

# Research on the Path of Higher Education Teaching Reform from the Perspective of Big Data

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**Abstract:** The advent of the digital age has pointed out the direction for the development of higher education. In this paper, the undergraduate course “Science of Interrogation” is taken as the research subject, the challenges of big data teaching reform in universities are analyzed systematically, and concrete measures, such as adhering to the concept of teaching reform under the condition of big data, establishing professional teaching teams, improving the curriculum construction level, emphasizing on being student-centered, and optimizing the reform of the curriculum evaluation system, are proposed to address these challenges.

**Keywords:** Big data; Higher education; Science of Interrogation; Teaching reform

**Online publication:** May 8, 2023

## 1. Introduction

With the profound integration of the internet, big data, artificial intelligence, and the real economy, big data is supporting the government in scientific decision-making and social governance. In this new era, all aspects are supported by big data, including the government’s promotion of social governance, enterprises’ product design, companies’ participation in market competition, and schools’ education. Police academies should take the initiative to adapt to the development trend of big data and carry out necessary teaching reforms. The question here is how classroom teaching can be promoted from the perspective of big data. In this paper, the undergraduate course “Science of Interrogation” is taken as an example to explore the feasible practice of curriculum construction in colleges and universities under the condition of big data in hope to provide reference not only for valuable research on big data, but also for a better undergraduate education development.

## 2. Significance of higher education teaching reform

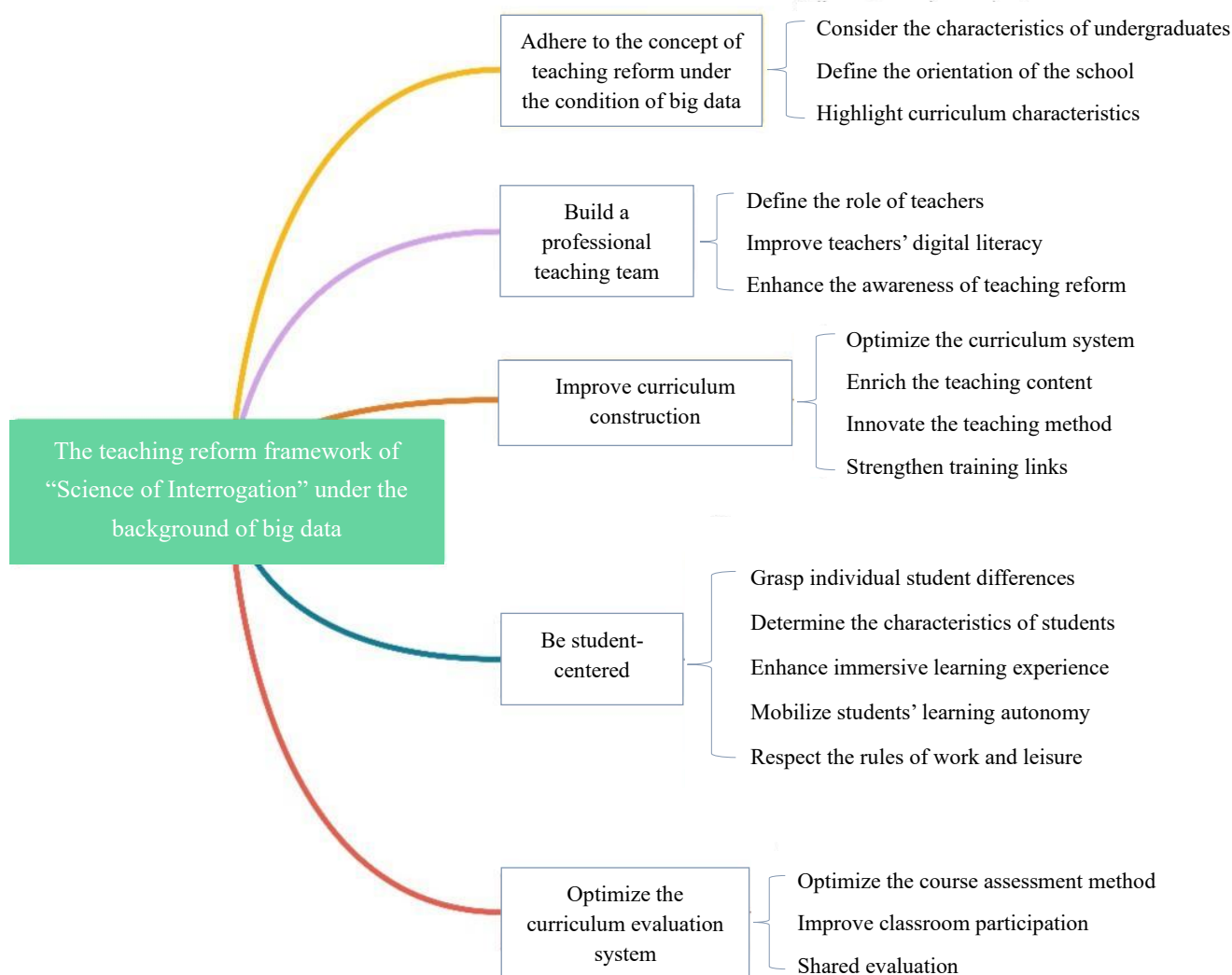
With the promulgation and implementation of relevant policies and regulations, such as China’s Education Modernization 2035, the Implementation Plan for Accelerating Education Modernization (2018–2022), and the Implementation Opinions on the Construction of First-Class Undergraduate Courses, necessary reforms should be made to the teaching mode of colleges and universities. The implementation of the Platform for Action on Big Data will have a huge impact on all sectors, with higher education institutions, especially police academies, bearing the brunt. The integration of big data into teaching reform is no longer in a state of questioning “whether or not to reform” or “how to reform,” but rather in a crucial stage of implementation. This requires colleges and universities to comprehensively sort out the teaching content and improve the quality of each course, reasonably raise the level of academic challenge, increase the difficulty and depth

of each course, as well as effectively improve the quality of course teaching [1].

At the present stage, police academies still face some difficulties in promoting big data teaching reform. First, due to the weak horizontal connections among colleges and universities, there are problems such as repeated construction of big data teaching platforms and inconsistent standards [2]. Second, the understanding of big data-related information among teachers is inconsistent, and their ability to teach under the background of big data is subpar. Third, there are obstacles to data sharing among colleges and universities. It is very common that big data application platforms are incompatible with each other and data cannot be shared. Fourth, big data teaching reform platforms in universities have insufficient maintenance resources, especially given their over-reliance on technology companies. These problems limit the depth and breadth of big data teaching reform in higher education.

### 3. Measures of teaching reform from the perspective of big data

Higher education teaching reform under the background of big data is a systematic project. In this paper, the construction framework and specific content of the teaching reform of “Science of Interrogation” are presented. See **Figure 1** for details.



**Figure 1.** Course construction framework for “Science of Interrogation”

### **3.1. Adhere to the concept of teaching reform under the condition of big data**

The direction of schools should be oriented around the professional police personnel training objectives, and scientific experimental teaching projects should be designed. The teaching content of the course should support the teaching objectives, and there should be a clear correspondence between the training content and the training requirements. In the design of the course, it is imperative to adhere to the law of undergraduate teaching and highlight the knowledge framework and rich contents. Case teaching should be the focus when teaching this course. Highlighting the course features of “Science of Interrogation,” theoretical teaching should encompass about 20%–30% of the course teaching, while the remaining 70%–80% should be case teaching.

### **3.2. Build a team of professional teachers**

On the one hand, it is necessary to improve teachers’ digital literacy, help them understand and encourage them to accept big data teaching reform, form a team of teachers to highlight the characteristics of big data in various fields, including writing educational reform papers, declaring educational reform topics, recording online lessons, carrying out teaching competitions, *etc.*, as well as help teachers familiarize themselves with big data teaching software and hardware. On the other hand, it is also necessary to introduce high-end talents. We should pay close attention to the introduction of talents, while promoting the understanding of teaching reform. These talents may include experienced instructors or those with doctoral degrees. Especially with the advancements in electroencephalography (EEG), speech, micro expression, and other psychological testing technologies, the introduction of high-end talents may offer some benefits <sup>[3]</sup>.

### **3.3. Improve the curriculum construction level**

First, the curriculum system should be optimized. The optimization of the course should be in line with the content of the textbook. In general, the course is divided into five modules: introduction, subject of interrogation, interrogation strategy, interrogation implementation, and big data. Each module is designed with corresponding questions, reference materials, and cases. Big data-driven teaching model allows for more comprehensive information gathering and in-depth analysis and evaluation of information. Big data from public security organs should be applied to teaching and training <sup>[4]</sup>, and interrogation techniques should be included in the training. The course content should include the characteristics and composition of the interrogation equipment, the preparation of the interrogation, the experimental group and the control group, the experimental observation and interrogation, the realization of interrogation strategy, and so on.

Second, the teaching content should be enriched with the principle of innovation. Teachers should be encouraged to update teaching cases regularly. On the one hand, the various forms of expression should be taken into account. Due to the characteristics of big data as a digital way of reflecting social existence or a form of social digital existence, it is considered to be diversified and multi-angled in various fields or dimensions <sup>[5]</sup>. On the other hand, when using big data resources and internal information resources from public security organs, the cases and data should be kept confidential, so as to achieve isolation, confidentiality, and traceability of data use. In this way, data would be used in a safe and controlled manner <sup>[6]</sup>.

Third, the teaching methods should be innovated. Case-based teaching (CBT) should be implemented in the teaching reform. In public security academies, scientific and technological methods should be applied to the teaching practice. In order to meet the talent demand for public security informatization and promote professional public security education as well as the training of innovative personnel, a big data platform system has been established for police demonstrations and training <sup>[7]</sup>.

### 3.4. Be student-centered

Firstly, the characteristics of students should be accurately defined. Excluding the influence of physiological maturity, Piaget holds that individual development is in fact the product of a large number of activities in the sense of practice, experience, environment, *etc.* [8]. The relationship between teachers and students should be improved, and the influence of “command,” “obedience,” and “discipline” on classroom activities should be subdued in police academies. In addition, emphases should be placed on student initiatives and the cultivation of students’ investigative literacy in the learning process. This would improve students’ understanding, thought process, and investigation skills.

Second, there should be an immersive learning experience. The lack of interaction between teachers and students in classroom, coupled with outdated teaching content, makes lessons less attractive to students, thus suppressing their enthusiasm in class and motivation for learning. As a result, students tend not to participate in class [9]. Therefore, in the design of the course, the characteristics of “The Times” should be considered and flipped classroom should be adopted to encourage participation in class. Modern information technology such as big data should be fully utilized to identify major problems and improve the courses or design high-quality ones [10].

Third, students’ learning autonomy should be mobilized. The rules of work and leisure must be respected. For instance, students, on a daily basis, should have their breakfast, take part in formation assembly, and attend classes and physical training; at noon, they should have their lunch, while taking a break, and continue with formation assembly, classes, or physical training; thereafter, they should have dinner and attend evening classes. There is regularity in these links. Only by understanding this regularity can students better allocate their study time. Other than that, it is important to take into account of individual student differences. Nowadays, most college students are those born after 2003. Their height, weight, character, psychological quality, and personal skills embody the distinct characteristics of “The Times.” These differences should be considered when making educational reforms.

### 3.5. Optimize the curriculum evaluation system

The course assessment should also be optimized. Several scholars have put forward the concept of “big data-driven investigation,” emphasizing the subversive changes brought by big data to traditional investigation [11]. First, it is necessary to improve classroom participation. In the design of flipped classroom, it is important to group the students appropriately. Students’ dormitory allocations can be used as the basis for grouping. Each group should consist of 6–8 members, and based on the participation, scores are given. The average score should be calculated after excluding the highest and lowest scores. Second, big data resources and methods should be taken as an important content of assessment, reflected in both the teaching link and the participation of students. The assessment results should be shared with other teachers and the students as constructive feedback. Finally, a scientific evaluation framework should be established as follows: course grade = usual class performance (15%) + assignment (15%) + mid-term test score (10%) + final exam score (60%).

## 4. Conclusion

The rapid development of big data application drives police academies to carry out teaching reform. There is a need to strengthen the construction of teaching teams and innovate the teaching ideas, teaching means, and teaching methods of “Science of Interrogation,” one of the basic disciplines in police academies. This discipline is committed to police personnel training under the condition of big data and achieving the expected goals of teaching reform and curriculum construction [2]. Reform is a continuous endeavor, and there are still problems such as inconsistent reform standards, differences among colleges and universities, and the lack of sharing of reform effects. Looking forward to the future, relying on the big data teaching

platform, and upholding the concept of big data teaching reform, the teaching reform of “Science of Interrogation” will provide some reference to the teaching reform of other courses under the background of big data.

### **Acknowledgments**

The author would like to thank his instructors who helped in the research, as well as his students and other personnel who actively cooperated in this work.

### **Funding**

This work was supported by the Education and Teaching Reform Research Project of Jiangsu Police Institute (No. 2022B12) and Qinglan Project for Jiangsu Province.

### **Disclosure statement**

The author declares no conflict of interest.

### **Author contributions**

The author confirms sole responsibility for the conceptualization and writing of the manuscript.

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