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Abstract
The study surveyed the uptake of software and hardware for music production. The research examined the challenges that Zimbabwean music producers face in accessing software and hardware associated with production. Through qualitative research, 26 participants including musicians and music producers, were purposively sampled from Harare the capital city of Zimbabwe and Midlands State University in Gweru. The researchers secured participants' informed consent and assurance of their freedom to withdraw from the study any time. Data were gathered through interviews online video and voice calls coupled with detailed questionnaires with open ended questions. Data were captured using voice recorders and note taking. The researchers analysed the data through a thematic approach basing on the Actor-Network Theory. The researchers focused on instruments and music productiontools associated with its production. Different software such as Cubase, Fruity Loops, Logic Pro X and Pro Tools 12 and hardware such as small audio interfares, keyrigs, and live musical instruments Mbira, Marimba, guitars, keyboards, live drums,ngoma, congas were in use in music production. However, some of the software were cracked versions allegedly due to high procurement cost. Accessing free resources on the internet was a challenge due to poor internet connectivity and high costs of data. There were limited opportunities for formal training in music production. Notwithstanding the challenges, music productions were undertaken with both analogue and digital resources. Aspirant music producers need to be proactive and explore the internet's free resources to gain knowledge about music production. Future research should cover a wider geographic to gather comprehensive data on the state of music production in Zimbabwe.

Introduction

The study surveyed the uptake of resources in the production of Zimbabwean contemporary music. The researchers made an assessment of the uptake of the available music production software and hardware in creating contemporary music. The presentation gives a background to music production highlighting the importance of software and hardware resources. Zimbabwean musicians and producers have been able to incorporate the knowledge and skills gleaned from Western music into their music through the use of music production software and hardware resources. That in turn provided them with a palette to engage in flexibility and versatility to create music that blends traditional and modern styles of music (Makaudze, 2018). The study looked at the issues that affected

the uptake of software and hardware resources in music production and detail them for the readers to appreciate.

Zimbabwean music has a rich and diverse heritage that has been shaped by the country's history and culture (Kunaka, 2017). Over the years, Zimbabwean music has evolved from its traditional roots to incorporate Western influences, resulting in unique contemporary sound (Atemnkeng, 2019). The uptake of music production resources both analogue and digital equipment played a crucial role in the above transformation, providing Zimbabwean musicians with the tools needed to produce music that is distinctive and competitive on the global music market (Ratshikuni, 2018). Emerging technologies constitute the essential tools in the production of music. Music production as a concept entails the process of recording, mixing and mastering (Huber & Runstein, 2017). Music production can be presided over by specialised personnel to ensure quality assurance. In that light three major role players are the audio, mixing and mastering engineers (Owsinski, 2022). The evolution of recording technologies has morphed the roles of music producers to pave way for a new modes of operation (Kavasch, 2020). Chimbudzi et al. (2021) submit that some of today's music productions are undertaken without session musicians and these cuts on expenses. The above turn of events has seen music producers doing everything on their own and sometimes without due prosesses to ensure quality control. In some places the three roles are still upheld as a matter of principle to quality assurance.

Some music production tools in current use include software packages like Ableton Live, Adobe Audition, Cubase, Fruity Loops, Logic Pro, Pro Tools, Reason Propellerhead and Sound Forge. Most of the software packages in the 21st century enable music producers to engage in recording, mixing and mastering. This makes music producers to get the most in one music production software. However there are dedicated software for mastering music and these include Izotope, Nuendo, Saw studio, Soundbleade, Soundforge, T Racks, Wave Burner and Wave Lab. Virtual instruments and plugins are software programmes used within a dedicated hardware digital audio workstation (DAW) or software in a computer to create and manipulate sounds. The sounds in a DAW can be real or synthetic samples. Virtual sounds can be drawn from synthesizers and drum machines or generated from MIDI data via the controller instruments. The virtual domain has dedicated functions and simulations of amplifiers, equalisers, dynamics, and effects processors. Popular virtual instruments and plugins used in music production include Native Instruments, Kontakt, Serum, and Omni sphere. They offer a wide range of sounds and effects for music production. However, they can be expensive and require powerful computers to run them effectively. Even though some of the above mentioned resources are available as freeware on the internet they may not offer the desired purpose for some music genres especially the contemporary Zimbabwean music.

The types of software and hardware used in music production vary widely, and also include both proprietary and open-source tools. Ncube (2020) identifies popular software used by Zimbabwean musicians which include Cubase, FL Studio, Logic Pro and Pro Tools. These are used for recording, mixing, and mastering music, including creating and manipulating sound samples (Huber& Runstein 2017; Gibson 2018). Hardware such as MIDI controllers, synthesizers, and drum machines are also commonly used in music production. Audio interfaces are hardware devices that enable music producers to work with hardware and software equipment. They also enable connections of microphones, electronic instruments, audio playback, recording from a computers, on workstations to monitor speakers and headphones. Some of the the hardware interfaces models include Audio Box, Behringer, Focusrite, Presonus, M Audio, MOTU, Scarlett and U-Phoria (Huber & Runstein, 2017; Gibson, 2018). Equipment like studio monitors, dynamic microphones, processors like compressors,

equalizers, reverb generators; instruments as in guitars, keyboards and mixing desks are still found in the analogue formats.

Music production can take place on stage as performers produce music in various ways. Some can do it as one person or duel, trio and as a full band or orchestra. In this study the survey places the studio music production under the spotlight to illuminate on the uptake of music production resources. The use of the emerging technologies in current music productions have become popular among Zimbabweans, with some artists and music producers combining both analogue and digital equipment into their workflows (Makaudze, 2018). Both analogue and digital equipment are designed to work together. However, some hardware work with software drivers which expire and need to be renewed from time to time. In some developing nations music producers use outdated interfaces that generate glitches and affect music production processes (Owsinski, 2022). In view of the above background the researchers found it necessary to explore the uptake of music production resources in Zimbabwe to unveil the prevailing trends.

The study engaged in a survey of the uptake of both software and hardware resources in music production. The intent was to ascertain the deployment of resources in music production in Zimbabwe. It was vital to explore the contexts of the music producers'choices and the reasons underlying the uptake of the said resources including their skills. As a survey the study did not delve into the actual utility of the resources in producing Zimbabwean music as this is spared for another paper. The researchers were interested in finding out the reasons music producers had for their preferences on analogue, digital resources or their combination. The research solicited the participants' lived experiences in connection to the uptake of music production resources, constraints faced and how they circumvented them. The information gathered helped to document the challenges and breakthroughs that musicians and music producers faced in the uptake of music production resources.

Literature review

The global fall in prices of music production resources led to affordability and accessibility of the requisite tools (Sterne, 2012). The above trends witnessed an increased number of people plying trade in music production and the industry becoming more competitive than before (Ncube, 2020). The western world leads in research and practice in music production. Substantial literature speaks more of the western world than the developing nations. In some developing nations including Zimbabwe affordability is not there, some music producers have adequate resources while determines the uptake of music production resources. Consequently there came the independent music producers and record labels who promoted a vibrant and diverse music industry (Chimbudzi, Muranda, & Maguraushe, 2022). Chimhundu (2018) says that the emerging music production resources also led to an emphasis on experimentation and improvisation in the creative process. This gave way to music that is dynamic and spontaneous especially with sofware that provide ready made beats and loops to create new musical renditions.

In music production musicians explore new sounds and styles to give birth to new genres like Amapiano and Zimdancehall (Chimbudzi, 2022). The uptake of software and hardware resources is an essential part of the music production process. Some Zimbabwean musicians and music producers have the opportunity to create quality music that is reputable on the global market (Mugure, 2019). The subject under study has stirred interest among researchers in recent years. Mawere and Abiodun (2019) also submit that experimentation with new sounds and styles became possible with digital resources. Such endeavours culminated in the creation of dynamic and innovative music that reflects the diversity and richness of Zimbabwe's culture. The impact of music production resources in the

creation of contemporary Zimbabwean music is significant (Chimbudzi, et al. 2022). Mugari (2018) in support notes that music production resources enabled Zimbabwean musicians to create music that is adaptable to different contexts and audiences. Examples of artists include Thomas Mapfumo who fused the Zimbabwean nhare *Mbira* with the western guitars and drums to create contemporary music. Other artists who have done the same include the late Oliver Mtukudzi, Biggie Tembo and Chiwoniso Maraire. Mugari (2018) goes on to say digital technology enabled Zimbabwean musicians to connect with audiences and collaborators from around the world resulting in the creation of new and exciting musical fusions. Such fusions include Zimdancehall which was born of the Jamaican dancehall, Afro fusion which fuses traditional Zimbabwean music with elements of Western music, such as rock, pop, and jazz also popularised by bands such as Bongo Love, Mokoomba, and Jah Prayzah of the Military Touch Music. Music production equipment links with globalization of Zimbabwean music (Kyker, 2016). Modern technologies have also helped promote Zimbabwean music on the international stage, increasing visibility and popularity. Music production resources allowed musicians to collaborate more with other artists and producers than in the 80s in Zimbabwe and internationally (Mushakavanhu, 2022).

Despite the advantages that come with music production equipment, in Zimbabwe some challenges have been encountered. The desire to own and operate the aforesaid resources also presents problems, particularly for those that cannot procure the latest but expensive software and hardware (Ratshikuni, 2018). Kwaramba (2021) informs that one of the main setback, is the lack of access to music production equipment in Zimbabwe. This has made some musicians to fail to take advantage of the emerging technologies in their music productions. Another imposing problem that has confronted music production in Zimbabwe is the scourge of piracy (Muranda, 2018; Pinto, 2022). Music piracy is a challenge that erodes the revenue for musicians and the producers in the Zimbabwean music industry. The existing literature points at challenges connected with the available resources and how affordable they are. However, there is a gap in audit of skills to operate the alluded music production resources, their upgrades, and keeping in touch with global trends. The authors think that the alluded knowledge gap is a factor in the uptake of the emerging music production resources and it needs some exploration.

Actor-Network Theory

The study was guided by Latour, Callon and Law (1980) whose Actor-Network Theory (ANT) originated in science, technology studies and sociology. The theory posits that social and material entities, including humans, non-human objects, and even ideas, are interconnected and work together to construct and maintain social reality. When it comes to the use of production software and hardware in creating music, ANT helped to understanding the complex interplay between technology and culture. In Zimbabwe, music production has undergone significant changes in recent years, with the advent of digital technology and the internet. While traditional instruments like *Mbira* and *Marimba* are still important in Zimbabwean music, many artists now use software and hardware to create and distribute their music. Through using ANT, the researchers explored how these technologies for music production are part of a larger network of actors that shape the music production industry in Zimbabwe. The technology itself is not neutral but is embedded within a larger cultural context that includes the artists, music producers, record labels, and audiences. The emerging technologies, in turn, shape how music is created, distributed, consumed, and also influences the way involved personnel as in artists, music producers and audiences interact.

Methodology

Borrowing from Creswell and Creswell (2019), the researchers used a qualitative survey as their research design to explore the uptake of music production software and hardware in creating music.

The qualitative survey enabled in-depth exploration of the participants experiences in their natural contexts in as far as the uptake of music production resources were concerned (Bryman, 2016). The qualitative survey enabled the collection of rich, detailed data about the experiences and perspectives of producers and music artists. The researchers explored the uptake of music production equipment coupled with the Actor-Network Theory to gird the analysis of information. The population included 26 purposively sampled Zimbabwean musicians and music producers who were actively involved in contemporary music production from Midlands and Harare provinces, the national hub of the recording industry. Midlands is the home for Midlands State University which houses the department of music with several musicians and music producers in the student population. Data were collected through semi-structured interviews with open-ended questions done in person, and telephonically with the aid of the digital recorder to capture audio. Perspectives and views of music artists and producers who could not be interviewed were captured through a qualitative questionnaire (Buschle, et al. 2022). The data was analysed through the thematic approach. Rubin and Babbie (2017) aver that open-ended questions provide a wide-ranging representation of the subject. Further, Flick (2018) opines that interviews offer flexibility and adaptability in different questions and contexts. The researchers observed all ethical measures for research involving human subjects. They obtained signed informed consent from all participants and guaranteed their freedom to withdraw in addition to confidentiality and respect for privacy.

Presentation of findings

In this section the researchers present the findings from the study. They collate the views, lived experiences and perspectives of participants, gathered from the research field. The information from the 26 participants is presented and analysed in the following paragraphs.

The participants submitted that the emerging technologies increased their efficiency and speed in music productions. Modern production enabled the producers to meet their targets and provide customer satisfaction. They could easily create, record, edit, mix music, and produce decent music within reasonable time frames. All the music producers praised the benefit the vast libraries of sound samples and effects which they used to creaste unique tones and sound textures. They also claimed that they manipulated the samples to create the desired music. The dedicated audio interfaces, microphones, and monitors enabled most of the producers to create recordings that were played on different sound systems. The researchers noted that the majority of the music producers held creativity as a critical component and software instruments eased the music producers' *modus operandi*. While the music production resources helped enhance the creative process and improve the quality of music production, they required significant investment of time and skills to learn how to use them effectively. Additionally, some producers preferred to stick with traditional instruments and recording methods, which offered a more tactile and organic approach to music creation. Ultimately, the choice of whether to use modern production tools or not was the prerogative of individual music producers in view of their preferences and goals. The researchers agree with this sentiment and hold that music production requires people with interest in learning new things because technology is dynamic hence requires incessant research.

Fifteen out of the 26 participants held that music production resources emphasised technical proficiency, and this destroyed creativity and originality. They felt that technical proficiency and musical expertise were separate requisite skills. One producer said, "Some productions are monotonous with very little creativity and that shortchanges the consumers". Another participant also said, "The young producers want everything done by the computer without their human involvement, obviously that does not work well". The 15 participants held that a certain level of musicianship is needed before one can be a music producer. They further highlighted that the quality

of productions had gone down due to over reliance on the software thereby killing originality of music. They bemoaned that some of the sound samples in the DAWs misrepresented the original traditional Zimbabwean sounds and that was viewed as a setback. To avert the above issue some producers combined both real instruments and the virtual sounds. This was a way to remain relevant to their clients. The researhers opine that the choice of music production resources remains the prerogative the music producer however quality is expected everytime.

The researchers concur with the above views although software is useful musical creativity is essential for music producers. Since musical skills develop over time the researchers noted that the above tendencies were common among the youthful upcoming producers with enthusiasm to make their mark in the industry. The other 11 participants whose majority were youths accepted that computers were useful in the digital age hence important for to do music production. They did not value the skills to play many musical instrument hence their exclusive reliance on software for music production. Even though musical skills are vital for producers and musicians to engage in creativity the authors think that technical proficiency is also needed for effective operation of music production software. By implication, proficient novice producers can create music through assembling some loops without the knowledge of the instruments' contextual requirements. The important issue is to maintain quality. It was noted that there were few formal music production schools and training programmes in Zimbabwe. This made it difficult for aspirants to develop the skills needed to produce quality music. Another problem was limited access to internet and that kept them away from using online music production resources and tutorials to equip them with relevant information pertaining to music production.

All the 26 participants informed that keeping up to date with upgrades of emerging technologies required finance to procure the needed resources. One impediment was the expensive data for internet connectivity, lack of revenue to buy the required drivers and acquire some open source resources for music production. However, most of the open source resources expire after some time, and that did not help the users. Five of the music producers claimed financial capacity to upgrade and keep abreast with the changing trends. Those that could not, mentioned that, their productions incurred compromised quality. The researchers noted that a minority were able to upgrade their software and computers, while the rest did not. The majority of the producers used computers that were bought more that 5 years ago due to lack of finance. About 15 participants used Fruity Loops 20, five music producers used Cubase 5, two had Cubase 12, two producers plied trade with ProTools 12 and one producer used Logic Pro X. It is clear that most of the music producers were behind with global trends even though they were all engaged in music production. That disparity speaks to the lack of access to requisite music production resources.

The researchers found that the majority of the users of Fruity Loops 20 claimed that it was user friendly. One producer submitted that, "Fruity Loops 20 is the best I learnt to use it on my own unlike other software which are hard to master". In support, 9 youthful music producers informed that Fruity Loops 20 provided them with everything they needed and it was an effective one stop shop for music production. Two users of Cubase mentioned that they did not want to venture into new unknown software as long as their Cubase 5 was giving them the decent results. Even though the above reasons make sense the overarching point was that music producers liked to create productions with ease. However, this impedes on discovering new ideas that can be offered in other software they opt not to use. Apparently Cubase 7, Logic Pro X and ProTools 12 users were elderly music producers who had vast experience in music production. They alleged that if one had the music skills and the understanding of theory of music it was not necessary to change from one software to another. They held that upgrades of the same software kept them abreast with prevailing trends. They were less

adventurous with music production resources in contrast to the youth. The youth sought to create their own mark and settle down hence their adventurous to explore new resources.

Different producers and artists in this study used a variety of hardware equipment in the production of contemporary music and they did that based on certain merits. The following, KRK, MAudio Presonus, Samson, and Yamaha monitors were common in use. On microphones, AKG 414, Samson C01, Shure SM57, Shure SM58, Rode NT1 and NT2. Audio Interfaces included Presonus Audiobox, Pesonus 1818, Presonus Studio Live 24.4.2 mixer, Presonus RM16, Yamaha synthesizers, the M-Audio 49 MIDI key rig, a 25 key Akai MIDI controller were used. The above equipment revealled the level of capacity to procure. The most common monitors were the MAudio and Presonus owing to their low price and availability on the Zimbabwe market. The Samson C01 condenser microphone was the most prevalent with music producers, they chose this one for its versatility and low price. The other microphones were just owned by three affluent music producers. The Presonus brand was a common audio interface among all the producers however, the Presonus Studio Live 24.4.2 mixer and Presonus RM16 were owned by 5 music producers. The majority of the music producers used the M-Audio 49 MIDI key rig complemented with Yamaha synthesizers, the 25 key Akai MIDI key rig was used by one producer. Three music producers used Apple computers compatible with Logic Pro X and Pro Tools 12. The rest of the music producers used Windows Personal Computers which ranged from core i3 to core i7 processing power.

From the above detail, the researchers noted that the youthful producers favoured Fruity Loops 20 as their music production DAW with core i3 computers. The reason being that it did not require processing power like Cubase 7, Logic Pro X and Pro Tools 12. It emerged that financial constraints forced most of the producers to use cheap affordable equipment. They claimed that they could not use the recent versions and equipment due to financial incapacity hence they resorted to using low end gear. Twenty one of the producers expressed the point that most of the brands listed above were available outside the country which could only be bought via online stores and through relatives who live abroad. This left most of them stagnant with the same software for years.

Effective use of music production resources depends on the skills of the music producers. Some of the upcoming producers lacked knowledge and skills to operate latest software and hardware resources and that hindered them from pursuing new ways to produce music. Some were technophobic to new technologies and were contented with their old equipment and their music production. From the above information, some computers, the software and drivers for music production were not upgraded. This made music producers not to progress in line with global trends. The challenge was common among producers with limited technical expertise to operate equipment. Some producers informed that they always sought for new ideas from others and the internet, eventually they gained experience while others struggled with outdated equipment. The quest for knowledge, defined the caliber that a music producer could be.

The majority of the producers claimed high cost of music production software as an obstacle, some aspiring musicians and music producers resorted to using cracked versions of software especially Fruity Loops 20. Such actions exposed them to legal risks and also limited their ability to access software updates and technical support from manufacturers of equipment. They bemoaned the scourge of music piracy which was a widespread in Zimbabwe, with many consumers preferring to download music for free from unauthorized sources rather than purchasing it. This limited revenue earnings that Zimbabwean musicians and music producers generated from their music, this made it difficult for them to sustain their careers. Ironically the above complain is out-of-place especially for those that produce music with cracked software. The researchers think that the isssue of piracy is more

of an ethical matter than to offset the burden of costly software. The authors noted that some music producers owned decent monitors, audio interfaces, microphones and computers and absurdly claimed that software was expensive, the reason to use cracked software was not convincing.

Conclusion

The researchers conclude that Zimbabwean producers and musicians embraced new technologies and production techniques in recent years. Some of the commonly used equipment included hardware DAWs, Fruity Loops 20, Cubase, Logic Pro X, and Pro Tools 12. The use of open source resources from the internet was not a common practice. Access to the internet was marred by the high cost of data for connectivity. There are few formal institutions that offer tuition in music production. In view of that most music producers engaged in the music production without formal training and that affected quality of products. In spite of that, some have also endeavoured to learn via the internet and other accomplished music producers. The use of modern resources like audio interfaces with analogue hardware to link microphones, instruments, and other audio sources to computers for recording and playback enabled music production. Music producers have embraced the use of software sound samples for manipulation and creation of unique sounds in the production of music. However, some producers were creative with digital technologies while others remained reliant on technology without pursuing knowledge to improve their creativity and acumen. There are some setbacks with the emerging music production resources, the high costs for capital equipment and maintenance, high dependency on evolving technology, and the loss of human touch replaced with artificial intelligence. To address some of these issues, producers should strive to play the actual instruments in addition to using synthetic sounds to create quality music. More institutions in Zimbabwe should offer studies in music production to nhance quality of music productions. Music producers should strive to own authentic software and detest from using cracked software in producing music in order to effectively fight against piracy. A broad based study may be needed to capture comprehensive data on the state of uptake of music production resources in Zimbabwe.

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