Practical Significance and Methods of Training Multidisciplinary Practical Talents in the Vr Field

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Abstract: It is the responsibility of today's universities to educate and train top talents for the Virtual Reality (VR) field. In Chinese universities, the training focus should be in the application field. VR is a multidisciplinary subject that integrates the three professional fields of design, motion image and technical development. Therefore, it is difficult to rely on specialists from one single major for the teaching and researching. This research group, formed by the teachers with backgrounds in Digital Media, Broadcasting and Computer Science, uses the multidisciplinary approach to develop series of VR courses. The experience and methods accumulated from the teaching, not only can be applied to the study of virtual reality, but can also be an inspiration to other majors in the way of training highly practical and innovative talents.

1. Introduction

In recent years, whether it is judging from the development trend of the world's fourth industrial revolution, or the support of national policies and the investment direction of giant companies, or the development speed of advanced information and communication technologies (5G, IoT), it is not difficult to judge the virtual reality (the term in the paper includes augmented reality, and mixed reality, hereinafter generally referred to as VR) will enter a stage of rapid development. The Ministry of Industry and Information Technology of the People's Republic of China once issued a document saying that China has missed the express of two technological reforms (the first is the Internet, and the second is the mobile Internet).VR has brought out the third wave of technology, and it is hoped that China can grasp this opportunity earlier. It is known to all that China has applied digital technology to the most in-depth and extensive applications. With the advent of the 5G era, the need for talents in the VR application market is bound to rise sharply. Then, the corresponding talent training work should be put on the agenda, and this is also an inescapable historical responsibility of Chinese colleges and universities.

2. Practical Significance of Training Vr Talents

2.1 The Role That Education Should Play in the Wave of Technological Reforms

In 2007, iPhone of Apple Inc. appeared on the market, and it introduced the mobile Internet era into people's daily life. Subsequently, the public has the opportunity to access the professional concepts of interactive design and user experience. However, in the face of a huge consumer market, there were few interactive design talents in China. Because domestic universities had not opened relevant majors yet at that time. And there was no systematic teaching system. Therefore, the skills of professional talents are basically obtained by means of personal exploration. The advantage of this kind of growth method is that the production speed is fast, and almost any new products and concepts in the United States can be quickly imitated. But unfortunately, there are shortcomings in the way that these companies survive. At present, there are only a few successful cases, such as BAT, NetEase, and Xiaomi. Most of the similar companies have transformed or closed down. It can be seen that products completed rapidly by imitating lack theoretical foundation and creativity. However, even so, talents in the interactive design market were still behind the requirement at that time. It has to come down to the out-dated college and university education, which does not keep

pace with the times, letting alone facing the future. In the 1960s, European and American countries had already started higher professional education of interactive design. When the era of the Internet and the mobile Internet came, talents of this discipline quickly played a role in helping the entire industry advance and develop rapidly, occupying almost all forefront applications in all industries. However, the real interactive design education in China has only developed for less than 10 years. Although there are still market needs, the mobile Internet is no longer developing rapidly, and the opportunities are not as many as before. However, in the new international wave brought by VR technology, colleges and universities in China shall take the initiative to take the responsibility of "backstop", researching new technologies on the one hand, while training talents quickly for the industry on the other hand, especially practical innovative talents [1].

2.2 Market Demand Analysis of Domestic Vr Talents

According to the global VR talent supply and demand report released by LinkedIn (LinkedIn, a global workplace social platform) in 2018, China's VR talent gap will reach 800,000, and the talent demand ranks second in the world, second only to the United States. In fact, it is difficult for people to verify the true situation of this analytical data, especially the VR industry is still in a "cooling-off period" that there are few profitable companies and many of which survive with the support of government; while in terms of hardware technology, platform system or engine software technology, there are currently few products in China that can stand on the international stage. We believe that the basic structure of domestic VR practitioners in the future will be the same like that of smartphones. Standards for hardware, operating systems, and engines can only be set by a few large manufacturers. More talent needs, or the part that most domestic industries and institutions have opportunities to be involved in is still application and content, which are the best that we are at. Therefore, Chinese colleges and universities should focus on the training of practical talents in the VR field [2].

2.3 High Threshold for Vr Talents

However, even for the content, the professional threshold of VR is still higher than that of mobile APP. Firstly, there will be a shift in the visual dimension, shifting from 2D to 3D, or even 4D (because VR can involve the five senses of human beings). It is said that the world that ants see is 2D. Imagine how much challenge it will bear to shift from 2D visual cognition to 3D. Whether a visual designer or a programming developer, it is impossible to change from the habitual 2D plane interaction and thinking mode to the 3D space interaction and thinking mode. Just like a graphic designer who suddenly needs to design in a 3D media, in addition to static visual images, he still has to study the balance of gravity, dynamic motion and interactive experience. And VR is an immersive experience that is completely different from the 2D interactive mode on the mobile phone. We believe that VR will open up a new career, such as immersive designers. Secondly, the professional structure of talents will change. For visual majors, designers must have the design capability of 3D images, and they must also understand basic animation principles and interactive experience design; and for programmers, they not only must master one or two engine technologies, but also must learn certain 3D image design and interactive design. These necessary requirements also raise the threshold of VR, which can even be said to be much higher than those of all the design categories in the current IT Internet field.

2.4 Multidisciplinary Training is an Effective Way to Train Creativity

General Secretary Jinping Xi pointed out that innovative is a keyword in finding talents in innovative practice, training talents in innovative activities, and condensing talents in innovative career[3]. Innovation must be generated in practice, and innovation without practice is an unconstrained idea that is hard to implement. And those masters with great innovations and true creativity all have diversified ways of thinking. They have a variety of perspectives to look at things and ways to solve problems, and they know how to truly serve the human society with technology. The requirements for practical talents of VR happen to be diversified and compound. VR integrates the three professional disciplines of design, motion image and technical development, and the ways

of thinking of each discipline is quite different, with obvious advantages and disadvantages. Students of design and motion image majors emphasize on affective thinking, and are full of imagination. However, they lack systematicness and logicality when doing things; students of the programming major are just the opposite, who emphasize on rational thinking and do things with logicality. However, they are not good at words, and they tend to focus too much on technology while neglecting application. And their aesthetic taste is also poor. However, every way of thinking is a way to solve problems. Through VR, they can get together to communicate and share their respective ways of thinking and solve problems cooperatively. During the cooperation process, powerful creativity is generated, since creativity is the capability to solve problems with multiple ways of thinking. For the VR industry, logical artists and tasteful programmers have become one of the standards of multidisciplinary and compound talents.

3. Practice of Training Talents

In the autumn of 2017, the research group officially started the professional teaching of VR. During the course research and exploration process, the teachers have explored some effective methods while encountering some problems that hind the progress. It is hoped that the content of this part can inspire colleagues at colleges and universities.

3.1 Course Setting

The VR courses of the university are offered to three secondary colleges and schools of Art Design, Humanities and Journalism and Informatics at the same time with the optional property. It focuses on the juniors and the training period is a whole school year. The content of the first semester focuses on basic training, including two courses of *VR & Media Art* and *Game Engine*. *VR & Media* Art is a theoretical foundation course for students of all majors, and it mainly explains the background theoretical knowledge of VR technology, and cooperates through the mixed team of different majors to make a VR product idea into a Demo. The students' communication and expression capabilities are practiced during the process of finishing the assignment. *Game Engine* is a small-class technical course respectively offered according to the role characteristics of different majors in the team. For example, classes of the design major mainly study the visual design part of the engine software; classes of the motion image major mainly study the engine movie part; and classes of the development major mainly study the content of interactive development. In the second semester, only one course of *Virtual Media Product Creation* is offered. This course takes scientific research subjects or commercial projects as the main content and a VR product that can be implemented shall be developed in teams since the beginning of the school. At the same time, in combination with some knowledge and content of innovation and entrepreneurship, students' awareness of products will be trained, namely, all research and development shall be based on reasonable application scenarios.

3.2 Student Recruitment

The students of VR course come from three secondary colleges and schools, namely, Art Design, Humanities and Journalism and Informatics. And they are mainly composed of seven majors of digital media, animation, environmental art, product design, radio and television, computer science and software engineering. Due to the high requirements of VR for professional technology, students need to have a certain professional foundation. For example, art design students need to have some design thinking and image design capabilities, and they need to be proficient in 2D design software such as Adobe Photoshop and Illustrator, as well as 3D animation software like Maya, Cinema4D or 3DMax. TV imaging students need to have the lens language and camera editing capabilities, and they need to be proficient in some video effects and editing software, such as Adobe after Effects, and Premiere. Programming and technical development students need to have basic language programming capabilities, such as C language and Javascript. The above are the preconditions for registration for VR courses. Therefore, the recruitment is mainly among juniors and seniors. After that, a limited number of students will be chosen from the registered students according to certain

conditions and requirements, for example, according to the major proportion of 2 students of (design) + 2 students of (motion image) + 3 students of (development), 8 groups of students will be chosen, with a total number of 56. After the study of a semester, students of the second semester will be chosen according to the performance of the students in the previous course. And the recruitment number of the second semester is decided by the number and content of the scientific research subjects. For example, there are 3 subjects in a semester, and 5-7 students are needed to finish one subject averagely, then the recruitment number of the "second semester" will be 15-21. Later, number of students required for each major will be set according to the specific subject content to make the major proportion of the team more reasonable.

3.3 Course Development

First of all, all students that choose the course of *VR & Media Art* are required to study *Game Engine* to promote effective cooperation between different majors. Otherwise, if someone in the team does not understand the core technology, he will contribute nothing except for giving some creative ideas. This will make the students feel uninvolved, and may eventually give up learning VR.

Secondly, all teachers of the research group are required to participate in the course teaching, and share their expertise and innovative thinking in their own fields. Especially in the course of the second semester, mutual learning among different majors will be adopted to enhance mutual understanding between students of different majors. For example, design teachers will teach students of the development major how to design, whereas computer teachers will teach design students how to write code. This does not aim to train computer students into designers, but to enable them to more effectively collaborate with design students, deepen their understanding of the language and way of thinking, and to make the product development work more smoothly.

At the end of the school year, the research group will organize an academic exchange in the industry. The activity will invite companies and colleges and universities from the VR industry to jointly share their work experience or teaching experience in the past year. At the same time, students' creation of the semester (final assignment) will also be reviewed and scored by experts from industry companies. And the purpose is to make companies and colleges and universities to learn more about each other's needs, thus improving cooperation mechanism to make the talent training and employment work to be carried out more smoothly.

4. Problems Met during the Teaching Process

4.1 Difficulties in Course Arrangement

From the perspective of the actual situation of colleges and universities in China, the communication and cooperation between majors and colleges and schools are very limited. One is due to some obstacles brought by spatial positions of different units and the other important reason is difficulties in course arrangement. Different majors have different course arrangements (for example, the design major usually have arrangement four classes together, while other majors usually arrange two classes together), while students have different course schedules (because they have different cultural classes). Therefore, the time for the uniform arrangement of courses is limited, and it shall be cooperated, analyzed and adjusted by many parties. For example, the evening class time. However, this also limits the effective study time of students. And although most universities encourage multidisciplinary cooperation, no effective mechanism or organization has been formed, and works such as course arrangement or adjustment of talent training programs often depends on the personal efforts of teachers to communicate with various departments.

4.2 Limited Class Hours

Each major has its own talent training program, and the extra professional credits are very limited. Therefore, time left for VR courses will not be too much. This not only limits many assumptions of teaching content and methods, for example, VR professional intensive courses

cannot be offered, but also affects the quality of students' assignment. In the end, some compromises have to be adopted and some teaching experience has to be sacrificed. And this is still a big obstacle in VR teaching practice.

4.3 Weak Foundation

Although most of the VR course students are juniors, they still lack some basic professional trainings, because there are no basic courses for them to learn during the first two years of their study, such as Design *Thinking*, *Image Language* and *Creative Programming*. If these courses can be compulsory courses for students of all majors, it will be of great help for students' learning of VR professional courses or other professional courses relevant to innovation and entrepreneurship.

4.4 Lack of Communication

For multidisciplinary talents, one of the most important capabilities is communication. Multidisciplinary professional fields like VR, it is almost impossible to have the situation of working alone, and it is bound to collaborate with students of different majors and different ways of thinking. Unfortunately, the training of students' communication and expression is not enough, and communication even becomes an important factor to hinder the effective teaching. And teachers come from different majors and disciplines also need to take the initiative to communicate and explore experience, and some people are needed to organize the management while some others are needed to cooperate the work. And everyone shall be willing to work hand in hand for the same goal.

5. Conclusion

Multidisciplinary teaching can enable students of different majors to interact and cooperate, and this is an invaluable learning experience that can effectively train their capabilities to cooperate with people of different ways of thinking. This is a basic requirement for talents needed by the society, and it is also the most real working situation for students after graduation. However, even if everyone realizes the value of compound talents and the importance of training multidisciplinary talents, there are still many difficulties when actually implementing it. Especially for the basic application teaching work of emerging technology subjects like VR, there is almost no precedent to follow. However, it is just these difficulties that strengthen the faith of teachers and students to move forward, because the exploration road of education and science is the path of a few "pathfinders" who finally have the opportunity to become pioneers in the field.

The 5G era is increasingly closer, and VR will certainly become the mainstream technology and media in the future. And its teaching must not copy the traditional ideas, but needs a method and mode that suits the future people. The mainstream audience in the future is those who are born after 1990s and 2000s, who are more focused on the learning experience than any previous generation, and more easily to accept new things. In addition, they are more eager to truly communicate with the world around them. What they need is the patient guidance of the teachers to light the fire for them to inspire their enthusiasm for learning and life. In the future, the world needs students to create while proposing newer and higher requirements for college and university education: Training compound and innovative talents who are willing to communicate and share with diversified ways of thinking.

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