Discussion on the All-English Teaching Methods of Biostatistics for Foreign Students Major in Aquaculture

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Abstract. Biostatistics is a key course in the teaching system of biology in higher education institutions and it plays a vital role in the biological researches and practices of students. In this paper, a preliminary summary of the exploration of teaching contents, teaching materials, teaching mode and assessment methods was made, and which can provide references for further improving the teaching effect of all-English teaching methods of biostatistics for foreign students major in aquaculture.

Introduction

With the increasing integration of the world today, higher education is developing more and more internationally. In recent years, the rapid increase of China's comprehensive national strength and the significant increase in the level of higher education have attracted more and more international students to study in China. The plan of the National Medium- and Long-Term Education Reform and Development Plan (2010-2020) is planned to further expand the scale of foreign students, increase the disciplines taught by English in higher education, and continuously improve the quality of foreign students studying in China. The practice and research of foreign students' higher education has become an important part of college education, reflecting the level of internationalization of higher education. In order to improve the quality of education for foreign students and accelerate the internationalization of agricultural universities, the curriculum construction of all-English teaching is crucial [1].

Biostatistics is a science to analyze data of life science researches by utilizing the principles and methods of statistics, including the design of experimental schemes, the collection, collation and analysis of experimental data. It is one of the important professional foundation courses for undergraduate majors in life sciences in many colleges and universities nationwide. Biostatistics belongs to the field of applied statistics with strong practicality and applicability. It is an important tool class which can cultivate students' statistical thoughts and learn how to scientifically design research plans and analyze data, and drawing scientific conclusions. Therefore, mastering the knowledge of biostatistics is of great significance to students' future work in the industry [2].

Building the Course Contents

Paying attention to communication and teaching students in accordance with their aptitude is the key to education quality, as is the education of foreign students. Most of the international students come from different countries and regions, the Chinese level is low, the English accent is very different, and the educational background is not the same. They learn from the different majors in biology, and their upcoming research work focuses on the statistical requirements are different. The results of the survey made by us show that the bio-statistical basis of international students is generally weak and uneven, for example, some have a basis of probability theory, while some have only some advanced mathematics foundations. In addition to hoping to understand and master the principles and methods of statistics, most students also hope to learn related software for statistical operations, and apply the knowledge they have learned to their research work, especially the use of statistical software SPSS commonly used in scientific researches [3].
Considering the situation of most students, we divide the course content into three major parts, one is the introduction of statistical basic knowledge and probability theory, the second is the design of scientific experiments, and the third is the application of several main statistical models and methods. At the same time, interspersed with the use of SPSS in various statistical cases. Due to the limitations of class hours and the practical needs of students major in aquaculture, the explanations of some obscure formulas are simplified. The focus of teaching focuses on the application of statistics in biological research and practice cases, which allowing students to master how to choose the appropriate statistical model and corresponding software operations.

**Selection of Teaching Materials**

Teaching materials and reference books are the important basis for ensuring high-quality teaching. At present, there is a lack of English biometrics textbooks suitable for students major in aquaculture in China, and the original English textbooks are expensive and not easy to purchase. A photocopying textbook titled “An introduction to Biostatistics” published by Tsinghua University is selected as teaching book, which is not expensive, and the content is not difficult to understand, thus it is suitable for students with weak statistical foundation to study statistical theory. At the same time, several handbooks of statistical analyses using SPSS are selected to instruct students on how to use SPSS. Considering the different professional backgrounds of different international students and the current situation of statistics teaching in China, we intended to select some cases for analysis from the perspective of students’ interest and produce multimedia courseware and after-school exercises by combining the explanation of statistical principles and the operation of statistical software.

**Interaction between Teachers and Students**

Compared with domestic students, the character and study habits of international students are quite different, especially for students from Africa. The teaching mode suitable for international students should be significantly different from that for domestic students. Although biostatistics is an applied course, it is full of abstract concepts and logical reasoning. Therefore, it is very difficult for students to understand statistical principles, which also makes students unable to use appropriate statistical methods to solve statistical problems. Considering the characteristics of international students and biostatistics courses, the traditional teaching mode cannot achieve the expected teaching effects. Therefore, the method of case-introduction teaching and problem-based learning combined with the traditional teaching mode was applied. On the one hand, with the analysis of a classic statistical cases, students can learn and master various abstract statistical mathematical models gradually, and further understand the statistical principles. At the same time, students were asked to operate SPSS software in the computer to apply what they have learned by combining with the actual needs of modern biological researches and the guidance of statistical software operation. On the other hand, with the introduction of statistical questions, the students' interest in learning and subjective initiative are stimulated.

In addition to the interaction in the classroom, we also strengthened after-school communication with international students. Some students still keep in touch with the teacher after the end of the course, and discuss appropriate statistical methods on the actual problems encountered in scientific researches. Through such teaching feedback, the teaching content and methods can be adjusted at any time to achieve better teaching results. The practice has shown that after-school communication is conducive to discovering problems and promoting reflection on teaching. Furthermore, international students come from different countries and regions, thus their English accent is very different and the communication is slightly difficult. This requires teachers to strengthen communication with students at the beginning of the course to prepare for the class in advance based on familiarity with the content of the course and improving their English teaching ability.
Diversified Assessment Methods

Assessment and evaluation are important parts of teaching. It can not only measure the teaching and learning effects, but also encourage students to actively learn. In the past, the assessment of biostatistics was mostly based on the close-book examination. While biostatistics is an application-oriented course, rote learning of statistical principles and formulas are not the teaching objectives. The teaching goal is to enable students to apply statistical principles and methods correctly to future researches and practices since most of the students studying in the course were graduate students who had already carried out scientific research. After comprehensive consideration of the course attribute and teaching objectives, the assessment method was mainly divided into three parts, namely classroom performance, after-school assignments and the final exam (analysis of actual statistical problems using SPSS) [4]. The performance of the class includes questions and attendance (accounting for 20% of the total score). On the one hand, it increases interaction, activates the classroom atmosphere and stimulates students’ interest in learning. On the other hand, it also plays a role in maintaining the order of the course. After-school assignments (accounting for 30% of the total score) are exercises for students after the end of each chapter, so that students can consolidate the content they have learned in a timely manner, and also enable teachers to further understand the students' learning status and correct the problems that are common to students in order to further adjust the contents of the lectures. The final exam (accounting for 50% of the total score) involves the operation of SPSS, which can evaluate the ability of data analysis and statistical inference. Through the feedback of the final exam, we can further understand the teaching effects and the students' learning needs, in order to further improve the future teaching.

Summary

Biostatistics is an important course for students to carry out biological research and practice. Facing the needs of international students, the above-mentioned teaching practices have been carried out according to students’ characteristics, and certain positive teaching effects have been achieved. There is no doubt that our exploration of the construction of all-English teaching methods of biostatistics is still in its infancy, facing many difficulties and problems, and needs to be further explored and improved in various aspects such as teaching materials, syllabus and teaching methods.

In short, the education of international students is an important component of the internationalization of higher education. It is an important part of the current teaching reform which promotes the improvement of teachers' teaching ability and discipline construction. Teaching students in accordance with their aptitude and creating a high-quality international education course with Chinese characteristics is an integral part of China's higher education to expand exchanges and enhance competitiveness.

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