Exploration on Talent Training of Digital Media Art under New Engineering

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Abstract. New engineering is a supply-side structural reform of talent training driven by industrial structure adjustment and transformation and upgrading in China's higher education. It includes emerging disciplines and majors corresponding to new business forms, as well as application-oriented talent training models, emphasizing interdisciplinary integration, social practicability and comprehensive ability training. Digital media art, which relies on technology, keeps up with technological innovation, and has the dual characteristics of art and engineering, needs to explore an effective talent training model suitable for the characteristics of this major. Taking the International College of Creative Design of Shanghai University of Engineering Science as an example, this paper investigates and analyzes the curriculum system of digital media art major in typical colleges and universities at home and abroad, as well as the demand for talents from industrial enterprises, from the current situation of talent training for digital media art majors, combined with the content of new engineering construction and digital media interaction technology as the core. Then construct the course group system to strengthen the training of computational thinking and Internet thinking ability, and pay attention to the organic integration with other horizontal course groups. In the setting of interactive technology course group, we pay attention to engineering thinking, set up courses with the nature of engineering design, and emphasize the cultivation of engineering thinking and practical ability.

1 Introduction

Since the new engineering project was proposed by the Department of Higher Education of the Ministry of Education, the research of interdisciplinary integration education model has been started in universities all over the country, and it has been widely implemented. New engineering can be understood as a collection of emerging engineering disciplines and subject education, which is formed on the basis of applied science and engineering science, through engineering practice and cross-integration with other disciplines. The new concept advocated by it refers to the development of modern science and technology, the combination of multiple fields, and the cross-integration of disciplines, and the focus of the new model is to build a new talent training model. [1]

New engineering is the supply-side structural reform of talent training driven by industrial structure adjustment, transformation and upgrading of China's higher education. [2] It includes emerging disciplines and specialties corresponding to new business forms, as well as application-oriented talent training models, emphasizing interdisciplinary integration, social practicability and the cultivation of comprehensive abilities. [3] Digital media art aims at artistic expression and takes computer, Internet and other digital technologies as creative means and communication channels. It is an application-oriented interdisciplinary subject supported by technology, driven by technology and closely following technological innovation, with both artistic and engineering characteristics. With the gradual implementation of the new engineering, the talent training model of this major is bound to be deeply affected by the new engineering concept. How to build a digital media art professional talent training model to meet the needs of The Times and drive professional transformation and upgrading has become a hot issue for universities to study and explore. Under the background of the Ministry of Education's proposal to accelerate the construction of new engineering, digital media art [4], as an interdisciplinary and dynamic major that keeps up with technological innovation, needs to try to explore an effective talent training model suitable for the characteristics of this major.

Taking the International College of Creative Design of Shanghai University of Engineering Science (SUES for short) as an example, art students in high school are relatively weak in basic knowledge learning, weak in logical thinking ability and ability to read foreign materials, less sensitive in considering problems, less careful and detailed, and less active and enthusiastic in learning. Guided by the needs of digital media art talents, it is necessary to strengthen the training of their computational thinking and Internet thinking. The major of digital media art is inseparable from the strong
support of computer information technology and intelligent technology, which improves students' ability to apply basic concepts of computer science to problem solving and system design, reflecting the new engineering concept of "reforming teaching content with new technology". [5] Through these technologies, digital media art majors can quickly master the design, product, enterprise and even the entire business ecology, so as to provide demand orientation for their design, that is, the "industry demand-oriented" requirement in the new engineering concept. [6] In view of the interdisciplinary characteristics of digital media art major, combined with new engineering, this paper focuses on the improvement of interactive technology course groups in talent training plans under the guidance of training objectives.

2 Sorting out the existing training plan

This major was jointly established by China and South Korea. Under the guidance of the teaching concept of combining "art, science and industry", digital media art major will draw on the strength of high-quality educational resources at home and abroad, cultivate and deliver good comprehensive qualities of art, science and humanities, master the basic knowledge of art, humanities and information technology for the development and takeoff of China's cultural industry and digital media industry. Solid professional knowledge of digital media content planning, design and production, familiar with digital media art design and production methods, processes and technical tools, with international advanced design concepts, strong design application and practical ability, team cooperation, innovation and entrepreneurship, good professional ethics, excellent self-learning ability and lifelong development ability, International composite applied talents who can be engaged in planning, design, production, communication, operation or management of digital media in related fields of media and cultural industry.

The graduation design works are mainly interactive experience. This refers to works with human-computer interaction as the main feature, including multimedia devices, games for wearable devices, virtual reality and augmented reality works, mobile Internet applications, etc. The interaction must be appropriate for the subject matter and content of the work. [7] Taking the training plan for grade 2020 as an example, the interactive technology course groups in the curriculum system are sorted out and shown in Table 1.

<table>
<thead>
<tr>
<th>Nature of curriculum</th>
<th>Course title</th>
<th>Relevance to interactive technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic compulsory course</td>
<td>Computer image processing</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Fundamentals of programming</td>
<td>strong</td>
</tr>
<tr>
<td></td>
<td>Advanced computer image processing</td>
<td>strong</td>
</tr>
</tbody>
</table>

3 Comparison of interactive technology course groups at home and abroad

In this paper, we selected two similar majors in domestic and foreign universities with similar levels to our university.

3.1 Domestic universities

3.1.1 Digital Media Art in Jiangnan University

This major sets up interactive new media and digital image creation two directions and module courses, with student creation as the center, art and technology integration. This major aims to cultivate composite applied talents who have good art and design accomplishment, can comprehensively apply digital media art knowledge to analyze and solve practical problems, master certain information technology, have professional knowledge and skills in digital media production and processing, and can engage in the design, teaching, research and management of digital media art in the field of digital media. [8]

The interactive technology course groups in the curriculum system include: Foundation of interactive experience, creative programming, cross-platform interactive design and development, new media display design, integrated innovation design, digital technology frontier, virtual reality technology and creativity, and interdisciplinary curriculum practice.

3.1.2 Digital Media Art in Shanghai Institute of Visual Arts

This major is an interdisciplinary major aimed at cultivating applied talents in the field of digital media art and design. This major aims at the development trend of digital media and the needs of social talents, highlights the characteristics of the training system of composite applied talents combining contemporary art concepts and digital technology, and takes the demand of digital media art talents determined by the social application.

Table 1. Interactive technology course group in SUES

<table>
<thead>
<tr>
<th>Nature of curriculum</th>
<th>Course title</th>
<th>Relevance to interactive technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic elective course</td>
<td>Mobile network principle and application</td>
<td>strong</td>
</tr>
<tr>
<td>Professional course</td>
<td>Fundamentals of virtual reality</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>International integrated project design</td>
<td>Medium</td>
</tr>
<tr>
<td>Professional elective course</td>
<td>Virtual reality design</td>
<td>strong</td>
</tr>
<tr>
<td></td>
<td>Interactive installation art</td>
<td>strong</td>
</tr>
<tr>
<td></td>
<td>3D engine application</td>
<td>strong</td>
</tr>
</tbody>
</table>
value system as the basic teaching goal of this major. To provide first-class creative talents for digital media art and comprehensive design industries, and to train composite applied talents for IT, art design, media communication and other industries. On this basis, the professional development plan focuses on the development trend of international digital media art, integrates into the cutting-edge academic framework of media art development at the cognitive and thinking level, and takes computer interaction and network as the main body and cross-media contemporary art creation as the basic teaching system at the performance level.\[9\]

The main courses are divided into four categories: basic theory, basic tools, basic methods and professional orientation, among which the interactive technology course group is shown in Table 2.

<table>
<thead>
<tr>
<th>Course category</th>
<th>Module</th>
<th>Course title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main course</td>
<td>Basic tool</td>
<td>Fundamentals of computer hardware</td>
</tr>
<tr>
<td></td>
<td>Fundamentals of multimedia programming</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interactive programming</td>
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<td></td>
<td>Virtual reality design</td>
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<td></td>
<td>Network remote interaction design</td>
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<tr>
<td>Extended course</td>
<td>Professional competence module</td>
<td>Fundamentals of automation control</td>
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<td></td>
<td>Sensor interaction technology</td>
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<td></td>
<td>Fundamentals of motor servo control</td>
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</tbody>
</table>

Table 2. Interactive technology course group in SIVA

3.2 Foreign universities

3.2.1 Design and digital media at the University of Edinburgh

The university does not have an undergraduate program in digital media art, but a similar program is Intermedia Art. Graduate students are majoring in design and digital media. Students learn a multi-perspective approach to developing media and interactive experiences, dealing with the complex relationship between design and digital media, and understanding the potential of digital media to combine into innovative and engaging forms so that it can be used for multiple purposes across multiple platforms. From design disciplines and fine arts, to humanities and computer science, students have the flexibility to tailor their modular study programs to their interests and career goals. The duration of professional study is 1 year. The first semester focuses on developing design thinking and digital skills, exploring ways to create and implement visual design and interactive animation, and discussing cultural theories about digital media. Major courses include graphic design and 3D modeling, interactive and immersive media, moving images and animation, user interfaces and user experience. The second semester shifts focus to dynamic and data-driven Web applications, game design studios, immersive experiences, interdisciplinary design, and interactive media design, with major courses in augmented and virtual reality, web and mobile applications, creative coding, data visualization, digital art installations, and more. Graduate projects cover areas such as creative coding, 3D modeling, games, moving graphics, UI and UX design, data visualization, augmented and virtual reality, mobile applications, interactive installations, and critical analysis of the impact of design on these uses.\[10\]

In summary, the school’s interactive Technology curriculum includes: creative coding, interactive media design, virtual and augmented reality, game development, application development, web and mobile applications, and digital art installations.

3.2.2 Digital Design at De Montfort University in UK

The university does not major in digital media art for undergraduates, and similar majors include graphic design, animation, communication art, media production, game art, game programming, etc., while graduate students specialize in digital design (interaction design, multimedia design) and creative technology.

The Digital Design major develops students’ practical skills around digital design methods, exploring and embracing digital and design-related technologies in their field. From concept development and prototyping to technical implementation, the Project Management course will support an in-depth understanding of every stage of the creative production process. It focuses on user experience (UX) and user interface (UI) design, mobile application design, e-learning, virtual and augmented reality, 2D and 3D animation, 3D digital printing, digital display and projection design, visual and visual effects, interactive kiosks and device design, wearables and smart clothing, etc. The Creative Digital Media Design course looks at the need for a critical assessment of current digital media technologies, examining relevant creative and management processes and production techniques. In addition to on-site design projects, you will learn about technology, project management, digital design method theory, concept development, prototyping and production techniques, and design and application testing.\[11\]

In summary, the interactive technology courses for the digital design major include: mobile application design, virtual and augmented reality, interactive kiosk and device design, creative digital media design, etc. Interactive technology courses for the Creative Technology major include: Artificial intelligence programming, creative coding, digital technologies for art practice, applied computational intelligence, modern programming techniques, and cross-media practice.
3.3 Comparative analysis

Through the above comparative study of similar majors in universities at home and abroad, it can be concluded that:

1. Foreign universities usually do not set up digital media art majors for undergraduates, but graphic design, animation, game art, game programming, media production, cross-media art, etc., and design and digital media, digital design (interactive design, multimedia design) and creative technology majors for postgraduate students.

2. Many colleges and universities in China have undergraduate majors of digital media art, but the emphasis is different. Some of them are transformed from art majors and take the original majors as the main direction, such as animation.

3. The interactive technology course groups of all colleges and universities basically include creative programming, interactive programming, virtual reality design, mobile application development, cross-media design practice, etc. Majors that attach importance to interactive device design have courses closely related to the device, such as computer hardware foundation, automation control foundation, sensor interaction technology and motor servo control foundation, which reflects stronger interdisciplinary characteristics under the background of new engineering.

4 Analysis of talent demand in domestic enterprises

With the emergence of new digital technologies such as mobile Internet, big data, virtual reality and artificial intelligence, The production mode, media form, communication mode, consumption mode and audience's aesthetic taste in the fields of animation, games and digital media are undergoing drastic changes. Some traditional media are rapidly developing in the direction of digitization, mobile and virtualization, and the cultural and creative industry is undergoing a profound transformation. Digital creative products have become the main content of the mass daily cultural consumption. The development of digital media has also become one of the most promising sunrise industries in the 21st century. China's digital media industry is developing rapidly, and the rapid development of the industry needs a lot of professional talents.

According to SMIA's first high-end digital media talent double selection meeting, China's digital media field talent gap is huge, and there is a serious shortage of composite talents with both technology and art, which has become a bottleneck problem restricting the development of enterprises. Therefore, digital media-related talents have been included in the national plan and listed as a scarce talent project by the National Scarce Talent Office.

Through the survey, we found that enterprises' demand for talents has the following characteristics:

1. Talent demand continues to develop to a high level and to application-oriented talents. Creative talents in addition to mastering technology, but also have a certain creative thinking and keen on the market, can understand the appreciation of the current target consumer groups, according to this orientation to create the majority of people like the story and character. For the technical ability requirements of production talents, students should not only have a comprehensive understanding of the breadth of knowledge related to digital media, but also achieve technical excellence in one field and have the depth of expertise in the work.

2. The requirement for talents with compound ability is getting higher and higher. At present, digital media art constantly draws on the strengths of many industries such as traditional art, digital technology and media, and dynamically absorbs and integrates elements of social culture, science and technology and daily life from a new perspective, showing typical cross-disciplinary characteristics, showing the development trend of integrated innovation, multi-point breakthrough and cross-integration. In addition to requiring practitioners to have skilled operational skills, it also requires practitioners to have creative thinking, data thinking and cross-border thinking ability, which is the core competitiveness of future digital media talents.

3. The digital media industry is more deeply integrated with traditional culture. The use of new media and new technologies to deconstruct and reconstruct traditional culture and art, and the integration of rich traditional cultural resources with digital and interactive new media technologies have become a new trend in the development of digital media art. Through the use of holographic imaging, human-computer interaction, dynamic capture and other technologies to present opera works, the audience can not only interact with the protagonist, but also personalize the characters in the drama and experience the legendary plot.

4. The requirements of enterprises on the knowledge structure of employees are comprehensive and diverse. In the survey, designers are required to have the basic ability of abstract analysis and independent problem solving, be skilled in software operation, have a strong sense of responsibility and discipline, have a mature value orientation and career planning, and have the ability to bear hardships and withstand pressure. This requires universities to train students with a wide range of knowledge, open thinking, innovative consciousness, knowledge and skills diversification integration.

Therefore, the current demand for digital media art talents is mainly reflected in the large demand for total talents, the shortage of high-level composite application talents reserve, and the diversity and complexity of talent structure. Therefore, the training direction of digital media art professionals is oriented towards digital creative industry, to train relevant enterprises in the field of digital media with a high level of basic cultural and artistic theory, digital art literacy and digital media design skills, and be able to control the most advanced digital media technology to realize digital creativity. At the same time have the ability of sustainable development and sound personality of compound advanced applied talents.
5 Conclusion

In summary, considering the overall credit hours, this paper believes that the interactive technology course group system for digital media art majors can be improved from the following aspects:

1. Appropriately add more comprehensive and concentrated practical links that focus on project practice and require the linkage of two or more courses, lasting one or two weeks, from material production to resource integration to achieve interactive functions, and complete a relatively complete digital media work.

2. The depth and breadth of the course content need to be further optimized. Under the new engineering, not only the construction of course groups, but also the capacity and depth of a single course will be enlarged. The organic interrelation between courses also requires to strengthen the organic interrelation between old and new knowledge, primary and secondary knowledge, core knowledge and adjacent knowledge in a single course. The breadth and depth of a course determine its role and value in the art and engineering integration training plan.

3. At present, there are relatively few installation works in Shanghai universities, and courses such as the application practice of sensors can be increased. In addition, in the academic system can try to master integration. Under the background of new engineering, art and technology of this major are integrated simultaneously, and the knowledge breadth, depth and difficulty of cross-border learning have increased [13], which determines that the four-year undergraduate period is too tight, and the method of linking the undergraduate and postgraduate studies can be adopted to try to solve this problem. Design an integrated teaching plan from bachelor to master, solve the cross-boundary integration problem by design before technology, and maintain the corresponding continuity of practical projects and teachers.

References


