Application of a PPT Presentation System in the Course of Overall City Planning under a Multimedia Teaching Context

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Abstract—By analyzing the defects and shortcomings of application of PPT technology in college teaching, the study designed a new PPT presentation system characterized by remote control, multipath playing, and timely demonstration. This system can present the content after transforming PPT texts and image signals to video signals and create multiple windows in different areas to achieve multipath presentation. Thus, sixty teaching objects in this study were randomly grouped into the experimental class and the control class. The course of Overall City Planning was taken as an example. The PPT presentation system was adopted for the students in the experimental class, whereas the traditional teaching method was applied for their counterparts in the control class. Results reveal that various learning indexes of the experimental class are superior to those of the control class. Accordingly, application of the PPT presentation system in the course of Overall City Planning could achieve a favorable teaching effect.

Index Terms—the PPT presentation system, the course of Overall City Planning, teaching, multimedia

I. INTRODUCTION

PowerPoint (PPT) is a type of software launched by Microsoft for text demonstration. In specific application, users can connect the projector to a personal computer and present PPT contents on the multimedia screen [1]. Users are not only able to create presentation texts offline, but also achieve teleconference and presentation of network texts through PPT [2]. Considering the advancement and diversity of PPT technology, researches on application of PPT in teaching have always been the hotspot of domestic and overseas experts and scholars. Relevant researches have also obtained very abundant achievements. Hopper et al. [3] summarized the comments on PPT and its peer technologies, stated its strengthes and affordances, and proposed innovative applications of PPT in teaching. Apart from common applications, PPT can also be applied to create online topical archives in stable content, produce streaming movies, and even be used as a media-rich simulation platform. Zhao et al. [4] discussed the challenges for social semiotic research and discourse analysis in each dimension, and specifically concentrated on the necessity of keeping away from the concept of text and of developing an adaptive, non-logocentric, and holistic multimodal approach to studying semiotic technologies. Liu [5] studied a multi-modal PPT demonstration teaching mode which reconstructs traditional PPT demonstration courseware in the form of text, image, color, voice, and so on, and brings a brand-new value for motivating the dynamic sense in classroom. Zhang [6] also researched the value of multi-modal PPT demonstration teaching, finding that the new PPT teaching form can positively change the students' learning attitude. Li [7] investigated a Kinect-based, fully automated PPT control system. The system, on the basis of the least square method, enables the speechmaker to achieve full automated body control of PPT without any contact by following the principle of artificial recognition -.

The scholars aforementioned have studied the application of some new PPT technologies in modern education and teaching from different perspectives. However, it can be summarized that there are still some defects in the application of PPT in teaching. First, most of the PPT technologies currently applied in the course of Overall City Planning are traditional ones. Due to this reason, video files cannot be transformed into PPT files. Actually, since video and PPT files are not of the same nature, they cannot be mutually transformed into each other. As suggested, video files should be directly inserted and played in PPT; or, important screen shots of the video could be put in PPT. However, because of the lack of voice and animation, the latter is far inferior to video in its effect [8]. Second, it is difficult to achieve remote playing and control. If a teacher needs to play a large-volume teaching video for students, he or she usually can only use a mobile phone or a special recording device to record the video content before class, and utilize a video converter to transform the recorded video into a common video format, such as MPEG, AVI, MP4, MOV, and 3GP [9]. In the teaching process, the teacher can directly demonstrate the video for students. It undoubtedly increases the complexity and workload of making courseware.

To fundamentally solve the problems aforementioned, this study viewed remote control, multipath presentation, and timely demonstration as the main demands for design of the PPT presentation system, developed a brand-new PPT teaching presentation system by analyzing the defects and shortcomings of application of PPT technology in college teaching and summing up design thoughts. The system can transform PPT texts and image signals to video signals for presentation and create multiple windows in different areas to achieve multipath presentation.

II. DESIGN OVERVIEW OF PPT PLAYING SYSTEM

A. Design and thought

Based on the design thought mentioned above, the composition modules of the PPT presentation system are constructed as shown in Figure 1.
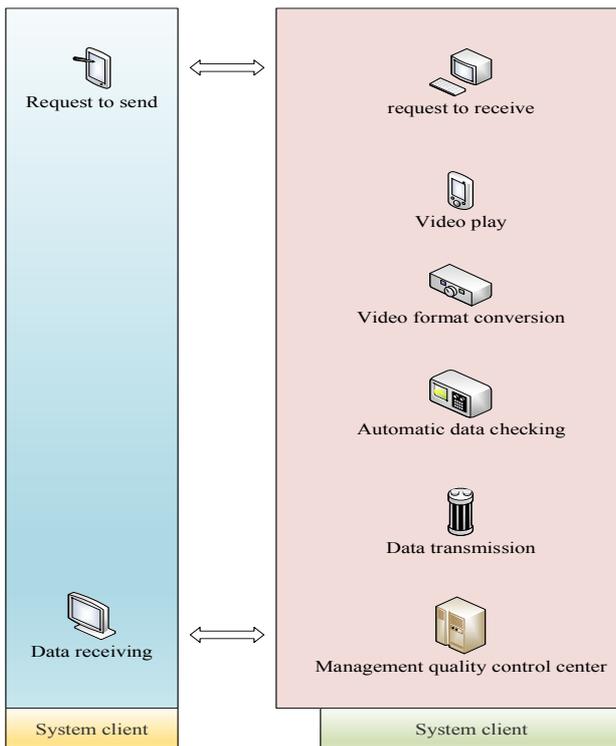
Figure 1.   Module structure diagram of the PPT presentation system

Visibly, the PPT presentation system adopts B/S architecture and includes two parts: the client and the server. In the specific module composition, the client contains a request sending unit and a data receiving unit. Meanwhile, the server is composed of a request receiving unit, a video playing unit, a video conversion unit, a data sending unit, and an automatic data inspection unit. The detailed module functions are as follows:

(1) The request sending unit: Sends request signals of PPT information connection to the system server through the wireless module.

(2) The data receiving unit: Receives PPT information connection signals fed back by the system server through the wireless module.

(3) The request receiving unit: Receives PPT signals sent by the system client.

(4) The video playing unit: This module is a core part of this system and can achieve remote virtual playing and control. The multipath presentation module can create multiple windows according to the client's request and play the same PPT video content at the same time.

(5) The video conversion unit: This module can transform texts, pictures, and small video signals in PPT into continuous long video signals and selectively generate a common video format such as MP4 for playing, as required by the user.

(6) The automatic data inspection unit: This module is a core part of this system and can automatically detect video-related data.

(7) The data sending unit: Sends PPT signals to the system client.

In addition, this system is also equipped with touch screen and voice control functions. When applying this system in teaching, the teacher can better combine teaching contents, control the whole classroom teaching, or
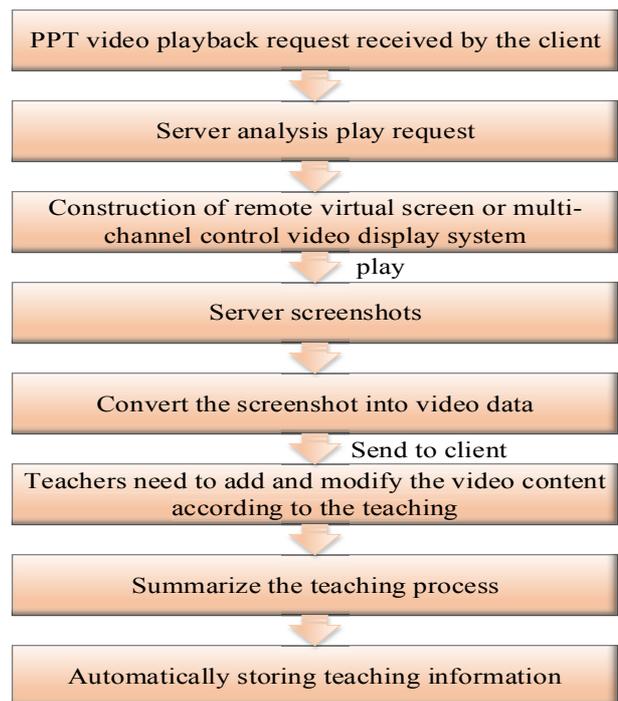

Figure 2.   Teaching process diagram of PPT playing system

conveniently and quickly set the system through the touch screen and voice control functions.

B. Operation process

In specific teaching application, the PPT presentation system introduces technical systems, such as program compilation [10], multimedia, wireless transmission, video conversion, touch screen control, virtual screen display, and multipath control, on the basis of computer information technology. Thus, the system can transform texts, pictures, and small video signals in traditional PPT into continuous and dynamic video signals for display, achieving remote control and multipath presentation, and presenting the content of specialized courses to students. Moreover, the system can achieve effective communication between students and teachers with the help of a virtual screen display, so that the teaching process becomes more convenient, entertaining, and dynamic. According to the description aforementioned, the system's teaching operation process is summarized in figure 2.

As shown in Figure 2, when applying the PPT presentation system, the teacher can use the rich and diversified functions at a proper time to import, modify, and improve video information of specialized courses, so as to gradually present the traditional PPT courseware content via dynamic videos. Specific application can be achieved through simple operations, such as touching and writing. Compared with the traditional PPT teaching system, this system brings more prominent convenience, interactivity, and entertainment, as well as a more apparent teaching advantage.

III.   TEACHING EXPERIMENT

A. Objects of the experiment

Class (5) and Class (6) of 2014 urban and rural planning major in Chang'an University in Xi'an, China, were chosen as the objects of the study. Each class comprised

35 students who had no significant statistical difference in their age, gender, and learning ability (P>0.05). In the specific teaching experiment, Class (5) served as the control class, whereas Class (6) served as the experimental class.

B. Experimental period

This teaching experiment lasted from March 2016 to June 2016, covering 48 class hours.

C. Experimental mode

In specific teaching, the course of Overall City Planning for the urban and rural planning major in colleges was chosen as the teaching content, with a total of 38 class hours. The course was composed of theory and practice. In order to highlight the teaching value of this PPT presentation system, this system was adopted for the experimental class, whereas the traditional multimedia equipment was used for the control class. After the course, the interactive participation rate, basic accuracy, teacher–student interaction rate, and final examination scores of both classes were collected, recorded and compared to explore the teaching effect.

D. Specific implementation methods

1) Traditional PPT teaching

In the control class, the teacher followed the traditional "method of teaching theories." Basically, multimedia demonstration, question answering, homework assignment, correction, and feedback were mainly used to complete the teaching process. In such a teaching mode, the communication between the teacher and students occurred only in the classroom, whereas practice teaching was primarily carried out in the campus training room.

2) New PPT teaching

In the experimental class, the teacher used the PPT presentation system as the major carrier and designed the teaching mode of "demonstration–interaction – summarization." Under the support of the PPT presentation system, the whole process of teaching Regional City System Planning in the Overall City Planning course is as follows:

First, the remote demonstration link mainly utilized the remote playing function of the PPT presentation system. Before class, the teacher applied the system server to establish a virtual display platform which is based on the mobile internet system. On the platform, the teacher transformed texts and pictures in PPT into video information, showed it to students, and guided students to engage in independent learning online. The process aforementioned is similar to the pre-class learning link of "flipped classroom." Differently, the video presented by the teacher in the PPT presentation system is longer and more professional. Figure 3 shows teaching in the remote demonstration link. Figure 4 presents demonstration by the PPT presentation system in the Overall City Planning Course.

Second, the on-site interaction link is based on the scene in the classroom. In this link, the teacher established an on-site interactive teaching situation by applying some functions of the PPT presentation system, including video demonstration, writing by a virtual pen, and touch screen control. For instance, when conveying the content of "the relationship between city planning and density of the surrounding population," the teacher took "Faku County planning and density of the surrounding population" for case study, divided the whole class into five groups, and assigned a specific planning task to each group. Each group developed a complete planning scheme through discussion, cooperation and design, transformed the scheme into a PPT file, and demonstrated the scheme via the PPT presentation system in the classroom. The teacher interacted with students and made comments when necessary to help them improve the scheme.

The third one is the summarization and sharing link. When each group finished their demonstration, the teacher utilized the PPT presentation system to compile each group's PPT data into a large video file, and improved each group's achievements through the functions of screen touch control and writing by a virtual pen s. Finally, all data were saved in a teaching file, and uploaded to the server of the PPT presentation system for students to download.

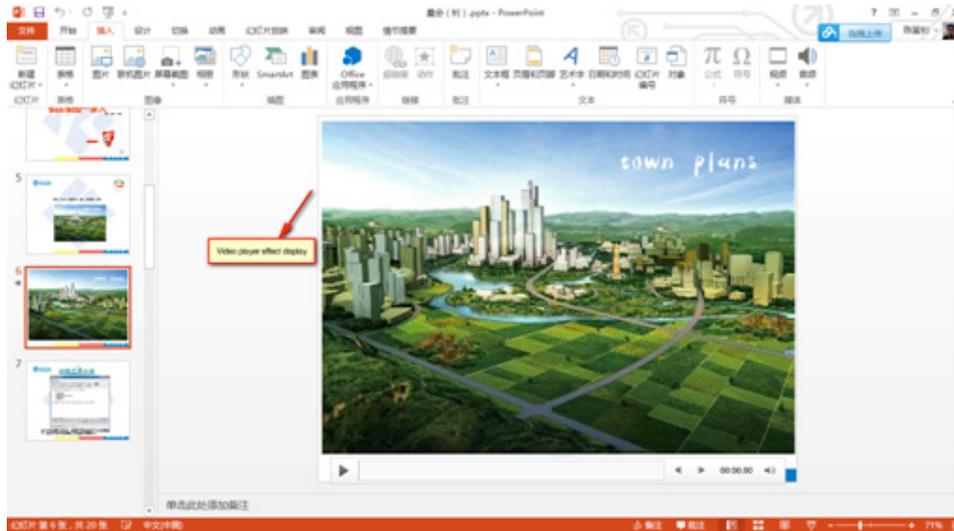Figure 3.   PPT playing display of remote demonstration link

Figure 4. PPT playing system making demonstration in the course of General City Planning

E. Statistical method

The Questionnaire on Teaching Effect of the PPT Presentation System was used to survey the teaching effect on both classes and gather students' learning indexes. A total of 70 questionnaires were distributed, and 70 valid questionnaires were recovered, with a 100% recovery rate. Meanwhile, EXCEL was adopted to quantify the data collected, create graph files, and complete statistical analysis of the teaching effect.

IV. RESULTS AND DISCUSSIONS

After the 48-hour class, the teacher collected, recorded and compared the interactive participation rate, basic accuracy, teacher–student interaction rate, and final examination scores of both classes to explore the teaching effect. The detailed statistical results are shown in Table 1.

From Table 1, it can be seen that the participation rate, accuracy, and interaction rate of the experimental class are higher than those of the control class. In particular, for "city planning design for the case Faku County," the participation rate and interaction rate reached 100% in the experimental class, whereas the data of the control class were barely satisfactory. This result indicates that application of the PPT presentation system generates different teaching effect.

In addition, as for final examination scores, the differences between the experimental class and control class in the average scores are also significant. The statistical results are to be found in Table II.

According to Table II, the differences between the experimental class and the control class in scores of are significant, regardless of the average score in the theory-oriented examination or in the practice-oriented examination. For the experimental class, the average score in the theory-oriented examination is 89.2, with the highest score of 99, and the lowest score of 75. For the control class, the average score in the theory-oriented examination is only 67.5, with the highest score of85, and the lowest score of 37.

Overall City Planning is a compulsory professional course for the urban and rural planning major in colleges. In the traditional multimedia teaching environment, course teaching is dominated by the teacher's demonstration and supplemented by students' viewing. Throughout the whole classroom teaching, it is difficult to give play to students' autonomous initiative, and students are mostly in a passive reception and viewing state. Few students would have the opportunity to interact with the teacher. In addition, the teaching mode of blind viewing also results in the lack of innovation in the whole teaching process and increases difficulty in motivating students' learning initiative. Thus,

TABLE I.
RESULT STATISTICS OF QUESTION DISCUSSION IN CLASSROOM (%)

Question	Data of experimental class			Data of control class		
	Participation rate	Accuracy	Interaction rate	Participation rate	Accuracy	Interaction rate
City planning design for the case of Faku County	100	90	100	70	72	56
Factors influencing city planning	100	95	86	80	81	45
The latest research method for city planning	100	87	89	75	67	61
Classification of villages around cities and towns	100	82	91	72	72	47

TABLE II.
STATISTICAL RESULTS OF FINAL EXAMINATION SCORES

Group	N	Average score of theory examination	Average score of practice examination
Experimental class	35	89.2	95.3
Control class	35	67.5	71.3

such a mode cannot play any essential role for course teaching reform. Therefore, this study researched, developed, and applied the PPT presentation system, which is based on B/S architecture and contains six modules and diversified functions, such as remote control, multipath playing, and timely demonstration. The system can transform texts, pictures, and small video signals in PPT into continuous and dynamic long video signals. Furthermore, with the help of the system's human–computer interaction module, the teacher can conveniently modify and improve teaching information, and establish in-class and after-class teaching communication scenes. Compared with the traditional multimedia teaching form, the PPT presentation system has a better teaching link and leads to a more outstanding teaching effect.

Specific application in teaching also proves the significant effect of using this system in the course of Overall City Planning shows on the improvement of students' classroom participation rate, accuracy, teacher–student interaction rate, and final examination scores. Furthermore, more than 90% of students in the experimental class suggested that the PPT presentation system is superior to those of the traditional multimedia system in its visual property, dynamic nature, and convenience. The teaching process designed by the teacher in this system is very interesting. Therefore, this system makes great contributions to stimulating students' learning interest and increases their joy in the learning process, which would naturally improve students' final examination scores.

V. CONCLUSION

This paper introduces application of the PPT presentation system in the course of Overall City Planning. The contrast and research of teaching effect shows that compared with the traditional multimedia teaching means, the PPT presentation system significantly improves course teaching effect. Therefore, this teaching system and relevant teaching modes deserve further promotion in other courses for the urban and rural planning major in colleges.

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