Course Orientation and Course Promotion Construction of University Computer Foundation Based on Computing Thinking

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Abstract. In today's information society, "University Computer Foundation" is the first general computer course for non-computer majors. How to enable students to adapt to the changing external environment is the key to learning this course. This paper puts forward the reform of computer basic teaching to cultivate students' computing thinking ability, aiming at further improving students' computer innovation ability and information literacy.

Introduction

Computational thinking is a series of thinking activities covering the breadth of computer science, such as problem solving, system design and human behavior understanding by using the basic concepts of computer science. It reinterprets seemingly difficult problems into thinking methods that we know how to solve through reduction, embedding, transformation and simulation. Based on the ability and limitation of the computing process, a new mode is implemented by human or machine.

With the continuous development of computer technology, the cultivation of computational thinking ability has attracted wide attention of experts at home and abroad in computer science. The teaching of basic computer courses in universities requires students not only to master basic theory, basic knowledge and application ability, but also to learn the core ideas and methods conveyed by computer science. The cultivation of computational thinking is the main content of the construction of university computer basic course system and the guiding ideology of the reform of computer basic course. It is an inevitable trend to carry out the reform of university computer basic course with the guidance of Computational Thinking Theory and method and the cultivation of Computational Thinking as the breakthrough point.

Current Situation of Basic Computer Teaching

The Basic Level of Students Varies Greatly

With the popularization of information technology education in primary and secondary schools, the teaching content of computer culture level in basic computer education in universities has gradually moved down to primary and secondary schools. However, due to the unbalanced development of education in different regions, the computer level of freshmen enrollment shows great differences. A small number of students have computer skills above the intermediate level of computer operators, but most of the students are still poor in basic knowledge and need hand-in-hand guidance from teachers. We have conducted a questionnaire survey in Xi'an Piqua College for three consecutive years. Most of the computer knowledge that students acquired before enrollment is limited to the preliminary application of the network, such as watching videos, sending and receiving e-mails and chatting, but it is still unsatisfactory to solve practical problems. Therefore, layered teaching and teaching in accordance with students’ aptitude are the inevitable trend of teaching reform.
Insufficient Fit between Basic Courses and Specialized Courses

The course "Computer Application Basis" is the basis for non-computer majors to learn computer related technology and other professional courses. However, at present, students' professional learning and computer basic teaching are not closely integrated, and students will not apply computer science methods to their major. This requires us to implement classified teaching, set up different teaching contents according to different majors, and construct a reasonable curriculum system, so that students can serve their basic computer knowledge in this major, and achieve uninterrupted university four years.

Emphasis on Application Rather than Thinking Training

Computer science education emphasizes the cultivation of applied skills and neglects the cultivation of Computational Thinking ability. Teachers teach mechanically in the classroom. It is difficult for students to improve their interest in learning by memorizing and operating mechanically. The teaching effect is much different than expected. Teachers do not really teach it to fishermen. The importance of cultivating computational thinking is not only reflected in the field of computer science, but also plays an important role in multidisciplinary learning. Computational thinking, as an important idea and method of computer science, can not only improve students' ability to solve their own professional problems, but also expand to other disciplines. Computational thinking is a kind of ability that everyone needs to master and a way of thinking that everyone should possess. As a compulsory public basic course for college students in their first academic year, the basic computer course is the best time to cultivate their computer knowledge and application skills, and to cultivate their computational thinking ability. Professor Chen Guoliang believes that basic computer education in universities is an important course to train students' computational thinking, which should not be underestimated. With the continuous improvement of the quality of University teachers, the learning process of college students receiving classes is also a prominent problem. Teachers often process abstract knowledge into students and test their mastery through classroom questioning and periodic examinations. In the classroom with teachers as the main body, students are relatively passive and do not give full play to their subjective initiative, so their ability to restructure after learning knowledge can’t be exercised. "Emphasizing education over education" is a common problem faced by computer basic education in Colleges and universities. The knowledge received by students in class is severely disconnected from the actual needs of society. Students do not have the ability to solve practical problems independently. They are always helpless in the face of practical problems. Some students even treat computer basic courses negatively and think that they can use computers to do simple office work. The importance of computer basic courses itself has not been given due attention.

Construction of University Computer Basic Course System with "Computing Thinking" as the Core

The basic course of computer science needs to cultivate students' cognitive ability of computer science, learning ability under the collaboration of network environment, ability to solve practical problems and coexistence ability of information science and technology. The basic course of Computer Science in universities should instill scientific thinking mode, not only the means and methods to solve problems, but also the improvement of thinking ability. The goal of basic computer courses in universities has gradually changed from mastering basic knowledge and application ability to cultivating comprehensive quality and innovation ability.

Course Orientation

In order to cultivate students' innovative ability, it is necessary to change "knowledge imparting oriented" to "computational thinking and ability cultivation oriented" in the teaching of basic computer courses. Based on knowledge imparting and skill training, we should pay more attention to the cultivation of students' information quality and Computational Thinking ability, and infiltrate
the cultivation of students' ability into the whole professional curriculum education. In order to improve the quality of education and teaching in an all-round way. The curriculum orientation is shown in Table 1.

Table 1. Orientation of Basic Course of Computer Application.

<table>
<thead>
<tr>
<th>Course Nature</th>
<th>Course Tasks</th>
<th>Course Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Basic Courses</td>
<td>Master the common operation of office automation, highlight the instrumentality and practicability</td>
<td>Ability to apply computer technology to solve professional problems and obtain professional qualification</td>
</tr>
<tr>
<td>First semester</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Credits: 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hours: 32</td>
<td></td>
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</tr>
</tbody>
</table>

Construction of Basic Course System of Computer Application

In 2013, the College Computer Course Teaching Steering Committee of the Ministry of Education officially issued the Declaration on the Reform of Computational Thinking Teaching, further clarifying the central position of cultivating Computational Thinking in the basic computer teaching of universities. This paper puts forward the reform of computer basic curriculum with the cultivation of "computational thinking" as the core, and constructs a "broad and specialized" university computer basic curriculum system.

"Broadness" refers to general courses, "specialty" refers to professional courses, and "integration" refers to interdisciplinary courses. The general-purpose curriculum is oriented to the basic teaching and quality training of the whole school. It mainly cultivates students' basic understanding and mastery of computer and information technology, and emphasizes the reasoning and deduction of students' Computational Thinking consciousness. Professional courses, according to the needs of different majors, provide in-depth explanations of computer software and hardware knowledge, and strengthen students' ability to use computers. Interdisciplinary curriculum is a new form of curriculum with the development of computer technology in various fields of professional application. This kind of curriculum takes professional knowledge as the main line and combines with the development of information technology, resulting in a new trend of frontier development in various fields with disciplinary background.

Table 2. Construction of Basic Course System of Computer Application.

<table>
<thead>
<tr>
<th>Hierarchical Module</th>
<th>Main Contents</th>
<th>Opening Specialty</th>
<th>Teaching methods</th>
<th>instructional objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1 (Basic Operational Ability)</td>
<td>University Computer Foundation</td>
<td>Non-computer major</td>
<td>Obligatory</td>
<td>Popularization of Computer Basic Knowledge</td>
</tr>
<tr>
<td>Access database</td>
<td>Accounting and Finance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photoshop Image Processing</td>
<td>Humanities, Art and Medicine</td>
<td>Elective</td>
<td>Basic Professional Accomplishment</td>
<td></td>
</tr>
<tr>
<td>Flash animation production</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Web page design, etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AutoCAD Graphics Making</td>
<td>Architecture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 2 (Integrated application and design capabilities)</td>
<td>Computer Science and Technology Competition (slide production, web design, graphics and image design, etc.)</td>
<td>All majors</td>
<td>Elective</td>
<td>Cultivation of Innovative Ability</td>
</tr>
<tr>
<td>Level 3 (Innovative ability)</td>
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</tr>
</tbody>
</table>

Because of the rapid development of information technology and the continuous penetration of various disciplines and specialties, basic computer education in universities must be intersected and integrated with other disciplines and specialties. Therefore, the construction of university computer
basic course system must highlight the characteristics of "application-oriented, practice-oriented and ability-oriented", and at the same time, the cultivation of information literacy and computer application ability of University non-computer majors should be uninterrupted for four years. This is the important premise and core of curriculum construction. The curriculum structure is shown in Table 2.

The purpose of this course is to improve the information literacy of University non-computer majors, so that they can adapt to the requirements of the information age. Emphasizing problem solving, emphasizing ability training and advocating innovative practice. Strengthen students' sense of social responsibility and mental health education, cultivate students' teamwork spirit, and enhance their ability to adapt to social life. To enable students to adapt to the work and self-development of liberal arts majors, with the ability to continue to learn new computer knowledge, skills and applications.

Conclusion

The core task of basic computer teaching in universities is to cultivate the ability of computational thinking, which is based on the methodology education of "calculation". Its curriculum orientation determines the choice of teaching content, the change of teaching methods and teaching means, and the corresponding curriculum assessment methods must be adapted to it. The reform of the course mode of "University Computer Foundation" based on the cultivation of computational thinking is the key factor for the implementation of Computational Thinking Education Reform and an effective way for the intersection of various disciplines.

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