Approaching the Experiment Teaching in Biomedical Textiles

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***Abstract*—As a multidisciplinary subject, biomedical textiles included various disciplines such as textile and biomedical engineering, design and modeling, mechanics, materials and fiber science, and so on. Thus, it is a challenge for the experiment teaching in biomedical textiles. This paper presented the current status of experimental curriculum and recommended several suggestions to improve not only the quality of experiment teaching but also the practical ability of students.**

***Index Terms*—experiment teaching, biomedical textiles, multidisciplinary, multimedia**

I. Introduction

Biomedical textiles is a booming emerging industry. With the increasing living standards, health has become one of the most concerned issues of human society. Moreover, the healthy living environment and well-developed health care system become the basic needs of modern society. Biomedical textiles plays an irreplaceable role in the medical security system to improve the health lifestyle and quality-of-life of individual humans [1]. In this circumstances, Donghua University set the biomedical textiles as a new direction on the basis of the specialty of textile engineering. However, the field of biomedical textiles lies at the intersection of the disciplines of textile and biomedical engineering, design and modeling, mechanics, materials and fiber science, biology and medicine, i.e. as a multidisciplinary subject, is emphasized [2-3]. Thus, it is a challenge for the university to offer the reasonable curriculum for biomedical textiles, especially for the corresponding experiment teaching [4].

A. *The class hour is limited.*

There are many experiments involved in biomedical textiles, such as the process of products, the chemical modification, the evaluation of the products' performance, the biological compatibility and so on. However, the experimental curriculum hours is relatively small, accounting for only 10% of the curriculum of biomedical textiles. Within the limited hours, the curriculum contents were concentrated as compacted as possible. But the amount of information is really too numerous for the students to accept, not to mention the improvement of practical ability.

B. *The monotonous teaching method leads to students' lack of enthusiasm.*

The traditional experiment teaching style of biomedical textiles is in the form that the teacher demonstrates experiment and operates instruments while the students observe the whole process. Due to the large number of students and the limited space of laboratory, it is difficult to ensure that each student could observe the process of demonstration experiments. In addition, because of the limited amount of experimental apparatus, it is also difficult to ensure that each student could operate the instruments themselves. Therefore, with the lapse of time, students gradually regarded it as a curriculum of observation instead of hand-on and lacked the enthusiasm or worse, ignored the importance of the experimental curriculum.

C. *The experimental teacher lacked the systematic training.*

As it has been stressed before, biomedical textiles is a multidisciplinary subject including various fields. In the experimental curriculum, different teachers taught the contents that they are familiar with, such as materials science, medicine, biology and so on. The students sometimes felt puzzled because the experimental curriculum taught by several teachers is relatively independent for them to understand well. Thus, although individual teacher is proficient in their respective field, a teacher with a comprehensive knowledge of the experiment teaching in biomedical textiles is needed. Then it comes to the issue of teacher training. Teacher's self-learning is appreciated. But this is not an effective method to master the whole comprehensive knowledge and the cutting-edge technology well. The individual endeavor without the systematical training is an obstruction for teachers. If teachers' teaching capacity of are weak, then no to mention the improvement of teaching quality.

II. Recommendations for Improvement

According to the issues in the current status of the experiment teaching in biomedical textiles, there are some targeted suggestions to improve this curriculum as follows.

A. *The establishment of special experimental curriculum is urgent.*

The purpose of the experimental curriculum is not only to assist students to study the biomedical textiles, but also to develop their ability of discovering and solving problems. Hence, it goes without saying that how important of experimental curriculum in biomedical textiles, which is as an interdisciplinary subject. It is necessary to establish a special experimental curriculum in biomedical textiles. And the content of the experimental curriculum should keep pace with the ones of biomedical textiles curriculum. This polish the combination of the theory and practice and enhance the knowledge systems of students.

B. *The multimedia teaching mode could be introduced into the experiment teaching.*

Presently, the multimedia has been widely used in university teaching and been well received by students because of its various forms. But the application in the experimental curriculum is still fairly new. According to the particularity of the experimental curriculum in biomedical textiles, it is feasible to create the media library about the usage of all instruments, and carry out the multimedia teaching mode of experiment teaching. This mode includes three parts: pre-class, in class and after-school. Before class, students are demanded to study independently study the usage of instruments by watching video. Each student has a particular identification to log in the media library. They are required to watch all the video and the record will be saved for teacher to check. In class, there are two contents: one is for students to practice operating the instrument that they had learnt from video; another is for the teacher to answer questions raised from students and assist them to operate the instrument. After class, students are separated into several groups to finish the final examination. Students could pick up the research subject interested them from the list or find the research subject themselves. In addition, the finally report will be shared in the media library so that all the students could learn from each other. Therefore, by means of the multimedia teaching platform, students could study at any time and any place. It could arouse their interest to learn, excite curiosity to think and cultivate capability to create.

C. *College should serve the systematic training platform for teachers*

With the evolution of the technology in medicine and materials science, the information update rate of biomedical textiles is rapid. Teachers are able to study the basics knowledge of another field on their own, but also need experts to impart the frontier technology. Therefore, the relative official department of college should supply a favorable training platform for teachers. It will play a magnificent role for their systematic training. The ways of training could be multiple. For examples, the invitation of experts for centralized training, the selection of excellent teachers to pursue advanced studies free and so on. There's no question about that the assessment mechanism should be took into the consideration. The reasonable assessment mechanism for teacher can urge them to make progress constantly. In brief, college could promote the capability of the experimental teachers through the administrative means. Meanwhile, the powerful teachers can greatly improve the quality of the experiment teaching in biomedical textiles.

III. Conclusions

That setting up a reasonable experimental class hour, introducing the multimedia into the curriculum and promoting the quality of experiment teaching are just some suggestion to the improvement of the experiment teaching in biomedical textiles. There is still a lot of work left to optimize this curriculum. However, the ultimate goal is to apply the scientific teaching methods to motivate students to discover the problems instead of to finish the homework, to pursue knowledge with enthusiasm instead of to be imparted knowledge.

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