

Design and application of micro-learning video in flipped classroom

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Keywords: micro-learning, micro-learning video, flipped classroom.

Abstract. The difference between traditional classroom and flipped classroom was analyzed in view of the characteristics of micro-learning video. Graphics and Image Processing was selected as the course to be studied. The way to design micro-learning videos specific to key and difficult points in teaching during the reform of flipped classroom was discussed. The application effect of micro-learning video was analyzed. Practice has proven that micro-learning video plays an important role in helping teachers and students solve the problems in teaching. It improves the autonomous learning and collaborative learning of students as well as their ability to find and solve problems.

1. Introduction

Flipped classroom, a type of blended learning mode emerging in the United States, entered China in 2012. With the help of information technology, flipped classroom reverses the content, form and purpose of traditional classroom instruction and homework. Teachers record instructional content in video format and help students finish preview, learning and review tasks after class. In this way, traditional classroom becomes the place where teachers provide individual coaching and discuss with students to solve problems [1].

One necessary condition for implementation of flipped classroom is that students must be provided with video resources for study to create the chance of out-of-class activities. Therefore, by referring to relevant theories and taking Graphics and Image Processing as an example, we analyzed the instructional design of micro-learning video in details. A series of micro-learning videos based on key and difficult points in teaching were recorded in accordance with course objectives and then applied in the teaching activities of flipped classroom. The analysis of application effect indicated that micro-learning video can effectively improve the learning ability of students and their academic record. It provides a valuable reference for resource construction of flipped classroom.

2. Difference between flipped classroom and traditional classroom

In traditional classroom, teachers impart knowledge with the methods like lecture, case study and group discussion, in which lecture usually accounts for over 70% of class time. Teachers are the imparter of knowledge in a traditional classroom. In flipped classroom, the focus of knowledge instruction is not on classroom any more. Teachers need to record videos before class, while students shall learn the videos before class. Thus, teachers only instruct students how to learn in the ways like case study and group discussion in the classroom to internalize knowledge. Students become the subject in the classroom. They acquire knowledge with the methods of active learning such as discussing with classmates and putting questions to teachers. Therefore, the difference between flipped classroom and traditional classroom can be summarized as follows:

(1) The role of teachers changes from imparter of knowledge to instructor of knowledge, and the role of students changes from passive learner to active learner.

(2) In flipped classroom, teaching methods are dominated by other ways (e.g. group discussion and case study) than lecture.

(3) Teaching mode is transformed from traditional face-to-face instruction to video-based distance learning in combination with class coaching, so as to help students master and apply knowledge effectively.

(4) Application of modern technology. New educational technology and means like Internet and video are integrated in former classroom instruction.

3. Instructional design of micro-learning video

3.1 Design philosophy

The preparation of micro-learning video is not only a process of technological development, but also a type of creative work that integrates leading educational ideas and methods of creative teaching design. However, teachers are always the final determinant [2]. Therefore, instructional design is the major premise for designing and producing excellent micro-learning video. In terms of Graphics and Image Processing, some images in real life are usually collected for processing in classroom. Therefore, instructional design of micro-learning video should focus on how to retain simple knowledge and present the procedure of image processing to solve teaching difficulties.

3.2 Design method

In our teaching activities, micro-learning videos for graphics and image processing are classified by toolkit or menu, and each video explains the simple steps of using a tool or a menu. The duration of each video depends on the difficulty of instructional content and is generally maintained at 5 minutes or so. Traditional lecture lasts too long. As a result, students are susceptible to distraction and lack interactive feedback, thus compromising the effect of knowledge assimilation [3]. In the case of “hair cutout using channels”, the methods of instructional design for micro-learning video are investigated.

(1) Simulate the thinking process of case. Micro-learning video demonstrates the operation of Photoshop based on instructional design in coordination with lecture so as to realize the effect of image processing step by step. During video recording, teachers operate the software as they lecture. In this way, the scene in class is simulated and the relation between steps is also expressed clearly to better present the idea of image processing.

(2) Analyze the tools available in image processing. To cut out hair and achieve perfect image matting effect, multiple tools and effects, such as Brush, Smudge Tool, Dodge & Burning and Layer Mask, should be adopted cooperatively instead of only using channels.

(3) Record the process of hair cutout using channels. During recording, students are required to find the better color channel for image matting, paint the edge of hair using Smudge Tool, divide foreground and background of image, create Adjustment Layer and set Hue/Saturation, as well as add Layer Mask to compose the image naturally. The combination of lecture and demonstration guides students to construct case situation in an upward spiral way.

(4) Micro-learning video can be played repeatedly and start at any position for targeted review of students, which is not available in traditional classroom. Moreover, during video recording, it is necessary to learn from successful experience of Woodland Park High School in the United States where flipped classroom originated. The presentation in micro-learning video shall be as humorous and vigorous as possible to improve the interest of students in learning by micro video.

4. Analysis of application effect of micro-learning video

More than 50 micro-learning videos were designed and recorded. The main objective was to deal with the key and difficult points in teaching Graphics and Image Processing and apply these videos in the teaching reform of flipped classroom for non-computer majors enrolled in 2014. Based on the teaching practice and questionnaire survey of 200 students in the selected class, the advantages and problems in application of micro-learning video were analyzed. The findings provide a valuable reference for design and application of micro-learning video.

4.1 Advantage of applying micro-learning video.

(1) It contributes to autonomous learning. With the guide of micro-learning video, students are able to conduct autonomous learning in a more effective way. They can understand the key and difficult points in teaching by watching videos, and train the ability to find and solve problems. Among 200 participants, 76% of them thought that video resources helped them a lot and were conducive to autonomous learning.

(2) It contributes to collaborative learning. In the manner of free combination, the 200 students measured were divided into 60 groups and each group consisted of 3-4 students. The collaborative learning group was required to complete the homework assigned by teachers, learn new knowledge based on the micro-learning videos provided, and record the difficulties which are not resolved during group learning. The questionnaire showed that after a semester of learning, 85% of students thought that micro-learning video contributed to group collaborative learning.

(3) It contributes to expansive learning. Expansive learning applies to excellent students who expect more of themselves. Micro-learning video records basic instructional content and also provides some learning resources for expansion after class in terms of the depth of instructional content. Among 200 participants, 71% of them thought that micro-learning video expanded their horizon and played a leading role in in-depth learning.

4.2 Problems in applying micro-learning video.

(1) Watching videos increases course load. Watching videos after class increases the course load of students. Even if students watch videos at fragmented time, they will have less time for entertainment and rest. In particular, the course load of average students who don't have many interests in learning is increased. Among 200 participants, 45% of them thought their course load was heavy or very heavy.

(2) Students may be overly dependent on video resources. Micro-learning video helps students a lot in understanding instructional content and solving problems, and also guarantees their autonomous learning and collaborative learning in group. However, a considerable number of students are overly dependent on micro video resources. Among 200 participants, 61% of them were overly dependent on videos, and some of them even believed that they were unable to complete homework without videos. Therefore, it is the obligation of teachers to strengthen the training of students' autonomous learning, understand the correct role of micro-learning video, and guide them to utilize micro-learning video effectively and improve their academic record.

5. Conclusion

As the flipped classroom model advances and information technology popularizes, the traditional teaching model in universities will be changed more or less. The application of flipped classroom in Graphics and Image Processing made some progress. Micro-learning video is the key to implementation of flipped classroom. How to introduce flipped classroom into courses properly is the challenge that confronts all teachers and the entire higher education industry. Flipped classroom changes the role of teachers and students, the time distribution of teaching and learning and the knowledge carrier [4]. Practice has proven that micro-learning video plays an important role in helping teachers and students solve the problems in teaching. It improves the autonomous learning and collaborative learning of students as well as their ability to find and solve problems.

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