

Analysis on the Optimization Path of Regional Supervision Policy in Shandong Province in the Age of Artificial Intelligence

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Abstract:

A new round of scientific and technological revolution represented by Artificial Intelligence (AI) technology is profoundly affecting people's thinking, cognition and lifestyle. As an important field related to the national economy and people's livelihood, basic education still has some problems, such as too detailed government powers and responsibilities, low participation of social subjects, and insufficient education informatization. How to deeply integrate AI technology with basic education to realize intelligent management is a problem that basic education schools need to think deeply in the future. When formulating educational supervision policies, it is necessary to combine the regional characteristics of Shandong Province to increase and refine the role of educational informatization in supervision regulations.

Keywords:

AI, Educational Artificial Intelligence, Educational Informatization, Educational Supervision

1. Introduction

Basic education plays an important role in China's education system. It is a national quality education for all school-age students, and plays a fundamental, leading and overall role in improving the quality of the whole people, cultivating all kinds of talents and promoting socialist modernization. China insists on giving priority to the development of basic education, and guarantees it as a key area of infrastructure and education development. As an important link to ensure the quality of basic education, the scientific, standardized and modern management of basic education schools is of great significance for improving the efficiency of education management and improving people's satisfaction with education. In recent ten years, with the improvement of computer computing power and the rapid development of artificial intelligence (AI), AI technology has penetrated into all aspects of people's lives, and has made remarkable achievements in unmanned driving [1], biomedicine [2], food traceability [3], education and teaching [4] and other scenes. In 2017, the State Council issued the "New Generation Artificial Intelligence Development Plan" and

made it clear that “by 2020, the overall technology and application of artificial intelligence will be synchronized with the world’s advanced level; By 2025, the basic theory of artificial intelligence will achieve a major breakthrough, and some technologies and applications will reach the world leading level; In 2030, the theory, technology and application of artificial intelligence reached the world’s leading level and became the world’s major artificial intelligence innovation center”. Since then, China’s society has accelerated into the “AI era”. For basic education, the degree of informationization and intelligence has also been highly valued by the state. In February, 2022, “Key Points of Work of the Department of Basic Education of the Ministry of Education in 2022” was issued, which proposed to vigorously implement the strategic action of digitalization of basic education, continuously deepen the reform of basic education, and promote the reform of information technology application [5]. Based on the above background, this paper discusses the optimization path of regional supervision policy in Shandong Province in the AI era. From the perspective of educational supervision policy, this paper discusses the present situation and shortcomings of educational supervision policies of the state and Shandong Province, and how to build a “smart supervision” model with regional characteristics of Shandong Province and oriented to basic education schools.

2. The Analysis of the Current Situation of Education Supervision Policies of the State and Shandong Province

Educational supervision is an important part of the educational system. Britain is the first country to implement the education supervision system, and its establishment can be traced back to the introduction of the education law in 1922 and the establishment of the independent supervision department-the Bureau of Standards Education [6]. Compared with the development of educational supervision system in Britain for nearly a hundred years, the history of educational supervision system in China is not long. The current system was initiated and developed by Comrade Deng Xiaoping in 1977, and it has only developed for more than forty years [7]. With the continuous development of China’s education, the educational supervision system has been continuously improved, and the relevant regulations and policies have changed accordingly, which can be roughly divided into three stages of change [7]: the first stage is the “embryonic stage”, starting with the “Interim Provisions on Educational Supervision” promulgated by the former State Education Commission in April 1991, which marks the beginning of the legalization process of educational supervision in China, and the educational supervision in China has since moved towards the road of institutionalized development; The second stage is the “development stage”, starting with the Regulations on Education Supervision issued by the State Council in 2012, which further clarified and expanded the Interim Provisions issued in 1991 in terms of comprehensive supervision and special supervision, laying the foundation for further in-depth reform of education supervision; The third stage is the “improvement stage”. Starting from the Opinions on Deepening the Reform of Educational Supervision System and Mechanism in the New Era issued by the General Offices of the General Office of the Central Committee of the CPC and the State Council in February 2020, while improving the existing regulations and policies, it puts forward clear requirements for the formulation of regional educational supervision policies, pointing out that it is necessary to “improve educational supervision laws and regulations, speed up the construction of relevant rules and regulations, and promote the introduction of supporting local regulations and policies”. Corresponding to the three

development stages of China's educational supervision system, the role of the government in educational supervision has also changed constantly, roughly following the logical transformation of the system from administrative control to functional debugging to compliance supervision [8].

Judging from the development process of the above supervision system, although the development time of educational supervision in China is short, it has developed rapidly and experienced many stages. Behind this rapid development, there are inevitably some problems and challenges, such as the lack of characteristics of regional supervision policies [9], the lack of independence of educational supervision [6], the outdated educational supervision policies [8] and so on. With the advent of the AI era, the rapid development of AI technology not only brings opportunities to the reform of educational supervision, but also exposes some shortcomings in China's educational supervision system, which brings great challenges to the traditional educational supervision work methods. For example, the new generation of information technology represented by big data and the Internet of Things has made great breakthroughs and been widely used in the fields of mobile payment, instant messaging, autonomous driving, etc. However, in the practice of education supervision, there are some problems, such as immature data sharing mechanism, relatively closed information, inability to share data in different education systems or even the same education system, and lack of unified data standards and norms [10]. This "information island" phenomenon is not a special case in the field of education, but also widely exists in the fields of medical and health [11,12], government services [13], aviation logistics [14] and so on.

Shandong province is known as the "hometown of Confucius and Mencius", and it is also a traditional college entrance examination province in China. The news that it is difficult for parents and students in Shandong to get high marks on the first line is frequently reported in newspapers, which shows that the Shandong provincial government and the people attach importance to education. Shandong province attaches great importance to education, which is also reflected in the formulation of education supervision policies. For example, as early as 1992, the Shandong provincial government initiated the Measures for Implementing the Interim Provisions on Education Supervision in Shandong Province, which was the first province in China to implement the National Interim Provisions on Education Supervision, earlier than other provinces and cities such as Nanjing (1997), Beijing (1999) and Hunan (1999). In December 2001, the 24th meeting of the Standing Committee of the Ninth People's Congress of Shandong Province deliberated and passed the Regulations on Education Supervision in Shandong Province, which is also the first provincial-level education supervision regulation issued by China. Although Shandong province has performed well in policy follow-up and response, judging from the requirements of modernization of educational supervision, there are still some problems in Shandong province, such as insufficient innovation in terms of content, obvious homogenization, simple imitation and copying, divorced from local reality and weak pertinence [7]. From the perspective of informatization, the Shandong Provincial Supervision Regulations have not followed up the informatization construction of supervision work, and there is no relevant expression of "information" in the current Shandong Provincial Education Supervision Regulations. In this respect, Beijing is in the forefront. For example, since 2009, the education supervision department in Beijing has successively established a number of special supervision databases and established an application system for local education supervision information

management, which includes five functions: supervision data collection, education supervision evaluation, grid management of inspector's responsibility area, education public opinion monitoring and education decision support [15]. These achievements in supervision informatization have played an important role in coping with the situation that the supervision work is generally turned to online in COVID-19 in 2020, and laid a foundation for the future school education supervision work.

3. The Exploration of “Smart Supervision” Mode of Basic Education Schools in Shandong Province

The traditional education supervision work in the AI era will also face transformation, and as the key focus of education supervision work, basic education schools should take the initiative to meet the opportunities brought by the AI technology revolution and form a “smart supervision” model with regional characteristics as soon as possible. Based on some problems existing in the current situation of educational supervision in Shandong Province, this paper briefly analyzes the future “smart supervision” mode of primary and secondary schools from three aspects: the transformation of government supervision role, the accurate implementation of regional supervision work and the exertion of the advantages of regional technology enterprises.

First of all, AI technology will help the government to change its supervisory role from micro-comprehensive to macro-regulatory. In the current Regulations on Education Supervision in Shandong Province, the government is still the leading department of education supervision. The full text of the regulations is only 22 articles and more than 2,300 words. The frequency of “government” appears as high as 22 times, and the role of social subject is completely unknown, which directly reflects the full responsibility of the government in supervision work. From the content of supervision work, the government's work responsibilities include more than ten items such as reports, complaints and suggestions, and the work content is microscopic and complicated. It can be interpreted from the regulations that the government in Shandong Province belongs to micro-comprehensive supervision. Although this way of supervision can improve the authority of supervision and exercise the supervision ability of the government, it also leads to the decrease of supervision efficiency and the increase of supervision error risk because of the heavy workload of the supervision subject. In the future school education supervision work, with the help of big data technology, a series of workflows can be realized, such as digital storage of the whole teaching process, full electronization of educational supervision files over the years, and real-time access to supervision materials, thus significantly improving supervision efficiency; At the same time, based on cutting-edge technologies such as deep learning, in the future, schools will be able to realize intelligent analysis such as automatic evaluation of teachers' teaching quality, evaluation of course difficulty and rationality based on live teaching videos, as well as automatic comprehensive evaluation and feedback suggestions of school-level, municipal-level and provincial-level education quality. Based on this, the government supervision work can realize the “shift of focus”, delegate the micro-responsibility to each school, collect the grassroots data layer by layer by intelligent machines, complete the automatic analysis and form preliminary supervision suggestions, and then the government will supervise and supervise at the macro level, thus completing the transformation of the government's role from micro-comprehensive to macro-supervision.

Second, AI technology helps the school supervision work to be implemented accurately. The supervision of basic education schools is complicated and has great responsibilities, which requires extremely high professional experience of the supervision department, while the government supervision department has limited personnel, which often leads to the practical difficulty of “one person supervising multiple schools”. This structural contradiction requires the government to pay attention to the key points and difficulties in school supervision, not only to supervise whether the school education responsibility is put in place and meets the social expectations, but also to solve the difficulties faced by the school education link in time, which need the supervision department to take the lead in solving, so as to maximize the efficiency of supervision and maximize the role. However, in the implementation process of supervision from a specific angle, schools are often difficult to realize their own key problems, and they are tired of coping with and unable to solve practical problems in the supervision process. The government is also caught in non-key affairs in the supervision work and cannot be targeted. In the future school education supervision work, with the help of massive data storage and powerful self-learning ability, AI intelligent analysis system will accurately locate and feed back the core crux of the current work of the target school at the first time. Whether the government continues to assume the supervision responsibility or other social subjects and independent institutions act as supervision departments, it can accurately implement the education supervision work of the target school, and effectively solve the key, difficult and urgent points of the target school in addition to the general supervision work such as policy reading and school evaluation.

4. Conclusions

Basic education is crucial in China's education system. China prioritizes its development and emphasizes scientific school management. Amid the AI era, where AI has made remarkable achievements across various fields, China also places high importance on the informatization and intelligentization of basic education. Against this backdrop, this paper delves into the optimization path of regional supervision policies in Shandong Province during the AI era. As a key part of the education system, China's education supervision system has developed swiftly but faces issues like a lack of regional policy characteristics. The arrival of the AI era has laid bare the shortcomings in China's education supervision system, such as the “information silo” phenomenon caused by immature data - sharing mechanisms. Shandong Province, known for its emphasis on education, has performed outstandingly in formulating education supervision policies. However, problems remain, such as insufficiently innovative policy content and a failure to keep up with the informatization of supervision work. The paper puts forward the exploration of a "Smart Supervision" model for basic education schools in Shandong Province. This includes using AI technology to facilitate the transformation of government supervision roles from micro - comprehensive to macro - regulatory. AI can also help in the precise implementation of school supervision work. Through AI's strong data storage and self - learning capabilities, it can swiftly pinpoint and feed back on the core issues of target schools. This allows supervising entities to carry out education supervision accurately and achieve the ideal outcome of “one school, one plan”.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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References

- [1] Zhang, X.Y.; Gao, H.B.; Zhao, J.H.; Zhou, M. A survey of autonomous driving technology based on deep learning. *Journal of Tsinghua University (Science and Technology)*, 2018, 58(4), 438-444. DOI: 10.16511/j.cnki.qhdxxb.2018.21.010.
- [2] Xu, W.W.; Peng, H.; Yang, J.F.; Hou, L.C.; Li, J.Y. Analysis on the application and development prospects of artificial intelligence in medical health. *Chinese Medical Management Sciences*, 2019, 9(5), 37-41.
- [3] Qian, J.P.; Wu W B.; Yang P. A review of the impact of new generation information technology on the intelligence of agricultural product traceability systems. *Transactions of the Chinese Society of Agricultural Engineering*, 2020, 36(5), 182-191.
- [4] Chen, K.Q.; He, Y.; Zhong, G.Q. Connotation transformation of information literacy and orientation of AI education objectives from the perspective of artificial intelligence: On the implementation path of AI courses and teaching in basic education. *Journal of Distance Education*, 2018, 36(1), 61-71. DOI: 10.15881/j.cnki.cn33-1304/g4.2018.01.006.
- [5] Editorial Department of This Journal. Department of Basic Education, Ministry of Education: Vigorously implement the digital strategy for basic education. *China Education Informatization*, 2022, 28(3), 3.
- [6] Tong, J.H. Enlightenment of British educational supervision system on the separation of management, operation and evaluation in China. *Good Parents*, 2020, 59, 51-52.
- [7] Liang, Y. Policy status and optimization countermeasures of school supervision in China: Analysis based on policy texts such as "Regulations on Educational Supervision" in 8 provinces (municipalities). *Beijing Education (Higher Education)*, 2022, 4, 25-31.
- [8] Chen, L.Y.; Chen, J. Modernization of educational supervision: Institutional logic, practical challenges and action strategies from the perspective of improving educational governance capacity. *Journal of Sichuan Normal University (Social Sciences Edition)*, 2017, 44(5), 78-84. DOI: 10.13734/j.cnki.1000-5315.2017.05.010.
- [9] He, W.H.; Dong, X. Characteristics, problems and improvement of local educational supervision regulations in China. *Monthly Journal of Educational Academic*, 2022, 1, 35-42. DOI: 10.16477/j.cnki.issn1674-2311.2022.01.005.

- [10]Guo, Y.H. New development of educational management informatization: Towards intelligent management. *Course Education Research*, 2020, 13, 10.
- [11]Ren, Y.; Zhang, L. Discussion on the problems and countermeasures of information islands in hospitals. *Journal of Medical Informatics*, 2021, 42(8), 64-67.
- [12]Wang, L. Breaking through “information islands”: Research on the key prevention and control points for urban elderly during the mid-late pandemic. *Journal of Sanmenxia Polytechnic*, 2021, 20(4), 113-117.
- [13]Xu, J. Optimization research on information unified platform in local government e-government. *Shanghai Normal University*, 2021. DOI: 10.27312/d.cnki.gshsu.2021.001714.
- [14]Li, Y.F.; Sun, P.F.; Lu, Z.H. Countermeasure research on solving the “information island” problem in Linyi logistics. *Economic Research Guide*, 2016, 5, 62-63.
- [15]Zhao, L.J.; Zhou, H. Opportunities, challenges and countermeasures for the informatization construction of educational supervision in the “Internet+” era. *China Educational Technology*, 2018, 7, 39-44.



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