

# Exploration and Practice on the Construction of First-Class Statistics Course

Songyan Zhang<sup>1</sup>, Lichao Tao<sup>2</sup>, Canjie Chen<sup>1</sup>

<sup>1</sup>School of Economics and Management, Zhejiang University of Science and Technology, Hangzhou, China

<sup>2</sup>Zhejiang College of Construction, Hangzhou, China

Email: syzh201@163.com

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## Abstract

Courses are the core elements of talent cultivation, and the quality of courses determines the quality of talent development. Statistics course is one of the basic courses of economics and management majors, and it is among the first 11 core courses listed by the Ministry of Education in these fields. However, the teaching effectiveness of most Statistics courses in economic and management disciplines is not satisfactory; students show a lack of initiative in learning, and their ability to apply knowledge is relatively weak. Based on the current state of teaching, and centered on the fundamental purpose of “Establish morality and cultivate talents”, the article explores the path to building first-class course from four aspects: teaching content, teaching methods, assessment methods, and the teaching team.

## Keywords

Statistics, First-Class Courses, Teaching Reform

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Courses are the basic units of the teaching system and the fundamental basis for educational instruction. High-quality courses are not only related to the formation of students' knowledge structure and thinking abilities but also to their growth and talent development. As a methodological science for data collection, organization, and analysis, Statistics is a basic course for economic and management majors (Li, 2024), and is also a first-class course that many universities focus on building. With the advent of the information and intelligence era, data has penetrated every field of the economy and society, putting forward higher demands for statistical data analysis capabilities (Xie & Yang, 2022), and the course of statistics also needs to keep pace with the times. In view of this, this article takes Statistics course at Zhejiang University of Science and Technology as an example

to elaborate on the exploration and practice of building first-class undergraduate courses, hoping to provide thoughts and references for the construction of similar professional courses.

## **1. Key Issues to Be Addressed in the Teaching Reform of Principles of Statistics**

In order to deepen the reform of higher education teaching and implement the teaching reform in course construction, Zhejiang University of Science and Technology actively organized the construction of first-class undergraduate courses. There are a series of problems that need to be solved in the traditional course of Principles of Statistics (Zhang, Wang, & Sun, 2022). For example: The teaching is overly focused on theoretical teaching, neglecting the application of statistical theory and methods in practice; The teaching content has not kept pace with the times and is not closely integrated with emerging fields such as big data and artificial intelligence; The teaching methods and means are relatively single; There is a lack of heuristic, discussion-based, and case-based teaching methods, etc. In response to the above situation, the key issues to be addressed in the teaching reform of the Principles of Statistics course are clarified first.

### **1.1. How to Optimize Teaching Content and Strengthen Practical and Ideological and Political Teaching**

Based on the existing textbooks, the writing of new forms of textbooks on the principles of statistics under the background of big data is carried out. Perfect and construct practical combat scenarios for big data statistical analysis teaching to solve the weak link of practice-oriented practical teaching. Excavate ideological and political elements and integrate course ideological and political education into the entire teaching process (Zhang & Tao, 2021).

### **1.2. How to Stimulate Students' Autonomy and Break the Silent State of the Classroom**

The current classroom has a high rate of looking down, and the interest in mobile phones is greater than the teacher's classroom explanation. How to improve classroom student participation through the reform of teaching models and methods, solve the problem of students' passive learning, and stimulate students' interest in learning.

### **1.3. How to Carry Out Process-Oriented Teaching Management**

How to create a systematic course system design through the creation, improve the evaluation and feedback link; the teaching process realizes the cycle optimization of theory-reflection-practice, and the teaching time and space form an effective closed loop Pre class-in class- post class (Mei, 2021). How to continuously improve the course assessment system and strengthen process-oriented teaching evaluation.

## 2. Establishment of Teaching Objectives

Based on the actual situation of students in our school and the actual problems they face, with the aim of “cultivating applied talents in economics and management with a solid statistical foundation, who are proficient in technology, capable of application, and innovative,” the teaching objectives of “Principles of Statistics” are set as knowledge objectives, ability objectives, quality objectives, and ideological and political objectives (see **Table 1**).

**Table 1.** Statistics course teaching objectives.

Knowledge Objectives	Ability Objectives	Quality Objectives	Ideological and Political Objectives
Collect, organize, and analyze statistical data, and appropriately apply statistical models to fit, infer, and evaluate actual phenomena.	Data processing ability, comprehensive analysis ability, systematic decision-making ability, and scientific research ability.	Global perspective in the era of big data, scientific literacy to solve practical problems. Practical innovation ability, sustainable development ability.	Scientific methodology, a mindset that pursues truth, and a pragmatic approach; courage to dedicate oneself; patriotic spirit.

## 3. Practical Path of First-Class Course Construction in Principles of Statistics

The statistics course is mainly for students majoring in economics and management. In teaching practice, the team focuses on the basic ideas of first-class course construction in statistics, and tries to explore the practical path of first-class course construction in statistics through updating teaching concepts, adjusting teaching objectives, focusing on student situation analysis, reconstructing teaching strategies, developing teaching resources, integrating teaching content, innovating teaching models, and reforming assessment methods.

### 3.1. Continuous Course Resource Construction, Optimize Course Teaching Content

After several rounds of course content reform, some outdated content has been reduced, statistical methods and tools have been increased, case introductions have been added, and the focus of content has been adjusted to highlight application orientation and mastery of basic knowledge (Zhang & Zhang, 2019), which has achieved good results in actual teaching.

In terms of course resource construction, we have made a case library of some hot issues in the economic field, supplemented with excellent statistical survey works, added an experimental course of “Statistical Analysis Application” (including software) for practical training, which has had a very good effect on consolidating course knowledge. At the same time, online teaching resources have been accumulated and constructed using the Internet platform, the knowledge points of the course have been modularized, corresponding teaching courseware has been designed, and 24 short videos covering the course system have been shot,

each with a duration of 8 - 13 minutes, totaling 245 minutes, which is conducive to students using their time reasonably for online fragmented learning, and is open to students in the SPOC model.

### **3.2. Carry out Teaching Method and Teaching Means Reform to Enhance Students' Sense of Subjectivity**

In terms of teaching methods:

- A combination of classroom teaching and discussion teaching is adopted. The discussion teaching of the course mainly targets phenomena in the course that are related to social and economic practice, and a number of discussion topics are adopted for discussion within the relevant links of the course with a time limit.
- Micro-class teaching and flipped classroom are used. Micro-class teaching is conducted using online platforms and Internet resources.
- "Multi-dimensional practice" is introduced into the teaching of "Principles of Statistics." It includes discipline competition practice, laboratory practice, and scientific research project practice. Students are organized and guided to participate in competitions such as the "People's Livelihood and Public Opinion Cup" College Student Statistical Survey Plan Design Competition in Zhejiang Province and the "Internet+" College Student Innovation and Entrepreneurship Competition.

In terms of organization and implementation: The course team teachers are experienced and work in collaboration. Students are organized to study online before class, including reading auxiliary learning materials, micro-class videos, etc.; in-class teaching includes case introduction of new knowledge, key and difficult point explanation, teacher-student interaction, etc.; after class, complete exercise homework. The first classroom organizes the teaching of course knowledge, and the second classroom organizes participation in statistical survey plan design competitions.

Students' course learning is useful and interesting, breaking the silent and single offline phenomenon in the classroom, optimizing teaching strategies, and improving teaching effects.

### **3.3. Reform the Course Assessment Method and Strengthen the Process evaluation of Teaching**

A scientific and reasonable assessment method is conducive to mobilizing students' enthusiasm for learning. An assessment method that focuses on the process will be more conducive to maintaining students' initiative, enthusiasm, and continuity in learning (Tao & Zhang, 2021). Therefore, the course grade assessment should include process evaluation and final exam evaluation, increase the proportion of regular scores, and reduce the proportion of final exam scores. For regular scores, it should be ensured from the system that the assessment can be quantified. Process evaluation can be composed of homework, attendance, teacher questions, course ideological and political education, etc., reflecting the learning effect of

each stage and guiding teaching improvement. With the increase of online teaching activity time, we have added multiple-choice questions, true or false questions, etc. to check the immediate learning effect, increased online self-learning link checks, and placed more emphasis on process evaluation.

### **3.4. Optimize the Construction of the Teaching Team and Create a First-Class Teaching Team**

A first-class teaching team is the key and guarantee for the construction of first-class courses. A first-class teaching team not only requires teachers to have noble moral quality and correct values, but also puts higher requirements on the breadth and depth of teachers' knowledge. Teachers should not only delve into statistical theory but also have some knowledge of computer science, economics and other disciplines to build a multi-disciplinary "statistics" course system (Liu, Chen, Jin, Chen, & Wu, 2022). It is necessary to pay attention to the growth of echelon teachers and form a structured, specialized, and sustainable development teaching echelon.

## **4. Further Thoughts**

### **4.1. "Promote Learning through Competition" and "Promote Teaching through Competition"**

The "Zhejiang Province 'People's Livelihood Cup' College Student Statistical Survey Plan Design Competition" co-hosted by the Zhejiang Provincial Department of Education and the Zhejiang Provincial Bureau of Statistics, whether in terms of goals, content, or procedural logic, the requirements for participating in the statistical survey plan design competition are highly consistent with the learning requirements of the principles of statistics, providing a good opportunity for "promoting learning through competition" and "promoting teaching through competition." Deepen "project-based teaching," explore more diverse and effective online and offline teaching forms, motivate students to carry out statistical survey activities, promote a positive interaction between teaching and practice, cultivate students' comprehensive abilities to observe, identify, analyze, and solve problems (Zeng, 2022). Encourage students to actively participate in problem-driven professional competitions and research projects, thereby achieving a comprehensive improvement in their practical skills, innovation capabilities, and team collaboration abilities. Use competitions to stimulate learning and drive students' autonomous learning.

### **4.2. Expand the Construction of Course Resources and Advance the Development of MOOCs**

Scientifically update the course content and develop textbooks for "Modern Applied Statistics" suitable for the big data era. Perfect the organic integration of course ideology and politics (Liao, 2023). Supplement with excellent collections of statistical surveys and teaching cases, and improve the collection of textbooks,

teaching aids, and online resources. Strengthen the construction and application of online platforms and network resources, and use university MOOC + SPOC smart teaching tools to build and further apply online teaching resources for “Principles of Statistics”, ensuring the effective implementation of blended online and offline teaching, and supporting the sustainable development of students.

## 5. Conclusion

The construction of first-class undergraduate courses is an important way to develop new engineering and humanities disciplines. In the process of building first-class courses, Zhejiang University of Science and Technology has put students at the center and achieved good teaching results through a series of measures, such as optimizing teaching content, innovating teaching methods and means, reforming assessment methods, and creating a first-class teaching team. These experiences provide new ideas and references for the construction of professional courses.

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## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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