

# The Reform and Practice of Innovative Talents Training Mode of Statistics Major in the Big Data Era

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**Abstract:** With the advent of the era of big data, the importance of data resources has become increasingly prominent, and the demand for innovative data analysis talents is growing. As a major of training data analysis talents, statistics is facing new requirements and challenges. To adapt to the development of the times, it is imperative to reform the talent training mode. Through the analysis of the present situation of the training mode of statistics specialty in colleges and universities, it is found that there are some problems in the current statistics specialty education, such as outdated curriculum system, weak teachers, and traditional teaching methods. Combined with the characteristics of the big data era and statistics majors in colleges and universities, some constructive suggestions are put forward to construct the training mode for innovative talents in statistics majors.

**Keywords:** Big data era; Statistics majors; Talent training model; Innovation ability

**Online publication:** May 20, 2024

## 1. Introduction

Under the leadership of the Party, China has leaped from standing up to becoming strong. With the rapid development of science and technology and the continuous improvement of comprehensive national strength, the demand for talent, especially innovative talents, is increasing <sup>[1]</sup>. Innovation-oriented talents are the primary resource for China's development. China has invested a great deal of effort and resources into training innovative talents and building talent teams. With the development of Internet technology, the world has entered an era of big data based on massive data. As an extremely important factor, big data has penetrated all walks of life. Many enterprises regard big data as one of their most important assets and consider the acquisition and accurate application of big data as a crucial basis for decision-making <sup>[2]</sup>. Big data possesses characteristics such as large scale, complex structure, fast data changes, and difficult data analysis <sup>[3]</sup>. These new features require more scientific methods to collect and process increasingly complex data and reveal the underlying laws behind the data. This necessitates not only solid statistical theories and methods but also the ability to quickly and timely obtain data from a large number of sources and use Internet technology for data analysis, to build

statistical models to solve these problems <sup>[4]</sup>. This requires students to have a more solid theoretical foundation and stronger practical application abilities than before. Therefore, higher requirements are also placed on the training objectives of innovative talents in statistics. Combined with the new developments of the times and the new requirements of society, this paper will analyze the current situation of the training mode of traditional statistics professionals, identify its shortcomings, innovate and improve the existing curriculum system, teaching staff, teaching methods, assessment methods, practical teaching systems, and school-enterprise cooperation. It aims to build a training mode for innovative statistics professionals in line with the characteristics of the times.

## **2. Analysis of the current situation of the training mode of statistics professionals**

Through the research on the training status of statistics professionals in some universities, it is found that the traditional training mode of statistics professionals mainly has the following problems.

### **2.1. Outdated curriculum system**

Currently, the curriculum system for statistics majors tends to “emphasize theory and overlook practice,” with theoretical courses occupying a dominant position and insufficient practical training hours. This curriculum fails to meet the demands of social development in the era of big data, as it does not offer students ample opportunities for hands-on practice. Consequently, statistics graduates often lack proficiency in data processing, making it challenging for them to immediately qualify for data analysis and other statistical roles <sup>[5]</sup>.

### **2.2. Weak faculty**

Big data presents significant challenges to colleges and universities. Statistics instructors must possess solid theoretical knowledge of statistics, proficient computer skills, and advanced data analysis abilities <sup>[6]</sup>. Given the broad applicability of statistics and the complexity of big data, both teachers and students face higher standards. Some instructors struggle to effectively utilize relevant statistical software, data analysis tools, and programming languages, hindering their ability to conduct data mining and other applications. This limitation in teaching content restricts students’ exposure and cognitive breadth, ultimately leading to suboptimal teaching outcomes.

### **2.3. Traditional teaching methods**

The traditional teaching method for statistics majors is quite uniform. Most instructors rely on lecture-based teaching in the classroom, where students absorb and consolidate knowledge through listening and post-class assignments. While this approach emphasizes content delivery, student engagement during class remains low, leading to insufficient interaction between teachers and students. Consequently, student motivation is often lacking, and their initiative remains underutilized. As a result, the overall teaching effectiveness is compromised, exacerbated by limited opportunities for teachers and students to connect outside of class. This scenario presents a significant obstacle in adequately training statistics professionals for the demands of the new era <sup>[7]</sup>.

### **2.4. Backward practice teaching design**

The emergence of the big data era has rendered the traditional practical teaching system inadequate in meeting the evolving demands of society for personnel development. Practical teaching primarily follows a pattern-oriented approach, with experimental content often disconnected from related professional courses. This fails to underscore the application of statistical theories and methods across various professional domains, resulting

in students' inability to integrate theoretical knowledge with practical application <sup>[8]</sup>. When confronted with real-world economic management issues, students struggle to apply statistical thinking and methods to analyze problems in conjunction with their professional knowledge. Furthermore, the practical teaching framework for statistics majors lacks both comprehensiveness and innovation. Traditional experimental projects tend to focus on basic experiments, each addressing a single knowledge point. However, real-life problems are typically complex systems requiring students to apply integrated knowledge to analyze and solve them.

## **2.5. Single assessment method**

Most traditional assessment methods for statistics major courses rely heavily on closed-book exams, often featuring questions centered around basic calculations. This examination approach presents a clear drawback of “emphasizing theory and neglecting practice.” While it effectively evaluates students' grasp of statistical theory, it overlooks their proficiency in applied statistical knowledge. This oversight hinders the development of students' innovative and practical skills, posing a challenge to the cultivation of innovative talents in colleges and universities <sup>[9]</sup>.

## **2.6. Superficial school-enterprise cooperation**

At present, many school-enterprise cooperation initiatives suffer from the phenomenon of “schools being proactive, while enterprises remain passive.” The current forms of school-enterprise cooperation are often limited, failing to adequately meet the requirements for cultivating innovative talents. Additionally, there is a notable absence of mature, standardized, and systematic mechanisms and models for school-enterprise cooperation <sup>[10]</sup>. The lack or inadequacy of management systems impacts the effectiveness and efficiency of such collaborations. To cultivate innovative talents with well-rounded development in knowledge, skills, and qualities, enhance the innovation and practical abilities of statistics graduates, and improve their competitiveness in the job market, it is imperative to reform and innovate the modes and mechanisms of school-enterprise cooperation.

Through an analysis of the current training methods for statistics professionals in certain colleges and universities, along with an understanding of the changing landscape and societal demands, it becomes evident that reforming the existing training methods for statistics professionals is essential. This will enable the nurturing of innovative talents in statistics who are equipped to navigate the evolving landscape.

# **3. Construction of training mode for innovative talents in the statistics specialty**

With the ongoing endeavor to establish China as an innovation-driven nation, nurturing individuals with innovative prowess and entrepreneurial acumen has emerged as a primary objective in education and training. Concurrently, within the realm of big data, the significance of data resources is increasingly pronounced, placing statistics – a discipline aimed at fostering data analysis skills – under fresh scrutiny and posing new demands and challenges. By optimizing the curriculum framework, refining teaching methodologies, and innovating assessment techniques, students' aptitude for statistical reasoning and their ability to apply statistical concepts comprehensively are systematically nurtured. This prepares them to emerge as innovative statistical professionals equipped with adeptness in processing big data.

## **3.1. Optimizing the curriculum**

Based on the current situation analysis, courses related to big data analysis, such as data modules, statistics modules, and application technology modules, should be designed <sup>[11]</sup>. During the formulation process, emphasis

should be placed on highlighting the unique characteristics of colleges and universities. This involves enhancing the professional curriculum system and updating teaching cases and analytical data. Consequently, students will have the opportunity to delve into advanced statistical theoretical knowledge in line with contemporary developments and practical applications. Moreover, providing students with practical opportunities will bolster their data analysis skills, thereby nurturing high-quality and high-level statistical talents.

### **3.2. Strengthening the construction of teaching staff**

To strengthen the construction of the teaching faculty, greater efforts should be made to attract talented individuals, ensuring that teachers possess a comprehensive knowledge base and strong practical skills. Various mechanisms should be employed to bring statistical experts from enterprises and institutions into the classroom. They can participate in competitions, provide student counseling, and even serve as part-time instructors at schools <sup>[12]</sup>. Additionally, to enhance the practical teaching abilities of statistics teachers, they can be encouraged to undertake temporary positions in relevant enterprises. Through long-term collaboration between statistics teachers and businesses or institutions, teachers can continuously update their statistical knowledge in line with the evolving landscape of these entities, thus ensuring that practical teaching methods remain up-to-date.

### **3.3. Reforming the teaching method and teaching means**

In the era of big data, the reform and advancement of the statistics major necessitates the optimization of teaching methods. It requires timely adjustments to teaching approaches, with a focus on student-centered learning. This entails fostering greater classroom interaction between teachers and students, thereby enhancing students' engagement <sup>[13]</sup>. Encouraging student participation in project research allows for the discussion of existing project-related issues, thereby bolstering students' practical skills and overall competence. Through this approach, students gain a comprehensive understanding of statistical theory, acquire proficiency in data analysis techniques, and gradually develop into proficient and innovative statistical professionals.

### **3.4. Improving the practical teaching system**

To meet the demands of the evolving big data society, statistics majors must enhance their multidimensional and progressive practical teaching system. This entails prioritizing the curriculum experiment and extracurricular practice platforms and reconstructing the practical teaching framework for statistics majors. Establishing a series of professional experiments, enhancing comprehensive and innovative practical teaching, and reinforcing the professional characteristics of statistics practical instruction are imperative <sup>[14]</sup>. Moreover, it is essential to diversify training avenues, promote research-based learning and innovative practical activities, and instill in students a heightened awareness of innovative practices. By establishing a structured system of extracurricular innovative activities, we can create a statistical practical teaching framework that integrates fundamental practical skills, career advancement capabilities, comprehensive practical abilities, and innovative application prowess.

### **3.5. Innovating assessment methods**

In the era of big data, the training of statistical talents necessitates the development of appropriate assessment methods. This entails incorporating practical content into examinations to evaluate students' ability to analyze and solve problems practically. The assessment should not only gauge students' mastery of basic knowledge and calculation methods but also evaluate their comprehensive application abilities. Therefore, it is imperative to revise the traditional assessment method, which often emphasizes theory over application. Curriculum evaluation should be reformed to encompass both theoretical and practical aspects. The conventional exam-

oriented evaluation method, which predominantly focuses on theoretical knowledge, should be enhanced. Instead, a new evaluation method based on application analysis and case studies should be adopted in the formulation of test questions. In practical assessments, students' ability to address economic and social practical issues should be evaluated. Additionally, emphasis should be placed on strengthening students' capacity to write statistical experiment reports and assessing the comprehensive application level of their statistical knowledge.

### **3.6. Enhancing school-enterprise cooperation**

In school-enterprise cooperation, schools and enterprises can leverage their respective advantages to achieve resource-sharing and complementary benefits. Schools can enhance teaching quality by utilizing equipment and resources provided by enterprises, while enterprises can boost production efficiency by leveraging the talents of schools. Common models of school-enterprise cooperation include order-type training, joint laboratory construction, and practice base establishment. In statistics teaching, the mode of school-enterprise cooperation should be innovated based on the specialty characteristics and the requirements of enterprises. Colleges and universities can engage enterprise technical experts to participate in discussions on teaching reforms, contribute to the revision of talent training programs, undertake professional teaching tasks, introduce practical cases into classrooms, elucidate new technologies and theories, broaden students' horizons, and enhance their learning enthusiasm <sup>[15]</sup>. Additionally, colleges and enterprises can collaborate on projects to integrate actual enterprise projects into teaching, allowing students to understand and master the operational processes of enterprises in practice, thereby enhancing their practical abilities. Through school-enterprise cooperation, college graduates can seamlessly transition into serving enterprises immediately after graduation.

## **4. Conclusion**

With the advent of the big data era, the demand for data analysis talents is rapidly increasing. Colleges and universities, as the leading institutions for talent cultivation, are encountering various challenges. Through an analysis of the current training methods for statistics professionals, this paper identifies their shortcomings. By combining the characteristics of the big data era with those of colleges and universities, it proposes an innovative training model for statistics professionals. This entails optimizing the curriculum, enhancing the capabilities of teaching staff, refining the practical teaching system, innovating the assessment methods, and empowering students to play a central role. By fostering their innovation and application abilities, this approach aims to supply society with innovative and skilled talents.

## **Funding**

Industry-University Cooperative Education Project of Ministry of Education in 2021 (Project No. 202102496004); Key Platform and Project of Scientific Research in Universities of Guangdong Province "Special Project in Key Fields" (Project No. 2023ZDZX4042)

## **Disclosure statement**

The author declares no conflict of interest.

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