Exploring the Teaching Reform of Computer Foundation Course Cluster in Application-Oriented and Innovation-Oriented Private Undergraduate Art Colleges

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Abstract: The article intends to combine the characteristics of Wuhan Institute of Design and Sciences, which is "art-based and multidisciplinary, coordinated and integrated development", with the actual professional setting of the college, and take the construction of the curriculum group system and content construction, which integrates the knowledge points of the computer foundation course cluster and the assessment points of the rank examination, as the starting point, adjust the curriculum system, reform the teaching content, teaching methods and teaching means, and establish a new teaching mode of the computer foundation course cluster in the private undergraduate college of art oriented to application and innovation.

Keywords: computer foundation course cluster; computer rank examination; private undergraduate colleges; teaching reform

1. Introduction

The document "Guidance on the Transformation and Development of Local Undergraduate Universities" issued by the Ministry of Education earlier clearly emphasizes that a number of local private undergraduate colleges and universities should be guided to transform into "application-oriented colleges and universities". At present, basically all majors in private undergraduate colleges offer foundation computer courses [1]. Under this guideline of the Ministry of Education, there are new and higher requirements for the education of basic computer courses in colleges and universities, the goal of which is "application-oriented, combined with professional, focus on the cultivation of practical computer skills, so that students can master computer operation skills and apply computer to solve professional problems"[2]. Therefore, the teaching quality of basic computer courses is directly related to the students'

computer application level and their ability to solve practical problems with computers, while the passing rate of national computer rank examination directly reflects the teaching quality of foundation computer courses in colleges and universities. Here is a breakthrough, combined with the characteristics of my institution "art-based", from the following aspects to explore [3,4].

2. Adjustment of the Curriculum System of Computer Foundation Courses

Combined with the setting of our computer foundation course system (as shown in Table 1 below) and the actual situation of computer rank Examinations, the current curriculum system of our school has the following problems:

Table 1. The curriculum of computer foundation courses before adjustment

Level		Course name	Class category
Two compulsory courses	Fundam-ent als of College Computer	Fundamentals of College Computer	University-wide
	Programming	VB. NET Programming	Engineering
		VB. NET Programming	Arts and Science
X elective courses	General education course	Web Development Technology, Fundamental Technology, Fundamentals of Computer Software Technology foundation	University-wide

First, the arts, science and engineering majors in the author's school offer programming courses, and students

can apply for the computer rank examination level 2 after completing their studies. Analyzing the requirements and contents of the National Computer Rank Examination Level 2, theoretical knowledge accounts for 30%, mainly examining the knowledge of four core courses of computer science majors: data structure and algorithm, programming fundamentals, software engineering fundamentals and database design fundamentals, which are higher than the white paper requirements of the Ministry of Education, but are important for improving students' information literacy based on software technology, and the teaching of these knowledge in the current There is no corresponding course in the current curriculum, thus students have to rely on their own learning. From the examination situation, the difficulty, content, students lose a lot of points, mastery is not good, so there is an urgent need for a course to correspond with it [5,6].

Second, the proportion of art students in the author's school is large, due to the characteristics of art majors, and at the same time, considering that the National Computer Rank Examination Level 2 assesses the programming ability, art majors do not offer programming courses, thus they cannot apply for the level 2 exam; but in view of the fact that they have studied the college computer foundation courses, students can choose to apply for the computer rank examination level 1. The examination center of our university was declared late for the rank examination, and at that time, based on the consideration of the initial smooth operation, so our university did not offer the level 1 examination. Therefore, due to the inconsistency between the curriculum and the level exam, the art students cannot take the level 1 exam in our school, which also affects the overall application rate of the school's level exam. At present, after many rounds of refining the rank examinations, our school has been able to meet the requirements of offering multiple levels of exams in terms of software and hardware conditions as well as the quality of management personnel. Therefore, for the reform of the teaching system, the integration of curriculum and rank examinations for art students is also a key point.

Third, in the past, due to the small number of faculty and heavy teaching tasks, the college did not systematically study the opening of general computer courses, thus causing the curriculum to fail to meet the individual learning needs of students for computer technology.

To address the above issues, taking into account the requirements of the Ministry of Education's white paper specifications and the rank examinations, the article proposes the following restructuring of the curriculum system, as shown in Table 2 below:

Table 2. The adjusted curriculum of computer foundation courses

Level		Course name	Class category
Two compulsory	Fundamentals of College	Fundamentals of College	Arts, Science and
courses	Computer	Computer A	Engineering
		Fundamentals of College Computer B	Art discipline
	Programming	Fundamentals of College Computer B	Engineering
		Fundamentals of College Computer B	Arts and Science
		Fundamentals of Programming	Arts and Science
X elective courses	General Education Course	Systematically study and offer courses based on students' interests and majors	University-wide

2.1. Computer Foundation Courses Take A and B Level Classification

Computer Fundamentals A is for non-art candidates, so Computer Fundamentals A course is supplemented with "Data Structures and Algorithms, Programming Fundamentals, Software Engineering Fundamentals and Database Design Fundamentals", which is the theoretical part of the National Computer Rank Examination Level 2.

Computer Fundamentals B is aimed at art candidates, and the teaching objectives of the original college computer fundamentals course have been able to meet the requirements of Computer Rank Examination Level 1 However, in order to solve the problem of uneven computer level and improve students' comprehensive and design practical skills, we need to make adjustments in teaching emphasis, teaching content, teaching methods and assessment methods, which are mentioned in detail below.

2.2. Cross-disciplinary Programming Courses

The current curriculum of programming classes is generally compatible with the requirements of Computer Rank Examination Level 2. At the same time, in order to respond to the policy of the Ministry of Education of the People's Republic of China on "transformation of private undergraduate colleges into 'technical application-oriented universities'", and to combine the professional characteristics of our school, Jackie Chan Movie and Media College, and the actual situation of the College of Information Engineering, we consider promoting the deep integration of digital media art and technology, and try to offer the course of basic programming system in animation majors; in view of the actual situation of animation majors, we also know from their teachers that students know more about the artistic expression of animation, but they do not know much about its technical implementation, which shackles their autonomy and innovation. In fact, the animation engine is a piece of program code, but at present, students do not have the basic knowledge of programming, so they

cannot understand the code, and at the same time, combined with the content of the rank examination, students are bound to master the basic knowledge of programming, so cultivating their basic programming ability is crucial to improve the passing rate of the rank examination and students' professional ability, and promote the professional development of the college.

3. Improvement of the Content of the Computer Foundation Course

Teaching content construction is the key. On the basis of establishing the above-mentioned curriculum system, after fully understanding and analyzing the requirements of the white book specification and computer rank examination, refining the knowledge points of both, and then organically integrating the knowledge points of both into each course, so that teaching and learning have clear objectives.

3.1. Improvement of Teaching Contents of Theoretical Courses

The computer rank examination examines the extent to which students have mastered computer application skills, and involves basic theoretical knowledge of computer. In view of the adjustment of the above curriculum structure and the actual situation of students in our school, we will improve the content of the theoretical courses in the following five aspects:

3.1.1 Computer Fundamentals A (for non-art classes)

Analyze the assessment contents and requirements of computer level 2, add "Data Structure and Algorithm", "Programming Fundamentals", "Software Engineering Fundamentals" and "Database Design Fundamentals". Teachers should study the content and knowledge points of the level 2 examination, use the excellent material of the rank examination question bank, and teach with past exam papers to improve candidates' self-confidence, so that more people can participate in the rank examination.

3.1.2. Computer Fundamentals B (for art classes)

Combining with the actual situation of art candidates themselves, we reasonably adjust the teaching contents to the assessment contents and requirements of the computer level 1 exam, take Windows, Word and part of Excel operation as students' self-study contents, try to introduce the concept of computational thinking, and increase the teaching of computer composition, data representation, storage and transmission in class, so that students can have a qualitative improvement in their understanding of computers.

3.1.3. VB. NET program design

The course will analyze the knowledge points of the computer level 2 exam, clarify the important and difficult points, strengthen the teaching of theoretical knowledge of "file operation", change the previous idea of "emphasizing the program (syntax) but not the design (algorithm)", establish a case library based on the actual problems of the students' profession, and focus on the

design ideas and algorithms to solve the actual problems, so that the students can really apply what they learn and improve their practical hands-on ability to solve professional applications.

3.1.4. ACCESS database technology

The teaching of ACCESS database technology attaches too much importance to "teaching theoretical knowledge of database, focusing on the operation process of a single table, mainly to teach knowledge", but ignores "the ability to abstract the actual problem into multiple tables, the related operation of multiple tables, in order to solve the actual problem". The subsequent deficiencies are also the focus of the Computer Level 2 exam. In this reform, it is proposed to establish a case library for students' professional practical problems, to link the knowledge points by cases, to stimulate students' interest in learning, and to improve students' practical hands-on ability to solve professional applications.

3.1.5. Programming Fundamentals for Jackie Chan Movie and Media College

Through cooperation among faculty members to understand the actual situation of students, the develop a curriculum system that meets the actual situation of the college itself, adopt a project-driven teaching method, and integrate programming knowledge points into actual projects, the College of Information Engineering and Jackie Chan Movie and Media College students will work together in small groups to complete and defend the report. Further consideration can be given to joint art majors to carry out innovative and entrepreneurial projects, joint graduation design exhibitions and other activities to deepen art students' understanding of programming and the "Sino-French Art Workshop" has been formed across majors, mainly aiming at the integration of digital media art and technology.

3.2. Improvement of Teaching Contents of Practical Courses

Computer science is a very practical discipline, so the focus of the basic computer courses is also to cultivate students' practical hands-on ability to solve practical problems.

3.2.1. Experiments of college computer foundation course

With the development of information technology, the popularity of personal computers, many domestic high schools have opened the *Information Technology* course, before entering the university most students have more or less contact with computer technology, so when entering the school, most students already have a certain basic ability to operate computers, but the students' computer operation level varies.

At present, the course content is still set up based on the regular windows, word, Excel and other operations of the validation of the experimental project, for many students who have previously studied or used, think it is too simple, do not want to learn; but really encounter more complex practical problems, such as thesis layout,

many students do not know, in fact, these small knowledge points have been taught and practiced in class; Another problem is that the Ministry of Education's white book and the rank examination are not designed to some content, such as audio editing, video editing, animation production and other applications, students are very interested, but the experimental program is not offered.

Therefore, the scientific and reasonable setting of the experimental content of the basic university computer course should take into account both the uneven status of students and their interests, and also improve the students' ability to solve practical problems by applying the knowledge they have learned comprehensively. Based on the above principles, the group intends to divide the experimental items into compulsory and elective, the compulsory experimental items are set according to the requirements of the White Book specification and the rank examination, and the elective experimental items are the use of widely used software in learning or life, thus stimulating students' interest in learning; At the same time, all the experimental projects of classroom teaching are comprehensive and design experimental projects, and the verification experimental projects are pre-study, which are left to students to complete independently outside of class, and a strict assessment mechanism is implemented, and students cannot participate in formal experiments if they do not pass the pre-study, so that the above problems are well solved. At the same time, we will study the question bank of rank exams and introduce as many questions of rank exams into the experimental projects as possible.

3.2.2. Programming course experiment

No matter from the white book specification of the Ministry of Education or from the rank examination, the focus of the experiments of programming class courses is to improve students' comprehensive design practical hands-on ability. However, due to the difficulty of the class, the experimental projects of the current courses are mainly verification experiments. Therefore, how to improve the teaching objectives of the course under the limited credit hours is the focus and difficulty of the research group.

The group intends to increase the proportion of comprehensive and design experiments, and set up experiments according to the gradient of program filling, verification experiments and comprehensive design experiments in each experiment, in which program filling and some verification experiments are placed outside the classroom for students to complete through independent pre-study, and complete as many comprehensive and design experiments as possible in the classroom; At the same time, we are still considering the option of "introducing the actual questions of the Level 2 exam into the experimental project".

For non-art candidates, the content of the practical courses should be combined with the content of the rank examinations on the computer, and the computer simulations should be increased, so that students can adapt to it in time and become familiar with it.

4. Innovation of Teaching Methods for Computer Foundation Courses

For the theoretical programming course teaching method, the previous "emphasizing the program (syntax) but not the design (algorithm)", but the computer level 2 is often tested is the students' programming algorithmic thinking, for this reason, the group intends to establish a "case-driven" as the core, professional application-oriented programming course teaching methods.

For the practical programming course teaching methods, the implementation of "progressive" teaching methods, change the past overall design approach, take the program to fill in the blanks, the program gradually decomposition, from simple to complex, from easy to difficult, so that students gradually master programming methods and training programming thinking.

In addition, the group has come up with a plan for the school to host and the college to organize a competition to simulate the computer level 2 exam, so as to let students feel the atmosphere of the exam in advance, psychologically reduce the burden and improve students' confidence in the exam.

5. Reform of Teaching Methods for Computer Foundation Courses

The current basic examination system can not meet the requirements of the new syllabus of the computer rank examination, the examination system is too old, the group intends to take into account the white book of the Ministry of Education and the new syllabus of the rank examination, to establish a database of questions to meet the basic computer and programming courses, to establish an experimental and examination platform, to achieve quantitative management, but also to lay the foundation for the extension of teaching from inside to outside the classroom, and to introduce the concept of "flipped classroom" to fundamentally change the teaching methods.

6. Conclusion

The article takes Wuhan Institute of Design and Sciences as an example, takes the national computer rank examination as a foothold, combines the school's professional characteristics of "art-based", takes the requirements of the white paper of the Ministry of Education as a basis, takes the construction of the curriculum system and content system that integrates course knowledge points with the assessment points of the rank examination as a grasp, improves the curriculum system, innovates teaching contents, changes teaching methods and means, and explores the pedagogical reform of the construction of the computer foundation course group in private undergraduate colleges that are application-oriented and innovation-oriented.

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