Abstract

Research on computer music starts late in China, and applications of computer MIDI and multimedia systems in Normal University music teaching is still at the beginning stage. In this paper, following the teaching practice and focusing on problems existing in computer MIDI and multimedia systems in Normal University music theory teaching, we present our experiences and understandings.

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1. Introduction

Science and art are two very different disciplines, but since ancient times, development of the arts has continued to benefit from scientific progress. In the twenty-first century, as the representative of the human third technological revolution - the rapid development of computer technology, computer application as a high-tech tool, is infiltrating all areas of human society. In the field of Music Art and Music education, it thanks to computer sequencing software (Sequencer), MIDI (Musical Instrument Digital Interface) and Multimedia technology development and maturity. Based on the PC (Personal Computer), MIDI and multimedia systems are the rapidly developing, and continue to expand the application of its space. Affected, the traditional music, music performance and music education methods are changing, people's understanding of the music art are constantly updated.

View of the situation of higher education in our country in the new century, the Ministry of Education recently issued twelve measures and observations on strengthening the undergraduate teaching, improving teaching quality in “A Number of Observations to Improve Teaching Quality on Strengthening Undergraduate Teaching”. One of them is to use modern educational technologies to improve teaching. Furthermore, they require colleges and universities to strengthen the building of campus network, electronic library, multimedia classrooms, and use of multimedia in teaching to gradually reach 15% or more.

There still appears to be a focus in music education literature about what the technology is but little on what the technology means in terms of rich or different experiences for students. Work by Reynolds [1] presents an approach that looks at the computer as something that allows the student to do something that could not be done without it. That approach draws heavily on the work of McDougall [2]. Published work from the current study [3, 4] presents views about how the computer allows us to investigate students’ compositions and, perhaps more importantly, how it allows us to investigate and develop our own understandings about students’ musical perceptions and understanding. A significant contributor to the development of our understanding is the fact that the computer allows us into the
processes of composition in ways that have never before been possible. This approach is not specifically developmental, yet provides opportunities to look at musical development in different ways.

However, due to limitations of the actual conditions in our country, it's late to start the study of computer music. MIDI and multimedia computer system in Music Teaching of Normal University is still at the development stage [5]. In this paper, we combine our teaching practices, talk about our own experiences on computer MIDI and multimedia systems in Teaching of Music Theory in the Normal University.

2. “Harmonics” Teaching

In Music Department of the Normal University, the blackboard and the piano have been the main teaching aids of harmony teaching. Many Pre-admission students don't know harmony. Facing them, teachers write harmony scores on the blackboard is difficult to create harmony sound, and play harmony sound on the piano is difficult to create harmony scores in the hearts of the students. Using this approach to teaching harmony, students often have “invisible, intangible” mental confusion. Though teachers and students do great effort on it, students often get just some abstract, cumbersome rules and prohibitions. As in the whole process of teaching the attention of students focused on how to avoid mistakes in the written work, thus, they don't feel the beauty of harmony sound, and their ideology cannot form the habit of thinking in general harmony. In the end, most people eventually lost interest and application of sound learning. In a sense, this is the most difficult to improve the teaching quality of harmony in the Normal University.

To address the theory and practice abruption problem in the teaching of harmony, the hearing and seeing abruption problem in the learning of harmony, we introduce the computer MIDI and multimedia systems in teaching. We mainly employ the score production software “Sibelius” (Version6.0) developed by Avid Technology Company, teaching of harmony software “Tonica” developed by Software Partners Company, and Sequencer software “Musicator Win” developed by Jo Brodtkord Company and Musicator A/S Company. We use their respective functions in teaching of harmony, as follow:

2.1 Using score display function of “Sibelius” for classroom teaching

“Sibelius” has very intuitive function for score display. Using this function, it can show the harmonic score and the actual sound in front of students simultaneously, and quickly re-presentation. For example, for some specific connection of chord, teachers can teach the basic writing rules, while playing through a MIDI keyboard, its various manifestations, included location of different melodies, different alignment, range of different audio zones, and so on.

Students hear the sound in stereo, but also saw their music score. Furthermore, according to their auditory and visual perception, they can make their own form of aesthetic judgments on a variety of audio connections. Practice proved that this way of classroom teaching is easy to stimulate students' interest and self-confidence in learning and aesthetic judgments.

2.2 Using score edit function of “Musicator Win” for exercise demonstration and assignment commenting

Score edit function of “Musicator Win” is very good. In the analysis of the students' written work and demonstration of exercise in class, using this function can often get good effects. For example, in the most common wrong chord connections, such as parallel, backward and hidden fifty-eighth degree, you can use the copy feature of music editing, copy the wrong chord fragments to the same rhythm track location of the next segment and use of the edit function on the new tracks to remove the excess voice part, leaving only the form of two parallel voice part. Student seeing and hearing on this issue will be clear, no need for too much instructions.

Doing exercises in the demonstration, teacher can copy the same exercise to the same location of different tracks. Through inspiring presentations, the students make different harmony configurations on same exercise. Then, using the single-track playback function of “Musicator Win”, students can listen to the playback of various harmony configurations. Audio-visual combination of harmony can develop students thinking and hearing skills of harmony, and bring up their elegant aesthetic of harmonic.

During analysis of the students' written work, we can use the same method, input the exercises to the computer and copy them to different tracks, analyse and correct the exercises in the new track. After correcting, teachers can compare the old and new configuration through the audio. Then students will have more profound awareness and understanding on those different harmony configurations.
2.3 Using “Tonica” for learning styles of different types of harmony and helping to correct the exercises

“Tonica” is professional teaching software on four-part harmony. Compared with other software, although “Tonica” don't have very friendly interface, for harmony teaching, the proprietary exercise function of “Tonica” can play a positive role.

For example, using the automatic harmonic function of “Tonica”, teachers can select different harmony styles to do several different sound configurations of the same exercise, enable students to understand the different technical differences between the acoustic styles. In addition, teachers can import students' exercises to “Tonica” with the MIDI file format, and correct those exercises. At the present time, harmony teaching takes the special case of large classes in many colleges. Using “Tonica” to correct the harmony exercises, is undoubtedly a more viable harmony teaching method.

2.4 Using the Real-time recording function of “Sibelius” and “Musicator Win” to play the harmony with keyboard

Playing harmony with keyboard is important content in harmony teaching of Normal University. In the past teaching, students were required to seeing chords mark, thinking connectivity rules, playing four-party harmony, simultaneity. But for various reasons, students are often trade-off in playing, play the wrong sound while he did not know. Using the Real-time recording function of “Sibelius” and “Musicator Win”, the students press the record button before playing, playing and recording will be completed simultaneously, and generate real-time score, so that the fleeting keyboard sound converted into stave form. Using this score as the basis, it helps students discover their own strengths and problems. In addition, to strengthen connection of the keyboard harmony exercises and improvised accompaniment curriculum, teachers can transform the four-party harmony playing by students into common accompaniment texture in the new tracks. This way can stimulate student interest in learning.

3. “Ear Training” Teaching

Hearing training is one of most important content in the Sightseeing and Ear Training Course, the importance to professional music students is self-evident. However, in the ear training teaching of the normal university, starting point for students is relatively low, academic hour of Sightseeing and Ear Training Course is relatively short, so the teaching of ear training is stagnating at a low level. Especially in recent years due to the number of blind expansion of enrollment, students are learning in the large classes. This problem goes from bad to worse, and has become a serious bad factor in music education of the normal university.

After the computer MIDI and multimedia systems came into the classroom, we employ the teaching software of ear training “EarMaster Professional” developed by MidiTec Denmark Company. It made a very good result in teaching.

“EarMaster Professional” is interactive multimedia educational software in the ear training education, it includes the character and pitch perception function of the melodic interval and harmony interval, pitch perception function of normal position chord and inverse position chord, different styles perception function of four-party harmony, different styles and pitch perception function of modal scales, dozen types of beat, and so on. Each of the training content has 10-60 class hour, depending on its difficulty.

“EarMaster Professional” is highly interactive and open. For example:

- In the perception exercises of interval properties, the teachers can follow the progress of teaching requirements and the circumstances of the students (even each student), set the range of perception material, the diapason of perception, the melodic interval or harmony interval, the direction of melodic interval in the same octave or the interval between two octaves.
- In the perception exercises of treble of interval, the teachers can set whether to specify the tone, whether to display the tone number, whether to display the first tone of melodic interval or the bass of harmonic interval, and so on.
- In the perception exercises of chord, the teachers can set the range of perception materials, the diapason of perception, column chords or broken chords, the direction of broken chords is upward or downward. The exercise materials include not only the traditional harmony but also the modern harmony of the chord.
- The content of the rest of the exercises such as scales, rhythm, melody, four-party harmony etc, can be designed by teachers (or students themselves) according to the teaching requirements of the training content of each lesson.
It is worth mentioning that, “EarMaster Professional” not only can be used in the ear training course instruction in the classroom, but also can be widely used in students practice after-school. If the learners can really follow the teaching program, complete all the courses using the computer step by step, their hearing will be a qualitative leap, and they will exceed the requirements of the syllabus of the Normal University.

4. “Instrumentation” Teaching

Knowledge of instrumentation is the necessary basic knowledge to a qualified music teacher in secondary school. Due to condition is limited, the teaching method of instrumentation in the past limited to the introduction of books. Students learn various musical instruments, mainly through teacher lectures and watching the musical pictures, but cannot hear the actual sound of various musical instruments. Obviously, this is a last resort method of teaching. After MIDI and multimedia systems came into the classroom, we use the multimedia CD-ROM software “Musical Instruments” issued by Microsoft in our teaching. This disc stored the sound, picture and text data of hundreds of musical instruments around the world since ancient times. They are classified by shape, area, orchestra and name respectively, can be invoked by teachers according to the teaching needs any time.

For example, in introducing the fiddle instruments, we can visually see lots of fiddle instruments produced in different historical periods in various shapes, from the bass viol to modern violin, viola, violoncello and BASS. We can hear their respective play, which is selected from the famous solo acoustic music, but can also see information about the shape of the instrument structure, shape data, history and performing ways. In addition to Western instruments, this disc collected many national musical instruments of different countries in Asian, African, Latin America, and North America. Far as in terms of Chinese musical instruments, this disc has collected over dozens of ethnic musical instruments. Using this disc in “Instrumentation” teaching, we can introduce these orchestras in the traditional classification, bus also according to age, regional, national and other standards for classification. Using the computer multimedia method in “Instrumentation” teaching, students can see and hear with, they have strong visual and hearing, like visiting a huge world instruments repository.

5. “Orchestration” Teaching

Orchestration course study the writing of multi-voice orchestral music, especially the composition theory of band audio and timbre mix. Learning environment in Music Department of Normal University is limited, the previous orchestration teaching often limited to the old pattern, written exercises and piano sound audition exercises. While students learned the initial orchestration theory and writing skills in the classroom, some people also tried to write some orchestration work, but it is difficult to achieve the desired results in the orchestration teaching, because students do not have the qualification to listen to the actual band sound of themselves orchestration work.

To improve the status of orchestration teaching, we employ the professional sequencer software “Cakewalk Pro Audio (TM) “, developed by Twelve Tone Systems. With the excellent sound editing function of this software, orchestration teaching achieved good results. For example, in the study of orchestration with woodwind group instrument and brass group instrument, a variety of instruments with different melodies, different chords order and different harmonic configuration, through the MIDI system can be issued specific, real instruments sound. It is beneficial for students to analysis the impression of orchestration. Again, when we introduce the bowing techniques of stringed instrument, using the sound editing capabilities of “Cakewalk”, we can make continuous bow, discrete bow, jumping bow, pausal bow effects, through the methods, increase or reduce the value of rhythm (tick), increase or decrease the speed of the notes of the keystrokes (Key Velocity) and build a new track to separate notes (New Track). The effects of left hand vibrato can be obtained by real-time data processing of the Modulation controller. Through this kinds of explanation, the students will have a more profound impression. In addition, the teacher can input the orchestration exercises of students to the computer with the “Musicator Win” or “Cakewalk”, analysis and comment these exercises with the actual sound. This way can greatly stimulate students’ interest in learning, and improve the quality of orchestration teaching.

Recently, Twelve Tone Systems introduced the software “Cakewalk Pro Audio” to replace “Cakewalk Sonar”. In this version, acoustic image, expression, chorus, reverb and other music elements can be adjusted intuitively in the main window. This update will make the orchestration teaching more easily and intuitively.
6. “History of Western Music” Teaching

“Music Mentor” developed by Midisoft company, is a multimedia educational software include sound, picture and text. It is divided history of western music into five times, Early Music, Baroque, Classical, Romantic and Modern. Furthermore, each period of music is divided into six topics, Melody, Rhythm, Harmony, Timbre and Texture. Using “Music Mentor” in History of Western Music CAI (Computer Assisted Instruction), we can study all six relevant topics of one historical period, also can study one topic with different historical periods. By order of the period, students can see and hear the style features of all kinds of music elements shown in one period; order of elements of music, students can observe the evolution of one music style in the different historical periods. Using this software as teaching aids in the history of western music teaching, can make learning of the history of music become more lively, specific and intuitive.

In addition, we can also use the multimedia CD-ROM software “So I've Heard”, issued by Vayager company, to get a better understanding of the Western Music History. This software uses interactive multimedia tools, providing the overview of the historical development of music, from ancient Greece music to the 20th century electronic music.

The first volume entitled “Bach and Before”; second volume titled “The Classical Ideal”; third volume titled “Beethoven and Beyond”; the last two volumes were “Romantic Heights” and “Here and Now”. Each volume contains the text, photographs, drawings and a large number of music examples, can make our history of music teaching more intuitive, vivid, easier access to good teaching.

7. Conclusion

As highly practical methods in the modern education, MIDI and multimedia system with its characteristic visual image and interaction application, provide a new approach to music Learners. It has demonstrated a very broad application prospects in music education.

Proved in practice that the using MIDI and interactive multimedia teaching system in the music theory courses, not only updated the traditional teaching model, enrich the teaching content, but also make the abstract music theory teaching truly and lively. It has greatly broadened the learner's perspective and active thinking, stimulated learner's enthusiasm in music study, but also improved the efficiency of music learning.

We are convinced that, with the development of computer technology, MIDI and multimedia systems will make the traditional music education and teaching system have a huge change in concept, content, means, methods, but also learners have a new way in music learning. And this all, for deepening the reform of teaching in Music Department of Normal University, achieving the modernization of music education, improving our quality and level of music education, it have a very important practical significance and immeasurable role in history.

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References


