

The utilization of digital technology in music education at Universitas Negeri Yogyakarta

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ABSTRACT

As is known, the most Indonesians have used digital technology in their daily lives, including in representing the art of music. As one of the adaptive educational institutions, Universitas Negeri Yogyakarta (UNY) is deemed necessary to further enhance the essence of music education that is integrated with digital technology. Based on the results of the literature studies and best practices regarding music technology and art, with a qualitative method that produces descriptive data, it can be seen that the foundation of today's music technology is to represent sound into a series of digital data. The fundamental shift of sound representation to digital media, has challenged the orientation of digital technology and its various effects on the process of music creation, presentation and publication. In this paper, the author examines three main functions of using digital technology in the context of music, namely music technology as a tool, instrument and collaboration media. The results of this study are suggestions for an integrated approach between music and digital technology in the educational process for music arts students.

Keywords: music, technology, integration

Pemanfaatan teknologi digital dalam pendidikan seni musik di Universitas Negeri Yogyakarta

Abstrak

Sebagaimana diketahui, sebagian besar masyarakat Indonesia telah memanfaatkan teknologi digital dalam kehidupan sehari-hari, termasuk dalam merepresentasikan seni musik. Sebagai salah satu institusi pendidikan yang adaptif, Universitas Negeri Yogyakarta (UNY) dipandang perlu untuk lebih meningkatkan esensi pendidikan seni musik yang terintegrasi dengan teknologi digital. Landasan teknologi musik masa kini adalah merepresentasikan suara menjadi rangkaian data digital. Pergeseran mendasar representasi suara ke media digital tersebut, telah menjadi tantangan orientasi teknologi digital dan berbagai efeknya pada proses penciptaan, presentasi musik dan publikasi. Dalam makalah ini, penulis meneliti tiga fungsi utama pemanfaatan teknologi digital dalam konteks musik, yaitu teknologi musik sebagai alat, instrumen dan media kolaborasi. Hasil dari penelitian ini adalah saran pendekatan yang terintegrasi antara musik dan teknologi digital dalam proses pendidikan kepada mahasiswa seni musik.

Kata kunci: musik, teknologi, integrasi

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INTRODUCTION

When conducting research on the impact of digital technology on the field of the art of music today, it seems that there is a need for an integrated policy within Universitas Negeri Yogyakarta (UNY) which stipulates that UNY can utilize digital technology in the field of music education. Referring to the research of Brown, A. (Brown A., 1992), that the use of digital technology can be used *1) as a tool to assist educational tasks*, such as administrative management in the field of musical arts, management of lecture learning materials, music performance data, audio-video works

of music art, and other matters related to the art of music. Apart from that, digital technology can function 2) *as a musical instrument* used to manage compositions, performances, or other musical expressions. In the end, digital technology can function 3) *as a collaborative medium* that reflects the interaction between educators, music art students and the public who meet in a musical art.

The three main functions of using digital technology in the music education process, need to be combined between one function and another so that the application of the essence of the art of music represented in music technology can be realized. Contemporary electronic technology relies heavily on devices controlled by electronic devices known as *microcontrollers, and electronic devices with microprocessor technology*. Digital computers are electronic devices that are best known by educators, students and the public. Computers have become a major technological device and are definitely used in every academic discipline of higher education, including the study of the arts of music at UNY.

However, the digital technology embedded in the computer that features audio-video control devices has a greater functional effect on the study of the art of music, than the computer in general and depends on its use. For example, the power of microprocessor resources is for the purposes of modern audio-video recording, music synthesizer, electronic tuner, rendering, audio-video converter, and others. The basis of this music technology is the digital representation of sound and video. Synthesizer is a music device that has many functions such as changing the color of the voice, volume, character and type of voice and even being able to change the high and low tone.

There are several important questions regarding the potential of contemporary technology to be fully utilized by musicians in relation to all uses of digital technology in the area of musical arts. *Can the use of digital technology further improve the quality of the represented music to a higher level? Will digital technology make it easier and more comfortable to manage music? Can a musician create musical alternatives that would be impossible to create music in any other way? Does a musician have the potential to ignore developing the artistic skills he needs?*

So far, there is no definite answer to these questions quantitatively, that the use of digital technology will always lead to better developments in the art of music. This happens, given the freedom of a person to choose the use of digital technology in music. Although this is more likely a personal choice, the choice to use digital technology or not to use it is something that should be seriously considered.

This paper intends to lay the foundation for proposed answers to the question of the comprehensive use of contemporary technology in the study of the art of music, and proposed new directions that can be articulated. This paper will examine the three main elements of digital technology that can support the study of the art of music at UNY.

METHOD

This paper is the result of an interview and collaboration process with expert sources in the field of technology as well as music observers with research using qualitative methods that produce descriptive data, namely telling and providing an overview of the object being studied. Furthermore, to describe it, data were obtained and collected through references and research documentation. In this regard, Moleong (1981: 21) states that: Qualitative Research is research that produces descriptive data. The second data is in the form of additional data from library research. Furthermore, Bog and Taylor in Moleong (2002: 5) define qualitative methodology as a research procedure that produces descriptive data in the form of written or spoken words from people and observable behavior.

FINDINGS AND DISCUSSION

The word of "technology" comes from the word "*technologia*" (Greek) which consists of the word "techno" meaning 'expertise' and the word "logia" meaning 'knowledge'. At first, the term of technology for the purpose of discussion of applied arts, but in the 20th century, that term has grown rapidly and includes a variety of ways, processes, and ideas apart from tools and machines. Along with the times, the term of technology has experienced a significant sharpening of understanding, including with digital technology.

Digital technology is an innovation and the result of the development of its creators that provides maximum convenience for humans to fulfill their various needs with an automatic operating system via a computer. The existence of digital technology has a huge impact on people's daily lives.

At this time, every modern person has depended on digital technology in carrying out their daily activities, including life in the process of music education at UNY.

As is known, at this time UNY has utilized digital technology in the field of music education. The use of digital technology can be used 1) *as a tool* to help with educational tasks, 2) *as a musical instrument*, and 3) *as a collaborative medium* that reflects the interaction between educators, music students and the public who meet in a musical art.

Utilization of technology as a tool

The musicians, musicologists, and others involved in music education have used a variety of technological tools to keep records of musical compositions, musical performances, and ideas about the music. From a historical perspective, it has been done through various print media, both for music notation or textual descriptions, as well as reviews of music on paper. Technological developments in industry and further advances in electronic technology, have made it possible to make electronic audio recordings of music. Audio and video recording technology has become an invaluable tool for educators and students of music studies. There are many high-tech tools that musicians can use at more complex levels, such as musical instruments and audio-video recording devices.

Contemporary technology, especially computer-based digital programs can be programmed that allows the computer to operate the functions of any digital musical instrument, which has been composed of the previous musical playing sequence. These devices and computer programs in multitasking, can act as a substitute for paper, pens, tape recorders, metronomes, tuners and other conventional devices in musical arts activities. The most important thing is that digital computers can integrate preprogrammed devices into a new hybrid set of devices, the benefits of which are greater than the sum of the parts of the device. In other words, the composition and performance in the art of music have been fused into one act, through the use of advanced and more refined electronic music synthesizers and recording techniques. For example, a computer program containing musical notation can be likened to the integration of paper and a tape recorder that can display musical notation, as well as record, edit and play musical performances. Its ability to transcribe the performance into notation, makes it beyond any previous technology, and allows it to be integrated with digital representations of sound.

The development and the use of such music programs and tools is a fundamental foundation for the music-related industry. There are many things that musicians, educators and music students can contribute to the development of digital technology. Therefore, the Department of Music Arts UNY can have more tools that are devoted to this development. Apart from that, the improvement of music education materials with high technology supporting it, will provide more space for commercial providers of these tools to employ UNY graduates who have a strong understanding of music combined with technical training and human factors.

Thus, the music arts institutions including UNY can seriously consider developing music technology research in the areas of composition, performance, music education, music therapy and musicology. As with any profession, musicians, educators, students and others who work in the field of music, must be proficient with musical instruments. Musical instruments are a major commodity tool for conventional music players, but contemporary technological tools such as computer-based notation programs, sequencers, music synthesizers, audio recorders and similar devices are commodity tools for most music professionals today.

The piano is widely used as a musical instrument by musicians, educators and students. This is because the piano is considered a musical instrument and a very useful basic skill for any student of music studies. The piano is an instrument that can help conceptual understanding of harmony and theory through its physical layout, and is accessible due to the ease of sound production in all registers. As a result, at this time the piano instrument is always found in music education and learning environments.

The author proposes that several forms of digital instruments are very suitable to open up job opportunities for graduates of music studies, which are currently occupied by acoustic piano instruments. Thus, the synthesizer skills in computer technology should be considered fundamental to the music education of any discipline related to the art of music, for the same reason that piano skills are considered fundamental in education.

The introduction of digital technology music devices into the world of music education can be carried out progressively. The introduction of the electronic music device can be started from the use of an electronic tuner and an electronic metronome. Then, the next introduction is the acoustic piano learning process which can be supplemented or replaced with a digital piano education process for non-performance roles. This is because the basic knowledge and skill requirements for an acoustic or digital piano are identical, excluding some extended performing techniques. The digital keyboard, can be a basic element for a computer-based work environment or music industry, which will become a common and very valuable place for the UNY music arts students. Apart from that, there needs to be a wider use of digital sequencers, digital recorders and other electronic devices related to the digital keyboard.

The next is the development of portable digital work assignments that allow all electronic or computer-based music management resources to be carried easily with musicians, educators, or music arts students, with convenience features equivalent to the use of other portable electronic devices, such as mobile phones, earphones, wireless headsets, and more devices.

Utilization of technology as an instrument

Throughout the history of music, the most basic and most important thing in the development of digital technology is the improvement of the quality of musical instruments. With musical instruments, musicians, educators, and students can externalize ideas and create works of musical art.

As is known, the wood and animal skin products are instruments that started the history of musical instruments. Then developed musical instruments made of brass and other metal elements, which are not only used as instrument materials, but these metal elements can be used to make musical instruments that have better wood elements, such as keyboard instruments from the *harpsichord* (ancient piano).

The development of musical instruments has not slowed down, especially orchestral instruments, which have increased rapidly through the use of integrated computer technology in improving form and structure through computer modeling and manufacturing. Instruments controlled by microprocessors, have been widely used in popular music and electro-acoustic music. Its development is no less rapid than previous instruments, driven by the desire of musicians and composers to realize harmonious musical perfection.

The synthesizer is an instrument at the forefront of contemporary music technology. Synthesizers have a decades-long history across a variety of musical styles and have spanned a wide range of electronic technologies. As with all new instruments, the form and function of the synthesizer is constantly evolving. Synthesizers of the 1990s were generally digital computers with motion controllers, which generally used a keyboard. The synthesizer's ability to manipulate sound is potentially more complex than previous musical instruments (Semegen 1989), but requires certain skills to achieve virtuosic control, master technique and proficiently play a musical instrument. The similarity of the synthesizer to other instruments in its performance requirements is described by Brown (1992) and Moore (1990) who provide a view of performance that includes both contemporary and traditional instruments.

Musical performance is the task of transferring the symbolic representation of musical ideas into the physical actions required to operate musical instruments, so that musical ideas can be realized in the form of sound. If digital technology is considered and accepted as a musical instrument, then the effective use of digital technology in the study of the art of music can become clearer. Musical instruments based on contemporary technology, especially synthesizers, need to be given the same opportunities as other musical instruments, and can be used easily. The development of digital technology as a musical instrument must be an integrated part of the educational process of music studies at UNY, so that the perspective of the essence of the art of music can always be maintained.

Kemp (1986) states clearly as follows: Some music teachers question whether an item of electronic equipment can be considered a musical instrument, maintaining that there is a fundamental difference between a machine and an acoustic instrument. Obviously, all instruments can be played without music and no musical instrument itself. It is the capacity of the musician to engage in the sensitive and imaginative movement of music, which transfers innate objects so that they become able to speak. All instruments have limitations, and the player's ability to operate on them in a

musically productive way is important. However, this does not deny the fact that we must develop electronic instruments that have the ability to respond to high levels of nuance and human sensitivity in their performance.

Utilization of technology as a collaboration media

The biggest impact of the development of digital technology on the education of music studies is its ability to enable collaboration in music management in new and better ways. The results of collaboration between musicians, educators, and students can change the way people perceive music, and provide new insights for the people who create and research it.

Digital technology has brought about one of the more significant changes in modern-day media whose effects are only beginning to be seen and felt today, as Gassée (1990) says, that *“Computers are simulation machines - powerful tools for building mental models. We're just starting to see them that way.”*

If someone studied and applied effectively, the use of digital technology can bring about new ways to study and understand music as a form of art and sound as a science. It is very interesting to observe the changes in music, musical thinking and collaboration in music as a result of the evolution of media and the transmission of significant dissemination of works. For example, the emergence of musical notation on paper in a certain room, is now very possible to store, communicate, share access to notation and collaborate virtually with others, without the constraints of distance and time.

Furthermore, the emergence of audio recording as a medium that can be easily published, has influenced the music community that allows each other to collaborate on music, and has become a new challenge for the role of musicians, educators and students. Live performances for the public, and enabling music to be stored and organized as sound recordings rather than notation or language notes (Jones 1992).

The digital radio broadcasting technology, digital television, social media, and internet technology have provided opportunities as well as challenges for musicians, music experts, music educators, music students and music lovers. The digital representation of music through internet-based technology has challenged and inspired the way in which music education institutions manage strategies about music to keep their place in the public sphere.

The fundamental theory of music, definition of musical instruments, basic skills of music, player roles, composer control, physical communication relationship between performer and audience, authentic style, history of musical instrument development (Boulez 1986), intellectual property rights, distribution of musical products, adherence to current tone and form (Deutsch 1976), and positioning in sound object space, psychoacoustics (Carterette 1989) *are* some of the problems faced by the academic music community as a result of the digital representation of sound. Digital technology makes it possible to solve problems regarding the nature of music.

Digital technology must be able to be the basis for working, learning, expressing, and collaborating on the study of the art of music. Music arts students, regardless of their specialty, should have guidance materials and access to digital technology, which allows students to be directly involved in music according to their needs and freedom of expression in music.

The influence of digital technology on the study of the art of music can go through several stages, including the stage of using digital technology as a tool, such as when it is used for accompaniment of practice, transcribing and arranging musical notation, or musicological audio exploration. Then the digital technology stage in the form of a synthesizer which becomes an instrument to be studied, written and performed like other musical instruments. Next, the stage of digital technology that can be a medium for expressing, illustrating sound, recording and publishing audio-video in new and unique ways, which challenges and expands knowledge about music.

Based on these things, UNY has a very big opportunity to be able to further improve the study of music education that is integrated with digital technology. As composer Pierre Boulez (1986) stated *“In the end, musical innovation must learn the language of technology, and even adapt it.”*

CONCLUSIONS

Digital technology has a very big role in the management and presentation of music education at UNY. If an academic perspective is given to this important aspect of creating and delivering music

arts education, it could further increase UNY's popularity and be fully harnessed by the power of the music industry.

Digital technology is a very valuable asset for UNY and has a significant and strategic position enough in the context of the integration of its three main utilization functions with music education, namely *as a tool* to help with educational tasks, *as a musical instrument*, as well as *a media for collaboration*.

The influence of digital technology on the study of the art of music can go through three stages, namely the stage of utilizing digital technology as a tool, the stage of synthesizer form, as well as the stage of collaborative expression media, sound illustration, audio-video recording and publication in new and unique ways, which are challenging and challenging. broaden your knowledge of music.

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