

Research on the Integration of Information Technology and College Art Design Education

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Abstract:

The development of China's economy has entered a new stage, and the market economy is facing With a new form, the development of high-tech information technology has also brought various industries Huge development opportunities and challenges have come. Through long-term exploration and practice, people gradually Discovered that computers have very powerful application functions, especially in art and design It has shown its strong vitality and unlimited development potential. The use of multimedia in has economy has become an inevitable trend, driven by the combined effects of the economy, technology, and education Products can promote the reform of educational mechanisms and improve the effectiveness of cultivating students' comprehensive qualities, At the same time, it can also strengthen the teaching level of teachers, thereby achieving a complete improvement in the classroom The purpose of teaching effectiveness. The integration of information technology and college art Design education curriculum needs to be based on the application of computer software and graphic design functions so that not only Improves students' professional skills in art and design, and also strengthened their computer skills Technical level. This article takes the new media animation course as an example to summarize the application techniques of integrated media education technology suitable for animation majors in universities.

Keywords:

Information Technology, Art and Design in Universities, Educational Curriculum, Integration, Application

1. Redefining Art

The concept of "art" has undergone multiple reforms in history due to differences in media. The development of the art field is determined by multiple factors, such as the development of science. The transformation of media marks the evolution of traditional and past art towards modern new media art concepts, and redefines art. In the past, art was mostly based on natural or artificially processed objects as a medium. When China first had televisions, they were all black and white images. After the

emergence of graphics, multiple image revolutions led to a transformation of the television environment from silent to sound, and from black and white to color.

The gradual advancement of art and science has also provided a good platform for the development of new media art and design, and the design concept of digital science has integrated “digital media” into it. In addition to the transformation of graphics, on the path of art development, the development of geometry, pigment chemistry, medicine, an Outline of human anatomy, and other disciplines has played a role in promoting the development of art design.

The medium is an extension of human beings, obtaining images and meanings through the cognitive information of the receiver, extending the sensory and emotional experiences of humans. The medium is information, reproducing things to the receiver through the transmission of information, and creating an information channel for communication between people. According to McLuhan, medium and cognition are interrelated [1].

In order to create art with complete and useful hues, fine arts, which are mostly conveyed by “cold media,” have been mixed with music, dance, and other genres like sound, light, and electricity. They are distributed and copied in a “hot media” manner, which distances the content, concept, and form of the artworks from tradition and eliminates the “authenticity” of the artworks. As Walter Benjamin put it, the features of art in the age of mechanical reproduction emerged. As a result of this development tendency, art has tended to appeal more to the public and the marketplace, while traditional art is under pressure to change and become marginalized.

The development of new media art and design has led to changes in the form and medium of media dissemination. Due to technological limitations, traditional art design lacks rich visual sensations and visual aesthetics, the design of images is not as professional, and various aspects of technology are also immature.

With people’s continuous pursuit of art and aesthetics, it has gradually developed into today’s dazzling new media art. New media art has increased the exploration and learning of basic knowledge of aesthetic design. By combining digital media technology with the same basic knowledge of aesthetic art and aesthetics, the quality of digital transmission information has been improved in various aspects such as visual communication and visual aesthetics. New media art contains advanced technologies such as rich visuals, massive information, and high-tech means. It must also be comprehensively improved in accordance with modern forms of information dissemination.

2. The Current Situation of the Application of Digital Media Technology in Education in China

2.1. The Application of Digital Media Technology in Education

In the first 20 years of the 21st century, hardware and software technologies, such as H5 (interactive animation), VR (virtual reality), AR (augmented reality), MR (mixed reality), XR (extended reality), Big data, mobile devices, 5G networks, have gradually matured and become popular in China[2]. There are more media technologies available for education than ever before. It is an opportunity and challenge for educators to integrate them and apply them to teaching.

The technical characteristics of media art education are the result of the combined effect of its internal and external regulations. Intrinsic regulation refers to the essential part of technology in the discipline construction of media art education. Although the training objectives and levels of media art education are the same, technology is the most important essence that distinguishes media art from traditional art. This is often reflected in the content and teaching methods of media art education. The external regulations are related to the development of the national technological level and the adjustment of the economic transformation industry structure. In the key industries of the new five-year national development plan, the media industry is juxtaposed with modern efficient agriculture, advanced manufacturing, modern service industry infrastructure construction, and information technology application. Currently, the country needs talents in the media industry, so it is natural to vigorously develop media art education and increase investment in its hardware infrastructure construction.

After the establishment of the People's Republic of China until the 1990s, in the context of relatively scarce materials and limited technological conditions, art education was equivalent to skill education. This face-to-face teacher apprentice education emphasized skills over culture, and the use of art education became a companion of simple elites.

New media technology has solved the problems of spatial limitations, lack of interactivity, and real-time data analysis in teaching, providing more learning and creative space for creative application courses. When new media technology has developed to a certain extent and practical experience has been gained in experimental demonstration teaching, its application in higher education has gradually emerged. However, the integration and application of multiple new and old media still require continuous practical exploration to form a system.

2.2. Current Situation of Internet Education Technology Application

The "Internet plus" action plan proposed by Premier Li Keqiang in 2015 has promoted the rapid development of "Internet plus education". MOOC based on network technology has been pushed to the forefront again, and the teaching model of Flipped Classroom has received more powerful support. The teaching model that combines social media technology with the classroom is gradually emerging. In the temporary online teaching environment caused by the epidemic in early 2020, the teaching resources established by MOOC played an important role[3]. Flipped classroom realizes the transfer of knowledge teaching and knowledge internalization sequence in the learning process, enabling students to learn online first, digest easy-to-understand knowledge points in advance, focus on problems in class, and discuss and solve them with teachers, forming a new teaching model. Flipped classroom makes students' learning from passive to active, and advocates deep learning. The Flipped classroom model based on rich online learning resources is particularly common in the theoretical research and art creation courses of high-quality courses.

3. The Teaching Status and Reform Direction of New Media Animation Course

3.1. Current situation of course teaching

The teaching goal of the new media animation course is to enable students to master the laws of animation motion, as well as the methods of animation action design and drawing the original animation. The key and difficult points of teaching are the grasp of action rhythm and the visual representation design of dynamic images. The conventional teaching strategy is based on theoretical and applied textbooks, combined with PPT courseware explanations and paper artwork displays, followed by creative exercises to guide students in translating theory into practice, thus mastering theoretical knowledge of animation motion laws, animation action design, and original animation creation methods.

Original animation (original painting) refers to one of the important nodes in animation production, which refers to the first draft drawn or designed from scratch. In anime, the speed of action may be due to the small number of animations used for the action, or it may be caused by the low number of frames each animation stays in (i.e., the problem of how many shots are taken). Therefore, the original animation creation not only requires students to have strong painting skills but also to be familiar with the laws of movement and time rhythm. Teachers should guide students from creating single-frame painting works to creating sequence painting works based on the timeline.

3.2. Limitations of routine teaching in the curriculum

There are three major limitations in regular classroom teaching of animation motion patterns courses:

First, the teaching links of role performance and action design are limited by space. When students perform in the animation role, they are limited in the classroom, which is quite different from the scene set by the animation. For students with limited imagination, it is difficult to integrate into the performance environment of animation, which affects their performance.

Secondly, the efficiency of the classroom review process is not high, and the review process of each student's work takes a lot of time. If the same problem occurs, it needs to be explained repeatedly. The collective review will waste most of the students' creative time.

Thirdly, it is difficult to provide after-school tutoring, and students' independent practice outside of class cannot be fully tutored. This mainly depends on their personal understanding and self-learning ability, which requires high personal abilities.

3.3. Exploration of cross-disciplinary teaching

The exploration of combining integrated media technology with animation majors in China is mainly reflected in software courses, such as developing mobile apps based on 5G technology for online operation demonstrations and problem-solving of 3ds MAX software. When explaining the operation of 3ds MAX software in the classroom, resources from online platforms can also be used to assist teaching; Developing small games suitable for teaching content using Virtools software, enabling students to transition from passive learning to active learning [4]. Through interaction, students can intuitively experience the action characteristics, keyframe positions, and rhythms of 3D animation characters, thereby better mastering the keyframe setting methods of 3D animation characters; Establish a 5G smart campus dedicated network to provide sufficient cloud storage space for digital animation rendering and provide a large capacity network disk for students to share learning

resources, film and television materials, etc. With the support of 5G, VR, H5, and other technologies, the “Internet plus College Animation Education” has begun to take shape, but when it comes to each course, the targeted teaching strategies and programs are not clear enough, and there is still a large space for planning and practice.

Given the course characteristics of animation movement patterns, it is crucial for students to understand the rhythm, amplitude, and speed of action performance. It is difficult to express the psychological and physiological characteristics of animated characters through physical and emotional movements. The purpose of curriculum reform combined with integrated media technology is to expand the knowledge content itself in form and provide high-quality feedback and stimulate students’ learning interest and inspiration through innovative presentation methods, thereby improving the quality and efficiency of the curriculum in both teacher teaching and student learning.

4. Application Strategy

4.1. Before Class: Creating a teaching resource library

The teaching resources of the new media animation course include new media animation theoretical knowledge, materials, live performance materials, action materials, and excellent animation action design works, which are mainly used to provide the required pre-class learning resources for the Flipped classroom, enrich classroom interactive teaching materials, and help students clarify learning objectives and aesthetic standards. In the past, course teaching resources were mainly based on paper and film, and television media, which could only meet the needs of one-way information transmission. Students did not receive timely guidance in the one-way learning process without feedback. The integrated media teaching resource library has the characteristics of diversification, high interactivity, and cloud computing. It not only enriches the presentation form of textbooks but also enables them to have interactive functions. Systematic tutorials help standardize professional knowledge, thereby better-aligning school education with industry needs.

The integrated media teaching resource library includes books, artwork, props, images, H5 interactive animations, AR assistance, etc., which form a diversified “learning first” system that combines physical textbooks with digital virtual textbooks (Figure 1). Taking the teaching material of the animation movement law course as an example, students can use H5 interactive animation to understand the laws of natural physics such as Free fall and parabola, and deepen their understanding of the basic movement law by interactively observing the rhythm, position, and deformation effect of each frame; Using mobile AR technology, display the AR auxiliary instructions set in the textbook, activate static diagrams into dynamic ones, making theoretical knowledge easier to understand; By watching VR animation scenes and performance cases through mobile phones or VR display devices, students can familiarize themselves with the performance environment in highly immersive VR images, and observe and learn the actions of performance cases from a 360 ° optional perspective. After “learning first”, students summarize the incomprehensible knowledge points into the course APP, and teachers adjust the teaching content through the statistical information of the APP, thereby improving the quality and efficiency of teaching.



Figure 1. Digital games.

4.2. Classroom: Building a classroom interaction system

The law of animation movement is a course that extends from theory to creation, and the learning process includes receiving knowledge, designing thinking, practicing works, listening to suggestions, and making modifications. Teaching interaction is the focus of the entire process and the purpose of building a multimedia classroom interaction system.

4.2.1. Teachers use integrated media technology to teach

The first characteristic of integrated media classroom teaching is the networking of information transmission. When teachers need a large amount of additional teaching information to assist in teaching, they can quickly search and transmit it to students through 5G high-speed networks and intelligent mobile devices, no longer troubled by the limited amount of information in paper textbooks and slow online information transmission. The second characteristic is the diversification of teaching methods. The smartphone app and AR display function can enrich the interaction channels and expressions between teachers and students. This novel and interesting teaching method can effectively stimulate students' enthusiasm, thereby promoting the healthy development of classroom teaching.

4.2.2. Interactive teaching based on XR technology

XR immersive situational teaching is a virtual and realistic application scenario using XR technology. XR, as the next generation computing platform, and 5G, as the Next-generation network, together form a new ecosystem: the spatial Internet [5]. Education is an important industry for the application of emerging technologies, and it is necessary to fully leverage the advantages of advanced technology to promote the development of teaching models in the new era. The hardware devices of XR technology will gradually become lightweight. By holding micro projectors with 5G+XR functional components, people can avoid wearing helmets and glasses, and directly experience various local and cloud XR scenes in the real environment with the human eye.

For animation motion law courses, XR can solve the problems of students' lack of imagination, enthusiasm, and sense of immersion in character performance at the technical level. XR technology combines physical objects with simulated scenes to create an experience between real and virtual. Through augmented reality display technology, Motion capture technology, and depth camera technology, it can achieve efficient "human interaction", create various fantastic animation scenes, avoid on-site dangerous factors, break through the limitations of unrealistic scenes, and enrich the types of performance scenes, Can meet the needs of various types of animation

performances. Expanding reality technology has greatly broadened learners' information acquisition channels, enabling them to perceive the real world from different perspectives and perception channels (pan real world with seamless integration of virtual and real-world), providing personalized learning support for learners, serving personalized learning needs, and reducing learners' learning Cognitive load.

4.2.3. Implement efficient APP interactive teaching

Self-service feedback learning is also a major feature of integrated media classroom teaching. Students can upload their original animation works to the cloud system through a mobile app, and use the app's image synthesis system to obtain previewable animation images. This not only allows for quick animation checks but also allows for file retention on the app, making it easy for teachers to review and modify in the future. In addition, the original animation creation process template can be set in the course app. Students can complete each creation step in the template according to the process and upload the artwork to the app. Teachers can synchronously promote the teaching progress, and students can observe and learn from each other, forming a synchronized and visualized teaching mode.

Teachers can also use the APP system in conjunction with hardware technology to project students' homework onto the large screen and students' mobile screens for an explanation. Through the APP, students can annotate and modify the homework, and then upload it back to the APP system to generate a new version of the homework for teachers to review again. During the process of student editing, teachers can continue to comment on other students' works. From this, it can be seen that integrated media technology has accelerated the process of teaching interaction, providing more diverse interaction opportunities for teachers and students, and allowing students to receive targeted guidance while also making full use of classroom time.

4.2.4. After class: Establish an integrated media creation and exchange platform

In addition to communication between teachers and students on campus, artistic and creative exchanges between universities and enterprises are equally important. Students need to timely understand the industry's aesthetic trends and technical standards, in order to better integrate into the industry. Based on integrated media technology, simultaneous online communication between multiple people in different regions has gained some experience in online education during the epidemic. The maturity of smartphone apps and 5G high-speed network application technology has provided conditions and technical support for after-school integrated media creation and communication platforms.

The online creative exchange platform of financial media includes two modules: sharing and communication. The former helps students understand De facto standards, as well as the latest works and industry trends; The latter allows students to communicate and exchange ideas with students and practitioners from other schools, thereby achieving the goal of catching up with industry standards and aligning with industry standards in school art creation. The sharing module can use mobile apps to establish a work search system, sharing the works of various universities and cooperative enterprises on the platform. Students can quickly access and download resources through the 5G network. The communication module can utilize various media to achieve online communication between text and images, as well as sending and receiving files. The integrated media creative communication platform plays a

role in assisting classroom teaching, consolidating knowledge points, stimulating students' creative desire and inspiration, and serving as a reviewer of practical achievements in course teaching.

5. Difficulties and Countermeasures in the Teaching of Integrated Media Animation in Universities

There are still many practical problems to be solved in the application of integrated media technology in college curriculum teaching. Firstly, the software and hardware technologies of XR need to be optimized, and the application cost remains high. Secondly, teachers and students should be familiar with the application methods of integrated media technology, and universities should provide corresponding skill training for teachers and students. Thirdly, students should have a certain level of self-control when using smart devices in class. For this, corresponding smartphone monitoring apps can be developed, or reminder modes can be introduced in course apps to prevent students from playing games or watching irrelevant videos. Fourthly, there are no applicable course apps and few virtual digital textbooks in the market, requiring significant upfront investment in app development and textbook resource production. Fifth, teachers have the heavy task of preparing lessons in the early stages of development, and online tutoring after class may take up personal time, requiring reasonable arrangements.

In response to the above issues, several countermeasures are proposed: firstly, regarding the cost issue of XR technology, some modules of XR can be implemented using smartphones, such as combining with "VR paper boxes" to form a head display device to meet the needs of students to experience animation virtual scenes; Based on paper textbooks and the photography function of smartphones, AR effects can be achieved. Secondly, the school offers new media technology application skills training courses to popularize the use of technologies such as 5G and XR[6]. Thirdly, establish a schedule for classroom smartphone usage and add monitoring or reminder functions in the classroom app. Fourthly, collaborate with foreign schools and enterprises to jointly develop virtual digital textbooks, and achieve school enterprise cooperation and joint education in the era of integrated media. Fifth, teachers should provide after-school tutoring at designated times to further standardize the online tutoring teaching process.

6. Conclusions

In recent years, the rapid development of high-tech information technology has greatly promoted the improvement of professional skills in art and design in universities. Through a series of reforms and innovations, the art and design profession has presented a new situation. Under this driving force, the courses of art and design in universities have also undergone corresponding integration and transformation in teaching modes and teacher-student relationships, further strengthening the application of computer information technology in this course, and making the courses of art majors in universities more diversified, hierarchical, and information-based.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

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