Asia Pacific Education Review
2007, Vol. 8, No. 1, 12-26.

Music Students' Perception of the Use of Multi-media Technology at the Graduate Level in Hong Kong Higher Education

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The core purpose of this paper is to draw together research issues and concrete problems with the use of multimedia technology at the graduate level in higher music education by examining one university's responses to the challenges posed by the use of multimedia technology as a teaching and learning aid for music education. Between June and July 2006, this study conducted a simple questionnaire and interview survey of 16 postgraduate students. The results suggest that music students are confident in their abilities to use multimedia technologies but that many do not believe that the introduction of multimedia technologies into the curriculum will improve the quality of their education. Whilst students' motivation to learn depends on their interest in the subject and their lecturer's approach, the incorporation of technology should always be relevant to each individual module. The results of this case study could help other universities respond to the changes brought about by electronic learning and other educational multimedia technology.

Key words: music students, multimedia technology, graduate level, Hong Kong higher education

Introduction

Nowadays much attention is paid to the construction of learning environments that integrate new technology, including CD-ROM, Digital Video Discs (DVDs), the internet, web project development and multimedia, into today's classrooms. From pre-school to university education, teachers have significantly increased their use of multimedia technology to enrich the learning and teaching environment (e.g., Chen & Chen, 2006; Fischer, Troendle & Mandl, 2003; Friedman, 2003; Jones & O'Shea, 2004; Leung, 2003; McFarlane, Williams & Bonnett, 2000; McGregor & Mills, 2006; Panagiotakopoulos & Ioannidis, 2002; Ranker, 2006; Wang, 2004; Wang, Li & Shi, 2006; Zhang, Kirk, & Yeung, 2005; Yang & Chen, 2007). New developments in e-learning and increasingly sophisticated learning technologies have made a major impact on university culture and education in various disciplines (e.g., Barr & Gillespie, 2003; Chang, 2005; Deadman, Trevor, Lynne, & Douglas, 2000; Glittenberg & Binder, 2006; Truman & Truman, 2006).

In the 1970s and 1980s, most music teacher education programmes ran comprehensive and specialised courses on general music, band, strings and chorus (Burton, 1990; Thomas, 1970), whilst courses on music technology have only appeared in the last decade (e.g., Bauer, Reese, & McAllister, 2003; Casey, 2005; Cain, 2004; Greher, 2006). The term multimedia describes a number of diverse technologies that allow visual and audio media to be

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This research project was funded by a Faculty Research Grant from Hong Kong Baptist University. I am especially grateful to the music students involved in the study for agreeing to participate and for providing valuable information for the research.
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combined. It also describes a number of dedicated media appliances, such as digital video recorders (DVRs), digital video discs (DVDs), interactive television, MP3 players, video images, PowerPoint presentation and other technologies, which can help students in music analysis, and which may be useful for learning practical music skills (e.g. Chan, Jones, Scanlon, & Joiner, 2006; Miller, 2004; Ryan, 2006; Savage, 2005; Welch, Howard, Himonides, & Brereton, 2005). Writing music using software packages has been shown to be an educational aid to student composition (e.g., Airy & Parr, 2001; Gall & Breeze, 2005; Manzolli & Verschure, 2005). Bray (2000) also suggests that Information Communication Technology (ICT) helps students to enhance their creativity, encourages them to be exploratory, and enables them to achieve learning objectives. Other studies maintain that global communication technology has offered a major contribution to music education by unlocking our musical knowledge, and by encouraging creative thinking in educational arenas other than performance-based ones (Bauer, Reese, & McAllister, 2003; Mansfield, 2005; Webster, 2000). The internet is used to explore new methods of music making, composition, and performance, along with the analysis and discussion of compositional and cultural matters related to digital music and culture among school students, university students, and musicians (Hugill, 2005; Marontate, 2005; Thompson, 1999). As a result, teachers' professional development must include learning how to integrate technology into their educational practice (Churchill, 2006; Dexter, 2006; Jeffs, & Banister, 2006; Zirkle, 2005).

In recent years, although information technology has come into common use in education, it is still questionable whether multimedia technology is more effective for delivering instruction than traditional methods. There are numerous studies covering the assessment of technological literacy and students' attitudes towards technology at the school level (e.g., Chow, Chin, Yeung, Chan, & Kwan, 1998; Ho, 2004a, 2004b; Koo, 2001; Law, Yuen, Ki, Li, Lee, & Chow, 2000; Su, Kong, & Jiang, 2001), but changes to the quality of higher music education, particularly at the graduate level with the use of multimedia technology, have not been evaluated. Multimedia Technology in this study implies the use of multiple forms of information and information processing, such as audio, animation, graphic interactivity, video and text, to assist music students. "Multimedia" also refers to the use of electronic media to harness powerful interactive pedagogies in music learning. This study will explore the extent to which classroom teaching and learning at graduate level might benefit from multimedia technology.

Background of Technology Education in Hong Kong Music Education

Many governments, including those of Singapore and Hong Kong, promote ICT as the necessary and inevitable route towards better education, as is made explicit by the title of Hong Kong's five-year strategy plan, *Information Technology for Quality Education*. The Hong Kong Special Administrative Region (HKSAR) has made a huge investment in the development of ICT in the education sector. A major mission of Hong Kong education is to initiate a paradigm shift in teaching methodology from a largely textbook-based, teacher-centred approach to a more interactive and learner-centred one (Education and Manpower Branch, 1998; Fung & Pun, 2001; Law, 2003; McNaught & Lam, 2005). Ho (2004a) has assessed to what extent the expectations of the five-year planned introduction of ICT into school music lessons - *Information Technology for Quality Education*, proposed in the *1997 Policy Speech* and *Information Technology for Learning in a New Era* - has produced the expected paradigm shift to a learner-directed mode of music teaching in Hong Kong.

Doubts have been raised about whether ICT is widely and effectively used to facilitate music teaching, and to stimulate students' interests in music learning. Based on a report on 30 primary and secondary schools, most school students were confident in using a computer, synthesizer, and other software to compose, and to download music and musical information from the internet (Ho, 2004a). It is also shown that the use of computer and music software in composition could complement performing and listening activities among secondary school students (Cheung, 2002). Although students believed that practical music skills are better taught in the traditional manner, they also thought that music technology could stimulate learner-directed creative music making (Ho, 2004a). Those students who were against computer-assisted music teaching agreed that only their music teachers recognised their musical problems, and were able to respond quickly to their needs and interests (Ho, 2004a). Ho (2004a) concludes that when ICT is carefully planned, designed and integrated into good music practice in classrooms, it can support students' motivation and enhance the quality of learning.

Today's students live in a global, knowledge-based age,

and deserve teachers who embrace the best that information technology can bring to music learning. With reference to Hong Kong higher music education, technological developments and curricular diversification are seen as the way forward for HK music faculties (Ho, 2001). Hong Kong universities have been encouraged to achieve their mission through the promotion of information technology education. In the last decade, the infusion of multimedia into teaching and learning has altered considerably educational strategies in Hong Kong higher educational institutions, and has changed the way lecturers teach and students learn (Ho, 2001).

Study Design

Objectives and Research Questions

This study aims to explore current developments in Hong Kong higher education since the introduction and the new emphasis placed on the use of multimedia technology. Four major questions are addressed concerning: (1) whether the use of video images, PowerPoint presentations and other educational technologies represent rich resources for students' learning in music; (2) to what extent multimedia technology, alongside other advanced educational technologies, helps students improve their creative music making and music practices; (3) to what extent multimedia technology can satisfactorily replace traditional learning methods and traditional conceptions of teacher-learner interactions; and (4) whether students feel that multimedia technology motivates their music learning, and whether the quality of music education at graduate level can be improved if it is used more.

Context

H University, which participated in this study, is the first higher education institution in the city to run a Master's Degree in music education and composition. The two-year part-time M.A. in music was first offered in the early 1990s. When it became self-funded in September 2003 it broadened its course to take in choral conducting, composition, music education, piano pedagogy, music in information technology, music education in early childhood, and music and culture. Music Technology, which is compulsory for first year MA students, is designed to help them recognise the features and potential of technology applications to music education. The teaching contents cover MIDI basics and sequencing, music notation, the World Wide Web, computer assisted accompaniment etc. Enrolment for the Master's Degree has grown from 15 to more than 40 students per year since September 2003. About 90 percent of postgraduates reading music in the university are female.

The Masters Programme places special emphasis on the role of technology and computers. The Electro-Acoustic Music Centre (EMC) and the Laboratory for Music Exploration and Research (LaMER) are the ideal places to use computers and other audio equipment to support performance activities. The EMC was built in 1990 to support the Bachelor Degree in Music Course, and is used for a unique stream in music production and composition. It is a centre where MA students can make recordings and experiment with MIDI music. The Digital Performer is the main programme used in the centre. With its double-wall design, the EMC is highly suited to professional standard recording. Moreover, there is one teaching room affiliated with the EMC that students can use to edit their MIDI and audio recordings. There are six stations in this room, and usually three to four students may work on one station in the class. Each station includes a computer, a small mixer, audio interface, MIDI interface, sound modules and a MIDI keyboard. Funded in part by government research grants, the Department opened the Laboratory for Music Exploration and Research (LaMER) in 2002. The acoustically treated 550ft2 facility is designed as a multi-purpose Research Laboratory and Project Space for Real-time Computer Music, Music Education, and Performance. The lab is equipped with cameras and recording equipment to allow unobtrusive observation of various musical activities, and can hold up to 40 subjects. To support performance activities, the lab has a DC3 Yamaha Disklavier grand piano, allowing MIDI playback of the pianists' exact movements. This, combined with the visual and audio recording capabilities, makes it an excellent environment for students to learn about their own performances. Besides these two music centres, other teaching rooms are well-equipped with a computer, a white board, an overhead projector, a visualizer, a CD player, a DVD player, a laser disc player and a video player. All these support tools are linked to a LCD projector.

Research Methodology

A simple questionnaire and a semi-structured interview survey were conducted with those music students who were willing to be involved in this study after the end of term between June and July 2006. A pilot test was conducted in

early June. The questionnaire and questions for interview survey were revised and further developed after the pilot test. Invitations were made by phone, e-mail and face-to-face contact between April and May 2006. Sixteen postgraduate music students were invited to participate in the survey between June and July. The survey venues were chosen by the interviewees at places convenient to them, for example at their schools, the university campus, music studios, a coffee shop, a McDonald's restaurant, a concourse of a residential building, and even their homes. At the beginning of the interview, participants were asked to fill out a questionnaire concerning their personal data, and their experiences and reactions to the use of multimedia tools both inside and outside class (see the Appendix).

Most of the interviews lasted from between 45 to 80 minutes. Two participants, especially numbers 6 and 7, gave especially long answers, which stretched the overall time to about 100 minutes. In a few cases when the participants gave brief answers, they were encouraged to elaborate. All the participants were very cooperative, and seemed very enthusiastic to talk about multimedia technology in music teaching and learning. A few tended to express their views on using multimedia technology in their schools, rather than their experiences of using it in the MA programme. The researcher believed that those interviewees were all experienced school music teachers, who were eager to compare their school music technology with that in the music education department. Nonetheless those interviewees had to be motivated and prompted to provide relevant answers on a few occasions. The interviews were recorded in Cantonese (a major dialect in Hong Kong) on MP3 and transcribed afterwards. All participants received a "thank-you card" and a HK$180 music store voucher. The ethnographic interviews were guided by the following series of open-ended questions:

1. Do you find video presentations helpful in understanding music/issues? If yes, to what extent?
2. Do you find listening examples helpful in understanding music/issues? If yes, to what extent?
3. Do you find PowerPoint presentations helpful in understanding music/issues? If yes, to what extent?
4. Do you think other advanced educational technologies, such as multimedia instruction packages, computer-assisted instruction, and the internet enhances music learning significantly?
5. Do you think music technology can motivate you towards more creative music making?
6. Do you think multimedia technology improves the quality of your music practice? If yes, in what ways? To what extent?
7. In what ways do you think multimedia technology facilities could replace traditional methods such as music textbooks and music references for learning music?
8. To what extent do you feel more motivated about learning music when multimedia technology is used in your lessons?
9. Do you think there should be more use of music technology in music lessons? If yes, to what extent? In which ways?

Findings

Background information about the questionnaire survey

For reasons of clarity, the 16 participating students (14 female and 2 male) were numbered from 1 to 16. Seven students were taking Choral Conducting, four Music Education, one Information Technology in Music, one Music Education in Early Childhood, two Piano Pedagogy, and one was taking Composition. Most of the MA students in this study concentrated their programmes on choral conducting, music education and piano pedagogy, so the number of participants attending these three courses was comparatively higher. Among the 15 MA students, nine were attending Year One; while the other six were in Year Two. One was a full-time PhD student (no. 3) who sat for two taught M.A classes of Creativity in Music, and Psychology and Sociology in Music, in the second semester of 2005-2006. She was invited to participate because of her great interest in becoming involved. Eight students said that their musical instruments were piano, one said accordion, one piano and percussion, one guitar, two piano and singing, one viola, one singing, piano and flute, and one singing. The major source of students' acquisition of musical knowledge was in the order of: instrumental coaches (7), university teachers (6), the students themselves (1), lecture handouts and other reading materials (1), and music reading materials (1) (see Figure 1 for the details)

Only two students (7, 16) had to share their computers/notebook computers with other family members at home whilst 14 students had their own. Student 14 and the other nine students (students 1 – 5, 7 - 9, 12) rated their skills in using a web browser such as Netscape to access their learning materials as "Advanced" and "Good" respectively, and six (students 6, 10, 11, 13, 15, 16) said they were

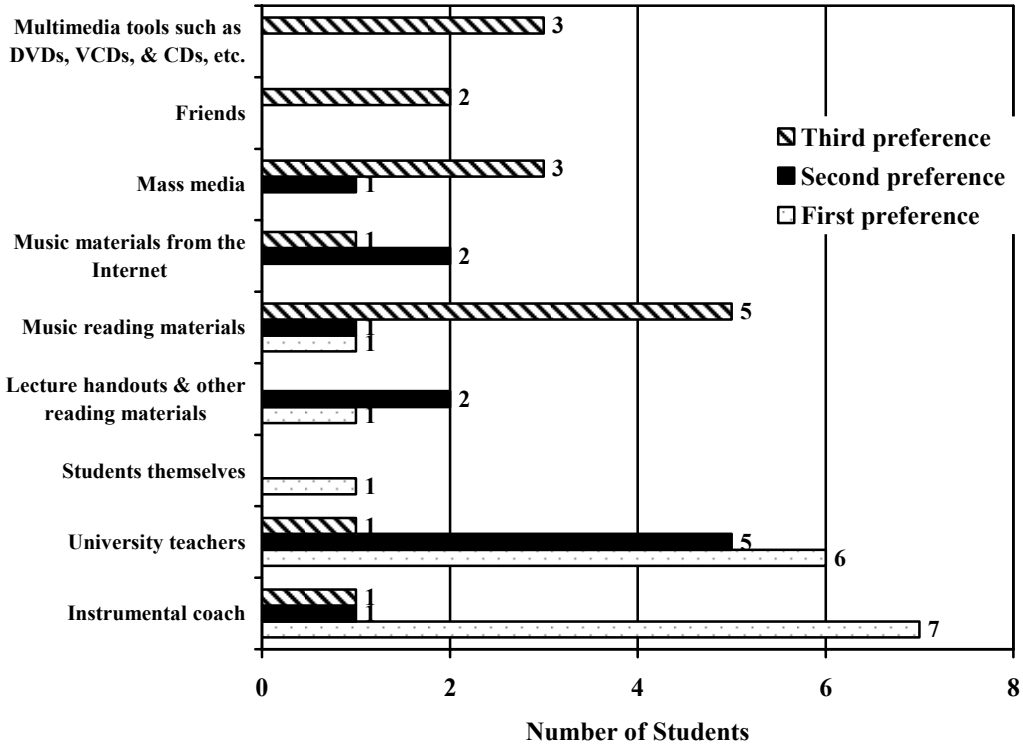

Figure 1. The major source of MA students' acquisition for musical knowledge as perceived by themselves

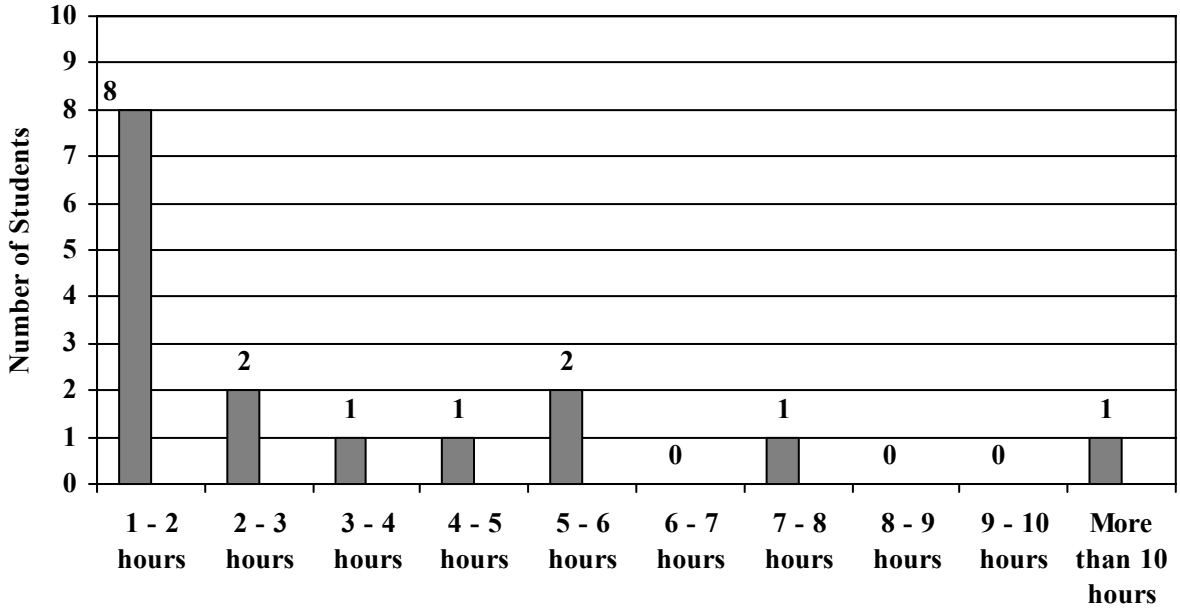

Figure 2. Hours spent on accessing their music materials related to the MA course on the internet by students each week

"Basic". Two students (4, 14) said that they felt very confident with multimedia technology for music learning; whilst 11 (1, 2, 5 -13) were simply confident. The other three students (3, 15, and 16) felt little confidence. When asked about their skills with the university's and other online library resources, students rated themselves similarly. Apart from student 3, the other 15 claimed that they usually did their on-line search for their music learning at home. Most students spent between one to three hours each week accessing music materials, which were related to the MA programme, on the internet (see Figure 2).

Only six students expected a classroom environment to employ multimedia technology, whilst the other nine noted that its usage depended on the nature of particular modules. Only Student 2 said that she chose MA classes partly on the basis of to what extent the instructor made use of multimedia technology. All of them believed that multimedia resources benefited music appreciation, composition and music history most. When asked about their use of multimedia technology for their oral presentations, only student 6 said that she merely read her presentation, whilst the others said that computer CD drives and DVD/VCD were their main medium of instruction. When asked if they felt technology/music technology had helped and motivated their learning, only Student 13 replied that they did not, whilst the others thought that it had a considerable effect on their learning.

Attitudes toward the use of multimedia technology, music listening, PowerPoint presentations, video presentations and other educational media tools in music learning

In the interviews, 15 of the subjects agreed that they understood more about listening to various musical features, performing styles and orchestration across different periods. Listening could also help music analysis. According to student 15, listening helped her to be more objective. Students 2 and 9 suggested that it would be better to have visual materials or music scores as well. Students 10 and 11 thought that the lecturer should suggest more listening examples after class. Student 14 pointed out that they needed to practise after listening so as to progress, and that music listening in itself could not help to perfect their musical skills. Student 3 said that teachers played the most important role at elementary or intermediate levels of instrumental learning, while practicing and listening became important at more advanced levels. Student 13 was the only subject who did not listen to music because he believed that the course did not require much listening.

Ten students (1, 2, 3, 4, 6, 7, 9, 11, 12 and 15) believed that PowerPoint presentations could be helpful for the understanding of music and issues in music. They all agreed that PowerPoint was useful for displaying key points, but that they would be more interested in it if it could also display pictures and sound clips. Student 12 even thought that PowerPoint could stimulate tired students. Student 3 said that she could better follow the thinking of the lecturer via PowerPoint. However, students 9 and 14 thought that there was no need to have PowerPoint for every lecture. Students 10, 14 and 16 emphasised that lecturers should only use PowerPoint as a supplement to their teaching. They also said that a well-prepared lesson could be given without PowerPoint. Students 5 and 13 were against the use of PowerPoint because they favoured unassisted presentations by music teachers. Student 8 found PowerPoint helpful only if it was of a suitable length and presented by a competent and well-prepared lecturer.

All the participants agreed that video presentations were helpful in understanding music/issues because by these means they did not need to imagine abstract notions. Ten students (2, 5, 6, 7, 8, 10, 11, 13, 15 and 16) thought that videos could help them visualise concepts and memorise things more easily, and that videos showing different music or different interpretations of music could broaden their horizons. Students 1, 3 and 5 mentioned that videos must be related to lessons. Students 1 and 11 said that video presentations help them to concentrate during lessons, but that explanation and discussion should follow them in order to help students understand music and/or music issues. For example:

> Student 1: "…I think the usefulness (of technologies) depends on whether the video relates to the content of lesson or not. Teachers should explain the aim of watching video instead of watching without achieving any goals or aims".
>
> Student 12: "… I can have my own experience after watching the video. I will think about it while I am watching. After that, our learning will be more effective if the lecturer can talk more about the music issue involved or we have can have a discussion on it. I can develop my own opinion, critical thinking and judgement … The lecturer is very important in giving the guidelines or questions to the students. Otherwise, students may get lost and may not be sure about the objectives of watching the video".

Two students (3 and 14) believed that video

presentations could either supplement the information taught by ineffective instructors, or that it was a sign of good teaching preparation. Students 9 and 12 pointed out that if the lecturers suggested some videos and guidelines it would not then be necessary to have a video presentation in class. Student 15 believed that when lecturers are well-prepared, they can give lectures without any video presentation.

Thirteen students (1, 2, 3, 4, 7, 8, 9, 10, 11, 12, 14, 15 and 16) agreed that other advanced educational technologies, such as multimedia instruction packages, computer-assisted instruction, and the internet could enhance music learning significantly. Student 4 thought that multimedia technologies were better than "chalk and talk" as they provided real life examples. Students 1, 2, 3 and 11 said that the use of other advanced educational technologies could arouse students' interest and could hold their attention. Eight students (1, 2, 4, 7, 9, 10, 11 and 15) found the Internet very useful in searching for up to date information for assignments, self-study, academic papers, and specific interest topics. However, student 5 believed that the best way to learn about music was by reading books from the library rather than using the internet. Student 6 did not trust advanced educational technologies. She disliked the sound of midi and thought that music information from the internet might be incorrect or inaccurate and highly subjective. Student 13 did not use multimedia instruction packages because he preferred traditional teaching. Though some students, such as numbers 6 and 13, disagreed about the effectiveness of using educational technologies, they all said that they used the internet for searching for information for the MA assignments and research projects, or for self-interest or downloading music files. The university's electronic sources were mostly used to access the internet. However, Student 6 said that she would prefer to visit the university library to search for her references if time was available. Nonetheless she was becoming more accustomed to the university electronic resources to access her references and other music information for her MA study.

Motivation towards creative music making with technology

Five students (1, 2, 7, 10, and 14) responded with a "Yes" when asked whether technology motivated them towards creative music making. They believed that music technology was used to explore creatively the newest developments in electronic and computer music. Students 1, 2 and 10 thought they could listen to their work instantly by using technology. Student 2 maintained that she could share her work with other people. However, Student 10 pointed out that, although she had more creative ideas when technology was used for music making, it limited the reproduction of sound. In addition these students explained that music technology could develop their understanding of composition, aural awareness and performance. They could explore the crossover of music technology into other fields, especially performance and multimedia. They could consider the possibilities of music technology in multimedia, using a variety of enhanced multimedia formats. While remaining focused on a creative and experimental approach to music technology, their musical understanding could be implemented through creative applications such as interactive media and recording live performance.

Those students who believed that they would not be motivated towards creative music making with technology, were either uninterested in composition or unfamiliar with music technology. Students 3, 4, 9, 11, 12, 15 and 16 did not have any interest in composition. Other students expressed difficulty with composition using technology, because they were unfamiliar with the art, or because they were using ill-equipped facilities and were hampered by time constraints:

> Student 6: "… I am not familiar with composition techniques. Also, since I have not practised using technology, I find difficulties in handling the technology. However, I do think that a music student cannot rely too much on technology… I don't agree with the use of midi sound and electronic music only offers me a remote feeling".
>
> Student 8: "… I may not develop a greater interest in composing after the completion of my MA course because using multimedia technology for composition means that we need to have a good memory and plenty of time in manipulating the technology. Also, we need a lot of software and accessories like sound modules, and an electronic keyboard. I don't have any at home… I need to practise it again and again because technology is quite a complicated issue, I will forget the details if I cannot use it all the time. The application of technology is quite a difficult task. Even though I can manipulate it, time devoted to music composition and my practice are the problems".
>
> Student 13: "… I do believe that people can make music without the aid of technology. People in the past could do that without technology and we can do the same as well. Nowadays, people depend too much on technology in creating music. I think that

musical ideas should come first in our mind. If it is presented in the hardware, it will be a rather routine performance".

These students pointed out that technology/music technology did not increase their motivation towards composition. Though they had knowledge about making music with technology, whether they were able to use technology in their own music making depended on whether they had interest in composing, how much time they had to devote to it, and their access to technology.

The improvement of the quality of music practice with the aid of music technology and other educational technology

Thirteen students (1, 2, 3, 4, 5, 6, 7, 10, 11, 12, 14, 15 and 16) believed that they could improve on their music practice with the use of multimedia technology. Students 1, 2, 4 and 5 thought that it increased their understanding of dynamics, articulation and expression. Students 3, 4, 6, 10, 12 and 15 said that it helped to compare the different styles of different performers, and how they interpreted the same music. Student 14 used multimedia technology to imitate recorded artists' performing styles, articulation and techniques. Student 12 believed that multimedia technology expanded her memory because it enabled her to hear the music repeatedly, whilst the teacher might only play it once. Students 8 and 15 used the technology to prepare music for examinations. Students 1, 2, 5 and 7 thought teachers' input to be fundamental to the learning process, and student 14 thought that teachers should guide listening.

Student 1: "I think teachers should play the main role in guiding my instruction and learning, help me to improve the techniques of playing. Technology is a kind of resource; we need to practice, so we cannot improve the quality of music practice by listening alone…"

Student 2: "…the teacher is a guide and provides advice. I taped my vocal and piano lessons as I could not remember all the things that teachers said, especially when the teacher taught me foreign languages in vocal lessons. The technology is an assisted teaching tool; a good teacher plays the main role in learning. However, teaching without multimedia technology doesn't mean that the teaching is poor, it depends on whether teacher can use the technology well and arouse interest and stimulate a learning atmosphere".

Student 5: "…I think the teacher helps me according to my own limitations, such as by telling me I cannot play as fast as the recordings' performance. Teachers can tell me my limitations, or strengths. The recordings can only be used as appreciation. I may not imitate the playing in recordings, but I feel happy to listen to them as appreciation. Recordings assisted learning music".

Student 7: "…My piano teacher suggested different performers to me … A clear guideline by my teacher and her encouragement do help me in improving my practice".

Student 9 would only use the multimedia technology for music appreciation, and did not have any expectation of improving the quality of music learning and music practice with its use. Student 13 could not tell if there was any improvement because she believed that improvement was not something that happened suddenly, but that it was a long process that required habitual listening.

Relationships between IT facilities/multimedia technology, music textbooks and traditional methods of learning music

Three students (1, 8 and 9) believed that IT facilities/ multimedia technology could replace textbooks, saying that technology had improved the acquisition of knowledge and enriched the content of education. Student 1 suggested that the content of textbooks could be converted into a CD-Rom. Ten students (2, 3, 4, 6, 7, 10, 11, 12, 15 and 16) however, believed that technology could not replace music textbooks but could only supplement them. Students 3, 6, 7, 15 and 16 believed that textbooks were "well-organized", "very systematic", "detailed", very user-friendly", and "give a sense of security".

Student 10 thought that technology could only replace some of the textual work. Student 2 thought that looking at monitors was not good for the eyes. Students 2 and 3 preferred hardcopies like textbooks in which they could write down their remarks when reading them. Student 11 thought that textbooks were not needed only when the lecturer's presentations were very good. Students 5, 13 and 14 held different points of view. Student 5 believed that only a perfect computer system could replace textbooks. Students 13 and 14 believed the character of the learners was a decisive factor for using technology instead of textbooks for their learning.

In response to questions concerning whether IT facilities/multimedia technology could replace traditional

methods for learning music, fourteen students (1, 2, 3, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15 and 16) answered 'No'. Of these, students 1, 2, 3, 5, 6, 8, 9, 10, 11, 12 and 15 considered a good classroom atmosphere to be the most important element in the learning process, and that face-to-face interaction and peer support were more 'real' than simply learning through the use of technology. Students 2, 8, 10, 11 and 14 said that it was important to have a teacher who acted as a live model, and who could give guidance and explanations. Six students (1, 6, 8, 9, 11 and 12) found that communication problems arose when using only IT facilities/multimedia technology for learning. Students 9 and 11 said that there were difficulties in asking questions, while students 1 and 12 said that they could not get instant responses from the technology. Student 6 doubted the credibility of technology, and said that the use of technology could only apply to those students who were very self-disciplined. Students 11 and 12, on the other hand, suggested that lecturers were needed to manage discipline in the classroom. Student 15 pointed out that IT and multimedia facilities are very expensive to install. Student 13 said that he was very conservative, and preferred traditional learning methods. Student 4 believed technology could replace traditional methods for learning music in the long run, but at present preferred teacher-student interactions in the classroom. Student 7 did not give a definite answer but thought that students could learn by themselves effectively with the internet. However, she believed that there were some things, such as musical skills and techniques, that could not be taught by means of technology. Altogether, fourteen students (1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15 and 16) believed that technology should be used in conjunction with teachers.

The effectiveness of multimedia technology for motivating students' learning and for improving the quality of music education at the graduate level

When asked about the relationship between the deployment of multimedia technology and students' motivation in learning music, 8 and 7 students respectively said "Yes, very much" and "Sometimes". Only one noted that it only offered only little assistance. Moreover, 12 students (1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13 and 15) believed that more use of multimedia technology in music lessons depended on the nature of the course. Multimedia technology could be used for practical subjects like music appreciation, piano pedagogy, conducting, composition, aural training and creativity in music. However, theoretical subjects like music history, music analysis, world music, music education in early childhood, psychology and sociology in music, should use more multimedia technology so that the lectures would not be only "chalk and talk". Students 2, 12, 14 and 16 thought that multimedia technology should be used in all classes. Visual materials and audio materials provide plentiful and diverse information and resources that could arouse their interest and help their understanding of music issues, widen their vision, and develop their critical thinking and ability to concentrate in class. Most students believed technology to be a teaching tool that made lectures more interesting, effective and memorable.

Nonetheless, student 3 pointed out that multimedia technology could only be used as teaching tools, and that more technology did not mean that the quality of learning would be better. Student 9 articulated her view on not abusing the use of technology in music classroom. Student 13 noted that he did not need much assistance from CD or music videos for the courses, but that he preferred to use the internet to search for information for his written assignments.

When asked if they would be motivated about learning music if multimedia technology was used, students 1, 2, 3, 5, 6, 10 and 14 concurred. Student 2 was impressed by lecturers who used multimedia technology in their teaching. Student 5 pointed out that lecturers' methods and styles of teaching and their presentation skills were the most decisive sources of motivation, and that any unrelated multimedia technology could not motivate her. Though Student 6, who had a bachelor's degree from Canada, found that multimedia technology motivated her learning to some extent, she seemed to be very apprehensive towards multimedia technology. She said that lecturers in Canada did not use much technology for teaching, and so she was accustomed to traditional teaching methods. Students 4 and 15 clarified the difference between "learning motivation" and "learning interest" with respect to the use of multimedia technology:

> Student no. 4: "I think multimedia is one of the mediums to acquire knowledge, but I don't think it motivates me. Multimedia would arouse my interest, but not the level of motivation…"
>
> Student no. 15: "...The use of technology can arouse my interest but it does require further study and my hard work for developing my learning motivation".

Students 7, 8, 9, 11, 12 and 16 said that it depended on whether or not they had an interest in the topic. If they were interested, they would be motivated and would keep studying, otherwise they would not. Students 9 and 11 might not

continue their study because of time constraints. Student 13 was only interested in learning about what he was not already familiar with. He claimed that multimedia technology could not assist him in acquiring knowledge about music, which depended on his urge to look for new knowledge.

Student 4 believed that the quality of higher music education depended on multimedia technology because it gave immediate access to so much information that could broaden students' thinking. Three students (7, 11 and 16) said that the use of multimedia technology in certain modules could be helpful, and Student 7 pointed out that the lecturer was important for arousing and motivating students. Twelve students (1, 2, 3, 5, 6, 8, 9, 10, 12, 13, 14 and 15) thought that multimedia technology was not the decisive factor in higher music education. Moreover, students 6 and 14 also said that there were limitations on the utility of multimedia technology. Eight students (1, 2, 3, 5, 8, 9, 12 and 15) pointed out that the quality of lecturers was the most important factor in higher music education, and that multimedia technology was only a teaching aid.

Discussion

Most of the participants were very positive about using multimedia technology in their music learning, no matter which subject they were taking in their MA programme. Most participants enjoyed having multimedia technology as a learning resource, especially for music appreciation, music analysis, and music history. However, the use of multimedia technology for music learning is, they thought, limited to the type of courses pursued (some being more amenable to using technology than others), and depended on the ease of communication between multimedia tools and students, and the feasibility of using music technologies. In response to the research questions, concerns about how multimedia technology and quality of learning intersect with the multiple and often contradictory dynamics of power amongst students have resulted in three dilemmas: (i) between music students' perception of music learning and the aid of multimedia technology in class; (ii) between the traditional role of music learning and the help of multimedia tools in music learning; and (iii) between the role of music instructors and the changing role of higher music education today. This study argues that, although multimedia technologies can motivate music students in learning, they can never replace the role of instructors in music classes, and traditional methods of learning music.

First, most participants agreed that Power-point software, graphic animation and audio-visual resources and other educational technologies could promote more effective music learning by rendering abstract ideas and concepts more intelligible (e.g., Airy & Parr, 2001; Gall & Breeze, 2005; Hugill, 2005; Marontate, 2005). All the positive feedback from this study shows that the use of multimedia materials was very helpful in making students learn efficiently and effectively. While MA students might have problems with concentrating in evening classes because of fatigue from work, they were generally observed to be nonetheless interested in teaching materials, especially visual ones, for example, DVDs. The introduction of graphics, audio, and video into teaching content, along with more editing and authoring software, provides a major enhancement (Ryan, 2006; Savage, 2005; Wang, 2006; Welch, Howard, Himonides, & Brereton, 2005). However, students expect their instructors to explore things other than those simply listed on PowerPoint, and music and videos other than those just played and listened to. Some students emphasized the point that a well-prepared lecture could not be given without the aid of a PowerPoint presentation. Although most students in this study believed that multimedia technology, such as video presentations of musical performances, could help students understand issues in music, and improve their musical performances, in terms of instrumental skills/playing and other musical practices, only five out of 16 maintained that their music creativity could be motivated by music technology. This study also shows that music creation is closely related to students' interests in composition, rather than on the availability of multimedia tools for composition. Most students in this study, who are either pianists, conductors or school music teachers, certainly felt that music technologies played no significant role in music creation. The survey data also indicate that the passion to incorporate music technologies too often overshadows how students learn, or in particular, how students learn through computer technologies.

Second, the incorporation of multimedia into instructional methodology and delivery systems in music education has enhanced the teaching and learning process, and empowered educational institutions to meet the rising expectations of the twenty-first century. It is also clear that electronic equipment allows students to engage in individual music learning and creation according to their own needs and ability, and at their own pace; and it can extend their access to information beyond that allowed by traditional classroom resources, thereby broadening the scope of their knowledge. However, this study shows that only three students believed

that IT facilities/multimedia technology could replace textbooks, whilst 14 did not agree about using multimedia technology to replace traditional methods of music learning. Even though most students had their own computers/ notebook computers, and were confident with a web browser and multimedia technology, they did not greatly rely on the internet to obtain musical knowledge. Most of them only searched for music information/knowledge on the internet, including the on-line library resources, for less than three hours per week (see Figure 2). This situation might be explained by the fact that most of the students were full-time school teachers, who lacked time. Many students preferred to have university teachers, instrumental tutors and printed music materials as their major sources of musical knowledge (see Figure 1). We cannot ignore the fact that the traditional role of musical learning, such as the time that is devoted to musical practice and the role model of music instructors, has played an important role in musical training. The findings obtained in relation to postgraduate students in this study are commensurate with those of Ho (2004a) and Cheung (2002), which found that the introduction of music technology could stimulate students' music learning, but that music teachers nonetheless played a significant role in providing critical judgment and guidance (Ho, 2004a). Despite students' focus on teacher-student interaction and teachers' explanations in this study, they were clearly familiar with the concept of adopting multimedia tools such as DVD, CDs, and computer drives for their oral presentations as well as to perfect their instrumental learning or performance.

Third, the study shows that multimedia technologies offer a range of possibilities, but at the same time place great demands on teachers. The traditional teacher-centric method of teaching, which has been used for decades in our educational system, has been modified and enhanced in higher music education (Churchill, 2006; Dexter, 2006; Jeffs & Banister, 2006; Jones & O'Shea, 2004; Zirkle, 2005). The teacher now has to function as an adviser in the music classroom by organising and structuring students' activities and their dialogues with them. Multimedia technologies do not take over the teacher's role, or transform music education in higher institutions, but require excellent teachers to take full advantage of the possibilities they offer (Fischer, 2003; Greher, 2006). As highlighted by some students in this study, there were communication problems in using technological facilities/multimedia technologies for learning music. It is very important that an assessment mechanism reviews the effectiveness of multimedia technology implementation in the light of university culture, the discipline of each individual module, teachers' sensitivity towards their students' learning and the provision of appropriate musical activities. Multimedia educational design will reinforce and strengthen the traditional instructional communication process, and foster a number of innovative methods to communicate musical knowledge to learners.

Conclusion

This study provides a better understanding of how multimedia technology is used in university learning from the perspective of music students. Most students in this study recognised the advantages of multimedia tools to arouse their learning motivation, but also stressed the vital role of instructors in their learning, the setting of appropriate teaching content, resources and evaluation processes, and mechanisms to monitor the achievement of standards, and to enhance the effectiveness of higher music education. All the presentation skills, classroom activities, and teacher-student and student-teacher interactions have to be considered as a whole. At the heart of these ideas is the shift away from thinking about music education solely in terms of multimedia technology, and more towards an ideal partnership between teacher and student, with the teacher as the major architect of learning. Once learning moves beyond the recall of principles, facts or data, and into the area of creativity, problem-solving, analysis, or discussion, learners need inter-interpersonal communication, and opportunities to question, challenge and evaluate their learning.

References

Airy, S., & Parr, J. M. (2001). MIDI, music and me: Students' perspectives on composing with MIDI. *Music Education Research*, *3*(1), 41-29.

Barr, J. D., & Gillespie, J. H. (2003). Creating a computer-based language learning environment. *ReCALL*, *15*(1), 68-78.

Bauer, W. I., Reese, S., & McAllister, P. A. (2003). Transforming music teaching via technology: The role of professional development. *Journal of Research in Music Education*, *51*(4), 289-301.

Bray, D. (2000). *Teaching music in the secondary school*. Oxford: Heinemann.

Burton, L. (1990) Comprehensive musicianship: The Hawaii music curriculum program. *Quarterly Journal of*

Music Teaching & Learning, *1*(3), 67-76.

Cain, T. (2004). Theory, technology and the music curriculum. *British Journal of Music Education*, *21*(2), 215-221.

Casey, A. C. (2005). A learning center solution for using technology in elementary music. *Teaching Music*, *12*(4), 50-53.

Chan, L. M. Y., Jones, A. C., Scanlon, E., & Joiner, R. (2006). The use of ICT to support the development of practical music skills through acquiring keyboard skills: a classroom based study. *Computer & Education*, *46*(4), 391-406.

Chang, W. (2005). Impact of constructivist teaching on students' beliefs about teaching and learning in introductory physics. *Canadian Journal of Science, Mathematics, & Technology Education*, *5*(1), 95-109.

Chen, T. L., & Chen, T. J. (2006). Examination of attitudes towards teaching online courses based on theory of reasoned action of university faculty in Taiwan. *British Journal of Educational Technology*, *37*(5), 683-693.

Cheung, J. W. Y. (2002). The effects of computerised music instruction on student motivation to learn music. *Asia-Pacific Journal for Arts Education*, *1*(1), 71-83.

Chow, C. C. K., Chin, K. C. W., Yeung, R. Y. T., Chan, C., & Kwan, M. C. M. (1998). *A report on a pilot study of the Hong Kong information infrastructure*. Hong Kong: Hong Kong Policy Research Institute.

Churchil, D. (2006). Teachers' private theories and their design of technology-based learning. *British Journal of Educational Technology*, *37*(4), 559-576.

Deadman, P., Brent, H. G., Trevor, B., Lynne, E., & Douglas, D. (2000). Interactive GIS instruction using a multimedia classroom. *Journal of Geography in Higher Education*, *24*(3), 365-380.

Dexter, S., Doering, A. H., & Riedel, E. S. (2006). Content area specific technology integration: a model for educating teachers. *Journal of Technology and Teacher Education*, *14*(2), 325-345.

Education and Manpower Branch (1998). *Information technology for learning in a new era: Five-year strategy, 1998/99 to 2002/03*. Hong Kong: Author.

Fischer, F., Troendle, P., & Mandl, H. (2003). Using the internet to improve university education: Problem-oriented web-based learning with MUNICS. *Interactive Learning Environments*, *11*(3), 193-214.

Friedman, R. S. (2003). Innovation and education in the digital age: reconciling the roles of pedagogy technology, and the business of learning. *IEEE Translations on Engineering Management*, *50*(4), 403-412.

Fung, A. C. W., & Pun, S. W. (2001). ICT in Hong Kong education. *Journal of Southeast Asian Education*, *2*(1), 165-180.

Gall, M., & Breeze, N. (2005) Music composition lessons: the multimodal affordances of technology. *Educational Review*, *57*(4), 415-433.

Greher, G. R. (2006). Transforming music teacher preparation through the lens of video technology. *Journal of Music Teacher Education*, *15*(2), 49-60.

Glittenberg, C., & Binder, S. (2006). Using 3D computer simulations to enhance ophthalmic training. *Ophthalmic & Physiological Optics*, *26*(1), 40-49.

Ho, W. C. (2001). Educational development according to quality, commercialization and internationalization: A study of music faculties at Hong Kong universities. *Music Education Research*, *3*(2), 187-201.

Ho, W. C. (2004a). Use of information technology and music learning in search for quality of education. *British Journal of Educational Technology*, *35*(1), 57-67.

Ho. W. C. (2004b). Attitudes towards information technology in music learning among Hong Kong Chinese boys and girls. *British Journal of Music Education*, *21*(2), 143-161.

Hugill, A. (2005). From online symphonies to MusiM00: Some creative uses of the internet in music and education. *Contemporary Music Review*, *24*(6), 527-540.

Jeffs, T., & Banister, S. (2006) Enhancing collaboration and skill acquisition through the use of technology. *Journal of Technology and Teacher Education*, *14*(2), 407-433.

Jones, N., & O'Shea, J. (2004). Challenging hierarchies: The impact of e-learning. *Higher Education*, *48*(3), 379-385.

Koo, H. C. (2001). A preliminary study on the impact of IT on curriculum with reference to the primary mathematics curriculum in Hong Kong. *Education Research Journal*, *16*(1), 69-98.

Law, N., Yuen, H. K., Ki, W. W., Li. S. C., Lee, Y., & Chow, Y. (2000). *Changing classroom and changing schools – A study of good practices in using ICT in Hong Kong schools*. Hong Kong: CITE, Faculty of Education, The University of Hong Kong.

Law W. W. (2003). Globalization as both threat and opportunity for the Hong Kong teaching profession. *Journal of Educational Change*, *42*(2), 149-179.

Leung, W. M. (2003). The shift from a traditional to a digital classroom. *Childhood Education*, *80*(1), 1217.

Mansfield, J. (2005). The global music subject, curriculum and Heidegger's questioning concerning technology. *Educational Philosophy & Theory*, *37*(1), 133-148.

Marontate, J. (2005). Digital recording and the reconfiguration of music as performance. *American Behavioral Scientist*, *48*(11), 1422-1438.

Manzolli, J., & Verschure, P. F. M. J. (2005). Roboser: A real-world composition system. *Computer Music Journal*, *29*(3), 55-74.

McFarlane, A., Williams, J. M., Bonnett, M. (2000). Assessment and multimedia authoring – A tool for externalising understanding. *Journal of Computer Assisted Learning*, *16*(3), 201-212.

McGregor, G., & Mills, M. (2006). Boys and music education: RMXing the curriculum. *Pedagogy, Culture & Society*, *14*(2), 221-233.

McNaught, C., & Lam, P. (2005). Building an evaluation culture and evidence base for e-learning in three Hong Kong universities. *British Journal of Educational Technology*, *36*(4), 599-614.

Miller, B. F. (2004) Added punch with powerpoint. *Teaching Music*, *12*(2), 50-53.

Panagiotakopoulos, C. T., & Ioannidis, G. S. (2002). Assessing children's understanding of basic time concepts through multimedia software. *Computers & Education*, *38*(4), 331-349.

Ranker, J. (2006). "There's fire magic, electric magic, ice magic or poison magic": The world of video games and Adrian's compositions about Gauntlet legends. *Language Arts*, *84*(1), 21-33.

Ryan, M. (2006). Exploring music instrument teaching and learning environments: Video analysis as a means of elucidating process and learning outcomes. *Music Education Research*, *8*(2), 191-215.

Savage, J. (2005). Working towards a theory for music technologies in the classroom: how pupils engage with and organise sounds with new technologies. *British Journal of Music Education*, *22*(2), 167-180.

Su, Z. M., Kong, Q. Q., & Jiang, S. X. (2001). Information technology in learning and teaching: Digital video clip resources bank (in Chinese). *New Horizons in Education*, *43*, 71-77.

Thomas, R. B. (1970). *Manhattanville music curriculum program: Final report*. Washington, D.C.: Office of Education, Bureau of Research.

Thompson, K. P. (1999). Internet resources for general music. *Music Educators Journal*, *86*(3), 30-36.

Truman, S. M., & Truman, P. J. (2006). An investigation of the situated learnability effects of single-and dual-modal systems in education: a report of music-oriented learning environment and science computer-assisted teaching studies. *British Journal of Educational Technology*, *37*(1), 131-142.

Wang, W. (2004). How university students view online study: A PCP perspective. *Campus-Wide Information Systems*, *21*(3), 108-117.

Wang, C. K., Li, J. Z., & Shi, S. F. (2006). The design and implementation of a digital music library. *International Journal on Digital Libraries*, *6*(1), 82-72.

Webster, P. (2000). Reforming secondary music teaching in the new century. *Journal of Secondary Gifted Education*, *12*(1), 17-24.

Welch, G. F., Howard, D. M., Himonides, E., & Brereton, J. (2005). Real-time feedback I the singing studio: an innovatory action-research project using new voice technology. *Music Education Research*, *7*(2), 225-249.

Yang, S. C., & Chen, Y. J. (2007). Technology-enhanced language learning: A case study. *Computers in Human Behavior*, *23*(1), 860-879.

Zhang, W. Y., Kirk, P., & Yeung, L. (2005). Online tutorial support in open and distance learning: students' perceptions. *British Journal of Educational Technology*, *36*(5), 789-804.

Zirkle, C. (2005). Web-enhanced alternative teacher licensure. *The Teacher Educator*, *40*(3), 208-219.

Received September 4, 2006
Revision received January 11, 2007
Accepted February 14, 2007

Appendix

Questionnaire

The following asks for your opinion about the use of multimedia materials and their effectiveness in assisting your studies at Hong Kong Baptist University. Your contributions and opinions are highly appreciated, and will help us to improve the programme to make your studies here even more efficient and enjoyable.

Unless stated otherwise, please use a tick "√" to indicate your choice in the boxes provided.

1. Gender:
   ☐ Female ☐ Male

2. You are currently in:
   ☐ MA1 ☐ MA2

3. Field of your major at the BA/MA level:
   ☐ Composition ☐ Choral Conducting ☐ Music Education
   ☐ Others (please specify):_____

4. Please specify your major music instrument that you are learning or you have learnt.
   _____

5. Which of the following people and/or media are the main source of your acquisition of musical knowledge ? Please choose the **three** most important（1 as the most important, 2 as the second most important and so on）
   ☐ University teachers ☐ Instrumental coach from university
   ☐ Private instrumental coach ☐ Parents
   ☐ Siblings ☐ Information technology including the Internet
   ☐ Friends ☐ Mass media（e.g. music magazines, radio, music-related television shows）
   ☐ Music reading materials (including music scores) borrowed from the library
   ☐ Handouts and other reading distributed by the university teachers
   ☐ Audio and visual materials such as DVDs, VCDs, and CDs, etc.
   ☐ Others (please specify)：_____

6. Do you have a computer/notebook computer at home?

   ☐ No ☐ Yes, I have my own computer. ☐ I have to share with my family members.

7. How do you rate your skills using a web browser e.g. Netscape to access your learning music materials?
   ☐ None ☐ Basic ☐ Good ☐ Advanced

8. How do you rate your skills using BU's online library resources for your music study?
   ☐ None ☐ Basic ☐ Good ☐ Advanced
9. How do you rate your skills using other online library resources (except the BU) for your music study?
   ☐ None ☐ Basic ☐ Good ☐ Advanced
10. At which place do you usually do your on-line search for your music learning?

☐ The university campus ☐ At home
☐ Other places (please specify): _____

11. How many hours do you spend accessing music materials related to your course on the internet each week (including inside and outside the university campus)?
☐ Less than one hour ☐ One - two hours ☐ Two - three hours
☐ Three - four hours ☐ Four - five hours ☐ Five - six hours
☐ Six - seven hours ☐ Seven - eight hours ☐ Eight - nine hours
☐ Nine – ten hours ☐ More than ten hours
☐ None

12. How would you rate your general confidence in using multimedia technology in your music learning?
☐ No confidence ☐ Little confidence ☐ Confidence ☐ Much confidence

13. Which of the following music activities do you think most suitable for the introduction of multimedia technology to benefit your music learning? Tick all that apply:
☐ Music appreciation ☐ Composing ☐ Music analysis
☐ Music history (including Chinese and Western history) ☐ Music reading
☐ Conducting ☐ Piano pedagogy or other instrumental pedagogy
☐ Aural training
☐ Other activities (please state): _____
☐ Not necessary at all

14. Do you choose classes partially based upon an instructor's use of multimedia technology?
☐ Yes, certainly ☐ Depends on the music module ☐ Not at all

If you want to express more concerning this part, please write out your opinions:

_____

15. What have you usually used for oral presentations in your course? Tick all that apply:
☐ Scanner ☐ Digital camera ☐ CD drive in a computer
☐ VCR hooked up to a computer to capture images
☐ Others, please specify: _____
☐ I rarely use multimedia presentation because I only read out my presentation content.

16. Do you expect a classroom environment that employs multimedia technology?
☐ Yes, sure ☐ Depends on the music module ☐ Not at all

17. On the whole, do you feel technology/music technology has helped you and motivated your learning?
☐ Yes, very much ☐ Some ☐ A little ☐ No