Research on System Platform Design of Applied Statistics Teaching in Colleges and Universities

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Abstract. The characteristics of Applied Statistics in Colleges and universities determine that practical teaching is an important part of applied statistics teaching system. Starting from the training objectives of statistics major, this paper analyzes the construction ideas of practical teaching system of applied statistics major, puts forward the practical teaching system of statistics major, which is composed of four subsystems and practical teaching platform, and puts forward the implementation scheme of the system.

Keywords: Applied · Statistics · Practical teaching system

1 Introduction

With the popularization and development of information technology and statistical application, statistics, as a method and technology of data processing and analysis, has become a necessary knowledge for everyone in modern society. However, the education of statistics major in Colleges and universities is always faced with three challenges: first, the continuous innovation and development of statistical methods in the application lead to the change of statistical content system; second, the continuous innovation and development of statistical methods lead to the change of statistical content system; Secondly, the development of information technology has led to the continuous innovation of statistical software tools; thirdly, the change of educational philosophy centering on students' development and social needs [1]. These challenges require the development of statistics in Colleges and universities, In particular, the application-oriented statistics teaching should change the educational concept, absorb new methods through case teaching, use new tools, and face the application and practice. The construction, innovation and implementation of the practical teaching system of statistics specialty are the key to the teaching reform of application-oriented Statistics Specialty in Colleges and universities.

2 The Orientation of the Training Goal of Applied Talents of Planning and Learning

The major of applied statistics is to meet the actual needs of China's socialist economic construction, have good mathematical and economic literacy, master the basic theories

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and methods of statistics, skillfully use computers for data processing and analysis, and be able to engage in statistical investigation, information management, quantitative analysis and other work in enterprises, institutions and economic management departments, Or statistical talents engaged in teaching and research in the scientific research department of the University.

2.1 Have Solid Statistical Theory and Knowledge Level

Have the ability of applying statistical thinking to analyze things and solve problems. In the process of constructing students' theoretical knowledge system, we should pay attention to the cultivation of practical application ability of knowledge. However, in the process of practical teaching, it is often found that teachers pay more attention to the introduction of formula derivation methods, but ignore the application of practice, resulting in students blindly master some basic formulas, but do not know how to solve practical problems.

2.2 Have a Certain Level of Macroeconomic Theory and Knowledge

It can analyze and understand the internal logical relationship between data at a higher and more macro level, deeply excavate the meaning behind data, and comprehensively improve the ability of analyzing and solving problems. Many students of statistics major, including some teachers, only emphasize the study of statistical knowledge, lack the guidance of economic theory, and the conclusions drawn from statistical methods to analyze economic problems are not convincing.

2.3 Proficient in Operating a Variety of Commonly Used Statistical Analysis Software

It can skillfully apply modern information technology to the practice of statistical work, making the complicated statistical calculation and analysis process simple, efficient and fast. Because many colleges and universities have not established a perfect practice teaching system and lack of practice teaching platform, practice teaching and theoretical teaching can not be well connected, which makes the effect of practice teaching difficult to play.

3 Thoughts on the Construction of Practical Teaching System of Applied Statistics Major

The construction of the practical teaching system of statistics major should meet the needs of social development, with the purpose of cultivating high-level applied statistical talents with strong statistical theoretical knowledge and practical innovation ability, highlighting the characteristics of practical teaching of statistics major [2]. The practice teaching system of statistics specialty is different from curriculum experiment and extracurricular practice. It is a multi-level, hierarchical and progressive practice system, as shown in Fig. 1.

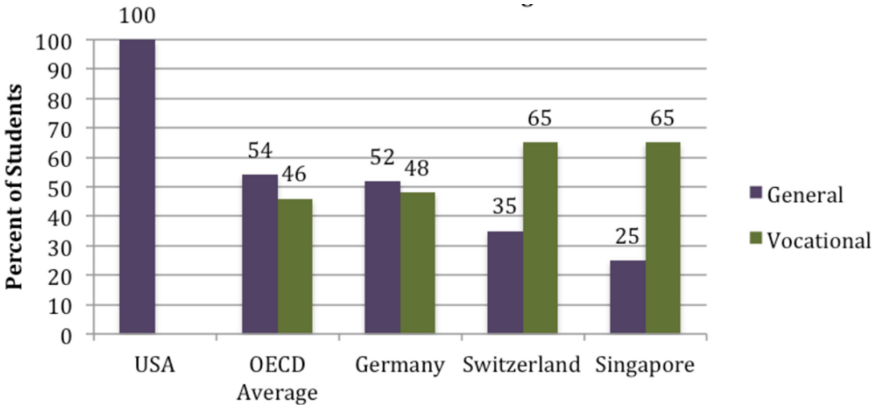

Fig. 1. Practice teaching system of statistics major

3.1 Statistics Practice Teaching System Is Divided into Three Dimensions, Progressive Layer by Layer

Many colleges and universities regard practical teaching as experimental teaching, and only set up simple experiments in some statistical courses, which does not reflect the characteristics of practical teaching of statistics. In the process of constructing the practical teaching system of statistics, we should first emphasize the practical teaching of professional courses, and then promote the training of professional skills and the second classroom learning, so that students can master the application of statistical theory in an all-round way.

3.2 Diversification of Practical Teaching Forms

In the process of designing the practice teaching system of statistics major, we mainly adopt the way of combining the on campus experiment with the off campus practice. The professional course of statistics is mainly to teach the whole working process of statistics, from the design of the scheme to the collection, collation, display, analysis and interpretation of data [3]. The combination of on campus experiment and off campus practice can not only cultivate students' ability to comprehensively use statistical methods and statistical analysis tools, but also cultivate and train students' ability to observe and understand society, improve students' ability to analyze, solve and adapt to society, and better combine theoretical knowledge with practical application.

4 Design of Practical Teaching System for Applied Statistics Major

According to the training objectives and specifications of statistics professionals, combined with the construction idea of practical teaching system, this paper thinks that the practical teaching system of statistics major should be composed of two main lines, four subsystems and practical teaching platform. The two main lines are: the practical teaching system running through the professional theory courses and the practical teaching

system running through the four academic years to guide and cultivate students' innovative ability and practical ability. The four subsystems are preparation practice teaching subsystem, curriculum practice teaching subsystem, practice teaching subsystem and innovative practice teaching subsystem. The details are shown in Fig. 2.

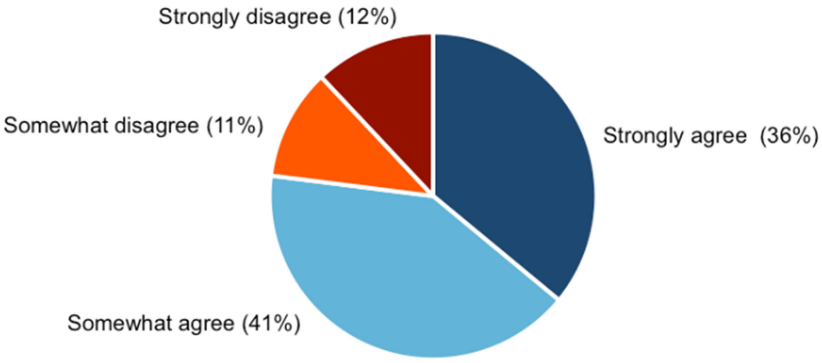

Fig. 2. Practice teaching system of statistics major

4.1 Preparation Practice Teaching Subsystem

Generally, the basic theory courses of statistics major mainly include two parts: public courses and subject basic courses. The setting of public courses is considered from the perspective of the basic moral quality and political quality of a college student. The subject basic courses are mainly set from the perspective of professional learning, so as to lay a good foundation for the future study of professional courses. The practice teaching subsystem of this link is mainly manifested in the cultivation of political quality and basic knowledge system, which lays the foundation for the study of basic knowledge.

4.2 Course Practice Teaching Subsystem

The main purpose of the system design is to enable students to use these methods for practical operation on the basis of mastering the theoretical knowledge of professional courses. For example, using SPSS to establish and manage data files, descriptive statistical analysis, parametric test, ANOVA, nonparametric test, correlation analysis and regression analysis, cluster analysis, discriminant analysis, factor analysis; using Eviews and SAS software to establish random time series model; using Excel, Eviews and SPSS software to make economic forecast and decision.

4.3 Comprehensive Practice Teaching Subsystem

In order to cultivate high-level application-oriented statistical talents, in addition to the introduction of professional basic theory, we should also set up some comprehensive simulation training, so that students' professional skills can be effectively refined. Through

comprehensive simulation, comprehensive design, comprehensive analysis and other links, students can participate in the process of statistical work, understand the nature, characteristics and requirements of statistical work, truly understand the connotation of accounting major, and improve their comprehensive ability to deal with and analyze statistical problems.

$$H = \frac{n}{\sum \frac{1}{x}} \tag{1}$$

4.4 Construction and Practice of Practice Teaching Platform

The construction of teaching platform can ensure the effective development of the practical teaching system of statistics major, and can monitor and feedback in real time to realize the two-way communication between students and teachers. Many materials, including case sets, exercise sets, practice manuals and practice reports, can be transferred and filed through the practice teaching platform to improve work efficiency. The purpose of learning is not only to master and use theoretical knowledge, but also to innovate. The practice teaching subsystem can improve the innovation ability and comprehensive analysis ability of statistics students through extracurricular research, undertaking projects, entrepreneurship planning system development and other ways, and can effectively use the knowledge to solve practical problems in a complex and changeable environment.

$$M_e = L + \frac{\sum f}{f_m} - s_{m-1} * d \tag{2}$$

$$AD = \frac{\sum |x - \overline{x}| * f}{\sum f} \tag{3}$$

5 Implementation Path of Practical Teaching System of Applied Statistics Major

The practical teaching system of statistics is a complex system composed of many aspects and elements, which must be carefully designed and organized to achieve the goal of optimization. The specific implementation path is as follows. Professional practice leading group should be set up to be responsible for the planning, organization, coordination, monitoring and evaluation of professional practice teaching, and actively give play to the enthusiasm and creativity of professional teachers and experimenters. The implementation of any practical teaching scheme must be specifically organized and implemented by professional teachers and experimenters. Therefore, it is necessary to fully mobilize professional teachers and experimenters to study practical teaching problems, develop and design practical teaching projects, and improve the enthusiasm and creativity of practical teaching effect. To formulate the implementation plan of practical teaching in statistics major, we should formulate not only the overall implementation

plan, but also various special implementation plans, And strive to be systematic, scientific and operable. 4. Compile books related to experiments, organize professional teachers and experimenters to write and design experiment instructions, teaching cases, teaching projects, simulation training topics, exercise sets, topic design sets, practical teaching CA courses and multimedia courseware, and strengthen the basic construction of professional practical teaching [4]. Establish and perfect the practical teaching management system, such as practice syllabus, practice code, practice record, practice appraisal form, practice performance evaluation method, extracurricular scientific research reward method, student research group and community management method, laboratory management system, in class experiment report system and so on. Strengthen the system construction of professional practice teaching.

6 Case Teaching Thought

6.1 Main Ideas

The case teaching mode originated in 1920 and was advocated by Harvard Business School. It is on the basis of students' mastering the basic knowledge, according to the teaching purpose and teaching content requirements, through negotiation and careful design of typical cases, to bring students into specific practical problems for exploration and research. Case teaching advocates a multi-directional and divergent way of thinking, cultivates students' creativity and imagination, focuses on practice and case explanation and analysis, and enlightens students' positive thinking. 2) actively participate in and guide students to solve practical problems with what they have learned. Designing classic and practical teaching cases has become a key issue in teaching.

6.2 Case Design Factors

To design a good case, we need to consider the following factors: professional relevance, moderate difficulty, collaborative learning, before and after contact and other factors. The first factor considered in the selection of visual basic (hereinafter referred to as VB) cases is professional relevance. The teaching object of VB programming course is non computer major students. Students do not have systematic training in programming, so computer programming is undoubtedly a very difficult thing. In addition, in the current teaching materials, the relevant examples are basically universal, lack of professional pertinence, resulting in students' interest and initiative in program design is not strong, and the effect of classroom teaching is not ideal. In order to ease students' fear of programming, arouse students' interest in programming with VB, better master programming skills, and enhance classroom teaching effect, I consider that students of different majors have different concerns. From the professional perspective of teaching objects, I introduce professional related cases for teaching, so that students can learn programming at the same time, Be able to solve professional problems.

7 Concluding Remarks

The cultivation of manufacturing engineering undergraduate talents is the human support and intellectual guarantee for the implementation of "made in China 2025" manufacturing power strategy under the new normal of China's aerospace development. The reform of training program is the key for Aeronautics and Astronautics colleges to actively adapt to the leap forward development of Aeronautics and Astronautics and promote the construction of a strong manufacturing country. Through the above-mentioned reform, we can build a modern and demanding talent training curriculum system; keep pace with the times, deepen the reform of curriculum teaching content; enrich teaching means, creatively use a variety of new generation information technology to organize students' learning activities; and finally achieve the purpose of improving the training program of aircraft manufacturing engineering.

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