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Research on Digital Application of MIDI Technology to Enable Piano Courses in Higher Vocational Colleges

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Abstract: In the era of digital education 2.0, in response to the national policy orientation, this study is committed to exploring the integration and application of MIDI technology in piano teaching in higher vocational colleges, aiming at innovating the piano education model. Through in-depth analysis of MIDI technology and practice in vocational piano digital course, this paper refines a set of accurate and efficient course optimization strategy, and deeply studies the path to expand the international job market of piano graduates in vocational colleges.

Keywords: MIDI technology; Piano education innovation; International job market; Piano digitization course; Curriculum optimization strategy

1. Build piano digital courses and promote the modernization of teaching resources

1.1 Cultivate innovative talents who adapt to modern music education

In order to improve the modernization level of piano teaching in higher vocational colleges, IT is necessary to build a digital curriculum system that integrates cutting-edge IT technology and international piano teaching method. The system should include interactive educational resources, such as high-definition performance videos, MIDI tutorials and cloud-based ensemble platforms, and adopt a modular design to meet the diverse needs of students. Personalized teaching is implemented in combination with artificial intelligence, and MIDI tools are used to strengthen students' innovative practice ability. At the same time, the implementation of teacher digital training, the use of comprehensive evaluation system to scientifically evaluate the learning effect, in order to cultivate innovative talents to adapt to modern music education, accelerate the digital transformation of piano education.

1.2 Application of MIDI technology in digital piano teaching

Connect the device: First, connect the piano to a computer or other MIDI compatible device via a MIDI interface. This can be done via a MIDI cable or wireless connection.

Install software: Install a MIDI compatible Digital Audio Workstation (DAW) or music production software on your computer. Make sure the software correctly identifies and configures the connected MIDI devices.

Record and edit: Record melodies and chords using the MIDI keyboard, then edit and mix them in the DAW. It can adjust the time value, intensity, pitch, melody, etc., and modify and control the change of music.

Timbre selection: MIDI tracks are assigned to different virtual instruments (VST plugins) or external sound sources to select and customize timbre. This allows pianists to explore and create a wide variety of styles of music.

Live performance: The MIDI controller controls the synthesizer or sound source module on stage for improvisation and live performance.

Music teaching: Teachers can use MIDI technology to record and analyze students' performance, and students can also self-check and self-correct their own performance works through MIDI software, adjust the performance speed, pitch and timbre through the software, and timely feedback and self-check and self-correct their own works. This helps to improve teaching efficiency and students' playing skills.

Game and movie Scoring: Use MIDI to create and trigger musical elements in a game or movie to add emotion and atmosphere to the work.

2. Reshape the teaching model innovation of piano courses in higher vocational colleges and improve teaching efficiency

2.1 Optimize the existing infrastructure

Upgrading of hardware facilities: Higher vocational colleges should purchase high-quality digital pianos and MIDI equipment to ensure that the performance and sound quality of music equipment meet the teaching requirements of piano majors in higher vocational colleges. Schools need to be equipped with high-performance computers and audio workstations to ensure that the teaching software runs smoothly.

Software resource integration: Introduce professional music production software and teaching aid software, such as digital audio workstation, virtual musical instrument, digital music APP, digital music teaching management platform, etc. Develop or purchase MIDI technology-related teaching materials and online resources, and establish digital resource library.

Network environment optimization: Build a clean network environment on campus, optimize the network education platform, manage and purify the network space platform, establish a stable campus network, and ensure the interconnection between digital teaching equipment. Higher vocational colleges should be equipped with high-speed Wi-Fi networks to support mobile device access and online teaching.

Teaching space transformation: Due to environmental factors, the traditional piano teaching mode is slightly monotonous in teaching materials and teaching methods. To create a digital piano teaching space, the school needs to build a digital piano teaching platform, transform the traditional piano classroom into a digital piano classroom, and install digital teaching equipment such as multimedia equipment, projectors and interactive whiteboards. It should also be equipped with a separate recording studio and music production studio, providing a professional-grade recording and mixing environment.

Technical support and maintenance: The school needs to vigorously enhance professional technical support, and establish a technical support team, responsible for the installation, commissioning, maintenance and update of digital equipment. Regular technical training is provided to ensure that the school's teachers are proficient in using digital teaching tools.

Security and Privacy protection: Implement network security measures to protect teaching data and students' personal information. Establish data backup mechanism to ensure the integrity and availability of teaching materials.

2.2 Deepen the innovation of digital piano teaching paradigm

Blended teaching mode: The traditional piano teaching mode usually adopts the teaching mode of one teacher for life or one teacher for multiple students. Teachers need to adapt to the digital era, and the teaching mode should combine face-to-face teaching and online teaching, and provide rich teaching resources through the network platform, including video tutorials, online exercises, virtual ensemble, etc.

Personalized teaching: MIDI intelligent software is used to analyze students' performance data and provide personalized practice suggestions and feedback. Adjust the content and difficulty of teaching according to the progress and ability of students.

Project-based learning: Design music creation, arrangement or performance projects that encourage students to solve problems through hands-on work and teamwork. Use digital tools to record and display project results to enhance students' practical ability.

Interdisciplinary integration: Integrating piano teaching with other art forms (e.g., dance, theater) and scientific and technological fields (e.g., virtual reality, augmented reality). Explore new art forms and ways of performing to stimulate students' innovative thinking.

Interactive teaching: Use virtual reality technology to create immersive teaching environments that allow students to experience different music scenes and atmospheres. Design interactive teaching activities, such as virtual ensembles, real-time feedback, etc., to increase student engagement.

Hands-on strengthening: Through the simulation of real work scenarios, students will strengthen practical skills, such as recording studio operation, music production, etc. Internships and employment opportunities are provided to help students apply their knowledge to practical work.

Lifelong Learning Support: Online courses and distance learning services are provided to support students in independent and lifelong learning. Establish a teacher development center to provide ongoing technical support and career development opportunities for teachers.

3. Advantages of MIDI technology in piano teaching in higher vocational colleges

3.1 Enhance practice effect

MIDI technology effectively improves piano practice effect through its repeated playback function, allowing students to practice infinite cycles until they become proficient, helping to find and correct mistakes and improve skills. Decomposition exercises enhance the independence of the hands and lay the foundation for the ensemble. MIDI technology also builds personalized learning paths, tailoring content to students' needs, facilitating independent learning, enabling differentiated teaching, and tapping potential, making piano learning a journey of exploration and self-discovery.

3.2 Meticulous cultivation of musical expression:

MIDI technology can accurately capture and simulate the subtle changes of force and expression processing in piano performance, providing students with meticulous musical expression training and helping to improve students' artistic expression level. It has injected new vitality into traditional piano teaching, opened the door to a higher realm of music art for students, and promoted their exploration of deep understanding and emotional expression of music.

3.3 Enhance the cross-border innovation ability of piano students in higher vocational colleges

Through learning the integration of MIDI technology and piano, students in higher vocational colleges acquire the ability to perfectly combine traditional music with modern science and technology. This ability to integrate technology enables students to incorporate innovative elements in music creation and performance to meet the needs of the international market for musical innovation. Having mastered MIDI technology, this allows them to combine piano playing with electronic music production to create unique musical styles and expressions. Through the use of MIDI keyboard and software, students can record and edit notes and chords in real time, adjust timbre and volume, and achieve precise control of music works. The application of this technology not only improves the efficiency of music creation, but also enhances the diversity and innovation of works.

4. Broaden the international employment horizon of higher vocational colleges

4.1 Strengthening and expanding practical experience

Through in-depth cooperation with multinational enterprises, vocational colleges provide students with valuable internship and employment platforms, so that they can exercise their skills in real work scenarios and accumulate practical experience. This collaboration not only promotes students' in-depth understanding of the dynamics of the industry, but also enhances their professionalism and work ability. In addition, the school actively promotes students' participation in projects and competitions at the international level, which not only helps students showcase their talents on the global stage, but also significantly enhances their innovative thinking, teamwork and international competitiveness. Through these practical opportunities, students are able to better prepare themselves for career challenges in a globalized context.

4.2 Further career Planning Services

To help students plan their future careers more clearly, the College provides comprehensive career planning guidance to help students establish career goals and tailor their personal development path. In addition, the School regularly organizes career development talks, seminars and workshops, inviting industry authorities and distinguished alumni to share their successful experiences and industry insights. These activities are designed to provide students with practical career advice, broaden their industry horizons, and inspire them to think and plan for their future career paths. Through these resources, students are able to better understand industry trends and master key skills for career advancement to stand out in a competitive job market.

5. MIDI technology and the future development trend of piano teaching

5.1 Deep integration of technology and teaching

In the field of piano teaching in the future, the deep integration of MIDI technology, artificial intelligence, machine learning and other advanced technologies will promote the innovation of teaching mode. This integration will enable MIDI systems to more accurately simulate human playing, including fingerings, dynamics, touch techniques, etc., thus providing learners with a learning experience closer to real playing.

This deep integration will enable MIDI technology to provide more personalized instructional feedback. By analyzing the performance data of learners, the MIDI system can identify and point out the shortcomings of learners in performance, such as intonation deviation and rhythm instability, and give targeted suggestions for improvement. This personalized teaching feedback will help learners find and correct mistakes faster and improve their performance.

5.2 Virtual reality (VR) and augmented reality (AR) technologies

VR and AR will bring an unprecedented immersive experience to MIDI teaching. This experience will greatly stimulate students' learning interest and creativity, providing them with an unprecedented learning platform.

First, through VR technology, students can play in a virtual environment with a famous pianist's "digital doppelgomez" ensemble. This experience will enable students to feel the exciting atmosphere of sharing the stage with the master and stimulate their passion for piano learning. At the same time, students can also observe the master's playing posture and skills in a virtual environment, so as to learn a higher level of playing skills.

Second, AR technology will enable students to perform in different historical periods and concert hall environments. This experience will enable students to feel the music atmosphere in different eras and cultural contexts, enhancing their understanding and feelings of music. At the same time, students can also play in the virtual concert hall environment to experience the real feeling of playing, so as to improve their performance level.

6. Conclusion

The combination of MIDI technology and piano teaching in higher vocational colleges has significantly improved students' musical in-

novation ability. This integration not only enables students to incorporate modern elements in music creation and performance to meet the needs of the international market, but also improves the efficiency of creation and the quality of works. In addition, students' music teaching ability has been enhanced, and their playing skills and understanding have been improved simultaneously. As a result, this curriculum integration provides a solid support for students' competitiveness in the international music field, laying a comprehensive and innovative foundation for their future music career.

References

[1] Shen Shuo, and Wu Kehui."Solfeggio Teaching Method Based on MIDI Technology in the Background of Digital Music Teaching."International Journal of Web-Based Learning and Teaching Technologies (IJWLTT) 18.1(2023):1-18.

[2] Yadav Prasant Singh, et al."A Lightweight Deep Learning-Based Approach for Jazz Music Generation in MIDI Format."Computational Intelligence and Neuroscience 2022.(2022):2140895-2140895.

[3] "Central Nervous System - Brain Research; Findings on Brain Research Reported by Investigators at McGill University (Synchronizing MIDI and wireless EEG measurements during natural piano performance)."Telecommunications Weekly (2019):

[4] Jim Murphy, and Trimpin."Transcoding Nancarrow at the Dawn of the Age of MIDI: The Preservation and Use of Conlon Nancarrow's Player Piano Studies."Leonardo Music Journal 27.27(2017):32-35.

[5] Lee Chang Yong, et al."Development of a Self-playing Piano with MIDI File."International Journal of Multimedia and Ubiquitous Engineering 11.10(2016):297-306.