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Industry-Academic-Education Integration: Innovation and Practice of Training Mode of Applied Statistics Talents in Big Data Era

—Taking Zhejiang University of Science and Technology as an Example

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Abstract

In the era of big data, new requirements are put forward for Applied Statistical Talents. Industry-academic-education integration is an effective way to cultivate applied talents. This topic aims at the existing problems, combined with the practice of Zhejiang University of Science and Technology, carried out the innovation and practice of applied statistics talent training mode.

Keywords

Industry-Academic-Education Integration, Applied Statistics Talents, Training Mode

1. Introduction

With the rapid development of Information Science and technology, human society has entered the era of big data. Big Data is impacting every aspect of socioeconomic life. With the rapid development of the big data era, the statistical discipline is changing with each passing day. The big data has greatly expanded the research object and the application domain of the statistical discipline, has grown many new statistical methods and the statistical technique, then is affecting the statistical development. How to train applied statistical talents and data statistical analysts for industrial and social needs under the background of big data, how to integrate big data mining, analysis and processing technology into the teaching of applied statistics courses, in order to ensure that the training of statistical personnel to meet the needs of society, These are things we have to

focus on and innovate on.

2. The Challenge to the Training of Applied Statistics Talents in the Big Data Era

The advent of big data is a milestone in the history of statistics. The challenges include data collection, management, storage, search, sharing, analysis and visualization. The sources and types of date changed at first. The types of data include not only structured data, but also unstructured data, semi structured data, or heterogeneous data. Then the mode of analytical thinking changed. The big data era is more interested in relationships. The process of statistical analysis has changed to find the valuable data directly from the large amount of data, and find the characteristics and quantitative relationship of the data through analysis, and then make judgments and decisions. The empirical analysis also changed from the traditional thought of "Hypothesis-test" to the new thought of "Discovery-conclusion". Finally, it has become far more associated with computer. With the increasing number of big data analysis techniques and software, statisticians can use new algorithms and analysis techniques to interpret larger data, which makes the scope of application of statistics wider, the system of statistics is further extended and improved (Jiao, Zhao, & Miao, 2015).

These changes bring new challenges to the training of applied statistics talents. They not only need to master statistical theory, statistical methods and the application of professional statistical software, but also need to have a variety of abilities, including knowledge fusion ability, problem-solving ability and big data application ability.

3. Analysis of the Current Situation

The investigation of some colleges and universities shows that there are many practical problems in the training of applied statistics talents. In the light of the actual situation of the Zhejiang University of Science and Technology, we will focus on three issues.

3.1. Problems in Practical Teaching

The teaching involved in the training of applied statistics talents is very practical, but the link of practical teaching has been ignored for a long time. First, the study of many software courses is separated from theoretical teaching, and the basic mode is to carry out theoretical teaching first and then experimental teaching, which wastes a great deal of students' time, also causes the student's study efficiency to be low. Second, there is a lack of practical training on the platform of big data system, and the lack of a centralized practice base, while the effect of decentralized practice is difficult to guarantee, there is no organization to ensure the development of students' extracurricular activities. Third, there is the lack of problem-oriented statistical modeling training and big data statistics

project training. As a result, the students' theoretical knowledge cannot be combined with practice, and there is no effective way to cultivate the ability of innovation and entrepreneurship.

3.2. Problems Existing in the Reform of Personnel Training Mode of Industry-Academic-Education Integration

The aim and direction of the integration of industry and education is to cultivate talents meeting the industrial and social needs of the big data era (Tao & Zhang, 2021). Integration of Science and education promotes the organic integration of knowledge creation process and talent cultivation process.

At the present stage, the integration of industry and education is only in the scattered points of educational elements, lacking of systematicness, depth and extensiveness. On the one hand, there is a high demand for high-skilled statistical talents. On the other hand, it is difficult for some college graduates to find jobs, the structural contradiction between the supply and demand of talents is prominent (Tao, Zhang, & Xu, 2019). At the microcosmic level, there is no talent training mode of school-enterprise cooperation and practical education. As for the integration of academic and education, with the progress of the Times, the scientific research status of universities is getting higher and higher, but "The educational nature of scientific research" and "The academic nature of education" have not really been implemented, the division of teaching and research functions within universities is still too rigid, which makes the contradiction between teaching and scientific research deeper, makes it difficult to realize the integration of academic and education effectively.

3.3. Problems Existing in the Construction of Teaching Staff

Many teachers lack the practice of statistical work and practical experience, cannot meet the needs of student training; in colleges and universities, there is a shortage of "Double-qualified" teachers who have profound knowledge of mathematics, computer and applied statistics as well as practical working experience in applied statistics. At present, many young teachers are directly involved in teaching after they graduate from comprehensive universities, so they have a certain level of theoretical research, but their practical ability is lacking. Most teachers are lack of investigation and research on the knowledge structure of statistical talents, and lack of research on the innovation of the training mode of applied statistical talents.

4. Exploration on the Training Path of Applied Statistics Talents Based on Industry-Academic-Education Integration

In the training process of applied statistics talents, we have been exploring innovative teaching mode. In developed countries abroad, the combination of industry with education and the cooperation between schools and enterprises are col-

lectively referred to as "industry-education integration". After more than 100 years of exploration and practice, a set of relatively mature practices has been formed, the theoretical research in this area has also achieved fruitful results (Klingstrom, 1987; Jon & John, 2012; Knudsen, 2015). Domestic scholars have also done a lot of research around the talent training mode of industry-education integration (Chen, 2014; Wang, 2016; Tang & Xie, 2020). Through Literature Review, enterprise research, interviews with brother colleges, etc., according to the problems existing in the practical teaching of applied statistics, we put forward the talent training mode based on industry-academic-education integration.

4.1. Scheme Design of Practical Teaching Mode Based on Industry-Academic-Education Integration

In view of the weakness of the practice of statistical teaching, we investigate deeply into the enterprise, understand the operation rules of the enterprise、the demand of the enterprise and the ability of receiving the practice, on this basis, we work out the relevant scheme of practice teaching mode.

Taking economics as an example, in order to improve the quality of school-enterprise cooperation, we re-plan the practical teaching system. In the first-year training stage, set up cognitive internship, through industry experts lectures and other forms of business visits, to understand the direction of industry development. In the second grade, there are practical links in the course, including Python big data analysis experiment, "Internet+" competition practice, economic policy research and analysis, etc., carry out the practice investigation relying on the inside laboratory and the outside cooperative unit. In the third grade training stage, there are economic quantitative analysis experiments, Digital Economy Enterprise Research, intelligent economy enterprise research and other professional practice links, relying on off-campus practice base, strengthen post training. In the fourth grade training stage, there are the economic specialized practice and the graduation practice. In the above-mentioned training program for Practical Teaching Talents, we adhere to the principle of gradual progress, the integration of industry and education will run through students' four-year college, from shallow to deep, covering industry cognition, skills training, corporate culture understanding and quality training.

4.2. Building a High-Level Platform of Industry-Academic-Education Integration

By integrating superior resources and cooperating with enterprises to build high-level cooperation platforms such as practice training base, Cooperative Education Base, Industrial College and Innovation Base, the new force point of school-enterprise cooperation will be formed. To deepen the docking with industry enterprises, promote the effective implementation of various agreements, the effect of industry-academic-Education integration should be reflected in the cultivation of talents, the level of running schools and the reputation of the so-

ciety (Zhang & Zhang, 2019).

We have set up various education platforms with enterprises to fully promote their participation in experiments, internships and practices, and explore a co-operative education mechanism of "Resource sharing, in-depth participation, and mutual benefit".

For example, in cooperation with Beijing Zhongke Terui Technology Co., Ltd., we have reformed the teaching content and curriculum system of statistics based on big data platform; in cooperation with Huike Education Technology Group Co., Ltd., we have carried out the construction and reform of Internet finance curriculum and teaching resources, in Industry-university Cooperation Project of Ministry of Education，our project was awarded as excellent final project. At present, we are cooperating with Shanghai Qianlong high-tech Co., Ltd. to build the practical teaching base of Economics and management based on industry-academic-education integration.

4.3. Strengthening the Construction of "Double-Qualified" Teachers

"Double-qualified" teaching staff is an important resource for application-oriented universities, is the quality guarantee for the cultivation of applied talents, it is also the key to promote the transformation of training model of innovative talents in application-oriented colleges and universities.

In accordance with the principle of combining training, introduction and employment, we should strive to build a contingent of applied and innovative teachers with strong practical and innovative ability, high level of teaching and scientific research, and Team Spirit. Colleges and universities should perfect the assessment methods for "Double-qualified" teachers and strengthen the incentive measures, and enhance the teachers' enthusiasm and initiative to improve their professional skills; It should also improve the regular practice system for teachers to go to enterprises, to build a social practice base with enterprises, send teachers to enterprises to receive skills training、post practice、temporary work and practical training, and to ensure that professional teachers can go to the industry for training in a certain period of time.

5. Conclusion

Through several years of exploration and practice, we have made certain achievements. Our students have achieved good results in various competitions, obtained various scientific research projects, and also published some academic papers.

In the training of applied statistics talents, we adopt school-enterprise cooperation training mode and practice teaching mode, which embodies the general goal of training innovative applied talents to meet the needs of society. Integration of industry, academic and education is the necessary way to train talents. Through the cooperation between the school and the enterprise, the students deepen their understanding of the industry and broaden their horizons, through

practice, students' knowledge fusion ability, working ability and professional accomplishment have been promoted.

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Conflicts of Interest

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

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