

Exploration and Practice of Combining Human Anatomy Teaching with Health Education in the Background of New Medical Science

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Abstract. To cultivate high-level science talents with a certain understanding of human anatomical structure and a grasp of health concepts. A university level public elective course "Decrypting the Human Body and Enjoying Health" was opened. Undergraduate students were divided into a pure online group and a mixed online and offline teaching group, their learning attitudes and grades were statistically analyzed. Online and offline blended teaching has significantly achieved better results. It is necessary for non-medical students to master a certain level of human anatomical structure and cultivate a healthy concept. If possible, online and offline blended teaching method is a better choice.

Keywords: New medical science; Human anatomy; Health education; Blended teaching

1 Introduction

Human anatomy is the first and most important basic course in medicine. It lays the foundation for subsequent medical basic sciences and clinical medical courses, and is the cornerstone and pillar of medical science. It is not only a medical course, but also widely used in sports, art, education, life science and other professions, with many overlapping and cutting-edge bionics artificial intelligence researches also using the relevant knowledge of human anatomy.

In 2020, by the support of the Ministry of Education's industry-university collaborative education project, collaborating with Shanghai zhuoyue ruixin digital technology Co., Ltd., we created an online course "Decrypting the Human Body and Enjoying Health". By now, it has successively launched to the website study platform of Treenity, University Open Online Courses, and Smart Education of China Higher Education. Also, as a school-level public elective course, we provide curriculum teaching for all undergraduate students. Through statistical analysis of the final exam scores, chapter test scores, classroom activity and other aspects of the students taking this course, this study explored the practical teaching effect of the combination of health education and human anatomy teaching under the background of new medical science.

2 Method

2.1 Survey object

The subjects of the study were 114 students from 39 majors in 17 schools of Jiangnan University who elected this course in 2022, including 74 boys and 40 girls. There were 76 freshmen, 11 sophomores, 15 juniors and 12 seniors, respectively.

2.2 Research method

The online and offline mixed study group (hereinafter referred to as the "mixed group") allowed 30 students to study in the laboratory, and the live broadcast was opened at the same time for other 84 students who only learn online (hereinafter referred to as the "online group") to learn simultaneously online. Online classes arrange students to complete corresponding task points and chapter tests, and interact to discuss relevant hot topics. SPSS 22.0 software was used for statistical analysis of students' scores. The measurement data were expressed as $X \pm S$. Between groups, t -test was used for comparison of differences, and paired t -test was used for comparison within groups. $P < 0.05$ indicated that the difference was statistically significant.

3 Results

The highest and lowest scores of the mixed group were 100 and 74, respectively, and the average score was 88.70. For the online group, the highest and lowest scores were 99 and 62, respectively, and the average score was 80.94. There were significant differences between these two groups ($P < 0.001$) (Fig. 1).

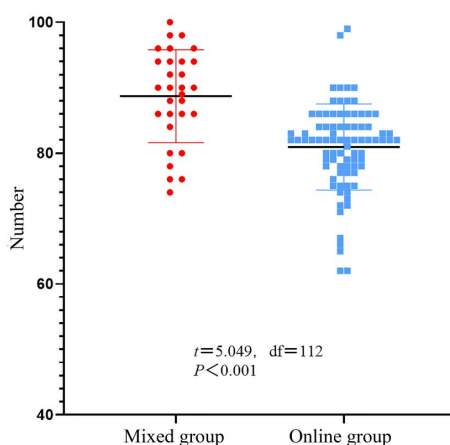


Fig. 1. Comparison of final examination scores between mixed group and online group

From the distribution of students' scores, there were 3 students in the mixed group of 72.5-77.5 scores, 3 students in the 77.5-82.5 scores, 5 students in the 82.5-87.5 scores, 9 students in the 87.5-92.5 scores, 7 students in the 92.5-97.5 scores, 3 students in the mixed group of 72.5-77.5 scores. Three students scored from 97.5 to 100 (Fig. 2). In the online group, there were 2 students

with scores ranging from 60 to 62.5, 3 students with scores ranging from 62.5 to 67.5, 3 students with scores ranging from 67.5 to 72.5, 11 students with scores ranging from 72.5 to 77.5, 32 students with scores ranging from 77.5-82.5, and 23 students with scores ranging from 82.5 to 87.5. Eight students scored 87.5-92.5, and two students scored 97.5-100 (Fig. 3).

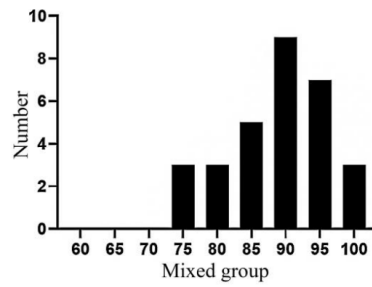


Fig. 2. Distribution of final examination scores of mixed group

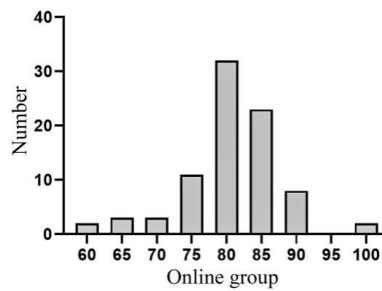


Fig. 3. Distribution of final examination scores of online group

In chapter quizzes of locomotor, visceral, vascular, sensory and nervous systems, the mixed group had better performance than the online group ($*P < 0.05$, $**P < 0.01$, $***P < 0.001$)(Fig. 4).

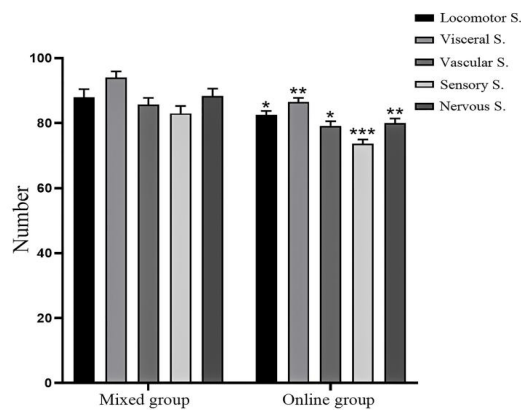


Fig. 4. Average exam score of each system

In the mixed group, the most active student spoke 54 times, compared with the least 10 times, with an average of 24.43 times per student; In the online group, the most active student spoke 36 times in the live course, compared with the least 10 times, with an average of 19.98 times per student. There was a significant difference between the two groups (Fig. 5).

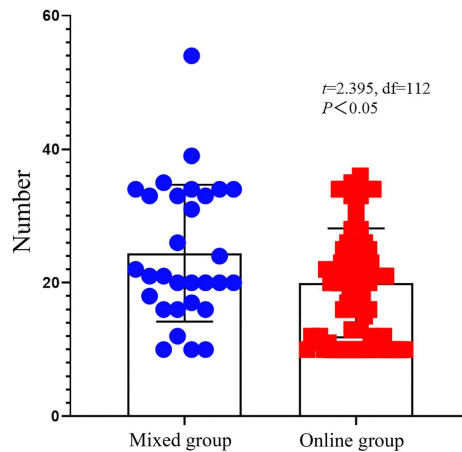


Fig. 5. Numbers of classroom speeches

For the 76 freshmen students, the lowest score was 62, the highest score was 99, the average score was 80.57. For the 11 sophomore students, the lowest score is 78, the highest score is 94, the average score was 84.36. For the 15 junior students, the lowest score was 74, the highest score was 100, the average score was 88.53. For the 12 senior students, the lowest score was 76, the highest score was 98, and the average score was 90.50. Compared with the final scores of senior students, the scores of freshmen and sophomores were lower, showing a significant difference (Fig. 6). It showed that senior students' learning capacity of anatomical knowledge has been significantly enhanced after a period of university study.

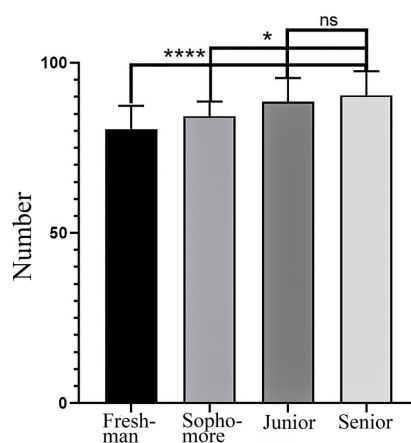


Fig. 6. Comparison of final grades among students of different grades

4 Discussion

At present, Jiangnan University has 15 majors offering 20 courses closely related to human anatomy. A number of university-level scientific research institutes, such as the Biomedical Research Institute, the Environmental and Health Research Institute, the Interdisciplinary Research Institute, the Systems Biology research Institute, will also use a certain amount of anatomical knowledge in their research. Therefore, to learn human anatomy and understand the structure of the human body is not only a major task for medical students, but also of great significance for many non-medical students in a university.

In 2022, a total of 114 students, from 39 majors in 17 schools of our university, enrolled in this course. Due to the limited capacity of a single laboratory, and to compare the teaching effect, we divided the students into a mixed group and an online group. Through analysis of the scores of these two groups of students, we found that the mixed group had obvious advantages in terms of the total scores, the distribution of specific scores and the scores of each chapter.

The knowledge of human anatomy belongs to the category of morphological science, and experimental teaching is very important in its teaching. It is difficult for students to understand just by listening to the theoretical explanations. Students are easily distracted in the classroom, which will seriously affect the learning effect^[1,2]. In the laboratory, the mixed group students had close personal contact with human specimens and models, which helped them a lot in learning, generated greater interest, showing more initiative in class speech^[3,4].

The anatomy course is very difficult to learn, and students are under great learning pressure. In the traditional teaching process, there are often a series of problems such as insufficient learning initiative, low learning efficiency, and insufficient mastery of students. The "Internet+" teaching mode organically combines the practicality, applicability and discipline construction required by the anatomy experiment, which could greatly increase the interest of the course in teaching, realize a large number of storage, update and sharing of resources, and effectively strengthen the interaction between teachers and students, stimulates students' desire to explore, plays a role in inspiring students' thinking and improving their innovative ability. Of course, there are also some problems such as uneven learning effects of students and difficulty in effectively controlling the learning process^[1,5]. Therefore, for morphological courses such as anatomy, it is particularly important to combine online classes with certain offline classroom teaching, and resonance at the same frequency is particularly important, and our results have fully confirmed this point.

For non-medical students, it is very necessary to properly master certain medical knowledge, especially human anatomical knowledge. The "Four New" construction specially emphasizes on interdisciplinary integration, cultivating high-quality interdisciplinary talents with interdisciplinary thinking and innovation awareness, strong practical ability, strong innovation ability, and international competitiveness. For example, through the cross-integration of design art and medical projects, many abstract and important information can be turned into more intuitive visual resources^[6]. In the new era, the demand for "new engineering" talents has increased rapidly, which has promoted the innovation and development of the medical-engineering compound field^[7,8]. New agricultural science is reflected in breaking the path dependence of traditional agricultural science construction, collaborative medicine, etc., and forming a new development strategy of multiple collaborative innovation^[9]. Combining

engineering and medical courses can break the barriers of traditional disciplines and cultivate interdisciplinary talents, which will play an inestimable role in the development of medicine, especially in the fields of translational medicine and intelligent medicine^[10].

The course puts forward the three-level concept of "deciphering the human body, keeping away from diseases, and enjoying health". On the one hand, it is to adapt to the development requirements of new medical science, and benefit people's life safety and health. On the other hand, through course study, non-medical undergraduate students could have a certain understanding of the human body structure, and then popularize the concept of health and serve "Healthy China".

5 Conclusion

Online and offline blended teaching has achieved better teaching results in "Decrypting the Human Body and Enjoying Health" course. On the one hand, the practice of combining human anatomy teaching and health education is in line with the development of new medical construction. On the other hand, it is conducive to cultivating the health concept of non-medical students. It could provide a reference for the teaching of other medical courses.

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