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Research Article

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Primary Analysis on Computer Basis Course Reformation

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ABSTRACT

Computer basis is an important course to foster college students' integrated quality and ability, and also a critical link for molding well-rounded innovative elites. However, some issues came up during teaching this course these years, and regarding this problem, this paper, combining new thoughts home and abroad on computer education and with actual situation of our university, points out necessity of courses reformation and brings forward some advises on teaching content and teaching approach.

Key words: computer basis; reformation; teaching content; teaching approach

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INTRODUCTION

"Computer basis" is a required course in college students' courses system. It not only offers primary computer knowledge, but also helps a lot to build students way of thinking. Each university has been exploring and practicing the best approach to teach this course.

The intent that our university set up computer basis courses in early years is enabling non-computer science majors get to know basic knowledge of computer subject as much as possible, and despite of different majors, they would still have demand to learn computer. Over years' course setup and teaching practice, we have achieved some improvement, but also certain problems arise.

Tab. 1: Preliminary college computer basis courses module and class hour allocation

Sequence#	Content module	Class hour
1	Computer basis	2
2	Microcomputer system	2
3	Operation system and application	2
4	Character processing software	4
5	Table processing software	4
6	Computer network technology(including web page design tool)	4
7	Multimedia technology(including PPT design)	4
8	Database technology and computer software technology basis	2

1 Teaching content ranges too broad, too much points and systematically weak.
Table 1 below shows main knowledge module and class hour arrangement in the beginning after we firstly set up this course. You can see this subject includes 8 knowledge modules. Actually there is no much relevance between each module, so it does not make any difference if the professor teaches module 1 first or 4 first. It looks like just a combination of several lectures since it is rather weak systematically.

Because this course is characterized by its large amount of knowledge key points and concepts, it is very difficult to comprehend the teaching content for those students who are weak in computer basis. What most of students learned

after they finished this course is just some loose definition and gaining preliminary application ability on office software, but they can hardly understand them in a systematical way, not to mention build a way of thinking regarding making use of computer to fix problems.

2 Misunderstandings on the course itself

About computer basis teaching, there is always some one-sided point that "computer basis course is about teaching how to use software and tool". The popularity of this broken point of view impacts computer basis teaching in college in a bad way, which results in that some teachers themselves also think the same way "we are teaching how to use office software in order to take computer level test". This problem brings challenges for computer basis teaching, particularly for the very first class of college computer.

TEACHING CONFUSION AND NECESSITY OF REFORMATION

1 Teaching Confusion

Regarding actual teaching effect, teaching experiences, students' feedback and environment changes as well as society demands, we think we need reformation badly for the time being in the respects of teaching content and fostering mode. But speaking of how to make a change, it is an always a concern and the confusion mainly involves several aspects as below.

(1) Course teaching content should focus more on basic principle and theoretical knowledge or on application software and tool instead?
(2) How to further develop students 'interest in this course and impress them?
(3) How to figure out the issue of low relevance among too much concepts and knowledge?
(4) What kind of demand that students and future society have on computer science and technology learning?
(5) What is the aim for the first college courses? What kind of problems we should/can solve?

2 Necessity of Reformation

Professor Zhou yizhen put forward the exact definition of "computational thinking". During the first "nine college league (C9) seminar on computer basis courses" held on July in 2010, below agreements were made on how to improve computer basis teaching: 1) computer basis teaching should attached more importance on fostering students 'innovation ability and promoting their integrated quality. 2) Building computational thinking should be the key task of course teaching. 3) We should further stabilize the foundation status of computer basis teaching. 4) We should strengthen exploring college computer basis teaching reformation in the respects of computational thinking. [1].

REFORMATION IDEAS

The essence of "computational thinking" lies in abstraction and automation [2]. In my understanding we should build up a way of thinking to use computer technology to solve problem and understand it can be solved as well.
This is a long term process that we should start from very little age, and it goes far beyond just through a course. To put it simply, "computational thinking" includes problem abstraction, building model, calculation design and implementation. These should be taught step by step, and the question is how to lay the foundation in the course to foster this ability.

With one semester's teaching practice, the author analyzed course teaching subjects' actual level and class hour allocation, and some suggestions are made concerning computer basis course reform.

1 Reformation on Teaching Content

Author's teaching subjects on computer basis course include engineering majors and arts majors. Their levels at the start and learning goal in the later period are totally different; therefore, I think we should clarify teaching content and teaching purpose according to majors.

(1) Science and engineering major should focus on calculation practice, and teaching content should at least contents basic thought and method to get solution with the help of computer, computer hardware basis and software basis. In order to connect C language programming design course in next semester, we may give more weight on module 3 and 4 in table 2. Table 2 shows main teaching modules and class hour allocation for non-computer majors of science and engineering subject.

(2) Arts and liberal art subjects should mainly aim at application, and teaching content should cover computational thinking and computational theory concept, computer hardware basis, computer software basis, computational culture and computer professional ethics education. And the course could carry more weight on tools application and computer assembling. Table 3 refers to main theory teaching module and class hour allocation for non-computer majors in arts and liberal art subjects in 2013.

Tab. 2: college computer basis course teaching module and class hour allocation in 2013 (for science and engineering subject)

Sequence#	Content module	Class hour
1	Fundamentals of computational thinking	2
2	Computational theory and computational model	2
3	Calculation basis	4
4	Programming language	6
5	Computer hardware basis	4
6	Computer software basis	4
7	Computational culture and computer professional ethics education	2

Tab. 3: college computer basis course teaching module and class hour allocation in 2013(for arts and liberal arts subject)

Sequence#	Content module	Class hour
1	Fundamentals of computational thinking	4
2	Computational theory and computational model	2
3	Calculation basis	2
4	Programming language	2
5	Computer hardware basis	4
6	Computer software basis	6
7	Computational culture and computer professional ethics education	4

2 Teaching Methods Reformation

(1) Course content of computer basis ranges broad and it covers lots of key points. With the rapid development of information technology in recent years, some information technology has become common sense in our daily life. Therefore, students can self study the common sense knowledge, or they can also learn in terms of study group, or students give lecture to students. In this way it promotes students' application ability on office software, and at the same time their oral presentation skills and team work spirit can also be strengthened.

(2) speaking of the fact that some computer basis course content is too boring to arouse students 'interest, we can make a change on teaching cases by introducing some fun cases or having them operate on small computer programs that programmed by ourselves so as to increase their interest for self study.

(3) We can build a shared teaching resource which includes class, experience and network study platform. And network platform contents syllabus, teaching plan, courseware, experiment guideline, interaction between teachers and students as well as exercises resources. Teaching and direction should be given in a planned and orderly manner, and that enables students gain computer skills and meanwhile promote computational thinking. Besides, we should guide students to use network self study platform to foster their self-learning and independent problem solving ability. Network self-learning mode can be supplementary to regular class teaching.

REFORMATION APPLICATION AND EFFECT

Till now we are still working on syllabus and shared teaching resources on those courses listed in table 2 and 3, actual effect is still further to be verified. But it is feasible in the aspects of theory and current teaching practice at least.

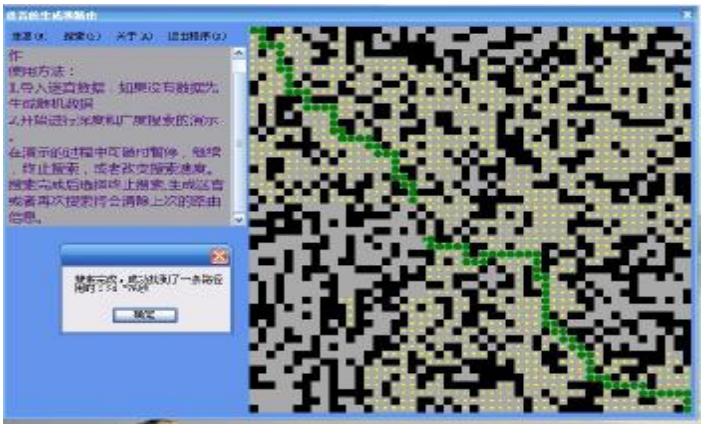

Fig. 1: Labyrinth

The author adopted two reformation approaches mentioned in (1) and (2) of 3.1 during actual computer basis

teaching. I designed some small programs for my students when we went through calculation method part. Taking labyrinth for example, I have them to operate in person. They input rows and columns for labyrinth to set the size, and then labyrinth is created automatically. Students only need to click search button, and the labyrinth on the screen would mark the way out in green lines and calculate the searching time it takes, just like what diagram 1 indicates. Students are all very interested to it and they even initiatively ask question how to program this trick. At this moment it is time to introduce them back track algorithm and guide them how to design with computational thinking. Students could self study as group after class regarding input and output equipment part that each group would need to make a PPT and randomly pick up one person to give a lecture to others. The score given to the presenting students serves as the score of the whole group. (Final score at the end of semester contents performance of presentation, PPT design, class conclusion, experiment and attendance.) This approach appeals many students since it helps to improve their courage, presentation skill, and office software skill and team work spirit as well.

CONCLUSION

Key task of compute basis courses is to cultivate more innovative elites which should be equipped with problem solving ability by using computer (computational thinking) and be competitive in international competition so as to secure our national strength. College computer basis is just one subject among so many college courses, and with about 10 classes' learning students can have a picture in their mind of the basic computer hardware structure and working principle, and this do help them to comprehend computer's problem solving approach, and get to know the limitation of computer as well. Meanwhile it lays the stable foundation of computer science for further study and research, which is also the goal of this subject. And that is precisely the reason why we always expect teaching content reformation go this way.

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