

Optimization of Biostatistics Beaching Model from the Perspective of Public Health Emergencies

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Abstract. Using biostatistical methods, simulation in the classroom of emergency events can allow students to solve practical problems in the classroom. This paper discusses the application of flipped classroom in promoting the reform of biostatistics teaching mode, transforming the teaching mode of biostatistics, and improving the teaching quality of biostatistics from the perspective of public health events. Practice has proved that this experiment has achieved good teaching effect.

Keywords: Public Health Emergency; Biostatistics; Teaching Model Optimization; Flipped Classroom.

1. Introduction

Because some qualitative analysis results can not meet the requirements of practical application, so quantitative research has been the direction of people's efforts. In biometrics, data collection and data processing are very important. This course mainly includes two aspects: one is the design of the experiment, the other is the analysis of the data. This course is a subject of both theory and practice. . It has the characteristics of sudden, mass and great harm, which brings great damage to people's life and life. This paper builds an education platform based on biostatistics, integrates the experimental skills training of public health in the hospital and the practical application ability training of public health in the education practice base outside the hospital, and forms an education practice training system for college students [1]. It provides practical public health services for maintaining and improving the health of the people and providing high quality for the people. This paper summarizes the necessity, content, characteristics, practice and future direction of the platform construction.

Flipped classroom is a different teaching method from the traditional teaching method in which teachers teach, students listen and students finish homework after class. Flipped classroom means that students first learn before class, and then understand and master knowledge by watching pre-recorded teaching micro-videos, or return to the classroom for in-depth discussion and practical operation after completing the tasks in the online course [2]. It can solve the problems in the learning process and finally complete all the tasks. This is a process that runs counter to the traditional way of teaching. It belongs to a kind of research and innovative classroom teaching method. Flipped classroom rearranges the time inside and outside the classroom, transferring the initiative and decision of learning from teachers to students.

Moocs + Flipped classroom is an organic integration of online and offline. On the one hand, MOOCs can effectively impart knowledge. On the other hand, the "interview" conducted in the classroom can promote students' thinking and development, promote emotional communication, enrich experience and other aspects. The two are highly complementary [3]. The reform method of MOOCs + flipped classroom is proposed based on the implementation of the biostatistics course.

2. Necessity of teaching reform of biostatistics

With the rapid development of biotechnology in the 21st century, experimental technologies such as human genome and gene chip have produced massive high-throughput data, which requires us to use modern methods to statistically process these data to find out the rules, so as to provide an objective basis for production and policy formulation. Biostatistics is an instrumental science that can help us achieve this goal. In the future, biostatistics will focus on data processing [4]. Therefore, it

should change the previous teaching mode, teach students according to their aptitude according to the training objectives and positioning of the major, constantly update their educational concepts, and constantly optimize the teaching content. The course has strengthened the practical operation in the classroom and reformed the traditional examination method. This allows students to match the development of educational reform. Compared with other medical disciplines, the main characteristics of biostatistics are: obscure in theory, abstract in concept, and monotonous in data.

2.1. Obscure principles

Biostatistics is an applied statistics discipline based on the principles of higher mathematics, probability and mathematical statistics. However, due to the lack of relevant basic principles of mathematics and statistics in the course of teaching, biostatistics only focuses on the application of some calculation formulas and calculation methods used in the course of teaching, but cannot elaborate the principles in detail. Therefore, in the teaching, students often have only a partial understanding and do not know its principle. Biostatistical techniques and methods are essential. The specific teaching content of analyzing and explaining some important theories and methods of biostatistics is put forward. The teaching content of biostatistics is very complicated [5]. According to the basic theory, there are many concepts, formulas and principle derivations involved in the teaching process. The method of statistical analysis takes into account the diversity of practical problems of life science to be dealt with and the heterogeneity of biomedical data, so the study of biostatistics also shows the characteristics of diversity and multiple methods. Biostatistics focuses on the organic connection between statistical theory and biomedical practice, and it requires students to be able to apply statistical methods to life and find hidden patterns. Biostatistics is a relatively difficult subject to teach. Figure 1 shows the scope of teaching biostatistics (the picture is quoted in teaching the measurement process in biostatistics).

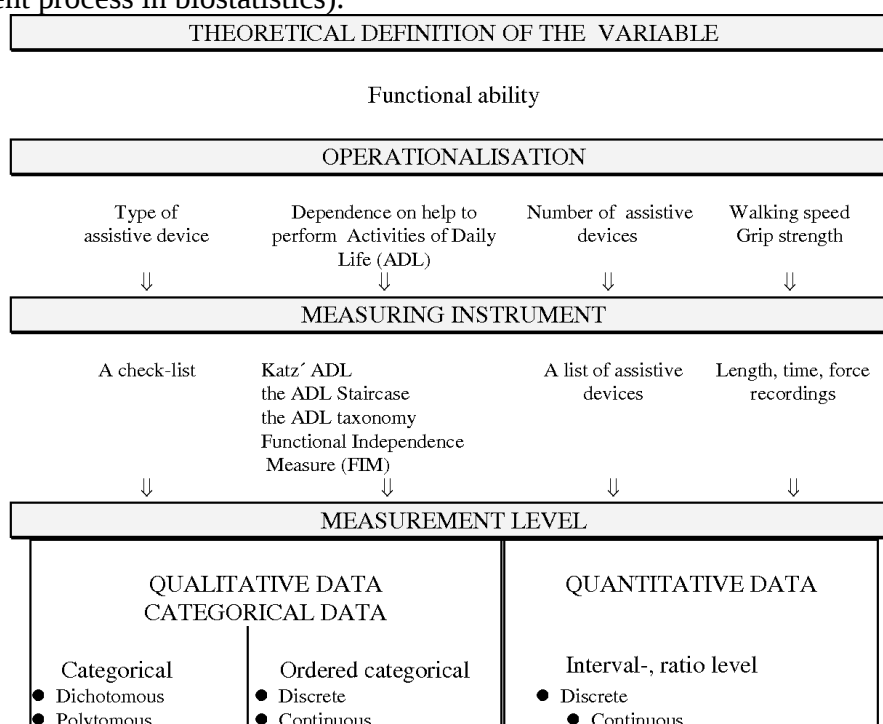


Fig.1 Teaching scope of biostatistics

2.2. Conceptual abstraction

Many concepts are derived from these theories. So its concept and language expression are very abstract, the idea is also very special. This is quite different from the intuitive way of thinking in other biomedical professions. In a relatively short period of time, it is difficult to have a deep understanding of mathematical knowledge, even more difficult to have a complete thinking ability for mathematical

knowledge [6]. Most of the teaching of biostatistics courses adopts the teaching method of "conveying ---- acceptance", which mainly focuses on teachers' explanation and guidance, so that students can receive a lot of information and knowledge in a long period of time. The single teaching mode, passive knowledge infusion, reduces the participation of students in the classroom, and then affects their learning enthusiasm. Secondly, because this course involves too many principles and formulas, the teaching process is likely to produce "only pay attention to theory and do not pay attention to practice". Teachers often only pay attention to the explanation of principles and the derivation of formulas, lack practical training and case analysis, and ignore the understanding of students' construction of materials. In addition, since the main teaching work is mainly held by full-time teachers, the teachers lack experience in practical application and case study of scientific research, which makes their understanding of this subject not deep enough and not advanced enough.

2.3. Boring data

Because in medical scientific research, biostatistics will inevitably involve the collection, sorting and analysis of data, and the collection, sorting and analysis of data are relatively boring work, so it is easy to cause the disgust of students. In the teaching process, teachers must guide students to find rules in seemingly chaotic materials and make these materials lively. It can introduce the flipped classroom based on MOOC biostatistics into the teaching of biostatistics, so as to better improve students' learning level. The training of knowledge and skills related to computer software is lacking in biostatistics courses. Biostatistics and computing are inseparable. In the face of big data in biomedicine, calculations that rely solely on manual labor are undoubtedly insignificant [7]. Therefore, teachers should familiarize students with the usage of some key statistical software in class. Further, students can flexibly use computer technology to process and analyze biostatistical examples. According to the characteristics of the biostatistics course and the problems in the teaching process, it is adjusted accordingly, so that students can better understand its basic theory and methods, so as to achieve the purpose of improving the overall teaching effect.

3. Optimization practice of biostatistics MOOCs under public health emergencies

3.1. Preview before class

Moocs and flipped classes require computers and smartphones, as well as smoother networks, so the need for hardware is modest. Teachers need to download a document from the MOOCs and Flipped Classrooms websites before the class starts, and then add the document to their PowerPoint. In MOOCs and flipped classes, you can also open the scanning function of wechat. By scanning the two-dimensional code generated by your mobile phone, you can follow and enter the official wechat account of MOOCs and flipped classes, so as to establish biostatistics courses and classes. After opening MOOCs and flipped classroom teaching in PowerPoint, you can choose to teach biostatistics courses created by yourself and automatically generate classroom two-dimensional code. At this time, students can use their mobile phone wechat scan the QR code, and then they can enter the classroom and complete the class attendance. The teacher's mobile phone has become a remote control for the remote control of the lecture PPT, which can be flipped and other operations [8]. The mobile phone of the student side can receive the course PPT and the course test content pushed by the teacher in real time. At the same time, students can also send real-time bullet-screens to communicate with the teacher and collect the course PPT through their mobile phones. Figure 2 shows the Architecture of the biostatistics MOOC teaching platform (the picture is quoted in the MOOC Architecture Model for Computer Programming Courses).

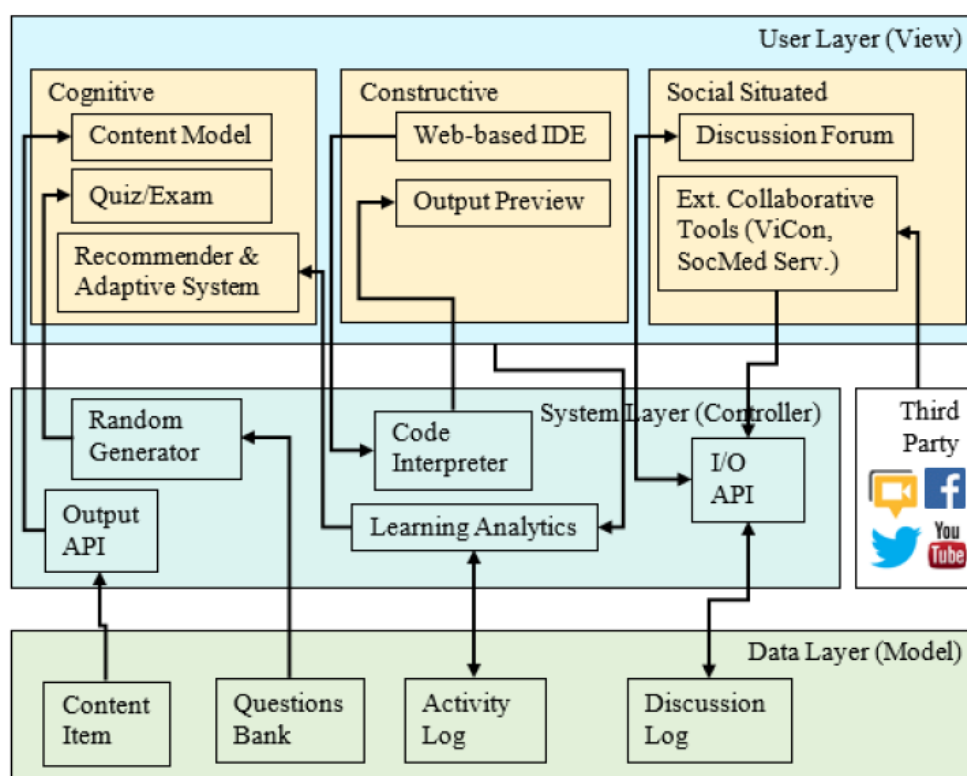


Fig.2 Architecture of biostatistics MOOC teaching platform

3.2. Use "MOOCs" and "inversion" for pre-class preview

Before the classroom teaching, students can improve their independent learning ability to maximize the learning enthusiasm. In addition, it can also give full play to students' spare time. Therefore, the teachers of the course team will push the preview courseware that they have designed, the preparatory knowledge that students need for class, and the problems that students need to think about, etc. to students, and require students to complete all the preview tasks within a certain time. For example, before teaching the chapter of theoretical distribution and sampling distribution, the teachers of the course team will assign the content related to probability to the students, who can prepare for the class by taking the probability theory of the course [9]. At the same time, students are required to summarize the definition of probability, types of events, rules for calculating event probability and other contents by themselves, and send them to the teacher's mobile phone. The teacher will reply to the problems encountered by the students in the learning process in a timely manner, and send messages to remind the students who do not complete the learning task on time, urging each student to do a good job in learning. As for the content that has been prepared before class with good quality, the teacher will not waste time to explain it in detail after summarizing it in class, which can effectively improve the teaching efficiency of the course. In addition, students who have completed the pre-class preview can study with questions in class, thus improving their learning efficiency.

3.3. Use MOOCs to interact with flipped classroom classes

After the use of MOOCs and flipped classroom to start teaching, the course PPT in the form of a single page, will be automatically synchronized to the student's mobile phone. On each PPT page, there will be the option of not understanding and saving, because students can save the PPT for follow-up study after preparing the lesson. When the students click the button that they don't understand, the teacher's mobile phone will get feedback from the students. The teacher can see how many students don't understand in each PPT page, so as to prompt the teacher to explain the content emphatically. In class, students can also answer questions they don't understand, or express their

views and opinions to teachers in the form of a bullet screen, which greatly improves students' participation. In addition, the experience of teachers in the course group is to solve general problems in class, while individual problems are solved one by one after class. Through this method, the interaction and communication between teachers and students are enhanced, and good results are received. For example, when teaching the probability distribution of continuous random variables, nearly 30% of the students in the class did not fully understand the response after MOOCs and flipped classrooms. When the teacher receives the information in the class, he does not continue to explain the new course, but uses the method of enumerating examples to teach again, so that they will gradually understand and master the course. Two teaching methods, "MOOCs" and "flipped classroom", are used to test the knowledge learned by students in the teaching process. For example, after learning the content of "average types", the teacher can use MOOCs and flipped classrooms to issue time-limited multiple-choice questions in a timely manner; After explaining a hypothetical test of the average value, the teacher will give this part of the exercise to the students as a subjective question. The students can write the answers on the paper, and then upload the pictures to the teacher's mobile phone for grading and grading in MOOCs and flipped classrooms. Through this testing function of MOOCs and flipped classrooms, biostatistics are tested at different time periods in each class. Such a time-limited test can include all students, so that each student can really participate in the learning of the class. Classroom quizzes are also an important part of students' daily performance. In general, MOOCs and flipped classrooms effectively combine teaching and learning, thus improving students' head-up rate and turning mobile phones from a tool to a sharp weapon, thus significantly improving students' learning efficiency. Figure 3 shows the MOOC process.

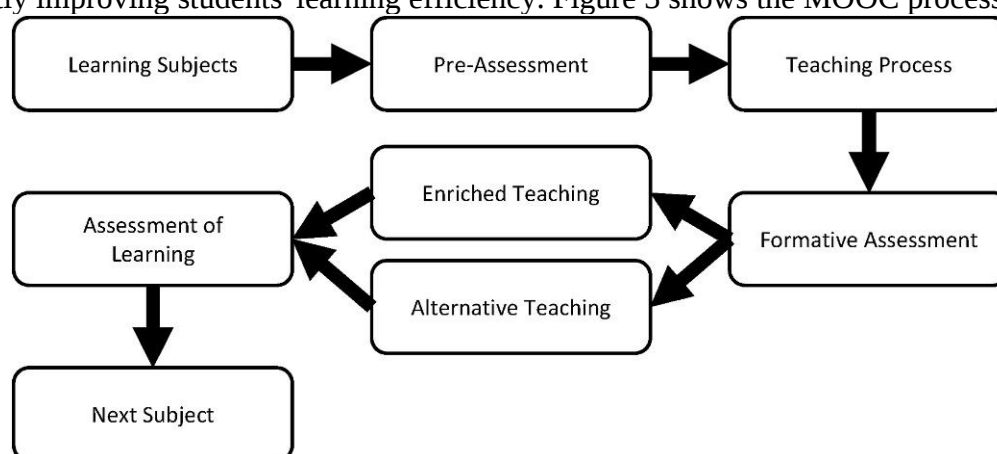


Fig.3 Mooc process

3.4. Use "MOOCs" and "PACT" to consolidate and summarize after class

After class, students can review and review the course content through the course PPT kept in their mobile phones, and teachers can also push homework and mock test papers to students through MOOCs and flipped classes, so that students can consolidate the content in class. After each class, teachers can also use the student learning materials and teaching materials obtained by MOOCs and flipped classrooms to summarize the teaching. In the teaching of biostatistics, teachers of the course team can conduct homework for students through MOOCs and flipped classroom after the completion of each chapter, especially through the mock test questions of MOOCs and flipped classroom, requiring students to complete the answers within a limited time, which can not only promote students to digest and master the content of the course in stages. It can also find out the problems existing in the course teaching and student learning in time, and solve them. During this period, students can consult teachers about the problems encountered in this course in MOOCs and flipped classrooms, and teachers can understand the doubts of students in real time and have interactive discussions with students. In addition, the course teaching data generated by MOOCs and flipped classrooms can be used to objectively evaluate the gains and losses in the whole teaching process, which shifts from the

past teaching empiricism to data-driven teaching, thus providing a scientific basis for better improving the quality of courses.

4. Conclusion

Moocs and flipped classroom are a new intelligent education means, which give full play to various functions of the Internet, mobile phones, wechat and office software, and adopt mixed teaching methods to improve some problems in the traditional education of agricultural majors in a certain sense, which has played a good role in improving the teaching quality of this course. Although there are still many aspects to be improved in MOOCs and flipped classrooms, if the channels of interaction and communication between teachers and students built before, during and after class can be effectively used, it will be helpful to enhance students' learning initiative, participation and enthusiasm, and also have a certain impact on teachers' educational concepts and teaching methods. The correct application of MOOCs and flipped classrooms can promote the teaching reform of courses to some extent and improve the learning efficiency and effect of students.

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