Study on the Innovative Practical Teaching System of Game Animation Specialty

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Abstract. The quality of talent training in colleges is closely related with the practical teaching. This paper perform a study on the practical teaching system of game animation specialty, and put forward a multi-level and diversified practical teaching mode, which is based on the integration of basic experiment, comprehensive training, engineering application, and innovation research. On the one hand, we establish professional laboratories and practice bases, on the other hand, we reform the practical teaching system, and indicate that the curriculum experimental teaching is the basis, the course design and graduation project is the cores, and the off-campus internship is the supplements. The proposed practical teaching system combine the in-class practical teaching with the extracurricular open project training, at the same time, we introduce the students’ scientific and technological competition as the driving force and effect checking tool, encourage students to participate in teachers' scientific research or carry out independent scientific and technological innovation. Implement results show that this multi-level and diversified practical teaching system inspire students' learning interest and cultivate students' innovation ability, which is conducive to improve the quality of talent training.

Introduction

Game animation technology is based on the digital, network and information technologies. Game animation industry covers graphics, animation, sound, multimedia and art design, et al., it is a fusion and sublimation of technology and art, and gradually become to a sunrise industry. Nowadays, game animation industry not only links the traditional culture and human civilization, but also represents a burst of youth and vitality [1]. It can be expected, when the traditional art is gradually marginalized, the game animation will gradually lead the trend of popular culture [2].

With the development of game animation industry, how to cultivate talents that possessing both animation creative ability and technical development ability is the key problem. In general, innovative talents should have a relatively perfect knowledge structure, innovative sense and practical ability. The cultivation of innovative ability is the key to the cultivation of innovative talents, which is also the core content of college education. Students’ innovative ability mainly comes from practical ability, practice is the basis of innovation.

Our college establish the game animation specialty in 2004. In recent years, we have been actively involved in the development of regional game animation industry, cultivate and transport a large number of high-quality graduates, these graduates made great efforts to promote the healthy and rapid development of regional game animation industry. The game animation specialty in our college is implemented by revolving around the cultivation of innovative talents. In order to guarantee the graduates possessing the perfect knowledge structure, we reform the corresponding curriculum system. At the same time, in order to guarantee the graduates possessing the innovative sense and ability, we reform the practical teaching system, and put forward a set of multi-level and diversified practical teaching mode [3], which is based on the coordination between in-class and extracurricular, and the integration of basic experiment, comprehensive training, engineering application, and innovation research.
Reform of Practical Teaching System

As a new discipline, game animation specialty emerged in a short time in China, its practical teaching mode is still in an exploratory stage. In many colleges, the practical teaching only belongs to the supplement and attachment of the theory teaching, the content of the practical teaching is mainly based on the confirmatory experiments and simulation training, while seldom associate with the practical application, thus leading to lack of applicability, comprehensiveness and innovativeness. The production of game is a complex and integrated process, which requires high sense of innovation. Obviously, just through the traditional practical teaching mode is hard to satisfy the enterprises’ requirements. To this end, we reform the professional training objectives and practical teaching system of the game animation specialty. On the one hand, we indicate that the cultivate objective of game animation specialty is the compound talents with the originality designing ability and application development ability. On the other hand, we emphasize the status and role of practical teaching, focus on adopting various forms of practice patterns, such as experiment, internship, course design and graduation project, etc., and construct a set of multi-level, diversified practical teaching system. Aiming to the quality and capability requirements of the compound talents, we put forward a new practical teaching mode, which make the cultivation of innovation ability and application development ability as the principle lines, and include multiple levels and multiple modules [4]. According to the teaching process and game development flow, we divide the practical teaching system into four levels: basic experiment, comprehensive training, engineering application and innovation research. (As shown in Figure 1)

Figure 1. Framework of the Practical Teaching System.
Level 1: Basic Experiment

Basic experiment practical teaching platform aims to cultivate students’ basic design and development capabilities, these capabilities are indispensable when they engaged in comprehensive game project development. The basic experiment includes three types: 1) Game planning experiments. 2) Game modeling experiments, such as role and props modeling, scene modeling, animation and special effects modeling, etc. 3) Basic game programming experiments. The game planning experiments is to cultivate students’ creative thinking, so that they can transform the ideas in the brain into game planning books. The game modeling experiments is to cultivate students' model creation ability, so that they can better understand all kinds of models and scenes in the game. The basic game programming experiments is to cultivate students’ programming thought and programming skills. All these basic experiments exercise students' practical hands-on ability and preliminary sense of innovation.

Level 2: Comprehensive Training

Comprehensive training practical teaching platform provides a series of comprehensive projects, such as “2D game design”, “3D game design”, “mobile game design” and “game MOD design”, etc. When the students have finished the basic experiment, they can enter into this level. By virtue of thoughts and methods of software engineering, we adopt team software process (TSP) in the process of development, and emphasize the procedure assessment and management. On the one hand, we cultivate students’ comprehensive practical abilities; On the other hand, we cultivate students’ team cooperation spirits.

Level 3: Engineering Application

Engineering application practical teaching platform mainly utilizes all kinds of professional laboratories and practice bases as teaching resources. With the goal of finishing the graduation design, we instruct students to develop commercial game animation products. In this level, we adopt the "college-enterprise cooperation" pattern and other means to improve students' engineering application ability, so as to meet the enterprises’ talent requirements.

Level 4: Innovation Research

Innovative research practical teaching platform is based on the “extracurricular science and technology innovation fund”, "College students’ startup incubation project" and various "College students’ science and technology competition", etc. The goal is to provide a service platform to support the innovative research. Through the declaration of innovative projects, students can obtain a preliminary research and innovation ability, cultivate rigorous and realistic scientific attitude, unity and cooperation of the work style, and truth-seeking scientific spirit.

Construction of Experimental Platform

The laboratories are indispensable places for cultivating students’ practical innovative ability, they are also important places for the theoretical and experimental teaching research. The professional laboratories provide a strong guarantee for the innovative practice of teachers and students.

In recent years, in order to better reform practical teaching system, we invest plenty of expenditure to establish the professional game animation application laboratories and innovative practice bases, these laboratories emphasize the basic principles of comprehensive, research-oriented and openness, which made a huge contribution to the cultivation of innovative talents and the development of game animation specialty. The established professional laboratories and innovative practice bases equipped advanced devices and management platform, and provided places that conducive to improve students' scientific research and engineering practice ability, further conducive to cultivate students' innovation ability.

In our college, the professional game animation experimental platform consists of four laboratories: 1) the basic game development laboratory, 2) the basic animation laboratory, 3) the
digital media technology laboratory, and 4) the virtual reality laboratory. The basic game development laboratory and the basic animation laboratory are the professional basic laboratories, the digital media technology laboratory and the virtual reality laboratories are the professional direction laboratories. On the one hand, the construction of these laboratories is fully compatible with the teaching plan and the corresponding curriculum architecture. At the same time, we strengthen the open experiments, design experiments, comprehensive experiments, and innovative experiments to serve the college students’ science and technology competition. The hardware condition of the laboratories promote students to participate in scientific research and innovation activities as early as possible, and better support the cultivation of students’ innovative spirit and innovative ability. On the other hand, open experiments have been proved as an effective teaching mode for cultivating innovative talents. It is a continuation, expansion and deepening of classroom teaching and in-class experiment. The implementation of open experiments need a scientific open management, this kind of open management is also the basis and assurance of constructing the experimental teaching system by integrating the in-class and extracurricular. Our professional laboratories are opened for all students, including laboratory resources, contents and times. In order to satisfy these open forms, we have drawn up a set of effective management institutions and norms, such as the discipline of laboratory opening, the flow of online booking, and other relevant aspects. Thus the students have opportunities to conduct the relevant extracurricular open experiments, participate in scientific competitions, and join the teachers’ research projects, etc.

Implement of Practical Teaching System

According to the characteristics of the practical teaching platform and the formation rules of students' innovation ability, we divide four-year undergraduate time into three stages. In each stage, we adopt a step-by-step practical teaching process to perform all levels of the practical teaching system.

Stage 1: 1 to 3 Semesters

This stage is mainly to carry out the basic experiment. In this stage, the target is to cultivate students' professional literacy and innovative thought, so we adopt the combination of lectures and trainings, more practice, less teaching strategies, etc., and carry out the experimental projects in the basic experiment level step by step. The concrete procedures are shown below:

Firstly, we strengthen the specialty awareness cultivation. Aiming to the freshmen, we introduce the specialty circumstance and industry development by organizing thematic reports, associate meeting of teachers and students, and experiences exchange meetings of different grade students, etc., so that the freshmen can quickly understand the basic tasks and development direction of the game animation specialty. At the same time, we provide the information about various innovative practical platform and practical training projects. As a traditional practical project, every year, we organize the freshmen to visit the “National Game Recreational Industry Base”, which let the freshmen understand the latest achievements of the game animation industry, the development process of game products, and stimulate their interest in professional learning.

Secondly, in the practical teaching process, we arrange all the basic experiment projects systematically, in order to do with the theory curriculums synchronized and connective. For example, when we teach the “Game Architecture Design” course, we set up the "Game Planning Experiment" simultaneously, so that the students can learn the theory, and perform plan and design exercises simultaneously, the ultimate target is to complete a game plan book. Another example is when we teach the “Digital Animation Design” course, we set up various “Modeling Creation Experiments” simultaneously, with the help of Photoshop, 3DS Max, Maya and other modeling tools, we teach students to create the role and scene models, thus help them to achieve the application of the theoretical knowledge.
Stage 2: 3 to 6 Semesters

After three semesters of the basic experiment training, students have formed a good professional literacy, some students also possess the ability to carry out the independent application project, a small part of students even possess the potential to do innovative research. To this end, the way of this stage’s practical teaching is people-oriented, and implement according to students’ comprehensive develop abilities. Concretely, we adopt a classified teaching mode, for example, when we are performing the “2D Game Comprehensive Training” project, we choose the outstanding student teams to develop the game engine platform, because the game engine layer is more complex than the game application layer. While for the other students, we teach them to develop a specified 2D game product based on the game engine platform. On the one hand, this mode reflects the industry division of labor, on the other hand, it reflects our cultivate target of people-oriented. Another example is when we are performing the “3D Game Comprehensive Training” project, by using 3D game development engines, such as Unity, OGRE or UnReal, etc., we lead the outstanding student teams to build a 3D game engine platform, and assign different difficulty tasks to different levels of students, thus the excellent students can directly take part in the SDK and game engine development, while the other students can start to develop from the script layer.

Aiming to the construction of development team, we promote the role exchange, so that each student has chance for different role. When they complete the final works, they still need to demonstrate their works, the excellent works can be recommended to participate in the science and technology competition, or to apply for the scientific and technological innovation fund. The winning works will assign the professional mentor to lead the student team for further development and application.

Stage 3: 6 to 8 Semesters

At this stage, students have entered the final stage before graduated. After 5 to 6 semesters of continuous practice, students have possessed independent design and development abilities, and team cooperative spirit. To this end, the goal of this stage’s practical teaching is to finish the graduation project. By taking into account students’ employment orientations, we make full use of various intramural and external-campus practical teaching resources to carry out engineering application practical teaching. Concretely, we open the intramural laboratories, assign professional mentors, and combine with teachers' scientific research projects. At the same time, we conduct extensive cooperation with the relevant enterprises, and explore various cooperation ways. For example, we perform joint development with game enterprises, and select teachers and outstanding students to participate in the enterprise projects. After the completion of the game products, students can submit as graduation projects, the excellent works can also participate in competitions, apply for patents, and thus form a win-win situation.

Effect of Implementation

Through continuous exploration and extraction, the advantages of our practical teaching system have been fully proved. This practical teaching system takes into account both students' personal development and specialty particular requirements, the hierarchical and classified implementation fully reflects the superiority of innovative practical teaching, shows strong vitality, and provide a strong guarantee for the cultivation of high-quality game talents.

First of all, students' practical ability has improved significantly, and students’ innovation atmosphere is more and more strong. Our college has established “Game Animation Association”, now the number of members is more than 400, and many students have won the awards in domestic competitions. For example, a student team independently developed a Chinese input method used on the GBA game platform, and obtained a personal patent. Another student team developed a 3D action adventure game and won the national second prize in the “2012 national three-dimensional digital innovation design competition”, the developed game works attract enterprises’ eyes and have been converted to commercial application. In 2014, 14 student projects are sponsored by the
"Extracurricular Science and Technology Innovation Fund". Secondly, the employment quality of graduates also significantly improved. Employers generally reflect that our graduates have strong hands-on ability and innovation ability. In recent years, the employment quality of graduates has been a leader in our college (employment rate keeps more than 98%), and the pay level of the game animation specialty graduates is the highest.

The construction of the practical teaching system not only provides a practical environment for the teachers and students, but also promotes the cooperation and exchange between the colleges and the enterprises. In particular, the college-enterprise cooperation mode open up a new world for the scientific and technological innovation and talent training, and further promote the construction of the practical teaching platform, make it more suitable for our talent training target [5]. For example, we have established various college-enterprise cooperation platform and research centers with the regional game enterprises. With the help of enterprises funding and support, more teachers and students have the opportunity to participate in scientific and technological innovation.

Conclusion

The proposed practical teaching system of game animation specialty has completely changed the traditional practical teaching mode, so as to make the practical teaching more scientific, complete and systematic. Along with the further improvement of practical teaching team, management and incentive mechanisms, assessment mechanisms and other supporting measures, we believe that the proposed practical teaching system will further promote the cultivation of innovative high-quality talents, will further promote the education reform more deeply in our college.

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