Strategies of better courseware-making and their efficiency from 2008 to 2016

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ABSTRACT

Courseware, which is based on computer-assisted instruction, has played an important role in teaching, but some problems are still existed in Courseware-Making. Some higher quality Courseware-Making strategies are summarized in this paper, and then their teaching efficiency in Space Geodesy from 2008 to 2016 is compared and analyzed.

Keywords: Courseware, making strategies, efficiency, from 2008 to 2016.

INTRODUCTION

Courseware, which is centered on computer, is a kind of modern teaching technology based on digital processing technique and audio-visual technology. Courseware can store, transmit, process, convert and search teaching materials by integrating a variety of media information such as words, voice and images and so on according to teachers’ teaching design (Lin, 2004; Qili, 2005; Kekang et al., 2002). Courseware is able to improve teaching effect because it has many advantages such as vivid, not restricted by space-time and easy to accept by students etc which could activate class atmosphere, motivate students’ thirst for knowledge and improve students’ interest (Lin, 2004). However, some problems still exist in Courseware-making. This paper has listed some suggestions to Courseware-making based on authors’ Courseware-teaching experience and also highlighted talked its usage in Space Geodesy teaching.

THE PROBLEMS IN COURSEWARE-MAKING

The key point is not outstanding

It mainly manifests in the following respects: Firstly, all slides are put together, colors are not harmonically matched and layout is arranged unreasonably and as a result part of contents cannot be seen clearly and the Courseware is short of sense of beauty, thus, it can hardly attract students’ interests. Secondly, superficial form flashy is overemphasized and a variety of unnecessary pictures, videos and voice materials are used in Courseware. Thus, the form will cover up the contents and students’ attention will be dispersed (Qili, 2005). Thirdly, teaching materials without selection are all written on Courseware, even some teaching contents that can be better shown by experiments and object-demonstration are demonstrated with slides, so the Courseware is the reprint of the textbook content. This single-form Courseware does not give place to the advantage of multimedia instruction, and it is easy to make students fatigue in auditory and visual.

Hierarchical structure is unclear and navigation is confused

Hierarchical structure and navigation in Courseware provide a “roadmap” for learners to search what they want to know. But at present most of the Courseware employ structures (Figure 1). Structure 1 starts with headline and catalogue, and then with endless contents, at last end up with “Thank you”. This kind of structure will easily make students not grasp the content structure very well and then get lost in class. Structure 2 is also called “link type”, hyperlink is used in the catalogue page to let user skip to content page, and it is also employed to skip to the
catalogue page when each chapter is completed. Compared with structure 1, structure 2 can allow students easily master courseware structure and catch up with the thoughts of teachers. According to students’ feedback, some teachers are not skilled in using hyperlink in classroom teaching, misoperation often occur in class. Thus, originally clear structure becomes chaotic due to the wrong navigation.

Lacks of materials

Currently, most of the courseware only shows listeners some simple and intuitive experiments in the form of video or animation on the screen. Although it assisted the teaching, its contents are too insufficient to reflect the characteristics of large information and wide range of knowledge that modern teaching methods own. Also few people made courseware with the difficult concepts. Some of the courseware only involves five or six materials and most of them are the illustrations in the textbook. There is the need for the teachers to give some other related contents in the actual teaching.

Lack of frontier

As a result of computer multimedia technology, the development cycles of a courseware is shorter than traditional methods, therefore, it should reflect the fast changes and improvements of teaching contents, especially some of the cutting-edge professional contents. However, a lot of users just move the contents of the book on the courseware and they rarely update it, so that, in one hand, it does not embody the advantage of development speed of courseware and on the other hand it lacks of flexibility.

Lack of interactivity

The fundamental feature of courseware is interactivity, which is conducive to teachers mastering students learning, making the teaching plan and adjusting lectures. Courseware design should fully reflect this characteristic. However, many teachers always overlook this point. They mainly focus on the presentation of the courseware, occasionally with some explanations, or just list answers of some questions. In this case, students almost have no time to ask and think and have no space to extend thinking and imagination. As such it is harmful to student’s innovation.

STRATEGIES

Some strategies are summarized based on the author’s teaching experience to solve the aforementioned problems.

Optimize the Courseware on the base of learners “noting” in the visual psychology

Psychological studies have pointed out that learning process does not start from the beginning of sensory generated from stimuli of the outside world, but from the individual’s learning motivation and the resulting selective attention of the sensory information. Therefore, there is no learning when no irritation occurs. And we can optimize the Courseware from the following features: 1) Selective: the clearest part in people’s vision is the central part, so the theme and the most important features should be highlighted when presenting teaching information with multimedia courseware; 2) Simplicity: irrelevant and redundant details should be deleted in the courseware.
background; 3) Novelty: new stimuli is not necessarily used for attracting the attention of learners, as long as there is obvious contrast and differentiation before and after stimulation, such as certain flashing or underlined text, drawing arrows and adding borders etc. However, when applying novelty it means, students’ attention should not be led to the novel means itself but should also to the learning contents.

**Optimize the Courseware with learners’ “concept formation” rule in cognitive psychology**

To help learners grasp concepts of something is one of the most important missions of teaching. When learning the concepts, the learners should not only remember all relevant names and definitions, but also acknowledge the common attributions between different things by using a series of examples so that they could extract and form concepts from the examples. In order to assist the learner to form concepts efficiently, here are some suggestions for the teachers: first, using examples rather than definitions; teachers should follow the steps from examples to attributions to definitions in teaching in which the multimedia courseware is used. In that way, the learner can achieve the leap from perception to rationality.

Secondly, positive examples should be used as well as, negative examples. The learner can not understand all the attributions of concepts deeply. Only by comparing the positive aspects with the negative aspects, can the learner grasp a concept completely and correctly. Thirdly, it is more practical to list an attribute table than use words to define the concepts. The attribute table is clear for the learner so that they could be deeply impressed. Moreover, the attribute table can help the learner grasp the main attribute of concepts immediately so that the learner can form the concepts effectively more simple and obvious than sentences, which is so boring that the learner could forget soon.

**Schedule reasonable hierarchical structure**

A whole Courseware could be divided into front page, overview page, catalogue page and conclude page on the basis of different functions. The basic design style of these pages should be consistent, but small differences which are helpful for learners to distinguish different parts is also necessary. Good page layout will make Courseware coherent and clear. The application of catalogue page is very important to hierarchical structure.

Catalogue page plays the role of reminding listeners that it will turn into the next part. According to previous experience, we recommend a simple but effective method: make a catalogue page first and then show the listener the catalogue page which outstood what would be taught next by using bold words when entering into the next part. In addition, different colors and significant pictures can be employed to differentiate catalogue pages and next part of the content will be turned naturally with the change of colors and images.

**Establish personal courseware material library**

It is necessary for every teacher to set up personal Courseware material library. Teachers should always accumulate materials in relation to teaching content and this will be helpful for Courseware making in the near future.

**COMPARISON AND ANALYSIS OF SPACE GEODESY TEACHING RESULTS**

The author progressively applies the aforementioned Courseware-making strategies in the teaching of Space Geodesy in recent years. In order to verify the practicability and validity of these strategies, some aspects like students’ average score of Space Geodesy, patents and published papers in relation to Space Geodesy were compared and analyzed in this paper by using recent 9 years (2008 to 2016) statistical data associated with Space Geodesy which comes from School of Geodesy and Geomatics, Wuhan University (Deyou and Jiancheng, 2009, 2010, 2011, 2012, 2013, 2014, 2015; Yibin and Ping, 2015 2016, 2017).

Figure 2 shows the statistics of students’ average score of Space Geodesy from 2008 to 2016, from it we know that students’ average score presents an increasing trend with exception of the year 2010. Figure 3 lists the patent quantity in relation to Space Geodesy from 2008 to 2016. Table 1 displays the recent 9 years’ published SCI and EI papers associated with Space Geodesy. Figure 3 and Table 1 both indicated that research and innovation ability are all improved. From the aforementioned comparison and analysis, it is evident that teaching level of Space Geodesy has improved with the step-by-step application of high quality Courseware-making strategies. These fully proved the efficiency of these strategies.

**CONCLUSIONS**

Multimedia teaching can make up traditional teaching’s deficiencies such as rigid, dull and bald. Some innovation projects have been summarized to solve the problems in Courseware-making in the base of author’s teaching experience, and then its validity proven by comparing Space Geodesy teaching results. Courseware making is a system work where the author is expected to master more good strategies in future teaching on the basis of students’
feedback and self-summary.

ACKNOWLEDGMENTS

This research was funded by National Natural Science Foundation of China (No. 41374012) and the 2012 undergraduate comprehensive reform and teaching research project of School of Geodesy and Geomatics, Wuhan University (201220).

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Cite this article as:
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