Application of Micro-lecture in Computer Teaching

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Abstract. As a new type of information-based teaching method, Micro-lecture are popular with students for their short and concise, vivid and diversified features. This article mainly introduces the concept of micro-class and its production process. First of all, this paper briefly introduces the basic concept and main features of Micro-lecture; Next, this paper analyzes the eight performance modes of the Micro-lecture and its main content carefully; Finally, this paper takes the actual Micro-lecture “Quick Installation and Repair of Computer Operating System” as an example, and elaborates the main steps and specific methods of Micro-lecture production.

1. Micro-Lecture and Its Features
By definition, the purpose of Micro-lecture is to enable learners to learn independently and get the best learning results. It has been elaborately designed to present short, complete teaching activities around a knowledge point or teaching session in video format.

Generally speaking, Micro-lecture only teaches one or two knowledge points, without a complex curriculum system or a large number of teaching objectives and objects. “Fragmentation” is its most obvious feature. But the Micro-lecture is to target specific target groups and deliver specific knowledge content. Micro-lecture itself still needs systematicity, and the knowledge expressed by a set of micro-courses still needs to be comprehensive. The main features of the Micro-lecture are as follows:

(1) The teaching of lecturer.
When the teacher is lecturing, he/she may appear in the lecture or in the form of a voice.

(2) The playability of streaming media.
The media type of Micro-lecture is usually video or animation, which can be played based on network streaming media.

(3) The duration of the course is short.
A micro course of video 5-10 minutes is appropriate, the minimum 1-2 minutes, the maximum should not be more than 20 minutes.

(4) The rigor of teaching design.
For each subject knowledge point or skill point, the content design needs to be complete and detailed.

(5) Cases of classic demonstrations.
Teaching and learning scenarios with real and typical cases.

(6) Supporting relevant resources.
Micro-lecture needs to be accompanied by relevant homework exercises, resources, and so on.
2. **Classification of Micro-lecture**

With the reform of education and the development of Internet technology, video production of Micro-lecture has a variety of forms. It can be a student course in which students participate in the enjoyment of traditional teaching; Or a film course where students learn about the world from an audio-visual feast; Or a strategy course, a small strategy to solve a big teaching problem; Or it's a kind of reflective curriculum, where small details lead to deep thinking about problems, and so on. Specifically, according to the content and form of presentation, it can be divided into the following eight modes.

(1) **Classroom Mode.** This is a form of Micro-lecture showing the real classroom teaching. The advantage is that the familiar scene is more conducive to the teacher to give instruction, while showing the teaching style and classroom atmosphere. The shooting location is generally selected in the classroom, auditorium, recording room, etc. The main elements of the shooting are the real classroom situation and the interaction between teachers and students. The subject of the shooting is teacher and student.

(2) **Practical Training Mode.**

This is a form of Micro-lecture showing the actual operation process. The advantage is that the operation process can achieve clear and prominent effects through local close-up shooting and post-editing. The shooting place is generally selected in the practice room, laboratory, workshop, etc. Shooting elements are mainly practical situation display, operating details close-up. The subject of the shooting is a teacher or an engineer, and students are optional.

(3) **Cutout mode.**

This is a form of Micro-lecture showing virtual scenes that are impossible in real life. The advantages are virtual scene design, highlighting the style of teachers, and explaining the integration into the post-packaging. The shooting location is generally selected in the company's recording studio, school classrooms with green cloth. The main elements of the shooting are the lectures given by the teacher. The subject of the shooting is the teacher.

(4) **Screen Recording Mode.**

This is a form of Micro-lecture showing the steps of software operation. The advantages are teaching software operation steps and effects, and the post-editing highlights key steps and skills, which is the first choice of software operation courses. The shooting place is usually in the classroom and office. The shooting elements are mainly the operation of the screen. The subject of the shooting is the teacher voice.

(5) **Two-dimensional animation.**

This is a form of Micro-lecture that shows an animated short. The advantage is that the knowledge content which is difficult to reproduce and difficult to understand in the scene is vividly explained through the story. This kind of Micro-lecture has high requirements on animation character image design, plot design, scene design, action effects and later dubbing.

(6) **Creative Animation.**

This form of Micro-lecture is a supplement to the two-dimensional animation Micro-lecture. The advantage is that in the absence of two-dimensional animation interpretation, by means of representing material in series, to achieve lively and interesting knowledge explanation. This kind of Micro-lecture has high requirements on material.

(7) **Three-dimensional display.**

This form of Micro-lecture is an upgrade of two-dimensional Micro-lecture. The advantage is to realize 3D modeling of the knowledge points or scenes explained and to restore the real object physical model. This kind of Micro-lecture can be mixed with courseware and video, which requires high requirements for the 360-degree demonstration of 3d model, external whole and internal structure details.

(8) **Courseware Mode.**

This kind of Micro-lecture is an upgrade of teaching courseware. The advantage is that there are many texts and original knowledge, and the dynamic effect of courseware is adopted to focus on attracting the attention of learners. This kind of Micro-lecture has high requirements for PPT courseware, which is supplemented by dubbing and special effects in the later stage.
Although there are various forms of Micro-lectures, the Micro-lectures completed are not limited to one or two forms. According to what needs to be explained for better teaching effect, an excellent Micro-lecture sometimes needs to combine more than three forms of expression. (Fig. 1 shows an example)

![Classroom Mode](image1)

![Practical Training Mode](image2)

![Screen recording Mode](image3)

![Courseware Mode](image4)

**Figure 1. Several typical Micro-lecture modes**

3. **The Production Process of Micro-lecture**

The essence of Micro-lecture is complete teaching activities with detailed video and appropriate music to help teachers achieve the purpose of imparting knowledge, then arouse students' in-depth thinking. For teachers, the key factor of making Micro-lecture video is to reflect the student-oriented teaching thought, and the making process should reflect the content from the perspective of students, and attach importance to the design of learning situations, resources and activities.

In general, the production of Micro-lecture should be subject to the steps of selecting the production content, designing teaching plans, developing the video script, photographing and collecting materials, editing and synthesis. The following is an example of a practical micro-class production case "Quick Installation and Repair of Computer Operating System" to analyze and explain in detail.

(1) Selecting the production content.

Due to the time limit, a micro-lecture can only complete one or two knowledge points or skills. How to extract the 90-minute teaching content of two classes into a 10-minute micro-lecture? The selection principle is generally to pay attention to the representativeness, practicality and timeliness of content. "Quick Installation and Repair of Computer Operating System" is a basic skill in the operating system establishment and maintenance unit of the "Computer Assembly and Maintenance Training" course. It is very practical in daily work, study and life. It contains two important knowledge points: the production of winpeboot disk and the quick installation of the operating system. The whole duration is also in line with the production requirements of micro-lecture.

(2) Designing teaching programs.

After the teaching content is selected, the corresponding teaching plan is designed according to the characteristics of the teaching content, and the teaching of micro-lecture is designed in outline. The
teaching programs is similar to the teaching plan prepared by teachers, mainly including teaching objectives, key points and difficulties, teaching methods, teaching content and teaching organization, and matters needing attention. Among them, this part of teaching content and teaching organization should explain the teaching steps and implementation details in detail, and determine the teaching form adopted by each link.

(3) Developing video script.

Different from the teaching plan prepared by teachers, the video script is a detailed design of micro-lecture. It designs and describes how to present the teaching plan through video screen step by step. The emphasis is to divide the teaching process into several scenes according to the film shooting script mode, and give the detailed design of each scene. With a scientific and detailed script, the teacher and the production staff of each link of the micro-lecture can have a clear aim and perform their duties, and finish the micro-lecture work more efficiently.

The main contents of the micro-lecture video script of "Quick Installation and Repair of Computer Operating System" are shown in Table 1.

(4) Material shooting and collection. Filming was conducted according to the previous survey site and shooting schedule. If you need an environment of green matting, you can arrive at the site ahead of time to arrange the site according to the shooting site, equipped with tools such as green cloth, lighting, track, makeup artist and cosmetics, and explain to the teacher the actual shooting requirements, so as to guide the teacher to complete the shooting process with high quality and freedom.

According to different types of micro-lecture, the shooting mode is also different, as follows:

Classroom mode: two or three professional high-definition (HD) 4K cameras were used for shooting, one for panoramic shooting, one for the teacher to take follow-up shots and close-up shots, and one for students and interactive scenes.

Real shot mode: two or three professional high-definition (HD) 4K cameras were used for shooting, one for panoramic shooting, one for the teacher who is the lecturer and the operation close-up, and one for the student close-up shooting.

Screen recording mode: a professional high-definition (HD) camera is used for recording, and the explanation is recorded in full screen by professional screen software.

Cut-out mode: two professional high-definition (HD) 4K cameras, one for front and one for side close-up.

2D animation: a professional high-definition (HD) camera is used for recording.

For the video recording and two-dimensional animation Micro-lecture, the teacher shall do the dubbing work himself or the professional staff of the company shall provide dubbing services.

(5) Post Editing And Synthesis. Post-production includes post-production of video and two-dimensional animation.

The editing mainly consists of virtual scenes, camera switching, PPT mapping, etc. The virtual scenes are mainly used for green matting, combining the teacher's real speech with the virtual scene, and cooperating with the teacher's explanation to gradually display the content. The lens switch and PPT map are mainly used for actual shooting. Using the three-person camera, the lens switch includes panorama, middle scene, students and PPT display four lenses. The lens switch follows the principle of natural reality, and at the same time refers to the principle of lens switch of TV, and the duration of each lens should not exceed 15 seconds. PPT texture is designed to ensure the clarity of the projector picture or the mobile TV screen during shooting and improve the aesthetic feeling of the whole picture. After the editing is completed, set the output of video according to the technical standards of the output, and the setting is completed and selected.
Table 1. "Quick installation and repair of computer operating system" micro-lecture video script.

| Scene/step | Main content                                                                 | Word line                                                                 | PPT / Picture Effects                  | Time budget |
|------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------|-------------|
| Title      | Course content                                                               | Hello everyone, in the previous course we learned about the computer startup process, hard disk partition formatting and installing the operating system with the CD. In this lesson we will learn how to quickly install an operating system for a computer. Let's look at a few cases first. | Suitable background image              | 3S          |
| Scene n    | Make WinPE bootable U disk                                                   | First, you must make a WinPE bootable USB drive to quickly install the operating system. WinPE bootable U disk is a U disk with WinPE operating system, various installed software and system image files. There is no limit to the size of the U disk. It is advisable to install all the above files. It is generally recommended that the capacity be 8GB or more. | Teacher lecture                          | 20S         |
| Scene n+1  | Make WinPE bootable U disk                                                   | The software for making WinPE bootable U disk can be downloaded online, and there are many versions. Below, we take the Chinese cabbage WinPE bootable U disk production tool software as an example to demonstrate the production process of WinPE bootable U disk | Practical demonstration, Screen recording | 150S        |
| Conclusion | Part of Thinking                                                             | Next, please continue to think: If Xiao Ming wants to restore his original operating system to the computer, how to install it? Today, our learning content is over, thank you! | The screen appears the word about thinking, the content and prompt of thinking. | 15S         |
| End of film| Production unit, etc.                                                        |                                                                           | Suitable background image              | 5S          |
4. Conclusion
Looking forward to the future of Micro-lecture, it is not difficult to find that with the rapid development of mobile communication and computer technology, the forms of Micro-lecture will be more diversified, the content displayed will be more abundant, and the platform for launching will be more extensive. In particular, combined with new learning modes such as mobile learning, distance learning, online learning and "ubiquitous learning", Micro-lecture will certainly become a new and important teaching mode and learning mode, and become the theme of education development in the future.

5. References
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