A STUDY ON THE USE OF TECHNOLOGY IN UNIVERSITY BASED MUSIC EDUCATION PROGRAMS: THE CURRENT SITUATION IN CHINA AND EMERGING TRENDS FROM ISME

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Abstract

This paper presents a discussion concerning the use of Information and Communication Technologies (ICTs) in university based music education degree programs and also in selected ICT based music courses. In this manuscript, the current situation in China is presented and compared to the emerging trends of research published at the 32nd World Conference of the International Society of Music Education (ISME). It is hoped that a number of possible topics for research and teaching practice innovation are going to be drawn and elicited from the discussions reported in this paper.

Keywords: ICT, China, ISME.

Resumo

Este artigo apresenta uma discussão a respeito do uso de Tecnologias da Informação e Comunicação (TIC) em cursos universitários de Educação Musical, bem como em outros cursos de música baseados no uso das TIC. Neste texto, a situação atual na China é apresentada e comparada com as tendências emergentes de pesquisas publicadas no 32° Congresso Mundial da International Society of Music Education (ISME). Espera-se que um número considerável de possíveis tópicos

para pesquisa e inovação nas práticas docentes possam emergir das discussões apresentadas neste artigo.

Palavras-chave: TIC, China, ISME.

1. Introduction

Music technology is considered as a relatively new topic of knowledge within the music education area. The International Society of Music Education (ISME), for instance, only recently created a special interest group in Music Technology[1]. A considerable number of Universities have included courses related to music technology in their music education programs. In addition, several online music courses have been developed lately such as the ones offered by the Educational Technology Coursera in partnership with universities such as Berklee College of Music and Stanford University. Moreover, many universities have been offering music online degree programs. In the US, for instance, there are 13 graduate and 1 undergraduate online degree programs in music that are NASM (National Association Schools of Music) accredited. Other countries such as Brazil, Finland and Canada have also been offering online-based music education degree programs, which are based on the use of digital technologies.

In China mainland, Modern Distance Music Education College of Central Conservatory of Music has been offering an undergraduate online arts degree program which provides online music technology courses. In Hong Kong, Hong Kong Baptist University and The Education University of Hong Kong have been offering music technology courses in music education degrees. Additionally, "iCourse" is a curriculum resource sharing platform of higher education which is sponsored by the Chinese ministry of education

1 https://www.isme.org/our-work/special-interest-groups/music-technology

and the ministry of finance during the "12th Five -Year plan"[2] in compliance with "undergraduate teaching quality and teaching reform project"[3]. Thus, it can be inferred that more discussions are needed in order to elaborate proposals that would lead to the implementation of technology based music education courses and degree programs in China. This paper presents a review concerning music education courses and programs that are technology-based. The emerging trends regarding the use of technology in Music Education are also going to be discussed here, through the research that has been conducted in the scope of the International Society of Music Education. The current situation and the literature about music technology in China are also going to be presented and debated. Following the discussions, it is hoped that several topics for research and examples of teaching practice innovation can be proposed.

The relevance of this manuscript is based on the fact that music technology is an emerging topic within the broad field of music education. The technology-based music instruction has been growing throughout the world at all levels, from elementary to higher education and also with the increasing popularity of MOOCs[4]. Many universities all over the world have used music technology in their music education programs and also many universities have offered totally online music education degree programs. This type of education is mediated by ICT, however there is still a lack of research and discussion concerning this specific subject. According to Bowman (2014), although these technologies are widely used in the online courses and degree programs that aim to teach music online, only a few research reports have been published recently about this subject. Thus, this paper intends to clarify some questions regarding the

2 China's 12th Five-Year Plan (2011-2015) which is a 5 years plan for country programming by National People's Congress.
3 One of the education project of "12th Five-Year plan".
4 MOOCs are Massive Open Online Courses.

aforementioned subject and also could be relevant in terms of the development of the research in this specific area, which could lead to advances in the teaching strategies employed in the processes of using digital technology in higher music education degree programs.

2. Music Education of Technology-based in China

The study and exploration of Music Technology has a long history in China. There have been musical temperament theory and musical instrument tuning tools since circa 770 – 476 BC, which can be regarded as the birth of China's early musical acoustics:

> *Three scale fall and rise method is the earliest temperament modulation in the world, which has used mathematical calculations to get temperament and documental recording. It was first recorded in GuanZi·DIYuanPian (Zhang 2007，p. II).*

Three scale fall and rise method refers to the way that string instruments make a chord pitch with vibrations corresponding to the relations between the strings. We can understand these string instruments as early music technologies. However, the development and circulation of Chinese music technology was slow because the nation did not invest much in research or make efforts to export cultural produces. Whereas, western music expanded, combining science and technology, exploration and research. With the development of computer technology, the exploration and creation of international music technology, represented by electrical music, was invited to China in the 1980s.

The first music technology research institute was founded in 1984 by Jiao Tong University and Shanghai Conservatory of Music

(Huang 2006). Early research focused on electronic music and was conducted at Central Conservatory of Music, Shanghai Conservatory of Music, Wuhang Conservatory of Music, China Conservatory as well as several other institutions.

With the increasing development of electronic and computer music, some universities in China also started research of different levels of computer music. Currently, there are universities that have been offering Music Technology degree programs such as The Capital Normal University, China Conservatory of Music, Central Conservatory of Music, The Education University of Hong Kong, Hong Kong Baptist University and so on. Meanwhile, there is an online undergraduate art degree program in the Central Conservatory of Music (See below for related discussion).

There have been certain achievements on the development of music technology disciplines exploration and experimentation in universities. Some of the representative essays is Huang (2006) with the work entitled "A Theoretical Study of the Development of Music Technology as An Independent Discipline and Professional Curriculum in China". This PhD thesis defines the connotation of music technology based on review the study of history and presents situation of music technology both in China and abroad. The thesis explored the development of music technology and the main content of professional curriculum as a discipline in China. After a discussion concerning the current music technology situation and professional curriculum construction in China, the thesis proposed to further expand the research on foreign music technology development and increase the breadth and depth of domestic and international exchanges and cooperation between China and other countries. Boldly learning from the successful experience of foreign countries, according to China's actual education situation to build and create the self-feature music technology discipline. However, the thesis was

published ten years ago. Therefore, there are still many questions in this area pending solutions.

Additionally, Ruan (2009) on his paper entitled "Application and Research on Digital Music Technology in Music Teaching" focused on application of digital music technology in teaching. Based on a case study in which he analyzed the use of the software such as Adobe Audition and Cubase, the researcher states that, by using these applications in teaching, it can enhance the quality of students learning and stimulate the interest of students. After that, the paper proposed that it is urgent for music teachers to grasp and apply computer music to teaching. Correspondingly, schools should further expand investment on electronic music equipment so that it can adapt the functional needs of music teaching.

Furthermore, the paper written by Cai (2014) "Research and Application of Computer Music Technology" focused on computer music technology applications in the music classroom to make teaching methods more diverse and effective. Conclusion of the paper is that using computer technology not only enhances the student's interest in studying music, but also improves the teaching quality in the classroom.

Moreover, Zhao (2010) on his article called "The impact of digital music on the current music technology discipline construction", makes a comparison between domestic and international digital music situations. The opinion of the paper is that new media digital music education system in China is still stuck in a simple model, which is based on the exchange from traditional instrument to digital instrument, but did not form a wide range of new media digital music education system like abroad. The paper believed that music educators in creative development and those who use digital music in teaching have had positive effects in the

U.S.A. and the development of music technology in China is not yet mature, and the need to strengthen training for music technology technicians is important.

Under the background of the "Internet +"[5] of rapid development, MOOCs started appearing in China in recent years. Tan (2015) said that MOOCs is different from the traditional curriculum. MOOCs has larger open networked, internal features which are personalized and participatory, including online learning effectiveness, learning to interact with core learning mechanisms such as collaboration and self-organization are many different examples and uses of technology for teaching. American universities have set up e-learning platforms to teach music. The effects of these courses have radiated throughout the world, causing widespread interest.[6] Some chinese universities, for example, in 2013 such as Beijing University, Qinghua University, and Fudan University also began to cooperate with Coursera and edX.[7]

With the beginning of MOOCs in China, "iCourse" website formally launched 12 music video open class category of "country boutique courses" which equals high quality and 8 Country Music boutique classes resource sharing lessons from October 12, 2011 to July 20, 2015 (Yang, 2015). As mentioned above, "iCourse" (see Figure 1) is a curriculum resources sharing platform of higher education, which is sponsored by the Ministry of Education, and the Ministry of Finance during the "twelfth five-year plan" in complied with "undergraduate teaching quality and teaching reform project"[8]. There

5 "Internet Plus" refers to the application of the internet and other information technology in conventional industries. It is an incomplete equation where various internets (mobile Internet, cloud computing, big data or Internet of Things) can be added to other fields, fostering new industries and business development in China. https://en.wikipedia.org/wiki/Internet_Plus#Definition

6 Tan S.J. (2015) Research on the Mixed Class Teaching Model in the Higher Normal Universities Under MOOC Environment. Teacher Education Forum,V.7,p.17.

7 http://fzghc.blcu.edu.cn/art/2014/7/11/art_6582_1076396.html

8 http://www.icourses.cn/aboutus/

are three types of courses which have 992 open video courses, 2867 resource sharing courses, and approximately 400 MOOCs on "iCourse" website.

Figure 1 – Screenshot of iCourse website <http://www.icourses.cn/home/>.

There is a MOOC named "Music Guide" on the "iCourse" website.[9] Professor Anning from Shandong University teaches a course which introduces basic music theory and how to appreciate music of China and Western countries. The course is conducted in 14 weeks, 45 minutes video instruction per week and 30 minutes of after class testing. As in September 2016, there were 3532 participants taking this course and when they finish and pass the exam they can receive a certificate signed by the teacher.

In addition, only one open video course of these courses was in music technology on "iCourse" website. This course is called "Music

9 http://www.icourse163.org/course/sdu-212004#/info

and Technology"[10] (see Figure 2). Chen Yang, who is the Professor of this course, is from Southeast University. The course consists of 6 (six) video lessons with the total time of 4 hours, 18 minutes and 36 seconds.

Figure 2 – Screenshot of the Music Technology Course <http://www.icourses.cn/viewVCourse.action?courseCode=10286V007>

This course presents music associated with arts, social sciences, natural sciences, and engineering technology. It describes the physics, mathematics and music knowledge and its application in musical instruments and music works. Professor Yang narrates the basics of architectural acoustics and its applications in music venues. The course introduces music recording, broadcasting equipment development and related technical knowledge. In brief, the course is an online open basic introductory video in music technology.

10 http://www.icourses.cn/viewVCourse.action?courseCode=10286V007

Meanwhile, Modern Distance Music Education College of Central Conservatory of Music has been offering one online undergraduate art degree program[11]. The College currently have been offering "music education", "arts management" and "digital music", which are three major directions of its undergraduate degree programs.

In addition, Prof. Jiaxing Xie from China Conservatory with Prof. David Hebert from the University of Bergen (Norway) have a MOOC Project in common called "Open Global Music Academy" (OGMA) which is a global cooperation between a consortium of chinese music conservatories with international music universities in several countries with the goal of offering online music education via MOOCs in both English and Chinese language. The host Organization is China Conservatory and the initial partner Organizations are from Bergen University (Norway) with Prof. David Hebert, Melbourne Conservatorium (Australia) with Prof. Gary McPherson, Federal University of Rio Grande do Sul (Brazil) with Prof. Liane Hentschke, New York University (USA) with Prof. Alex Ruthmann, Educational University of Hongkong (China) with Prof. Bo-wah Leung and plus other International Music Institutions and professors. It can be infered from the OGMA project that Chinese music scholars are making efforts to offer MOOCs at the same level as these type of courses are being offered throughout the world.

Generally speaking, university music education based on the use of technology is in its beginning stages in China. Many universities all over the world have used music technology in their music education programs and also many universities have offered exclusive online music education degree programs. Overall, the research of

11 http://mdmec.ccom.edu.cn:8080/cms/xljy/661.htm

music technology in China is still scattered among universities and there is space for further communication and collaboration.

3. Emerging Trends of Technology-based Global Music Education at ISME

Technology in music education has been normally associated with the following topics: 1) a subject that students can major and pursue a degree in (music technology degrees, such as audio engineering, music producing, electronic music, computer music, sound recording, and so forth); 2) a platform for enhancing and delivering courses in music, such as MOOCs, online classes, online degree programs, and other platforms such as Coursera, Kadenze, and others; and 3) Creative applications, software, and hardware tools for making, learning and experiencing music through technology, which can be used in university music courses of all kinds, in person and online, such as the ones developed by the Music Experience and Design Lab from New York University[12].

Concerning degree programs and courses, music technology has reached at a state of maturity in many countries. As aforementioned, considerable number of universities have included courses related to music technology in their music education programs. In the US, for instance, there are 94 American Universities offering music technology programs.

With the development of the digital technologies, the use of technology in music education has shown some emerging trends in the universities in terms of teaching and research. According to the 32nd World Conference of the International Society for Music Education (ISME) which was held in Glasgow-UK in 2016 – despite the

12 https://musedlab.org/

fact that the ISME Music Technology special interest group was only recently created – there were 58 (fifty eight) spoken presentations and 14 (fourteen) posters published in the proceedings of the cited conference. In order to uncover the so-called emerging trends, the authors tried to organize both the spoken presentations and the posters into categories in order to unravel the emerging trends. They are described and explained in the next paragraphs.

The categories that emerged from spoken presentations and posters from the 32nd World Conference of the International Society for Music Education (ISME) were[13]: 1) Technology in General, which refers to the use of ICT in general for teaching, learning and making music. This can include hardware, software, and so on, normally combined. The presentations and posters of this category do not mention a specific technology but the use of them in general; 2) Mobile, which is related to mobile applications, hardware, and devices for teaching, learning, and making music; 3) Apps/Software, which is a category that includes applications and software for teaching, learning, and making music that are not online or mobile, but rather for stand alone use; 4) Collaborative Projects, which is a category that refers to collaborative projects between international institutions in order to promote the use of technology in music education; 5) Online, which is related to online courses, degrees, or applications for teaching, learning music; 6) Social Media, which is a category that is related to the use of social media such as Facebook, Instagram, and so forth for music education.

13 https://www.isme.org/sites/default/files/documents/ISME%20Conference%20Proceedings%202016%20Final.pdf

Table 1 – Number of spoken presentations presented at the 32nd World Conference of ISME according to the categories created by the authors.

Category	**Number of Spoken Presentations**
Technology in General	36
Mobile	10
Online	4
Apps/Software	4
Collaborative Projects	3
Social Media	1

Font – Proceedings of ISME's 32nd World Conference, Glasgow, Scotland. 2016.

Table 1 shows the quantity of spoken presentations according to the categories defined by the authors. It can be drawn from Table 1 that the majority of the spoken presentations were related to technology in general. This can lead to the conclusion that many researchers tend to investigate combined technologies rather than a single one. However, the category Mobile had 10 (ten) spoken presentations, which can denote a tendency since and may demonstrate the popularization of music apps for mobile devices: Smart phones are becoming increasingly prevalent all over the world. Additionally, many apps for mobile devices are free, as long as users can download the software, they can use it at their convenience. As aforementioned, MOOCs are becoming increasingly popular and many online degree programs are being offered throughout the world. This might explain the number of presentations related to online technologies that are used for teaching, learning and making music. Although – as aforementioned – there is a tendency for the use of mobile applications, there are still apps/software that are being

developed for stand alone operational systems. Collaborative Projects is the category that comes after Online and Apps/Software. Three presentations were related to collaborative projects such as the Open Global Music Academy (OGMA) that is described above. These projects involve different institutions and their effect on music education deserves to be investigated. Although social media is becoming increasingly popular nowadays, there was only one presentation related to this topic. It can be inferred that more research is needed concerning this subject.

Table 2 – Number of posters presented at the 32nd World Conferece of ISME according to the categories created by the authors.

Category	**Number of Posters**
Technology in General	5
Mobile	0
Online	4
Apps/Software	4
Collaborative Projects	0
Social Media	1

Font – Proceedings of ISME's 32nd World Conference, Glasgow, Scotland. 2016.

Concerning the posters (Table 2), among fourteen poster presentations in the music technology field, five could be included in the Technology in General category following the same tendency that was noticed in the spoken presentations sessions. However, none of the posters was related to mobile technologies. Four presentations were related to online music education, which reinforces the fact that

online music education is growing rapidly. Four posters could be associated with apps/software, which denotes the fact that many stand alone applications are still being developed for music education. One poster was related to social media and none with collaborative projects.

It can be drawn from the spoken presentations and posters of the last ISME World Conference that researchers tend to investigate the technology in general and its use in Music Education. However, there is a tendency for research work concerning Mobile technologies. Online music education is another area that is growing rapidly. As aforementioned, more and more technologies are being developed and programs and courses such as "Play With Your Music" (figure 3) which was developed by the Music Experience and Design Lab from New York University[14]. According to their site[15],

> *Play With Your Music is about learning music while playing with music. The first six-week course provided an introduction to critical listening, strategies for learning from recordings, musical uses of audio effects, mixing and remixing.*

As mentioned above, online courses offered by educational platforms in partnership with universities are evolving rapidly. Kadenze (Figure 4) is one of these platforms that aims to bring artists, educators and engineers together from different leading universities across the world to provide courses in a number of subjects.

14 https://musedlab.org/
15 http://reports.p2pu.org/play-with-your-music/

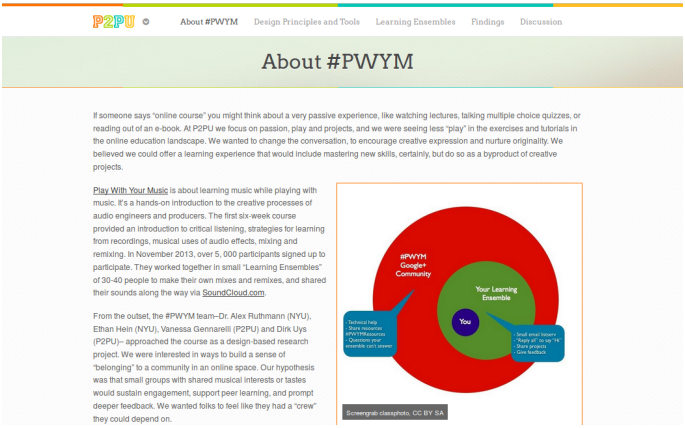

Figure 3 – Screenshot of the Play With Your Music Course <http://reports.p2pu.org/play-with-your-music/>

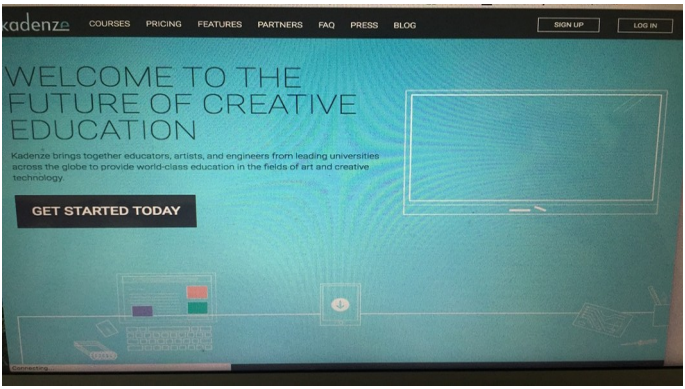

Figure 4 – Screenshot of Kadenze website <https://www.kadenze.com/>

Despite the popularity of mobile and online applications, there is still software for Music Education being developed for stand alone machines. This is the case of the Sonic Pi which was created at the University of Cambridge Computer Laboratory[16]. This application is a sort of coding language that is driven for learning coding skills in a creative way by composing or performing music. The developers affirm that Sonic Pi can be used for either music or computing classes. Sonic Pi is an open source project which means that – besides being free – the app can be modified by the user and used according to his or her needs.

Collaborative projects between universities from different countries are becoming increasingly popular. The Open Global Music Academy (OGMA) project, for instance, consists of a consortium between Chinese and international music institutions with the intention of offering online education via MOOCs in both English and Chinese language.

Social media such as Facebook, Instagram and others are being used in education and more specifically in music education. Despite the fact that only one spoken presentation and one poster were presented at the 32nd World Conference of ISME about this topic, the subject has been investigated by many researchers such as Méio (2014) who used Facebook and Noteflight for conducting a collaborative composition activity among students of the distance education undergraduate degree program in Music of Universidade de Brasília – Brazil. Méio (2014) concluded that the use of social media could open new possibilities for Music Education since the students would not need to use exclusively formal virtual learning environments to make and learn music.

16 http://sonic-pi.net/

4. Final Remarks

This paper aimed to present a discussion concerning the use of ICT in music education programs and courses as well as – based on a study of the spoken presentations and posters of the 32nd World Conference of the International Society of Music Education – to show the trends throughout the world concerning this subject in terms of research. Nonetheless, the history of music technology in China was shown and the current situation was discussed. It can be inferred that there is a tendency for the offering of online courses in music throughout the world and these type of courses are also being offered in China, both with the sponsorship of the government and with partnerships and collaborations with international universities.

Based on the spoken presentations and posters presented at the ISME conference, six main categories of research related to Music Technology in Music Education emerged: Technology in General, Mobile, Online, Apps/Software, Collaborative Projects, and Social Media. It was found that the category "Technology in General" was the one that had most research studies about. However, the category "Mobile" can be considered an emerging one as there was a relevant number of spoken presentations and papers about this subject. The other categories still deserve to be more investigated.

In addition, some research questions still need to be answered such as: How do people learn music through MOOCs? What pedagogical approaches could be employed for using ICT in Music Education? What is the impact of collaborative projects in music education? How social media can be used for teaching music? It is worth mentioning that many other questions may arise as there are many specific topics among the aforementioned categories that could be tackled by researchers.

The research on music technology in China might be in its early stages but it can be inferred that – following the partnerships with international universities – will reach the same tendencies that are prominent all over the world. It is hoped that the discussions presented on this paper not only may clarify some questions and lead to more research concerning the use of technology in music education but also could contribute for teaching practice innovation in the field.

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