

Application of Micro-Video Teaching in Precision Agriculture

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Abstract—*Precision Agriculture* is an important and comprehensive curriculum in undergraduate majors included agronomy, biotechnology, biological sciences and so on. By reason of the contents of this course are complex, indescribable and nonrepresentational, so that students often feel boring and confusing. When appropriate amounts of micro-video teaching were applied in the teaching practice of this course, making this course turned into more interesting and informative, so that the enthusiasm of students would be fully mobilized and motivated, and finally the understanding of relevant expertise of this curriculum for them would be facilitated observably. The advantages of micro-video teaching were summarized in this paper. Meanwhile, some existent problems in the application of micro-video teaching were also pointed out unreservedly, as the theoretical basis for the further popularizing and application of this teaching method in other courses.

Keywords—*Micro-video; Teaching; Precision Agriculture*

I. INTRODUCTION

The curriculum of *Precision Agriculture* mainly contains crop science, informatics, computer software, automation, engineering and so on. This course seeks to provide students with a general understanding of precise implementation of modern agricultural production. What's more, students can understand the situation of current modern agriculture and the status of precision agriculture in the supply of agricultural products. They will be familiar with the types of new agriculture and its application characteristics and preliminary grasping of the precision agriculture production and reproduction. The professional vision and ability of students can be expanding ultimately by learning this course. Due to the extensive and interdisciplinary nature of the *Precision Agriculture*, students may find it difficult to comprehend and master the content of this curriculum, and resulted in the effect of teaching inefficiency if only the traditional model of teaching is applied. Because the traditional teaching mode separates the theory and the practice, so the teaching effect is often poor. At the same time, there are also significant differences in teaching effectiveness due to the great differences in theoretical and experimental teaching conditions and the teaching level of teachers in various colleges and universities in China.

With the rapid development of network technology and multimedia technology, multimedia teaching methods were widely used in teaching practice of many disciplines [1,2], and

the application of micro-video teaching was also applied more and more generally. Micro-video teaching referred to the introduction of short video clips (3-5 minutes) in the classroom, which were generally based on a complete meaning of the tiny knowledge module or unit of information to elaborately show the relevant knowledge-points of the course with the help of micro-video resources. As a new teaching technique, its obvious characteristics were short, exquisite and convenient operation [3,4]. The micro-video resources mean that those video clips could be downloaded and shared on the internet through personal computers, mobile phones and other tools. Meanwhile, micro-video resources had a wide range of contents, such as movie clips, short documentaries, short news videos, advertisement clips, etc. [5,6]. In addition, micro-video was made up of sound and continuous pictures, and the vivid performance of it could be achieved spontaneously [7]. The disadvantages of traditional teaching methods such as monotonous and abstract could be overcome via application of micro-video teaching. Hence, micro-video teaching was an important supplement and innovation in teaching methods, as an important part of teaching reform [8,9]. Therefore, on the basis of carrying out the teaching of *Precision Agriculture* for several years, the method of micro-video teaching had been applied naturally in the teaching of this course, in order to explore the construction and reform of the course, and fortunately reasonable teaching effect had been obtained. In the end, the advantages and some of the issues of applications of micro-video teaching in *Precision Agriculture* had been summed up straightforwardly in this paper.

II. MERITS OF MICRO-VIDEO TEACHING

A. Knowledge points could be shown veritably and vividly by application of micro-video teaching

There were many abstract processes in the *Precision Agriculture*; for instance, with the help of information technology to guide agricultural production. However, this relevant theoretical and technical knowledge were both important and difficult to understand. In the traditional teaching process, most of teachers might use the process flow charts or a few related pictures of production, etc. Although students were likely to comprehend some of these technologies and methods, the actual production of agricultural products might be more complicated, involved many steps and other processes. There were many details that need attention, and the whole process were more abstract, these contents could not be understood and

mastered by the teacher's verbal description or picture display. The whole production processes and the details of the problems could be displayed vividly and systematically via making use of micro-video teaching. Understanding of these contents might be enhanced for students. For example, through broadcasting the micro-videos of using computers to control the lighting and temperature of greenhouse, the whole process of temperature and illumination change would be demonstrated clearly. By utilizing micro-video learning and combining with the teacher's appropriate explanation, students would have a deeper and intuitive understanding of the content and knowledge; better teaching effectiveness could be achieved subsequently.

B. The contents could be made easier to be understood for students by micro-video teaching

Micro-video teaching is the organic whole of the combination of image and sound. It is displayed in a dynamic form. Not only rich and colorful images, but also detailed explanation of contents and information, micro-video teaching makes plain and dull knowledge easy to understand. Some of the focus and difficulty knowledge points also will be become more and more easily accepted and comprehended by students. For example, the substantial contents in *Precision Agriculture* course were complicated and difficult to be quickly identified and gained for students. However, if micro-video teaching was introduced in *Precision Agriculture*, the students could quickly grasp the characteristics of specific production process. This was because through the introduction of relevant video clips, students could not only see how computers accurately controlling the process of lighting, temperature and irrigation, but also hear clearly and concisely explanations to elaborate on the growth of crops. Compared with the traditional teaching methods, video and audio performance forms were more intuitive and vivid, so that the obscure contents became more facile to be comprehended and mastered for students.

C. Micro-video teaching brought a large amount of recent and abundant knowledge in Precision Agriculture

It is one of the directions for teaching reform to reduce the class hours and make students have more time to study independently. In our school, the period of *Precision Agriculture* course was reduced from 48 hours to 32 hours, which requires teachers must finish their teaching tasks in less time. But if the traditional teaching methods were still applied in *Precision Agriculture*, the teaching progress would be very slow, and the scopes of knowledge involved were narrower, and the relevant knowledge in the course could not be updated in time. How to teach more knowledge information to students in fewer hours might be a fairly difficult problem in *Precision Agriculture*, but this problem could be easily solved if micro-video teaching was used becomingly. There would be not taking up too much class time (usually a micro-video only 3-5 minutes) to perform micro-video teaching, but which could contain a lot of knowledge. For example, the latest research results about *Precision Agriculture* in various countries could be focused showing in a short period of time by application of micro-video teaching, and then the students could quickly acquire the latest and most abundant knowledge and information. Not only students' horizons would be developed adequately, but also students' curiosity would be fully

stimulated, so the teaching efficiency of the course was bound to be significantly improved and access to better teaching effect.

D. The making levels of multimedia courseware could be observably improved by using of micro-video teaching for the teachers

With the popularity of the Internet, teachers can collect and download the various micro-video resources needed for teaching from the Internet. When making the multimedia courseware used in the process of micro-video teaching, the teacher only needs to use the network to retrieve the required video resources and then use the simple download technology to download the courseware to make the courseware. However, the making process of Power Point (Slide teaching) might be reasonably tedious, teachers needed to type the teaching content verbatim and edit text and design the layout and divisions. Micro-video teaching could provide a new way for multimedia courseware for the teachers which were unfamiliar with making Power Point. In addition, multimedia courseware made by using micro-video resources was a digital teaching material that could be preserved for a long time. Through constant updating and accumulation, some teachers could create their own micro-video resource library for other teachers in the whole school to improve the overall courseware levels of *Precision Agriculture*.

III. MATTERS THAT NEED TO BE ATTENTION FOR TEACHERS IN MICRO-VIDEO TEACHING PROCESS

A. The frequency of micro-video teaching in each class should not be too much

Classroom teaching is a kind of cognitive activity, its salient feature is the need to interact with teachers through students, so that students can understand and master a certain point of knowledge preferably. In the process of micro-video teaching, some teachers played too many micro-video resources and sometimes even used the whole class time to let students watch micro-video. For example, some teachers just sat on the platform and clicked the mouse to play one after other micro-videos, while the teaching of the process of agricultural production might completely be turned into a video lesson. Students could only passively watch these micro-videos, when they encountered the problems in agricultural production process, which they might do not understand well. Because the micro-video were played constantly, teachers did not answer their questions in time; there were more and more problems which the students can not understand well, so that students may eventually loss of learning interest. In general, the number of micro-video played in a lesson should not be exceeded 3, and each micro-video should be paused after it is finished, and then teachers could promptly explain the key and difficult issues in it. Moreover, according to students ask some questions for the contents of the micro-video, teachers were to answer the questions and allow students to take the initiative to participate in the discussion about the micro-video, so that students could be transformed from passive recipients into active participants.

B. Implementation of micro-video teaching needed to be utilized the combination of blackboard and Power Point

In the process of playing a Micro-Video, it might be difficult for students to understand and grasp directly the essence of the teaching content from the narrative of the videos, when the videos were played without the necessary written or PPT explanations. In fact, after the micro-videos played many students often feel little harvest. Teachers should organically integrate micro-videos playback with blackboard or Power Point as a complete teaching process, with both micro-video content related to specific practices of *Precision Agriculture* and teachers' detailed theoretical knowledge explained in blackboard and Power Point demonstrations, so that the key and difficult issues were to be highlighted and easy for students to understand, and then the purpose of enhancing teaching effectiveness can be achieved ultimately.

C. Regarding highly on the quality of micro-video teaching resources

Although micro-video teaching had a positive effect in the teaching of *Precision Agriculture*, some teachers could not effectively use the Internet to gain massive information for suitable micro-video teaching resources. Because they could not master information technology well, teachers could obtain only a small number of micro-video teaching resources with not timely update and low definition. At the same time they also could not properly adjusted and produced access to the micro-video teaching resources, resulting in the teaching process used by the micro-video resources might not be consistent with the teaching content. In addition, in the process of micro-video teaching, some teachers were not proficient in Power Point and micro-video switching operations, resulting in the entire course were straightforward, inconsistent and fairly boring. The teaching effectiveness and quality were both seriously affected. Therefore, the teaching unit should strengthen teachers' pre-job training, enhancing teachers' ability to use information technology, attaching importance to the quality of micro-video resources. Meanwhile teachers should pay attention to the exchange and sharing of micro-video resources among colleagues, and collecting them through various channels and approaches to gain micro-video data related to the *Precision Agriculture* course content.

In addition, teachers should also make appropriate analysis and selection of the downloaded micro-video data, deleting the resources which are not related to the *Precision Agriculture* course, and avoiding the precious time for these improper micro-video materials. Therefore, teachers should not only pay attention to the quality of micro-video resources, the use of high-definition content and timely updates of the materials, but also pay attention to the selected resources. They should guarantee the teaching topics with closely related, so micro-video data should be appropriate edited and produced, making it representative, and improving the consistency with the teaching content. Finally, we should also attach importance to the accumulation of video teaching resources in the ordinary time and lay the foundation for the establishment and improvement of micro-video teaching system.

IV. CONCLUSIONS

In summary, the interest of course knowledge could be increased by the rational use of micro-video teaching in the teaching practice of *Precision Agriculture* course and then students' learning enthusiasm would be enhanced significantly. Through the organic combination with traditional teaching methods, the teaching quality and effectiveness could be significantly improved. What's more, the contents could be vivid displayed via the micro-video teaching, and the interest in learning of students would be greatly stimulated. If teachers could properly combine teaching objectives in teaching practice and choose reasonable micro-video resources, they could give full play to the advantages of micro-video teaching, and then the students' creative thinking would be cultivated timely and better teaching results were to be achieved for students with active learning ability. Micro-video teaching, as an open information carrier, was introduced into the teaching of *Precision Agriculture* course, which was a new attempt and experience. It needed to be combined with conventional teaching methods. Some attentions should be paid to the use of micro-video teaching, and then the teaching effect of *Precision Agriculture* would be improved obviously through continuous exploration and application.

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