

from the experience of academic tools, establishing the norms of planting and placing hands, forming stroke culture, and publishing methodology manual [6].

**Conclusion.** Analyzing stringed plucked instruments (Lute, Domra, Mandolin), it should be noted that the Chinese national musical instrument Pipa has much in common with them. First of all, they are plucked instruments that are basically played in the same way and may even have similar left-handed skills. This is because they have the same origin. They are all exotic instruments, and they all have a wide range of tones. Among them, the 30-fret Domra is three octaves and ten semitones. It's exactly the same as Pipa.

But it should be noted that they are somewhat different. First of all, the Lute has given up the way of playing with picks and has been completely changed to fingerstyle, but Mandolin and Domra are still playing with picks, which is the biggest difference between them. Of course, their tunings are also different, Mandolins and Domra are G, D, A, E, while Pipa are A, D, E, A. The Mandolin and Domra are very similar to the Pipa. This creates favorable conditions for the spread of the Pipa in Belarus.

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**WU JUN**

China – Republic of Belarus, Vitebsk, VSU named after P.M. Masherov

## **ARRANGEMENT FEATURES FOR DIFFERENT MUSICAL INSTRUMENTS**

There are a wide variety of keyboard instruments, and although the vocal principles are different, the structure is mostly similar. Keyboard instruments often used in contemporary times are acoustic piano, electric piano, synthesizer, accordion, organ, MIDI keyboard and so on. At present, the most commonly used piano in music production should be the acoustic piano and MIDI keyboard, and the electric piano is also used very frequently in live performances. Strictly speaking, the MIDI keyboard is just an input tool and does not sound in itself, but it can also be used as an instrument after loading the sound source. MIDI keyboards and electric piano are sometimes also used as synthesizers because they can load different tones [1].

Because the keyboard belongs to the order of semitonic sound, sound and playing more regular, so it is easier to use computer technology to quantitative processing, this technology is also mature, and MIDI keyboard input tools and piano playing method almost no difference, so can truly and completely reflect the style of piano playing style and skills. When using computer music technology to teach the piano sound department, the key to guarantee the effect is mainly to choose a high-quality sound source. The purpose of the article is to analyze the technology of creating computer music.

**Main section.** Piano sampling technology started early, coupled with its own structure technology, there are a lot of realistic effect, sound quality of the software and music to choose from. At present, larger computer music manufacturers have invested a lot of costs in the production of transferred piano sound sources, which often use top recording equipment to sample Steinway Grand Piano and Yamaha Piano. The high production cost doomed the extraordinary quality of these sound sources. When arranging the piano sound part, it can avoid quantitative functions to allow subtle changes and defects. Try to play as rich and varied as conditions permit [2].

For the organ, the old wave meter and the new sampling sources can truly restore its sound, and their simulation of the old organ phoner often gives an auditory experience with a sense of The Times.

The organ belongs to the long line of the harmonic instrument, try not to cooperate with too large reverberation, in order to avoid blurred sound, lack of strength.

The synthesizer is a digital instrument based on various algorithms, versatile and easy to use. But due to the different algorithms, different synthesizers also have different characteristics, suitable for different styles. Generally speaking, the synthesizer, due to its relatively modern timbre, is different from the characteristics of traditional entrance instruments, and is usually used as bedding in music and bass and principal instruments in electronic music.

If a small amount of mechanical noise is input in the audio, which does not affect the overall sound sense, it can be retained. If the mixing of the work is affected, the noise reduction device can be used to sample the noise reduction.

Acoustic piano sound processing capabilities are shown in the table 1.

Table 1 – Acoustic piano handling methods

№	Opertaion	Processing method	Reason
1	Phase	Using stereo sound: bass on the left and treble on the right	To purify piano sound.
2	Compression	High compression ratio, short attack and release time	This setting ensures crisp high pitch and bass
3	Balance	Decay medium frequency and low frequency, high frequency increase	The lack of influence of instruments on each other and the timbre performance of the piano
4	Reverb	Minimal or no reverb effects	The resonance of an acoustic piano is rich, too much reverb will easily cause muddiness

The standard String Group (String Section) is composed of four instruments, namely violin, viola, cello and double bass. According to the division of labor, the same instruments often form a string orchestra. String music, with round timbre, diverse colors, and flexible performance, can express the emotional changes of the music through the change of timbre and strength, and produce a moving and gradual effect. Due to its great elasticity, once appearing in the music work, it is often regarded as the core instrument of the color expression of the work. In contemporary music production, string music often appears in emotional arpeggios, long feelings, and gorgeous colors [3].

String instruments have a wide range, and string bands cover the vast majority of the sounds of contemporary music works, even experimental music. There are three main points to note in the string production:

1. The cello is a constringed musical instrument, so it is often necessary to rely on slip sound to adjust the intonation when playing, and use more slip sound, which can reflect the characteristics of the cello and is easy to identify.

2. One key point of playing the cello is bow transport. Different bow transport methods have a very great impact on timbre. The bow mode of pushing upward and rubbing the strings is called the upper bow, with the strength increasing from weak to stronger. The bow of the lower bow is in the opposite direction, the strength and volume also decrease with the movement, and the tone and volume of the lift are directly affected by the way of transporting the bow.

3. Slow bow can play multiple notes at one time at a very weak volume, but is weak. Fast bow transport is just the opposite. When making more undulating works, the quick transport bow is generally used to reduce the number of sounds played at one time.

The microphone is generally selected all pointing capacitive microphone, distant parallel placement of the higher horizontal height, generally is about 3 meters from the first row of musicians about 3 meters, the height of about 2.5 meters. At the same time, the position arrangement of the strings themselves is also very important, which is an important factor to ensure the effect. If the band is large, it can be arranged in the way of the classical music orchestra, while imitating the reverberation effect of the concert hall during the mixing, while if small, the instruments commonly used in the American recording studio.

The string band itself is divided into multiple vocal parts. Generally speaking, the performance between the four vocal parts is much different. Therefore, the mixing of the strings is very high. It is best that each device can be clearly heard, to ensure the mutual cooperation between the vocal parts.

People's throat is the best musical instrument. As early as the Wei and Jin Dynasties (魏晉), there is a saying that "silk is not as good as bamboo, bamboo is no better than throat". As part of the body, people are more familiar with the throat than the instrument, soft and varied. In contemporary pop music, vocals is a very important component, and is the most difficult to record and process of the people will have a lot of changes in the singing process.

Different from bel canto music, contemporary pop music singing to resonance degree is not high, sound method is natural, small volume, so recording microphone generally about 18 cm from the mouth, height keep in the upper lip attachment, usually the microphone in front of the singer about the height of the nose, the microphone diaphragm as high as the mouth. The difficulty of vocal recording are the lip and teeth and the frequency range between male and female students.

For lip and tooth sound, spray wheat and other noise, equipping the microphone and changing the Angle of the head can avoid these factors. Generally, the microphone head and mouth are 30–45 degrees, which can effectively reduce the excess airflow caused by diaphragm vibration, and also ensure the clarity of the recording sound. To enhance the space of sound, we process reverberation, but contemporary music is usually added to facilitate the coordination of voice and accompaniment parts.

Remix (Audio Mixing) refers to the process of integrating multiple different sound tracks into one sound track through optimization, adjustment, and superposition. In the past, mixing relied mainly on synthesizers (Sound Module) and tuning tables (Mixing Console). Now, with the continuous maturity of computer music technology teaching, a professional computer and music production for a music production software can complete this work.

Audio spectrum is only a certain width, instruments and vocals in their separate track sound is clear, full, but if they want to stack to a track, will produce many repetition on the same frequency, cause fuzzy cloudy effect, such as the piano track affects the guitar, vocal often affect the sound of turbidity, the main thought and purpose of mixing is to adjust the sound, timbre, dynamic, high and low frequency, in order to achieve harmonious track, music work.

Most of the time, the shrinkage mixing work is not perfect, such as the overall loudness, balance, penetration, burst sense is not in place, so we also need to use the audio after an overall adjustment, that is, what we call the mother band processing. The content of the master band is generally:

1. According to the beginning and end of the song, generally fade and fade more, making the beginning and end natural and smooth.
2. Adjust the overall loudness, timbre and dynamic of the work.
3. Through EQ adjustment and dynamic compression, enhance the color and emotional tone of the work.

Consider the technology of creating computer music on the example of equipment that is appropriate to use in this case (table 2).

Table 2 – Equipment Information Sheet

	Device	Model
1	Computer	Lenovo Thinkpad E40
2	Recording Interface	Apollo
3	MIDI keyboard	KS25A-49-61A
4	Microphone	Neumann U87

In accordance with the tasks set, it is possible to choose piano, string and percussion instruments, as well as solo guitar and bass guitar. This involves playing virtual instruments rather than an acoustic recording method to avoid the effect of noise on the sound quality of the recording.

While confirming the type of accompanying instruments, it should also ensure that there are corresponding sound sources on the computer and evaluate the quality of the sound sources. Soft sound sources with poor quality often do not divide strength level for stratified sampling, and cannot respond to the strength signal of MIDI input. Therefore, the music played lack of changes, cannot reflect emotional change, which will reduce the listening sense of the whole song.

MIDI sheet music input methods are very many, the current mainstream methods are: mouse click input; MIDI keyboard input; analog keyboard input. Some MIDI device manufacturers also produce MIDI instruments like MIDI guitars, but MIDI because the MIDI keyboards are intuitive and convenient.

After the accompaniment production is completed, the recording starts based on the accompaniment. My recording device is a modern brand microphone, and he connects through a sound card to the computer. The following is a schematic diagram of the signal transmission. Before recording, you can render some effectors and open the listening button. At present, EQ adjustment can be divided into multiple frequency bands, which has achieved the effect of distinguishing high school and low frequency and more detailed frequency.

The compression ensures that the high-frequency part of the waveform will not be too large, causing an overflow. During acoustic compression, its dynamic range is controlled to reduce the difference between the peak level and the mean level. It makes the human sound track more coordinated with the texture, and makes the sound more powerful. However, as the peak level drops, the overall level may have to be increased appropriately. Also noteworthy are options such as reverb, retraction and mixing.

After the shrinkage and mixing is completed, the generated work needs to be handled by mastering. The master band is the last process in the post-processing process. During the mother band processing process, through EQ adjustment and dynamic compression can make the music sound fuller and have tension. The effect of noise reduction by sampling (figure).



Figure – Schematic diagram of the master band processing

**Conclusion.** So far, a computer music work is basically completed. The actual music production process, different computer music producers may adopt different treatments and different processing orders, which are all allowed. The basic principle in computer music production is clear sampling; no destructive processing; appropriate output level. Processing that meet these three points are acceptable, but the auditory effects of different processing methods may vary greatly.

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## ЯН ЦОНЛИНЬ

Китайская Народная Республика, Хух-Хото, Хух-Хотоский профессиональный институт

## КАК ОБНОВИТЬ ФОРМУ И МЕТОДЫ ПРЕПОДАВАНИЯ ВОКАЛЬНОЙ МУЗЫКИ В КОЛЛЕДЖАХ И УНИВЕРСИТЕТАХ В УСЛОВИЯХ НОВОЙ ЭПОХИ

В ходе исторической эволюции человеческой цивилизации музыка уникальным образом дошла до наших дней, люди передают свои эмоции и выражают свои мысли через музыку, музыка стала неотъемлемой частью духовной жизни человека. Таким образом, преподавание вокальной музыки очень отличается от других дисциплин колледжа. Преподавание вокальной музыки – это не только передача знаний, но и сочетание технологии и искусства. На фоне новой эры традиционные методы обучения в колледжах и университетах не могут соответствовать требованиям преподавания, и преподавание вокальной музыки в колледжах и университетах также