

Exploration on Teaching Reform of Bioenergy Curriculum in Colleges and Universities

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Abstract: Some problems in the teaching process of bioenergy curriculum had been analyzed objectively in the paper. Under the background of the rapid development and popularization of WeChat, it's proposed to apply the WeChat platform to the teaching of bioenergy curriculum naturally. The curriculum reform and practice of bioenergy were discussed subsequently, and the advantages of WeChat platform auxiliary teaching were summarized definitively, so as to lay a theoretical foundation for further application and promotion of WeChat platform teaching methods.

1. Introduction

The bioenergy curriculum mainly covers energy plants, energy microbes, genetic improvement of energy organisms, biogas industrialization, bioproducts, biomass industry, energy agriculture, and future bioenergy development. College students can understand the current energy situation and the status of biomass energy in energy supply through this course, and know new energy types and their application characteristics, and initially grasp the principles of production and reproduction of biomass energy resources and biomass energy conversion.

The concept of sustainable use of resources will be established for the students, and their professional vision and capabilities will be expanded through the system learn of bioenergy curriculum, too. Because there are a wide range of topics and crosses in multiple disciplines covered in the bioenergy curriculums, if only the traditional teaching model is used, the contents of the curriculum may not be understood and mastered well by students, so that the effect of teaching may be poor. At the same time, due to the different teaching conditions and teaching level of teachers in various universities in China, there may be significant differences in teaching effectiveness.

At present, the traditional teaching mode is a common teaching method adapted in the process of bioenergy teaching in most colleges and universities in China, and often paid more attention to the accumulation of students' knowledge and the construction of knowledge system [1]. However, the traditional teaching model relies too much on the instructors from teachers, and the subjective initiative of the students cannot be fully mobilized [2]. Therefore, it's difficult for students to understand and accept the knowledge with application of this this teaching model, and students may feel boring and tedious in the entire learning process, the subjective initiative of students can not be fully exerted, and the atmosphere of classroom is inactive.

The enthusiasm and motivation of students for learning bioenergy will be gradually lacked and lost, and eventually the ability to innovate and practice for students will not be well exercised and improved. Hence, this type of teaching model adopted in the bioenergy curriculum needs to be ameliorated.

In era of knowledge informatization, the needs of teachers and students cannot fully be met by

traditional teaching methods, and new requirements for teachers' innovative ability and ability to obtain information are put forward subsequently, so teachers must to actively discover and establish new teaching ideas and techniques on these foundations to find new ways to promote effective interaction with students [3].

At the beginning of 2011, a new chat tool named WeChat has been developed and released by Tencent company [4, 5]. This chat software has many functions, texts, voices, pictures videos can be send with this chat tool in real time[4-6]. Meanwhile, it can be installed on mobile phones, and can be used by users at any time. Hence, WeChat is quickly accepted by the public in China, especially among young people [4, 5]. As of April 2017, the number of active users with WeChat has been reached to 889 million monthly. Particularly among the college students, the usage rate is very high (more than 90%) [7].

WeChat is a new type of chat software [8]. It has become the most common chat tool for college students in China and has an indispensable position in their lives. This allows us to see a new opportunity for educational networking, perhaps providing a new platform for mobile teaching. In this case, micro-learning and mobile learning are made it easy to walk into college students' lives. On July 29, 2010, the outline of the national medium and long-term education reform and development plan (2010-2020) has been issued by the ministry of education of the people's republic of China, which focuses on the application of network information technology in education [9]. WeChat contains a lot of useful functions, we can use WeChat to send text, voice, video and pictures, and publishing those information in a circle of friends [5]. At the same time, special official accounts can be created in WeChat, so that more people can pay attention to the related content and news. Hence, we can apply these features of WeChat in the teaching process of bioenergy courses.

Teachers and students can create a brand-new teaching model of bioenergy through WeChat, so that the interest and passion of college students in bioenergy courses can be fully stimulated, and students can actively mobilize their subjective initiative. And then an atmosphere of independent learning is conducive to being created, which is a powerful supplement for the compressed curricular hours in university.

This research intends to use the teaching of bioenergy courses in the faculty of agricultural science of Guangdong Ocean University as an example to apply the WeChat platform into the teaching process of bioenergy. The WeChat platform, which commonly used by students, can be used to assist in teaching to stimulate interest of students in independent study and improve learning effectiveness of students.

2. Analysis of Current Status of Bioenergy Teaching

2.1 Compression of Class Hour

As an important basic professional course in biotechnology, agronomy, and plant protection, the basic theories and methods for breeding of energy crops are included in bioenergy. It plays a role in the agriculture and forestry and is a very important curriculum. However, the academic hours of professional courses have greatly been reduced in colleges and universities in China during the curriculum reform. For example, the theoretical period of the bioenergy curriculum was 48 hours, but now it has been reduced to 32 hours. Because the academic hours have been severely reduced, teachers only have time to lecture on important topics in class. So that some theories of bioenergy may not be developed in detail, and it is even more difficult to teach students the latest theories and research results. Some students have gradually lost their enthusiasm and interest in learning about the curriculum, because they can't understand the content of the bioenergy curriculum. As a result, students will become uninterested in learning, and teachers cannot teach well. What's more, the enthusiasm of teachers can not be mobilized energetically and the difficulty of teaching bioenergy courses will be increased ultimately.

2.2 Lacking of Communication between Teachers and Students

The communication with students is very important for improvement of teaching quality. Teacher talking and students listening is a traditional way we used to teach in China. However, is the knowledge taught by the teacher fully understood and mastered for the students? It is difficult for teachers to collect feedback on these issues. If teachers want to reform teaching, they can only do it based on their speculate reasons. Therefore, this is also the reason why the teaching content of the curriculum is modeled and simplifying methods. Now, because the class hours are severely reduced, the time for teachers and students to meet and communicate with each other becomes more less. Moreover, the interactions between teachers and students are generally only in the course, and the questions are also mainly proposed by the teacher for students to answer under the traditional teaching methods. If things go on like this, an insurmountable psychological gap will gradually develop between students and teachers. Even if they interact with teachers face to face, some students may feel a bit scared. Therefore, in order to improve the teaching quality and effectiveness of the course, some network resources such as the WeChat platform can be introduced into our course teaching process to compensate for this deficiency and increase the interaction opportunities between teachers and students.

2.3 Limited Teaching Resources

The traditional teaching of bioenergy courses mainly focuses on three parts: expounding the teaching materials, explaining basic theoretical knowledge and recommending various literature materials. With more and more information on the Internet, new resources are becoming increasingly easily to be learned and mastered by us nowadays. Therefore, traditional courses can no longer be noticed by students, and interest and resonance of students cannot be aroused in those classroom teaching. The contradiction between the compressed academic hours and the mass of teaching content is existing in curriculum teaching now, making it difficult to obtain good teaching effects by using the teaching time in the classroom only. Hence, the network information should be used to enrich the teaching resources of the bioenergy curriculum, so that students can not only accept the book content taught by teachers in the class, but also use the online platform outside the classroom to gain more fresh information about bioenergy curriculum, so as to increase teaching resources and expand stretch the mind of students.

2.4 Traditional Teaching Methods are Singleness

When teachers teach classes of bioenergy curriculum in most universities in China, they may use the way of teaching knowledge of textbooks in a “one-to-one” teaching style. The teaching content is limited to book knowledge. The result of preaching and teaching can only be achieved with this approach, but the effect of disabusing can not be achieved by the students [10]. This teaching mode has been out of touch with the times and cannot be kept up with the rapid development of information age. As a result, students tend to feel tedious about the teaching process and do not understand the main lines of knowledge content. Even students cannot master the focus and difficulty of the bioenergy curriculum. Therefore, this teaching model will lead to lack of energy in the classroom, and the learning motivation of students cannot be fully mobilized.

3. Application of WeChat Platform into Bioenergy Curriculum

The new teaching model with WeChat platform was adopted in bioenergy curriculum in this study, and the teaching of two classes (a total of 68 students) in the our school were applied with the new method, while the teaching of other two classes (70 students in total) were adopting the traditional teaching methods to carry out a semester of teaching reform and practice of the course. In addition, the survey of these two teaching classes was showed that 100% of the students had installed WeChat software in mobile phones, and used it as the main communication tool. Finally, we analyzed and compared the teaching effects of these four classes.

3.1 Using WeChat to Promote the Update of Bioenergy Teaching Resources

Teachers could upload useful learning resources via texts, pictures, audios and videos with the help of WeChat, and students could acquire the need in circle of friends in WeChat, such as reading, reprinting, replying, and asking questions, and so on. Students can also actively participate in their own activities, and various types of information related to the content of bioenergy courses were disseminated through the WeChat platform. We could also send curriculum learning resources to the students who cared about the platform by creating a bioenergy public platform. When using the WeChat platform to learn bioenergy courses, students could choose what they were interested in learning according to their own interests and hobbies. Finally, those resources were shared with the assistance of WeChat platform, leading to broaden the horizons of students, expand students' knowledge, and enhance students' interest in learning.

3.2 Using WeChat to Expand the Time and Space for Bioenergy Teaching

Based on the WeChat platform system, which was open around the clock, the chat groups were established by teachers and students making the students having a 24-hour online micro-classroom. In addition, it was found that the students in the two classes were users of WeChat. Teachers could send instructional texts, pictures, audios, videos, etc. into WeChat groups, or they could send review questions to specific students via WeChat. And then students could start learning on a piecemeal time and on any occasion, such as dormitory, home, station and airport, to create a more liberal and relaxed learning world for themselves. As a result, the learning locations and class hours were not confined to the classroom. Finally, the students allowed themselves to have an opportunity to study anytime, anywhere, and make up for the shortcomings of compressed class hours.

3.3 Using WeChat to Build a Platform for Teachers and Students to Exchange

Adding interactive discussions with WeChat in the teaching of bioenergy, and transmitting and projecting them to the large screen in the classroom, students made comments and answer questions at any time in the classroom. Meanwhile, teachers compared timely of the students' learning situation and know whether the students were listening carefully and seriously or not, and then the interaction between teachers and students might become easier. Some explorations in this area had been already made in some colleges and universities and achieved good results.

For example, some computer science students at the suzhou university of science and technology in China had used the WeChat public accounts to build a simple interactive program between teachers and students in classroom. Students used this program on mobile phones to interact with teachers, and they could also use it to submit assignments, answer questions, and participate in discussions. What's more, discussions between teachers and students after school could be also made feasibly with the help of WeChat. Students used WeChat to ask questions to teachers and other students and discuss problems, and to deal with all kinds of doubts encountered in the learning process. Using the circle of friends in WeChat, students could timely feedback their needs, discuss curriculum knowledge points, publish their own learning opinions and insights, and present their own experimental ideas. Moreover, students consulted some knowledge and content outside the classroom, and teachers also accessed the feedback and information from students through the WeChat platform.

3.4 Comparison of the Effects of Teaching

The evaluation results of this round of course teaching were shown in Table 1. It could be seen from Table 1 that the assessment results of the 1st and 2nd classes of WeChat teaching test classes were significantly higher than the other 2 normal teaching classes. From the results summed up in table 1, the model of WeChat-based bioenergy teaching reform was feasible. Through the communication and interaction of the WeChat platform, the learning efficiency and interest of students had been greatly improved. The excellent rate of the final exam results and after-school exercises, and the popularity of the courses by students were all significantly higher than those of the control class (Table 1). During the course of teaching, students found and corrected mistakes in

a timely manner by repeatedly watching relevant materials. Moreover, the ability of students to find problems and solve problems had also been improved observably. Judging from the nature of the curriculum, this kind of WeChat-based teaching model in bioenergy curriculum might be also widely used in the teaching of other courses.

Table 1 Statistics of teaching effects of bioenergy curriculum

Class	Excellence rate of final exam (%)	Excellent rate of after-school exercises (%)	Excellence rate of assessment of teaching (%)
1	48.3	95.4	98.2
2	50.6	94.8	96.5
3	20.7	40.5	70.4
4	23.6	43.7	65.3

WeChat teaching method was applied to Class 1 and 2; normal teaching way was used in Class 3 and 4.

4. Advantages of Applying WeChat platform in Teaching of Bioenergy Curriculum

4.1 Developing Interest of Student by Creating and Focusing on the WeChat Public Platform

The WeChat public platform has emerged as a new thing in mobile communication technology and is now in full swing in the marketing field. Based on the features and advantages of this platform, a WeChat platform for bioenergy public was created to send curriculum learning resources to students who were concerned about the platform. According to their own interests, students used WeChat to conduct learning of bioenergy courses and screen their favorite resources about bioenergy curriculum.

4.2 Inspiring Self-learning Ability of Students through Circle of Friends in WeChat

Using the circle of friends in WeChat, teachers published the logs related to bioenergy courses. These logs could be taken various forms, such as pictures, videos, audios and texts. The content of logs could be original or forwarded ones. The knowledge of bioenergy was expanded markedly for students by reading, reprinting, or replying to the diary of teachers in WeChat. And then more diversified information was absorbed by students, and interest and enthusiasm of them were stimulated in learning about the bioenergy curriculum.

4.3 Promoting Communication and Interaction among Students and Teachers

Positive roles were played in the teaching of bioenergy courses with the help of WeChat, specifically in three aspects: (1) When teachers arranged group works, students in different groups established different WeChat groups for discussion and analysis, and finally reached the consensus to produce the final answers. (2) In order to make it easier for everyone to communicate and interact with each other, students also set up different study groups within the school and used the WeChat groups to discuss and help each other. Thus the doubts and difficulties were encountered eventually for them during the process of learning bioenergy. (3) Teachers also established different WeChat groups in units of classes. And then teachers used WeChat groups to organize students to join in the discussing on a certain topic, and they made use of the WeChat group to ask questions to specific students. Of course, Students could express their opinions at any time in the process.

5. Conclusion

With the rapid development of internet information technology and the increasing popularity of hand-held intelligent communication devices, WeChat, as a convenient instant messaging tool, has been become a common way of communication for college students in their studies and life. It also brings new opportunities for the reform and development of traditional teaching models in universities. Teachers and students can use WeChat to create a brand new way of teaching in

bioenergy. The situations of college students using WeChat were analyzed in this paper, and the WeChat platform was applied into the teaching of bioenergy to make it become the bridge of connecting students, teachers or other friends for sharing relevant knowledge. What's more, the teacher-student interactive platform was built for promoting the timely update of teaching resources. Finally, a set of WeChat-assisted teaching modes was summed up and applied to the teaching of bioenergy courses to stimulate the interest of students in independent learning and improve teaching effectiveness.

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