Building Multi-level Practice Teaching System for Digital Media Major

Xiao-hong SHEN¹²,*, Li LI¹, Yun-feng ZHANG¹² and Xiu-hua JI¹

¹School of Computer Science and Technology, Shandong University of Finance and Economics, Jinan 250014, China
²Shandong Provincial Key Laboratory of Digital Media Technology, Shandong University of Finance and Economics, Jinan 250014, China
*Corresponding author

Keywords: Practice teaching, Digital media, Teaching reform, Multi level.

Abstract. The paper analyzes the problems of current practice teaching of digital media major and presents a multi-level practice teaching system that includes the specialized practice skill training level, practical ability level for innovative application and practical ability level for innovative scientific research. The multi-level practice teaching system can offer the practical training of different direction according to the degree requirement, career requirement and research requirement, which can realize the diversified and individualized practical training purpose.

Introduction

In recent years, the digital media industry which uses the technologies, such as Internet and wireless communications, as the transmission carrier and takes the digital media content as the core, has obtained much attention and got a rapid worldwide development [1]. Chinese government has also promulgated a series of policies to accelerate the development of digital media industry. Accordingly, colleges and universities in China began to build the digital media relevant majors to provide the engineers and technicians who specialize in the digital media professional knowledge to solve the shortage of qualified personnel. In general, digital media relevant majors are subdivided into digital media technology major and digital media art major. Here, digital media major is used for simplicity.

As a multidisciplinary research field, digital media field include digital games, digital animation, digital creative design, digital audio and video, digital publishing and other aspects, in which digital games and digital animation are two important core areas [2]. Therefore, practical explore of experimental teaching plays a very important role in the teaching system of digital media major [3], which is helpful for students to train and develop their independent thinking and innovation abilities. In this paper, we discuss the construction of the effective practice teaching system for digital media major and describe its implementation based on the Provincial Experimental Teaching Demonstrating Center in detail.

Analysis of Current Practice Teaching in Digital Media Major

Practice teaching is a key step in the teaching system of digital media major, because it can train and improve not only the operating ability but also the innovative thinking and application ability [4]. A certain practice teaching experience has been gained, while Shandong Provincial Experimental Teaching Demonstrating Center of Digital Media located in Shandong University of Finance and Economics has been constructed on the basis of Shandong Provincial Key Laboratory of Digital Media Technology and Shandong Provincial Sino-US International Cooperation Research Center of Digital Media. However, there are still some problems in the practice teaching of digital media major [5,6].
(1) As a high practice requirement, the current practice teaching system mainly depends on the experiment courses. There was no diversity in this training way, so the training quality needs to be improved.

(2) Most of experiments in practice teaching system are for verification and demonstration. So many comprehensive cases from actual design project should be selected to add to practice teaching system to improve the ability to solve practical problems.

(3) It is known that the knowledge and technology of digital media field update rapidly, which means that some practice teaching contents are lagging behind and need to update regularly.

(4) It is easy to become pure engineering training and lack theoretical guidance, if the practice ability in the talent training only depends on the short-term intensive training [7].

(5) Most of the training ways of the practice teaching focus on the operation, but lack the capabilities of complete designing and developing a whole digital media project [8]. In other words, it is difficult to use the theory, technology and operation to design and implement a digital media project.

Therefore, it is necessary to reform the practice teaching system for digital media major to build the pluralistic, individualized and systematic training pattern so that the practice teaching can provide different types and different levels of the practical training in different periods for different student.

Construction of Multi-level Practice Teaching System

Multi-level Framework for Practice Teaching System

To realize the diversified and individualized practical training, we take the digital media major in Shandong University of Finance and Economics as an example to design a multi-level framework for the practice teaching system based on the Shandong Provincial Experimental Teaching Demonstrating Center of Digital Media. The multi-level framework of the practice teaching system is shown in Figure 1.

![Multi-level Framework of the Practice Teaching System for Digital Media Major](image)

Figure 1. Multi-level Framework of the Practice Teaching System for Digital Media Major

In the multi-level practice teaching system, the cultivating process of the practice teaching can be made up of three sections which is shown in the dotted box on the right side in Figure 1. We call them specialized practice skills, practical ability for innovative application and practical ability for innovative scientific research, from the low level to high level. Among them, the specialized practice skills refer to the experimental operating skills that a person engaged in the digital media industry should have. These skills are mainly obtained by the experimental curriculum within the specialty
training program, such as compulsory courses, elective courses, curriculum design and specialized integrated experiments. The practical ability for innovative application refers to the ability that students could apply to design and develop the engineering projects innovatively. So it mostly benefits those employment-oriented undergraduates and ultimately depends on the demands of the digital media industry. The practical ability of innovative scientific research focuses on the practical ability to perform a scientific research innovation, which aims to the high-end top-notch innovative talents. Therefore, the multi-level design for the practice teaching system can provide different practice levels according to the student's learning condition, specialized interest and professional plan, which reflects the real student-center spirit. So performing the above three sections of the practice teaching step by step can improve the ability of creativity and practice of undergraduates, and finally realize the goal of innovative professional talents training for digital media major.

Following the multi-level framework, we integrate the existing laboratories resources and classify them into five categories: specialized basic laboratories, specialized integrated laboratories for digital media technology, specialized integrated laboratories for digital media art, innovative laboratories for engineering project and innovative laboratories for scientific research. Among them, the former three categories are used to cultivate the specialized practice skills, the latter two categories aim to cultivate the practical ability for innovative application and practical ability for innovative scientific research respectively. The innovative laboratories for engineering project, including two opening laboratories, are mainly used for students to train and participate the undergraduate's contests, which aim to cultivate the practical application ability, team cooperation ability, communication ability and organization and leadership ability, so this category focuses on training the innovative talents for engineering application. Innovative laboratories for scientific research are attached to Shandong Provincial Key Laboratory of Digital Media Technology and Shandong Provincial Sino-US International Cooperation Research Center of Digital Media, in which the Provincial Key Laboratory has good academic advantages and the Provincial Sino-US International Cooperation Research Center can be used as the domestic and international academic exchange platform. Both of them can provide students the environment to create, innovate and communicate that is important for the scientific research training of high quality innovation talents. So the whole practice teaching system is one integrated system, in which these three layers are both close and independent relatively and gradually increase the level of talent training.

**Implementation of the Multi-level Practice Teaching System**

**Implementation of the Specialized Practice Skills Level.** The practice teaching plan should be updated to keep up with the demand for the digital media talents in the market. The connection of the experimental contents among those correlated curriculum is a key problem. So those experimental courses are divided into several course groups, such as program and algorithm group, hardware and system group, graphic/image and their application group, network technology group, animation and games group, art course group. These courses within a group are asked to be highly relevant and dependent, and the courses between the groups are relatively independent. Further, the course linked-lists are built to describe the relationship between the relevant topics within or among the course groups. To serialize the successor topic, the comprehensive cases are designed according to the topic linked lists and then split into several experimental teaching point or teaching modules to correspond to the experimental course.

**Implementation of the Practical Ability Level for Innovative Application.** The practical ability for innovative application is one part of the individualized practical training and aims to become the active practice from the passive practice, so the fun and practicability of the practical projects is very important. Many undergraduate contests, such as programming contests, animation design contests, web design contests, mathematics modeling contests, are used to support this practical layer. Students with the same interests set up the innovative groups. Teachers periodically offer some training courses for the different contests. Old group member pushing new group member is performed and thus the practice training pattern of student as main body and teacher secondary is formed to not only
encourage students to explore the innovative practice and apply the professional technical skills, but also cultivate their team spirit.

**Implementation of the Practical Ability Level for Scientific Research.** This layer aims to train students how to acquire new knowledge and engage in scientific research. The real scientific projects come from the Provincial Key Laboratory and Provincial Sino-US International Cooperation Research Center and are selected to explore students’ interests in scientific research field. In general, these projects can be composed of a number of functional modules, which help students to understand the theoretical difficulties vividly. During the practice, the innovative ability for scientific research of students are trained and mined, such as those skills how to collect information in literature, how to track the research focus, how to study independently and how to carry out project research.

As described above, the multi-level practice teaching system is implemented to meet the degree requirement, career requirement and research requirement, which offers a diversified and individualized practical environment and training pattern.

**Summary**

To improve the talents training quality and provide a diversified and individualized practical training, we build a multi-level practice teaching system for digital media major to meet different demands of practice, such as specialized practice skill, practical ability for innovative application and practical ability for innovative scientific research, which help students to improve their practice ability gradually from low level to high level.

**Acknowledgement**

The work was supported by Shandong Provincial Undergraduate Colleges and Universities Teaching Reform Research Project of China (Grant No. 2015M103) and Teaching Reform Research Project of Shandong University of Finance and Economics of China (Grant No. jy201448).

**References**