Construction and Research of the Virtual Teaching and Research Office of "Weapon Aesthetics"

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Abstract: In order to improve teaching quality, raise the academic bar for teaching and research, and foster the development of creative talent, colleges and universities have undergone a significant transformation in the form of the virtual teaching and research office. The virtual teaching and research office of the weapon aesthetics course group is founded on the basis of information technology, which promotes the development of weapon aesthetics and raises the standard of instruction through research projects and multimodal instruction, cross-specialty the weapons aesthetics course group building, the expansion and integration of teaching resource library, and the leadership of first-class professional teachers. The results of the study show that students are satisfied with the teaching model as a whole, and are especially satisfied with the quality of teaching resources.

Keywords: Virtual Teaching and Research Office; Weapon Aesthetics; Cross-Specialty; Art-technology Combination

1. Introduction

In 2021, the Ministry of Education issued the Notice on the Pilot Construction of Virtual Teaching and Research Office, seeking to investigate and encourage the establishment of new grassroots educational institutions, and build several virtual teaching and research offices of various types and dynamic development based on modern information technology, to ardently advocate for the superior advancement of higher education. Feng et al [1] pointed out that for design education, design and art courses need to integrate big data, artificial intelligence, virtual reality and other new technologies to expand the imaginative space of design and enrich the form of design art. Chu et al [2] pointed out that colleges and universities should cultivate educators' interprofessional awareness, set up a "dual-teacher" educator team, lead the development of integrated education, create a good environment for cultivating composite art and design talents and provide protection. Mansurjonovich et al [3] put forward the innovative idea of teaching mode of digital media art, through the concept of discipline integration training, to help students cross different disciplines and cultivate inter-professional ability. Therefore, in the current stage of the development of a high-quality education system, making full use of information technology means driving the profound change of grass-roots teaching organization, forming an inter-disciplinary weapons aesthetics course group oriented to the "integration of art and industry", and actively investigate the rationale for the establishment of the weapons aesthetics course group's virtual teaching and research office as well as the practical route, in order to create a teaching style that greatly pleases the students.

2. The Connotation and Characteristics of Information Technology-Based Virtual Teaching and Research Office

2.1 The Connotation of the Virtual Teaching and Research Office

In addition to the traditional offline teaching and research office operation mode, the virtual teaching and research office is a new generation of information technology that emphasizes mobile Internet, platform construction, information security, and other contemporary Internet technologies. Its goals are to increase information sharing, lower operating costs, broaden the scope of services offered, and improve the effectiveness of the organization of teaching and research activities [4]. This new model is a deep-seated transformation of the times and teaching

culture in the construction of teaching organizations and teacher training in colleges and universities, which is conducive to improving the quality of teaching, upgrading the academic level of teaching and research, and the cultivation of creative talents.

2.2 The Characteristics of the Virtual Teaching and Research Office

The inter-temporality, synergy and diversity of the virtual teaching and research office have contributed to the advancement of innovation and growth in the field of education. It offers a broader space and opportunities for teachers' professional growth, stimulates students' interest in learning and creativity, and enables better sharing of educational resources. The application of the virtual teaching and research office has a promising future and will certainly have a positive and far-reaching impact on education.

Inter-temporality. It breaks the geographical limitations and time limitations that exist in the traditional education model, and through network technology and information technology, it can achieve remote communication and cooperation among teachers. Teachers can participate in the production of lesson plans, the preparation of instructional materials, and the exchange of teaching techniques and strategies through the virtual teaching and research office at any time and any place, creating a broad space for teachers to cooperate.

Synergy. It promotes cooperation and interaction among teachers through such functions as online discussion, resource sharing, teaching case studies and collaborative research projects. On the platform, teachers can jointly study problems, share experiences, learn from each other, discuss problems and solutions in cases, and learn from and refer to the experiences and practices of others, to enhance teachers' capacity for both problem-solving and instruction.

Diversity. In addition to offering a range of research and teaching activities, such as online discussions, seminars, teaching case studies, etc., but also integrates all kinds of teaching resources, such as teaching design and teaching videos. Can choose the interesting and needed teaching topic, and outlook of teachers' teaching; suitable teaching and research methods and resources can be selected according to teachers' needs to meet different teaching needs. Participating in project learning, practical activities, teamwork, and facing practical problems stimulates students' creativity and innovative thinking, cultivates independent learning and problem-solving ability, effectively improves students' comprehensive quality, and better adapts to the development needs of future society.

3. Pathways to the Virtual Teaching and Research Office for the Weapon Aesthetics Course Group

The virtual teaching and research office of the weapon aesthetics course group is an information-based grassroots teaching organization constructed by integrating different "online and offline" modes of teachers' teaching and research such as Tencent conference, offline communication, and WeChat group chat, breaking through time and space constraints, as shown in Figure 1[5]. Teachers can rely on the Internet platform for online collaborative teaching and research, as well as the mobile video broadcast platform to carry out online teaching activities. The platform supports teachers' data-driven teaching activities, provides intelligent recommendations and personalized services, and promotes personalized and collaborative teaching; it supports regular teacher training activities, and improves teachers' teaching level and professional building capacity. Students can access the platform via the Internet to share teaching resources, take part in educational activities, and obtain online guidance and assessment. The implementation of the above contents and methods aims to promote the establishment of the virtual teaching and research office of the course group of weapon aesthetics, encourage professional growth for teachers and raise teaching standards.

3.1 Deep Integration of Teaching through Information Technology

The new liberal arts guides the reform direction of design art courses in the concept of education, and big data, artificial intelligence, virtual reality and other technologies provide technical support for its curriculum reform. The new reform of design education needs to respond to the changes and

needs of The Times [6]. Improving the quality of instruction and advancing the discipline in the field of weapon aesthetics requires knowing how to integrate scientific research topics, results transformation, instructional videos, instructional cases, practical training projects, and other multidisciplinary teaching resources. Using the power of information technology, the virtual teaching and research office of the weapon aesthetics course group integrates teaching resources from multi-disciplines to create a high-quality shared teaching resources database.

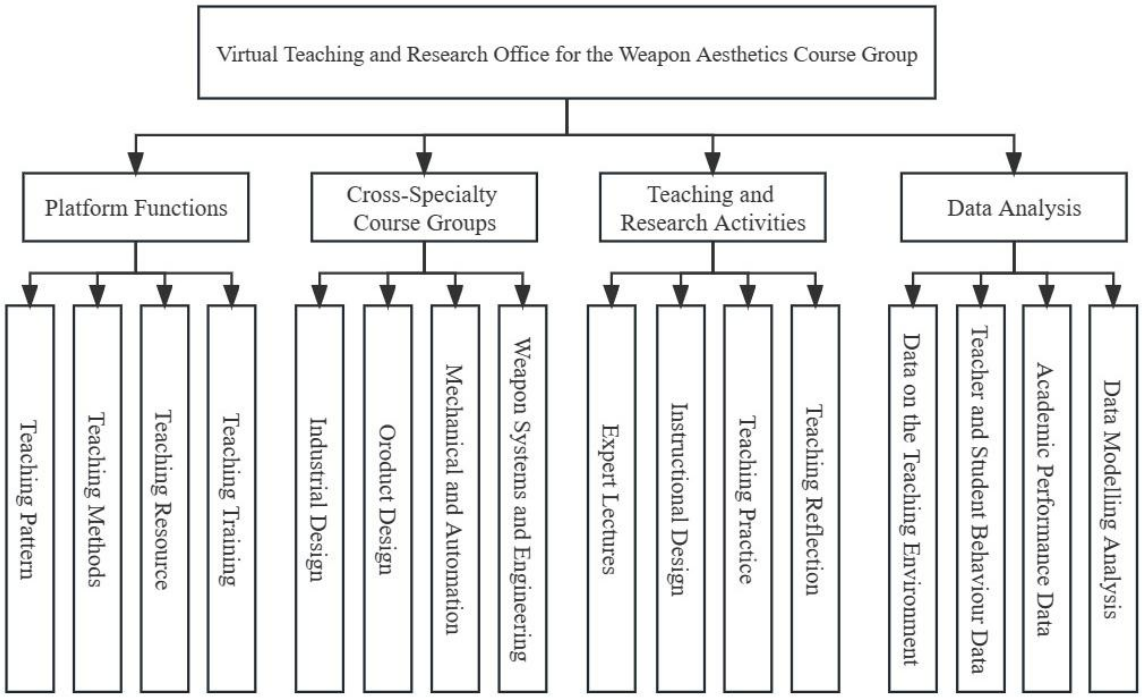

Figure 1. Functions of the Virtual Teaching and Research Office of the Weapon Aesthetics Course Group

The platform provides teachers and students with rich teaching materials and tools by integrating multi-disciplinary teaching resources. With the help of resources such as scientific research projects and achievement transformation provided by the platform, cutting-edge issues in the field of weapon aesthetics can be deeply studied to raise instructors' scholastic standards; through watching teaching videos and teaching cases, teachers can learn different teaching methods and strategies and provide references and reference for teaching practice. Practical learning can be carried out through practical training projects and teamwork on the platform to cultivate students' problem-solving abilities and creative thinking. Participate in scientific research projects and achievements transformation, timely grasp the latest research results in the field of weapon aesthetics, and broaden students' academic vision; enhance students' learning effect and ability by watching online courses [7]. Through the virtual research office of the weapon aesthetics course group, teachers and students can communicate and collaborate to improve the teaching level and learning results. Through dialogue and sharing on the platform, they can exchange teaching experiences and learning outcomes while also benefiting from one another's knowledge. Through the online evaluation and feedback on the platform, they can have an in-depth comprehension of the impact of teaching and the progress of learning and, in due course, modify and enhance the teaching techniques and learning tactics. In conclusion, the construction and application of the weapon aesthetics course group virtual teaching and research office has observed how well many majors may be integrated, improved the quality of teaching, and contributed to the development of weapon aesthetics.

3.2 Set up a 2+2 Cross-Specialty Weapon Aesthetics Course Group

The current state of art and design education at colleges and institution needs to be based on

cross-specialty fusion to achieve innovative change, in order to keep up with the needs of the times' evolving growth and the need to enhance the effect of talent cultivation. Art and engineering integration is an important means to promote innovative change and talent training, only to accelerate the implementation of cross-specialty integration in the form of art and design education, in order to cultivate high-quality composite art and design talents, and help the comprehensive strength of talents to enhance the overall. The formation of a 2+2 cross-specialty weapon aesthetics course group is aimed at integrating the two majors of "product design+industrial design" and "mechanical manufacturing and automation+weapon systems and engineering". Students majoring in product design and industrial design will be able to provide creative and aesthetic designs, while students majoring in mechanical manufacturing and weapon systems and engineering will be able to provide engineering and technical support, promoting students' potential for teamwork, communication and independent learning, thus achieving the perfect combination of innovative design and manufacturing.

Course group students can work together to discuss and solve problems in the field of weapon aesthetics, cross professional boundaries, bring together knowledge and skills from different professional backgrounds, and promote innovation. The effective functioning of the course group is ensured through active participation in activities and access to appropriate support and resources. To introduce the concept of active management development by organizing visits to actual arms manufacturing plants, face-to-face interaction with professionals, validation and experimentation through field trips and practical activities. Short-term work planning and long-term work objectives are formulated. Short-term work planning includes weekly or monthly study and research plans, as well as task allocation and collaboration arrangements among team members; long-term work objectives cover development plans for one year or longer, such as participation in academic conferences, publication of papers or application for patents. To cultivate students' independent learning and independent innovation, the course group encourages students to choose research directions and topics, propose innovative design options and solutions through literature research and experimental studies, and complete the corresponding studies and projects.

3.3 Give Full Play to the Exemplary and Leading Role of First-class Professional Teachers

In 2021, the implementation plan of the pilot work of the virtual teaching and research office specifies that the head of the virtual teaching and research office should be a master teacher, the head of a national first-class major, the head of a first-class course, and other teachers of a higher level; the major or the course on which is based has been approved as a "national first-class major construction site" or a "first-class course" [8]. The university actively organizes diversified and multi-form regular training, and cultivates excellent faculty with the power of famous teachers. To support the professional growth of first-line instructors, allow first-class teachers to demonstrate and take the lead in their teaching.

In order to improve the subject quality and teaching ability of teachers, the school organizes various professional training, lectures, seminars and workshops, so that teachers can learn from each other and exchange experiences [9]. At the same time, the school carries out teaching skills training to help teachers master advanced teaching methods and tools, and improve the efficiency of classroom interaction and student participation. In addition, the school has set up a mentor system, allowing senior teachers with rich experience and teaching achievements to act as mentors for new teachers, so as to promote the growth of new teachers and integrate into the educational environment of the school. The school also encourages teachers to participate in academic research and teaching competitions to enhance their teaching research and innovation abilities and to strengthen the school's academic influence. Teachers can make full use of it in the form of online training and seminars to share teaching experience and teaching resources, organize teaching research and curriculum development, as well as assess and improve teaching effectiveness. It provides easy access to teaching resources, teaching design and

implementation, and timely interaction and feedback with students.

3.4 Implement the Virtual Teaching and Research Office Management and Operation Mechanism

The virtual teaching and research office of the weapon aesthetics course group, which is composed of multiple disciplines, needs a stable management and operation mechanism to ensure its long-term operation and development.

Formulate a clear management mechanism. Combined with the annual work points of the weapon aesthetics course group, the work plan and work summary of the virtual teaching and research office are formulated; focusing on the key work of teaching, regular seminars and exchanges of advanced educational concepts and teaching methods are held, and collective lesson preparation is carried out; for the new teachers' group, the cultivation program for the enhancement of teaching ability is determined, and the more seasoned teachers who have demonstrated success in education are assigned as mentors to the less experienced teachers.

Establish a clear organizational structure. According to the backgrounds and skills of the course group members, clarify the responsibilities and authorities of the leading organization, the management team as well as the roles of each role; instructional design groups, teaching resources groups, teaching assessment groups, etc. can be set up, with each group being responsible for a different task and working together to promote the work of the department; set up a personnel selection mechanism to ensure that suitable members are recruited, and that appropriate training and guidance are provided to enhance their professionalism and teamwork skills.

Performance evaluation and incentive mechanism. By setting clear goals and targets, members are regularly assessed and given feedback to identify problems promptly and take appropriate improvement measures, such as training, improving communication methods and optimizing work processes. Performance appraisal and continuous improvement are cyclical processes, communicating with members and jointly formulating improvement plans and tracking improvement results. Rewards and development opportunities are provided according to the performance of members to motivate them to work and improve their performance.

4. Evaluation of the Effectiveness of the Virtual Teaching and Research Office of the Weapon Aesthetics Course Group

4.1 Establishment of a Teaching Effectiveness Evaluation System

The evaluation index system is divided into 3 levels of indicators: the target level is the evaluation of teaching satisfaction in the virtual teaching and research office of the weapon aesthetics course group; the guideline level includes 4 secondary indicators of the teaching process, teaching resources, teaching management, and teaching platform; and the factor level includes 12 tertiary indicators, as shown in Figure 2 [10]. Students' satisfaction with the teaching and research center is heavily influenced by the interactive contact between professors and students during the teaching process, the efficacy of the teaching activities, and the flexibility of the learning form. The richer the teaching resources, the stronger the content design, the broader the teachers' knowledge, the more they can enhance the classroom atmosphere, and the higher the corresponding teaching satisfaction. Improving the teaching management system, providing teachers and students with learning help and support, feedback on assessment and evaluation, and the learning participation management platform, to ensure the quality of teaching, and the better the classroom presentation, the higher the students' satisfaction with the teaching and research institute. Students' satisfaction with the Office of Teaching and Research can also be reflected in the platform's compatibility, stability, and quality of instructional materials.

4.2 Conduct Platform Satisfaction Evaluations

This study was conducted by questionnaire survey, in-depth interviews with six lecturers and teaching secretaries, adjusting the questionnaire according to the experts' opinions, and distributing the questionnaire to 53 students of the course group for testing, and assessing the elements that influence teaching satisfaction in light of the statistical

questionnaire data, with the specific values shown in Figure 3. Among the 12 indicators, students' satisfaction with the "quality of teaching resources" is the highest, reaching 94.33%, indicating that high-quality teaching resources are the core of educational resources, and students can get a good education through the use of inter-temporal teaching resources; followed by "content transferability" with an evaluation value of 92.33%. The evaluation value of "content transferability" is 92.45%, which indicates that teachers have deeper professional qualities and play a guiding role in motivating students to learn. It can be seen that students are satisfied with the quality of teaching resources and content transferability of these two indicators, indicating that students are more satisfied with the level of teachers and resources integration of the virtual teaching and research office of weapon aesthetics, indicating that the office provides a more satisfactory learning environment for students as well as teachers, which is of positive significance for the development of weapon aesthetics in the future.

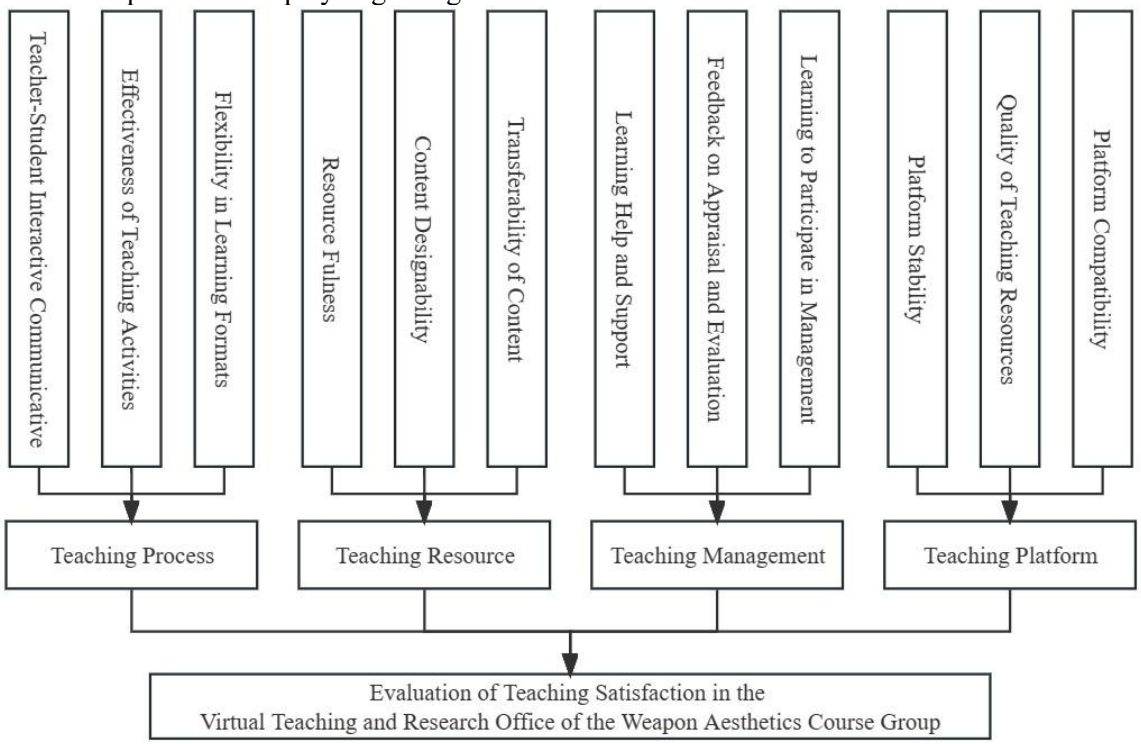

Figure 2. Teaching Satisfaction Effectiveness Evaluation Index System

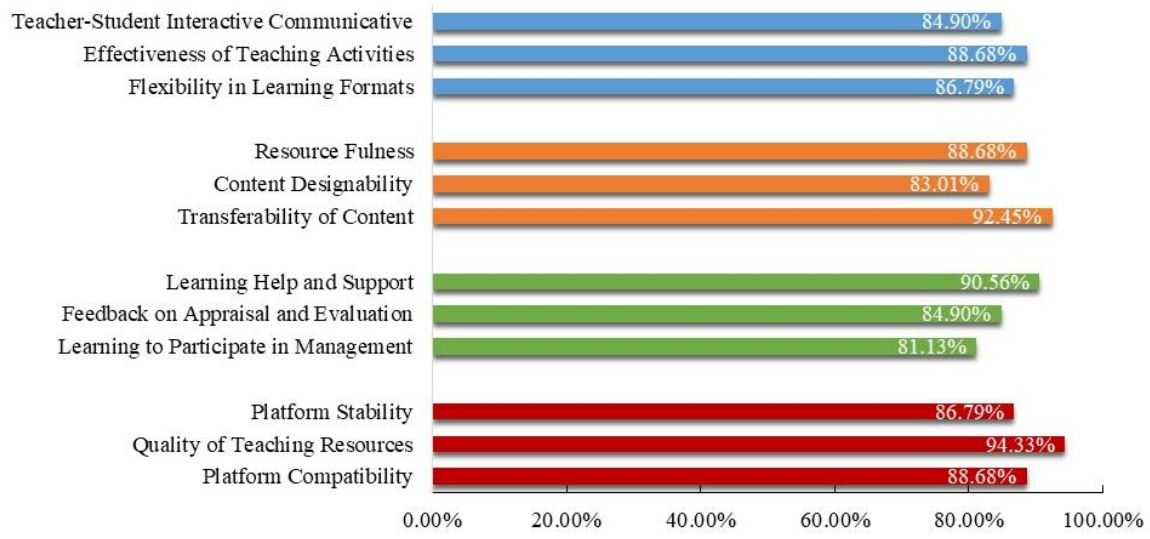

Figure 3. Results of the Teaching Satisfaction Survey

According to the above evaluation values, the final result of the comprehensive evaluation value of students' satisfaction with the teaching of the virtual teaching and research office of the weapon aesthetics course group is shown in Figure 4. The total level of satisfaction of the teaching platform is the highest, reaching 89.93%; the satisfaction of teaching management is only second to the teaching platform, reaching 88.05%; the evaluation value of the teaching process is relatively low, with a satisfaction rate of only 86.79%; the satisfaction rate of teaching management module is only 85.53%, with the lowest evaluation value. As a new type of grass-roots teaching and research office, it provides a new idea path for the construction of the course in terms of content, method, implementation, and faculty. To a certain extent, it meets the needs of course group members, but in the future practice process, further research should be carried out on teaching management systems and other aspects.

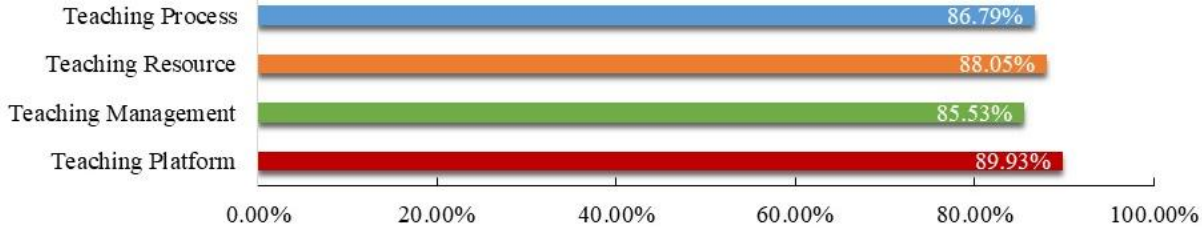

Figure 4. Overall Survey Results for Teaching Satisfaction

5. Conclusions

The virtual teaching and research office of the weapon aesthetics course group is based on the core of the teachers of national first-class major "product design" and provincial first-class major "industrial design", and introduces the teachers or industrial workers with the background of machinery and automation, weapon system and engineering, etc. to discuss the course implementation, teaching content, teaching methods, teaching tools, teaching evaluation and other contents of the special course group of "weapon aesthetics" in order to study the integration of art and industry together. The course group of "weapon aesthetics" is established for the joint study of "weapon aesthetics" in the integration of art and industry.

The university is committed to establishing a first-class virtual teaching and research office, continuously strengthening cross-specialty, cross-institutional and cross-regional multilevel teaching and research collaboration, providing strong support for cultivating exceptional undergraduate talent, helping to create a top-notch framework for cultivating composite talent., and promoting the development of high-level distance education quality. In the future, it will further promote the development of teaching and learning, and provide a more realistic and vivid learning environment through the introduction of more advanced technologies, such as virtual reality and augmented reality. Strengthen the cooperation with related industries to cultivate students' practical ability and professionalism. Emphasis will be placed on teacher training and updating of professional knowledge to manage the course group's ongoing development in the area of weapon aesthetics.

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