiliated journalistic purposes during the World War II. However, these were especially used for music recordings. Magnetic recording played an important role during the World War II due to the unique demands of the war time journalism. After sometimes, magnetic recording became and played a leading role as a recording medium in the field of broadcasting as well as the standard for

mastering music especially for Phonograph recordings. The medium of tape came in different types of formats such as; Reel to reel, Sound cartridge and, Cassetts that was introduced to mass market by Phillips in 1964 (Thaker 72).

In early recordings such as mechanical, musicians had to alter according to the technology and it took a long time to record a song. The quality if the recording depends on the way in which it was recorded and the equipment that were used to record. With the introduction and arrival of the new medium- the tape, the pattern of recording began to change. The medium of tape could be easily handled than the disc medium both for recording and editing purpose (Thaker 73)

The other specialty of handling tape is that it could be trimmed easily in the editing process and two pieces of tapes with different recording on them could also be joined by splicing without any audible transition or degradation of the final product. In addition to that, using tapes for sound recording could make somewhat longer recording than discs (Thaker 73)

2.2.4 Digital Recording

According to Mark Katz in the preface of his book, 'Capturing Sound' where he quoted Paul Valery, "We must expect great innovations to transform the entire techniques of the arts, thereby affecting artistic invention itself and perhaps even bringing about an amazing change in our very notion of art". This statement made by Paul Valery has been proven to remain relevant over the years as the digital recording era has significantly transformed the landscape of music production, offering musicians and producers vast array of tools and techniques to create and refine their music.

In this era, the sound or data are transformed into binary or numeric format while recording with the aid of an Analog to Digital Converter (ADC). In its initial stage, the system of digital recording has been subject to experimentation for recording television signals optically and reproducing them by scanning with the beam of light by Philips along with several other electrical firms in the 1970s. Initially, digitalized data were recorded on a reel tape which was especially manufactured for video recordings followed

by Digital Audio Tape (DAT), whereas the DAT was popularized only in studio workstations. However, the same principle of recording method could be successfully utilized to record audio data in digital audio form on a compact disc. During the recording process, digitized audio data consists of electronic pulses that can be translated into pits of regular size of the disc and stored on the disc as pits. The principle of Pulse Code Modulation (PCM) which was used to digitally represent analog signals was invented by Alec Reeves who was an English man in 1930. In 1967, the technical research laboratory in Japan, the NHK demonstrated an early studio-type digital tape recorder (Thaker 76-77).

A few years after popularizing the Digital based recording field, digital multi-track recording machines were produced for sound recording, especially for professional recordings and private and personal recording purposes. From its preliminary stages, video tapes were utilized as recording medium. A few years later, hard disc medium was introduced to the recording field as a method of recording rather than video tapes. In 1984, the MIDI (Musical Instrument Digital Interface) technology was introduced alongside the Digital Audio Workstation (DAW) which was used to compose, synthesize and record music using personal computers. Each and every software-based DAWs have extensive MIDI recording, editing, and play back capabilities (Thaker 79).

In addition to that, technology and the recording equipment are now being transferred to human palms. These types of small and handy smart phone based digital work stations are known as Mobile Audio Workstations (MAWs). Some MAWs are greatly used by Journalists and other researchers to record interviews and small-scale music productions (Thaker 79).

2.3 The Process of Music Recording

Due to the digitalization of music recording, personal choices of recording artists, availability of various groove tools, the process of recording can be approached in diverse ways.

According to Huber and Runstein, the cost-effective environment of the project studio has brought music and audio production to a much wider

audience, thus making the process more personal. If we momentarily set aside the monumental process of creating music in its various performances and notation forms, as well as electronic music environment, then the process of capturing sound onto a recorded medium will generally occur in six distinct steps (24-29);

2.3.1 Preparation

According to Huber and Runstein, this is one of the most important aspects of recording process that occurs before the artiste and production team step into the studio. It involves getting everything ready (from the song lyric to the types of instruments that will be needed for the song and then checking for studio equipment functionality. This step which is known as pre-recording phase has a significant effect on the quality of the final recording (Huber and Runstein 25).

2.3.2 Recording

In this phase, one or more sound sources are picked up by a microphone or are recorded directly (as often occurs when recording electric or electronic instruments) to one or more of the isolated tracks of a multitrack recording system (Huber and Runstein 27).

2.3.3 Overdubbing

During this phase, the previously recorded tracks are monitored in the studio over headphones while one or more musical parts are laid down onto the separate and available tracks of a recorder or DAW. Individual parts are added to an existing project until the song or soundtrack is complete (Huber and Runstein 27).

2.3.4 Mixing Down

When all the tracks of a project have been recorded, assembled, and edited, the time has come to individually mix the songs into their final media forms. The mixdown process occurs by routing the various tracks or tape or disk-based system through a professional or project's studio's hardware or virtual console to alter the session's musical or audio program. This phase involves combining individual tracks or instruments and vocals, adjusting their levels, panning them in the stereo field, adding effects like reverb or delay, and balancing the sound to create a polished final product (Huber and Runstein 27-28).

2.3.5 Mastering

This phase requires the use of specialized, high quality audio gear in conjunction with one or more sets of critical ears to help the artists and producer attain a particular sound and feel for the finished product. It involves enhancing the overall sound quality, ensuring consistency throughout the song, equalization, and applying final touches like compression and limiting (Huber and Runstein 28-29).

2.3.6 Product Manufacture

Last but never least in the production chain is the process of manufacturing the master recording into a final, salable product. Whether the final product is a compact disc or a vinyl record, this process should be carefully overseen to ensure that the final product does not compromise all of the blood, sweat, tears and money that have gone into the creation of the project. This phase involves, creating a manufacture master, product packaging, art layout and printing (Huber and Runstein 29).

2.4 Music Production as Art and Science

"The reason we are alive is to express ourselves in the world. And creating art may be the most effective and beautiful method of doing so" (Rubin 240). From this excerpt, we can realize the significance of music

production as an art, as it encompasses the creative expression of our ideas and emotions through several musical instruments such as the human voice.

Music production involves an intricate blend of artistry and technology, a process where creativity and technical skills merge to create captivating auditory experiences. We can't talk about music production and not make mention of sound as a scientific phenomenon. According to Huber and Runstein "By understanding the physical nature of sound and how the ears change a physical phenomenon to a sensory one, we can discover how to best convey this science into the subjective art forms of music, sound recording, and production" (Huber and Runstein 33)

The purest form of sound is known as sine waves and every musical sound we hear is in fact a composite of sine waves at different frequencies and amplitudes. These sine waves combine to form the sound, and their frequency and amplitude relationships determine the quality, or timbre, of the sound. If the sine wave components of a sound are not related in simple integer multiples, the sense of pitch is lost and the sound quality approaches noise (Davis and Jones 16-17).

Sound arrives at the ear in form of periodic variations in atmospheric pressure called sound pressure waves. This is the same atmospheric pressure that is measured by the weather service with a barometer; however, the changes are too small in magnitude and fluctuate too rapidly to be observed on a barometer. An analogy of how sound waves travel in air can be demonstrated by bursting a balloon in a silent room. Before we stick it with a pin, the molecular motion of the room's atmosphere is at a normal resting pressure. The pressure inside the balloon is higher, though, and the molecules are compressed much more tightly together. When the balloon is popped, the tightly compressed molecules under high pressure begin to exert an outward force upon their neighbors in an effort to move towards area of lower pressure. When the neighboring set of molecules have been compressed, they will continue to exert an outward force upon the next set of lower-pressured neighbors in an ongoing outward motion that continues until the molecules have used up their energy in the form of heat (Huber and Runstein 33-34).

Likewise, as a vibrating mass (such as a guitar string, a person's vocal cords, or loudspeaker) moves outward from its normal resting state, it squeezes air molecules into a compressed area, away from the sound source. This causes the area being acted upon to have a greater than normal atmospheric pressure, a process called compression. As the vibrating mass move inward from its normal resting state, an area with a lower-than-normal atmospheric pressure will be created, a process called rarefaction. As the vibrating body cycles through its inward and outward motions, areas of higher and lower compression states are generated. These areas of high pressure will cause the wave to move outward from the sound source in the same way as was caused by the balloon. It is important to note that the molecules themselves do not move through air at the velocity of sound, only the sound wave itself moves through the atmosphere in the form of high-pressure compression waves that continue to push against areas of lower pressure (in an outward direction). This outward pressure motion is called wave Propagation (Huber and Runstein 34-35).

The role of science in music production cannot be undermined as it helps in understanding the technical aspect of sound production such as acoustic, audio engineering and signal processing.

2.5 Roles and Responsibilities in Music Recording and Production

When you get right down to the important stuff, the recording field is built around pools of talented individuals and service industries who work together for a common goal (producing, selling, and enjoying music). Recording studios and other businesses in the music industry are not only known for the equipment they have but are often judged by the quality, vision, and personalities of their staff.

The primary roles and responsibilities in Music production and Recording as follows;

The Artiste

According to Huber and Runstein, the strength of a recorded performance begins and ends with the artiste. All the technology in the world is of little use without the existence of the central ingredients of human creativity, emotion, and technique. Just as the overall sonic quality of a recording is no better than its weakest link, it is the performer's job to see that the foundation of all music is laid out for all experience and ears. After this has been done, w carefully planned and well produced recording can act as a gilded framework for the music's original drive, intention, and emotion (Huber and Runstein 17).

Studio Musicians and Arrangers

According to Huber and Runstein, a project often requires additional musicians to add extra spice and depth to the artist's recorded performance. For example;

A member of a group might not be available or might not be up to the overall music standard that are required by the project. In such situations, it is not uncommon for a professional studio musician to be called in.

An entire group of studio musicians might be called on to provide the best possible musical support for a high-profile artiste or vocalist.

A project might require musical ensemble (such as a choir, string section, or background vocals) for a particular part or to give a piece a fuller sound (Huber and Runstein 17-18).

The Producer

According to Huber and Runstein, the producer is responsible for shaping the artistic direction of a project, collaborating with artists and managing the technical and creative aspects of the recording process. He is charged with the following responsibilities;

Assist in the selection of songs

Help to focus the artistic goals and performance in a way that best conveys the music to the targeted audience.

Help to translate the performance into a final, salable product (Huber and Runstein 18).

The Engineer

According to Huber and Runstein, the role of an engineer can be best described as an interpreter in a techno-artistic field. The engineer must be able to express the artist's music and the producer's concept through the medium of recording technology. The role of the engineer is best described as an art form, as both music and recording are subjective in nature and rely on the tastes and experience of those involved. The engineer is charged with the following responsibilities;

Place the musician in the desired studio positions

Set levels and balances on the recording console or DAW mixing

Interface

Overdub additional musical parts into the session that might be needed at a later time

Mix the project into a final master recording in any number of media and mono, stereo, and/or surround sound formats (Huber and Runstein 18-19).

Maintenance Engineer

The maintenance engineer's job is to see that the equipment in the studio is maintained and in top condition, regularly aligned, and repaired when necessary (Huber and Runstein 19).

Mastering Engineer

The role of a mastering engineer is to tweak a final mater recording in terms of overall and relative level, equalization, and volume dynamics so as

to present the final master recording in the best possible sonic and marketable light. The mastering engineer is charged with the responsibility of listening to and processing the record in a specialized, fine-tuned monitoring environment (Huber and Runstein 19).

2.6 Hardware and Software Resources in Music Recording and Production

"With the advent of self-powered speaker monitors, cost-effective microphones, DAW workstations, and hardware DAW controllers, it's a relatively simple matter to design a powerful production system into any existing space" (Huber and Runstein 72). According to this extract we realize that the process of music production and recording has progressed heavily since its introduction by the mechanical era. Aided by the digitalized technology, it is now easier to create and record music using both hardware and software resources. There are various numbers of hardware and software resources for the producer/recording engineer to choose from as they each have their specific role, but regardless of what role they play, these resources have been invented to make recording and production processes easier and more creative.

Hardware Resources

Among other hardware resources, computers first presented a way to digitize recordings by printing sounds to a digital drive rather than a using a tape machine and as these computers became more exponentially powerful, the drawbacks regarding speed and sonic characteristics continued to be less and less noticeable. Now most recording studios primarily use computer systems and many computer musicians have become self-reliant (Bevins 11).

Within a computer system, certain components are vital for creating appealing music. The most impactful unit of the computer, one that will dictate many musical capabilities, is the processor. The most important chip in a computer is the Central Processing Unit (CPU). Modern CPUs contain millions of transistors the size of an average thumb's width. These highly

complex chips will determine important aspects of a computer music project such as, possible track count, number of virtual instruments, and number of sound processors on channels. The second most vital component of a computer system for a music project is the hard drive. Hard drives store components of the project like recorded audio, sample libraries for virtual instruments, and algorithms virtual processors. These two computer components (CPU and hard drive) dictate how much information a computer-based music project can handle (Bevins 11-12)

Inside the computer, all data is stored as binary code. Ways of interacting with this data have changed over the years to become more intuitive. Right now, the mouse and Keyboard are the two major ways most people input information and a monitoring screen is used to view what is being inputted (Bevins 12)

While Visual monitoring can be helpful with music projects, being able to hear the sound you are working with is vital. Speakers connect to computers, and through a process known as digital-to-analog conversion, binary code gets changed to analog audio. This process works in reverse as well (Analog-to-digital conversion). Most computers have A/D converters built into them, but the quality of this conversion is variable. Plugged into the converter can be loudspeaker or headphones which will help to inform sound adjustment (Bevins 12-13).

Musical Instrument Digital Interface (MIDI) controllers are being made in many varieties and the most popular form is in replication of a Piano keyboard with white natural notes and black sharp/flat notes. MIDI controllers present many musical data entree possibilities for computer-based systems and when a key is pressed, information is gathered that can be read by a virtual instrument as pitch, duration, and velocity. With this hardware device, a musician can have hands on experience on interfacing with a piano keyboard, while utilizing the benefits that computer technology offers. Connected to computer, they control virtual instruments that can realistically sound like a drum set in a large church, a saxophone in an intimate jazz club or a synthesizer from outer space. The keyboard controller

is the most widely used of all controllers and it is thought of as the most versatile (Bevins 13).

With computer-based system, Virtual instruments and MIDI controller are not the only way to get sounds into project. Another way of incorporating analog sounds in a project is through the use of microphones. Microphones have been primary tools used to record music since the early 1900s, and today are still very widely used. Microphones are used to capture a wide range of sounds like acoustic instruments (including the human voice), amplified instruments, and sounds that may not be very conventionally musical. With the perfection of computer technology and the interesting inconsistencies of the natural world, microphones fed into a computer create such vast possibility (Bevins 15-17).

Software Resources

The central software applications for computer music sessions are called Digital Audio Workstations (DAW). While serving many functions their main role is to record audio and MIDI, provide windows for arrangement and mixing, as well as to host plug-ins. In arrangement views, audio and MIDI tracks are stacked vertically and are displayed on a linear timeline. A convenient feature that many DAW arrangement windows have is a grid that corresponds with rhythmic values of a project's tempo. Mix windows often look very similar to analog mixing consoles and each channel can host a mono or stereo track and have insert points, panning knobs, auxiliary sends (pre or post fader) and volume faders (Bevins 19).

2.7 Virtual Musical Instruments and their Significance

Virtual musical instruments are software programs that enables us to create music using a computer, without the use of live instruments or hardware synthesizers. According to Vesa and Takala, Physical modelling as a method of Virtual instrumentation "allows us to imitate the sound production mechanism of an acoustic musical instrument using a computer

program, and the sound produced will automatically resemble that of the real instrument" (Vesa and Takala 75).

According to Rastogi and Joshi, "The virtual musical instrument is an interface that allows users to simulate a musical instrument by printing a template on a sheet of paper, placing it in view of the webcam of their laptop and running the console application. The user then 'plays' the virtual instrument as if it were a real one, and appropriate music is generated" (Rastogi and Joshi 1). This proves that Virtual musical instrument provides accessibility to a vast array of sounds, making it easier for musicians and producers to experiment and create music without the need for expensive gear or physical space for multiple instruments. Additionally, virtual musical instruments can be easily integrated into Digital Audio Workstation (DAWs), allowing for seamless recording, editing, and manipulation of sounds.

CHAPTER THREE
METHODOLOGY

3.1 Research Design

For this study, a descriptive research design was used to provide an accurate presentation of the entire study without the variable being influenced or manipulated. This research design helped to state clearly the prospects and challenges involved in using virtual musical instruments in recording studios in Benin City, from the music producer's and studio engineer's perspective and experiences.

3.2 Study Area

This study focuses its interest in recording studios situated in Benin City, Edo State.

According to Berniamma, “Benin City which is an ancient city is the capital and largest metropolitan Centre of Edo State and is located in close proximity to the Benin river, situated approximately 40 kilometers to the north, while its eastern perimeter lies 320 kilometers from Lagos via the arterial road network. The city’s municipal boundaries connect with those of several prominent neighboring towns in southern Nigeria, notably Agbor, Oghara, and Ekpoma” (Berniamma).

The people of Benin have their own musical singing style polished by their culture and level of literacy and according to Ighile, “Music, to the Binis is, among others a function of human effort and order, and to produce music, there must be a creative blend of form and some kind of organization or recurring pattern. However, the Binis are not consistent on how musical skill is acquired as there are some who hold the view that talent is inherited from one’s parent or relative, while there are others who believe that every person is born with the same aptitude but interest and training determine whether one becomes a musician or not” (Ighile 105). From these excerpts, we are able to ascertain that despite Benin City being an ancient city that have experienced a lot of cultural changes and historical events, music plays a huge role in the culture of the people and, a good number of the indigenes are engaged in the act of singing and making music.

3.3 Population of the Study

The population of this study consists of owners and engineers of recording studios in Benin City, Nigeria, who have interacted with or employed the use of virtual musical instrument in their music productions. This population is characterized by diverse professionals who have at least a five years experience of using the virtual musical instruments in recording studios of various types and sizes.

3.4 Sample and Sampling Technique

This study utilized purposive sampling to select participants who are actively engaged in the use of virtual musical instruments within their

recording practices. This sampling technique is important to ensure that the insights gathered are relevant and informative.

Presumably there are twenty-five recording studios altogether in the four local government areas in Benin City, this researcher highlights the experiences and opinions of the one-fifth of these twenty-five recording studios for the purpose of this study. Hence, the sample size for this study is five recording studios in Benin City. This number of studios is appropriate for the study because it gives room for several perspectives from different studio professionals who have at least 5 years of working experience in the use of virtual musical instruments within their recording practices.

3.5 Instrument for Data Collection

For this study, interviews were used as an instrument for data collection because it allows for an in-depth exploration of participant's experiences and perspectives regarding virtual musical instruments, its prospects and challenges. Semi-structured interview, which combined predetermined questions with the flexibility to explore topics based on participants responses were used: this structure was useful in gathering relevant and informative insights.

Interviews were held in person, and a mobile telephone device (handset) was used to record the participants responses in order to accurately capture all relevant information. The estimated duration for each interview was 45 minutes, and six questions that embody the essence of the study were asked.

3.6 Reliability of the Instrument

Reliability in descriptive research refers to the consistency and stability of the measurement or observations made during the study. In this study, the reliability of interviews means that if the same questions are posed to different participants, the responses would be consistent and reflect their true experiences. Each participant has their personal experiences when it comes to the use of virtual musical instrument, but through interviews the

researcher was able to identify the similarities and differences between their experiences using a semi- structured interview question. The approach of semi-structured interviews reduces variability in how questions are asked and gives the interviewer the liberty to explore further on a previously answered question. This structure helps the interviewer to gather more information on the study and allows for easier comparison of responses from various participants.

Since the participants precise and honest response has a great influence on the study, it was important that the researcher established rapport with the various participants in order to create a comfortable and trustworthy environment for the participants.

3.7 Procedure for Data Collection

1. Due to the sampling technique, this study utilized the random purposive sampling where a specific group of studio engineers and studio owners who are actively engaged in the use of virtual instruments for at least 5 years were selected, then 5 different participants were randomly selected from this group to participate in this research study. This approach helps to ensure that the sample is representative of the intended population while still focusing on specific characteristics that are important for the study.

2. Interview questions that reflect the aim and purpose of the study were created. These questions covered topics like the advantage of using virtual instruments, challenges faced, and the overall experiences in using virtual musical instrument in recording studios in Benin City.

3. With the consent of the participants, interviews were scheduled on a convenient date and held at the various recording studios. Participants were informed on the importance of their insights and its contribution to the study.

4. During the interviews, a comfortable environment was created for participants and a semi structured format of interview questions were asked to ensure for flexibility in responses, while also ensuring that all necessary topics are covered.

5. With the permission of the participants, interviews were recorded using a mobile telephone device, for accurate data collection.

3.8 Method of Data Analysis

Interview as an instrument for data collection provides rich and detailed insights into participants experiences and perspectives regarding virtual musical instrument. These insights which were originally represented as audio recordings went through a process of transcription which involved converting audio recordings to written texts, ensuring that all spoken words were accurately captured, as the main aim of the study is to accurately interpret the response of the participants.

These data which is now presented as text were thoroughly analyzed with open coding in order to break down the collected data into smaller, manageable pieces by identifying key concepts, themes, and patterns without any perceived notions or categories. Open coding as a method of data analysis helped the researcher to construct a more robust and insightful conclusions in this research study leading to a more accurate thematic analysis, which involves grouping the codes into potential themes. Codes gotten from different sections of the participants responses were grouped into either of these themes; Prospects of using virtual musical instrument or, Challenges of using virtual musical instrument. This helped the researcher to create a clearer and broader perspective from the interview as all underlying ideas from the participants were accurately applied and referred to.

CHAPTER FOUR

PRESENTATION OF DATA, ANALYSIS, AND DISCUSSIONS

It is important to restate that the aim of this research is to explore the prospects and challenges associated with the use of virtual musical

instruments using a number of selected recording studios in Benin City as a case study.

4.1 Presentation of Data

4.1.1 Interview Questions

1. For how long have you been using the Virtual musical instruments?

2. Do you prefer the Virtual musical instruments to live instrument recording? If so, why?

3. How has the geographical location of Benin City influenced your preferred method of musical instrument for production?

4. What are some of the challenges you encounter while using the virtual musical instrument for recording and production in Benin City?

5. What are the prospects of using virtual musical instrument?

6. What can be done to optimize the use of virtual musical instruments in recording studios in Benin City?

7. When was the interview held?

4.1.2 Answers to Interview Questions

Participant 1: Hitmakers Recording Studio, Benin City.

Hitmakers recording studio is located at 25, Airport Road, Opposite Uwaifo's Creative Hub, Benin City, Edo State, Nigeria.

1. Godwin Idios is a music producer and owner of Hitmakers recording studio. He has been using virtual musical instrument for music production for fifteen years.

2. He prefers the virtual musical instrument production because he sees it as an upgrade to the live musical instrument production. Instead of going to source for a group of good instrumentalists, virtual music production has

made it possible to produce music alone with the required tools being available online.

3. He states that, he does not allow his geographical location to be a limitation to his music productions and creative works. Music is a universal language and technology has made it possible for a music that was produced in Benin to be played overseas. He claims that it will be a limitation for him to allow his geographical location to affect what he produces or how he chooses to produce it.

4. He stated the following as some of the challenges that can be encountered while using the virtual musical instruments;

- Technology has indeed made it possible for virtual musical instruments to sound as organic as the live instrument but, the cost of these high-quality virtual instruments is outrageous considering the prices in Naira.
- System crash and loss of flash drive which may result to loss of already recorded and produced jobs.

5. The prospects of using virtual musical instruments are;

- It is very convenient and accessible
- It is readily available
- Virtual musical instrument has enhanced creativity by making it possible for a single individual to be able to manipulate various musical instrument through a hardware device such as a MIDI keyboard.
- When compared to the cost of a live musical instruments production, virtual musical instrument production is resource friendly.

6. He stated the following as some of the ways to optimize the use of virtual musical instruments in Benin City;

- Virtual instrument often requires a significant amount of storage space. Having a sufficient hard drive space to store the

instrument libraries and samples will significantly improve performance.

Regularly updating the virtual instrument software to access new features, bug fixes, and compatibility improvements is essential for optimal performance.

7. This interview was held on 27 September, 2024.

Participant 2: Hypesonic Recording Studio, Benin City.

Hypesonic recording studio is located at 63, Omofomwan Street, Off Okhoro Road, Benin City, Edo State, Nigeria.

1. Irato Onuwaje is a music producer and owner of Hypesonic recording studios in Benin City. He has been using Virtual musical instruments for music production for over fifteen years.

2. He prefers the virtual musical instrument for music production because, it is easily accessible and editable. Although he uses a number of live instruments for semi analog production (a combination of both live musical instruments and virtual musical instruments).

3. From his experience, the geographical location of a producer no longer affects his work. Whatever method of instrumentation he chooses to use as a producer whether live or virtual, it is only important that the production was professionally done. Also, proximity to customers has been enhanced by technology and it is now possible to be a producer in Benin City and have clients all over the world. Technology has made making music more convenient as it is now possible for a beat to be produced in Benin and transferred to a client overseas for vocal recording.

4. He stated the following as some of the challenges that can be encountered while using the virtual musical instruments;

Live instrument recording requires everybody to be playing together at the same time but, in virtual instrument recording, the producer needs to be skilled enough to know what

instruments are needed, when they are needed and, how they should sound in order to achieve the required aim of a particular project.

Virtual instrument production takes time because it requires a lot of creativity from a single person unlike the live instrument production where the work is shared among specialized instrumentalists which require less work and more personal creativity.

There are a lot of low-quality virtual instrument and the high-quality ones with rich sound are often very expensive.

5. He stated the following as some of the prospects of using virtual musical instrument;

It is convenient

It can be easily edited and manipulated

It is readily available

Most of these virtual instrument software programs are affordable

Virtual instrument is more portable and can be carried around easily.

6. He stated the following as some of the ways to optimize the use of virtual musical instruments in Benin City;

Making use of a high-quality audio interface to ensure accurate sound reproduction and minimize latency when using virtual instruments.

Proper mapping of MIDI controllers to various parameters of the virtual instrument results to a seamless operation.

Latency issues can be addressed by optimizing buffer settings in the DAW and audio interface.

As a producer making use of the virtual instruments for production, it is important to have at least a basic knowledge of different musical instruments.

7. This interview was held on 1 October, 2024.

Participants 3: Strings Recording Studio, Benin City.

Strings recording studio is located at Ero Complex, Beside First Bank, Iyaro, Benin City, Edo State, Nigeria.

1. Freeborn Oviri Decency is a music producer and owner of Strings recording studio in Benin City. He has been using the virtual musical instrument for production for over five years.

2. He prefers the virtual instrument production because editability is possible, unlike the live instrument production where the instrumentalists have to start over again when a mistake is made.

3. As a producer in Benin City, most project that he has worked on required the use of virtual instrument and semi-analog instruments, because technology has made it possible to do almost everything that is done live, digitally.

4. He stated the following as some of the challenges that can be encountered while using the virtual musical instrument;

The sophisticated nature of the virtual instrument makes it a difficult and time-consuming software to learn how to operate. It requires a lot of willingness and dedication, as the possibilities of using the virtual instrument is endless.

As a producer using the virtual instrument for production, it is important to learn how to play a number of musical instruments because, even with the virtual instruments, you will have to work with tones, melodies, chords, and pitches.

As a music producer using the virtual instruments for production, one has to be musically inclined to be able to hear a song,

realize its key, and identify what instruments are needed to fit the type of song that is being produced.

5. He stated the following as some of the prospects of using the virtual musical instruments;

The virtual instrument is readily available and easily accessible

Compared to the cost of live instruments and hiring skilled instrumentalists, virtual instrument is more pocket friendly

Virtual instrument is more convenient

6. He stated the following as some of the ways to optimize the use of virtual musical instruments in Benin City;

Before installing a virtual instrument, it is important to verify that the virtual instrument is compatible with the DAW software that is being used to avoid crashes and compromised performances.

Regularly update your software

Make use of a computer that has sufficient processing power and memory to handle the demands of running virtual instruments smoothly.

7. This interview was held on 1 October, 2024.

Participant 4: Psalter Recording Studio, Benin City

Psalter recording studio is located at Dayo Street, Off Pz Road, Off Sapele Road, Benin City, Edo State, Nigeria.

1. Esene Thank-God is a music producer and owner of Psalter recording studios. He has been using the virtual musical instrument for music production for over eight years.

2. He prefers the virtual musical instruments because, there is access to high quality instrument (the higher the memory size of a virtual instrument, the better the quality of the sound of the instrument hence, the higher the price of purchasing the virtual instrument). There are availabilities of virtual instrument that date back as far as the 1960s which were made with high

quality wood, has high quality tone, made in different countries in different centuries which can only be globally accessible as a virtual instrument.

3. Virtual musical instrument gives you the possibility of accessing any musical instrument whether western or traditional and, as a producer in Benin City, he has noticed that there are only a few electric pianos that are in a good shape and can be used for music production but getting them is very difficult and nearly impossible but with virtual instruments, these musical instruments are always available at your fingertips when you have purchased and installed them. Also, in Benin City, most professionals that can play live for a live instrument production are not readily available reason being that some have relocated, while others might have other jobs that they do asides music, and this can greatly affect the outcome and success of a production.

4. He stated the following as some of the challenges that can be encountered while using the virtual musical instruments;

System/software crash that can lead to loss of jobs stored on the system.

Theft of flash drive and hard drive where these virtual instrument plug-ins are stored.

The cost of getting high quality virtual instrument is very expensive.

For a live instrument production, the producer gets the opportunity to only think as a producer and allow all other instrumentalists express their creativity and professionalism, unlike for the virtual instrument production where the producer has to be the instrumentalist that plays and arranges all the instruments.

There are some virtual instruments that no matter how they are, you can tell that they are virtual instruments when you hear the sound that they produce because they are unable to produce the organic feel and soulful texture when needed for a production.

5. He stated the following as some of the prospects that can be encountered while using the virtual musical instruments;

Virtual instrument production is convenient

Virtual instruments are very portable and all the producer has to do is to save and install them on his hard-drive and they can be used at anytime and anywhere, unlike carrying live instruments like the grand piano around to work with.

The cost of buying these virtual instruments is cheaper compared to the cost of buying a high-quality musical instrument and getting a professional to play it.

Virtual instruments are mixed-ready for the producer to use, thereby saving time.

Virtual instruments are readily available for use

The attention to detail in virtual instruments is increasing by the day as there has become a lot more possibilities and upgraded feature with the virtual instrument.

6. He stated the following as some of the ways to optimize the use of virtual musical instruments in Benin City;

Before installing the virtual instruments, it is important to verify that they can easily be integrated and controlled within the DAW software.

By investing in high quality sound libraries for virtual instruments, the realism and depth of the sound produced is enhanced.

Implementing a robust back up system to safeguard your virtual instrument libraries, project files, and recordings is very important as this can prevent loss in case of technical failure or system crash.

A good audio interface can significantly enhance the overall sound quality.

7. This interview was held on 1 October, 2024.

Participant 5: Freetown Recording Studio, Benin City

Freetown recording studios is located at 72 Airport Road, Benin City, Edo State, Nigeria.

1. Freedom Ugiagbe is a music producer and owner of Freetown recording studios in Benin City. He has been using the virtual instrument for music production for over five years.

2. He prefers the virtual instrument recording because virtual instruments allow musicians to access a wide range of sounds and instruments without the need for large physical spaces or budget for very expensive gears. Also, since virtual instrument offer flexibility in terms of editing and manipulating sounds, it has become easier to experiment and create unique music.

3. He claims that in an ancient city like Benin, it is impossible for the art of live instrument recording to go extinct, as it can only evolve from the traditional live-enclosed room recording to a more digital-analog instrument recording whereby a number of live instruments are recorded digitally. He proves this by stating that when producing music in Benin City, especially when those involved are the indigenes of the city, traditional live instruments like the gourd rattle and agogo are usually needed. Although, any and every musical instruments have been made virtually available, but a traditional Benin song by an indigenous artiste will require a number of these local instruments to be played live, especially because these traditional instruments can easily be found in the city.

He however reveals that Benin City has influenced him to develop his traditional and live instrument recording to a more upgraded semi-analog and virtual instrument recording in order to create sounds that resonates with the people and portrays the culture of the people of Benin City.

4. He stated the following as some of the challenges that can be encountered while using the virtual musical instruments;

System crash during or after a production session.

Theft of flash drive and hard drive which may lead to loss of jobs.

Lack of stable power supply kills time and creativity.

5. He stated the following as some of the prospects that can be encountered while using the virtual musical instruments;

It is very convenient.

It is easily accessible and readily available.

It is possible for an individual to be able to manipulate and utilize a number of musical instruments through a MIDI keyboard in a recording studio.

6. He stated the following as some of the ways to optimize the use of virtual musical instruments in Benin City;

Regular maintenance and updating of software and plugins are essential for optimal performance.

Since virtual instrument require a lot of storage space on the computer, it is important to have sufficient hard drive space to store the instruments libraries and samples.

Quality samples and instrument libraries can significantly impact the final music production.

7. This interview was held on 3 October, 2024.

4.2 Analysis of Data

Participants	**Prospects**	**Challenges**	**How to effectively use the Virtual Instrument**
Hitmakers Recording Studio	1. Instead of going to source for a group of good instrumentalists, virtual music production has made it possible to produce music alone with the	1. Technology has indeed made it possible for virtual musical instruments to sound as organic as the live instrument but, the cost of these high-	1. Virtual instrument often requires a significant amount of storage space. Having a sufficient hard drive space to store the

	required tools being available online 2. It is very convenient and accessible 3. It is readily available 4. Virtual musical instrument has enhanced creativity by making it possible for a single individual to be able to manipulate various musical instrument through a hardware device such as a MIDI keyboard 5. When compared to the cost of a live musical instruments production, virtual musical instrument production is resource friendly	quality virtual instruments is outrageous considering the prices in Naira. 2. System crash and loss of flash drive which may result to loss of already recorded and produced jobs.	instrument libraries and samples will significantly improve performance 2. Regularly updating the virtual instrument software to access new features, bug fixes, and compatibility improvements is essential for optimal performance
Hypesonic Recording Studios	1. it is easily accessible and editable 2. It is convenient 3. It can be easily edited and manipulated 4. It is readily	1. Live instrument recording requires everybody to be playing together at the same time but, in virtual instrument recording, the	1. Making use of a high-quality audio interface to ensure accurate sound reproduction and minimize latency when using virtual instruments

	available 5. Most of these virtual instrument software programs are affordable 6. Virtual instrument is more portable and can be carried around easily	producer needs to be skilled enough to know what instruments are needed, when they are needed and, how they should sound in order to achieve the required aim of a particular project 2. Virtual instrument production takes time because it requires a lot of creativity from a single person unlike the live instrument production where the work is shared among specialized instrumentalists which require less work and more personal creativity 3. There are a lot of low-quality virtual instrument and the high-quality ones with rich sound are often very expensive	2. Proper mapping of MIDI controllers to various parameters of the virtual instrument results to a seamless operation 3. Latency issues can be addressed by optimizing buffer settings in the DAW and audio interface 4. As a producer making use of the virtual instruments for production, it is important to have at least a basic knowledge of different musical instruments
Strings Recording Studio	1. Editability is possible 2. The virtual	1. The sophisticated nature of the	1. Before installing a virtual instrument, it is

	instrument is readily available and easily accessible 3. Compared to the cost of live instruments and hiring skilled instrumentalists, virtual instrument is more pocket friendly 4. Virtual instrument is more convenient	virtual instrument makes it a difficult and time-consuming software to learn how to operate. It requires a lot of willingness and dedication, as the possibilities of using the virtual instrument is endless. 2. As a producer using the virtual instrument for production, it is important to learn how to play a number of musical instruments because, even with the virtual instruments, you will have to work with tones, melodies, chords, and pitches 3. As a music producer using the virtual instruments for production, one has to be musically inclined to be able to hear a song, realize its key, and identify what instruments are needed to fit the type of song	important to verify that the virtual instrument is compatible with the DAW software that is being used to avoid crashes and compromised performances 2. Regularly update your software 3. Make use of a computer that has sufficient processing power and memory to handle the demands of running virtual instruments smoothly

		that is being produced.	
Psalter Recording Studios	1. Access to high quality instrument 2. With virtual instruments, musical instruments are always available 3. Virtual instrument production is convenient 4. Virtual instruments are very portable and all the producer has to do is to save and install them on his hard-drive and they can be used at anytime and anywhere 5. The cost of buying these virtual instruments is cheaper compared to the cost of buying a high-quality musical instrument and getting a professional to play it 6. Virtual instruments are mixed-ready for the producer to use, thereby	1. System/ software crash that can lead to loss of jobs stored on the system 2. Theft of flash drive and hard drive where these virtual instrument plug-ins are stored 3. The cost of getting high quality virtual instrument is very expensive 4. For a live instrument production, the producer gets the opportunity to only think as a producer and allow all other instrumentalists express their creativity and professionalism, unlike for the virtual instrument production where the producer has to be the instrumentalist that plays and arranges all the instruments 5. There are some virtual instruments	1. Before installing the virtual instruments, it is important to verify that they can easily be integrated and controlled within the DAW software 2. By investing in high quality sound libraries for virtual instruments, the realism and depth of the sound produced is enhanced. 3. Implementing a robust back up system to safeguard your virtual instrument libraries, project files, and recordings is very important as this can prevent loss in case of technical failure or system crash 4. A good audio interface can significantly enhance the overall sound quality

	saving time 7. The attention to detail in virtual instruments is increasing by the day as there has become a lot more possibilities and upgraded feature with the virtual instrument	that no matter how they are, you can tell that they are virtual instruments when you hear the sound that they produce because they are unable to produce the organic feel and soulful texture when needed for a production	
Freetown Recording Studios	1. Virtual instruments allow musicians to access a wide range of sounds and instruments without the need for large physical spaces or budget for very expensive gears 2. Virtual instrument offer flexibility in terms of editing and manipulating sounds 3. It is very convenient 4. It is easily accessible and readily available 5. It is possible for an individual to be able to manipulate and utilize a number of musical	1. System crash during or after a production session 2. Theft of flash drive and hard drive which may lead to loss of jobs 3. Lack of stable power supply kills time and creativity	1. Regular maintenance and updating of software and plugins are essential for optimal performance 2. Since virtual instrument require a lot of storage space on the computer, it is important to have sufficient hard drive space to store the instruments libraries and samples 3. Quality samples and instrument libraries can significantly impact the final music production

	instruments through a MIDI keyboard in a recording studio		

4.3 Discussions of the Findings

Based on the analysis of data, this researcher discovered that the prospects or benefits of using the virtual musical instrument outweighs the challenges that are involved in the use of virtual musical instrument for music production. This factor which appears to be a major influence on the method of instrumentation in most recording studios in Benin City, is as a result of technological advancement as this research has shown that there has been significant improvement and upgrade in the use of virtual instrument software over the past years, that makes the outcome of a production a similar and even a better result than the live instrument recording.

This research also shows that the geographical nature of the city of Benin has also influenced the use of virtual instruments for music production, as the city is geographically situated in a region that is blessed with natural resources that are used to produce these traditional live instruments which makes sourcing for these live instruments, easier. Hence, it encourages the use of a semi-analog or hybrid production where a number of live instruments are used alongside virtual instruments, and this has helped to preserve the use of live instruments for music production in Benin City.

This study established that the conveniency, availability and accessibility of the virtual musical instruments is one of the major reasons why it has become a more reliable and popular method of instrumentation, and it verifies the statement made by Paul Valery “We must expect great innovations to transform the entire techniques of the arts, thereby affecting artistic invention itself and perhaps even bringing about an amazing change in our very notion of art”. This research shows that the use of virtual musical instrument has made the production process easier and a lot more personal as an individual can now produce music in a small enclosed space, with just a computer, a workstation, and a few hardware and software devices, having

access to equipment and instruments that were made over decades ago without geographical or access barriers.

It was also discovered that there are procedures and requirements needed to optimize the use of the virtual instruments as one of the most common challenges involved in the use of virtual instruments is the system and software crash which can be resolved by regularly updating the various software programs and implementing a robust back up system to safeguard the virtual instrument libraries, project files, and recordings.

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATION

5.1 Summary

In this study, we explored the potential benefits and obstacles of incorporating virtual musical instruments in recording studios in Benin City. Due to the evolution of music production from analog to digital era, this study is aimed at providing insights into the feasibility and implications of adopting virtual musical instrument in the local music production industry. Advantages such as cost-effectiveness and versatility, along with challenges like technical limitations and the need for specialized training are revealed in this study.

5.2 Conclusion

Technological advancement has significantly changed the way and manner in which various activities are carried out and the act of music production is not an exception. Music production has evolved through various eras, from the analog to the digital and this study focuses on one of the major characteristics of the digital era which is the use of virtual musical instrument for music production.

The purpose of this study is to reveal the various prospects and challenges faced by different studio owners and recording engineers in Benin City and this research conducted in this study proves that the benefits of using the virtual musical instrument outweighs the challenges, hence it has become a more reliable method of music production.

The findings of this study proves that technological innovations have helped to make life easier for creatives and artistes, as music producers are now able to express themselves in the best and most convenient way possible regardless of their geographical location. So long as there is access to the internet, virtual instruments and software like the virtual musical instruments, is readily available and always accessible for use.

5.3 Recommendations

Having examined the individual responses of the various participants, the following recommendations are proposed to enhance the integration of virtual musical instrument into music production processes;

Virtual instrument should be used more because live instruments are more expensive and requires a lot of space.

Music producers should be willing to learn and explore the many features of the virtual instrument as the possibility of what can be created with it are endless and fascinating.

It is important for music producers to be musically inclined with pitches, tones, sound textures, and rhythms as the sophisticated nature of the virtual instrument makes it possible for an individual to play several musical instruments during a production session.

The virtual musical instrument requires a regular updating and maintenance, for optimal performance.

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