

How does technology embed and empower education governance?

-- Analysis based on governance long period theory

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Abstract. With the development of technology, education is becoming more and more intelligent. Technology also affects education governance, promote the modernization of national governance system and governance capacity. However, it is still unclear what role technology plays in education governance and how the government should carry out technology governance. This paper analyzes the relationship between technology and educational governance based on the long period theory of governance. It is found that from the perspective of long cycle, the educational governance of technology embedding will experience the old pattern, the new pattern and the updated pattern, and finally form the governance pattern of technology and governance updating with the same frequency. In addition, using SCP model, it is found that technology can empower educational governance in organizational structure, government behavior, and technological effectiveness.

Key words: Educational governance, Long period theory, Technology management

1. Introduction

At present, technology is playing an increasingly important role in education and educational governance. Policy documents such as the 14th Five-Year Plan have clearly pointed out that digital transformation should be promoted by informatization and intelligent means. From the perspective of theoretical research, how to realize the modernization of educational governance has aroused great concern and heated discussion in the academic circle. From the perspective of practice, promoting the modernization of education governance capacity and system is a strategic measure and a major proposition of education reform and development in the new era.

Educational governance includes not only the governance of education itself, but also the governance of the entire educational ecosystem. When education moves toward "wisdom" with the development of technology, can technology also make education "governance"? That is, can technology empower educational governance? How is it enabled? In order to answer these questions, this paper will sort out the context of China's educational technology governance, and analyze the relationship between technology and educational governance by using the long period theory of governance.

2. The technical governance context of Chinese education

Technology is the transformation of natural, human or social activities by using accumulated scientific knowledge, experience, skills or objects (ready-made or created) to meet human needs^[1], technology embedded governance refers to the application of technology to investigate non-economic system, making it an important tool of social governance^[2]. Based on the above definition, the technological governance of China's education can be summarized as follows:

2.1. Agricultural age: Monopolies and dependencies

In agricultural times, the state used the soft technology of ideological system to govern education, and education became the monopoly product of the ruler and the subordinate of the political system. Although the scope of education at this time continued to expand, there was a systematic school education, but its purpose was only to train the talents of the feudal rule. From the perspective of education process, the state monopolizes education activities to ensure that it has the absolute right

to speak on education, such as setting up institutions with dual attributes of education and education management, such as imperial College and imperial College. For educational purposes, the state used the imperial examination system and other selection systems to select scholars who met the requirements of the rulers. Under the state monopoly, the educational system serves the political system, and educational activities become subordinate to political activities.

2.2. The Industrial Age: Lag and reform

In the industrial age, educational governance in China shows serious development lag and strong demand for reform. In terms of development, China lacks advanced productivity and technology, and still adheres to the old ideas in educational governance, with obvious loopholes in governance methods and systems. In terms of reform, some progressives began to make explorations after the Opium War: reformists such as Liang Qichao introduced foreign educational ideas; Tao Xingzhi, CAI Yuanpei and others studied educational management theories based on Chinese local educational management practices; Sun Mingjing and others created an educational development model using audio-visual education as a tool and means. At this time, the localization of western technology thought promoted the reform rudiment of educational modernization in China.

2.3. The Information Age: Outreach and extension

However, the reform attempt in the agricultural era failed to bring the advantage of backwardness, and China's educational governance still lags behind western countries. In the information age, technology is not only applied in the field of education, but also extends to educational governance. At this time, the technology is no longer limited to soft technology such as ideological system, but also points to a tool and means independent of governance, such as using assessment system to strengthen the construction of educational team and setting up a special network of educational management institutions. At the same time, educational management has been expanded, nan Guonong and Xiao Shuzi and other educational technology experts participated in planning many major projects and activities, educational technology began to become a specialized discipline. At this stage, modern information technology had a transformative impact on the practice and theory of educational governance in China, and the modern educational governance system began to take shape.

2.4. The Age of Intelligence: Breakthroughs and unknowns

In the 21st century, some key technologies can not only assist the decision-making behavior of educational governance, but also directly empower educational governance and form a new educational governance mode. He Kekang, Sang Xinmin, Zhu Zhiting and other educational technology experts have conducted theoretical research on educational reform from the perspective of educational informatization and modern educational technology. However, the rapid development of technology has also brought many unknowns: can modern information technology really be embedded in educational governance? How should it be embedded? What is the final result? In addition, the protection of data privacy, the bridging of regional differences and the treatment of data barriers in the process of embedding are also worth further discussion.

3. Educational governance from the perspective of long period of national governance

The long period theory is an important perspective to understand the evolution law of human society and country^[3] Some scholars observed the process^[3] of technological governance in a long period from the reform and innovation of national governance as the entry point^[4]. From the perspective of governance, China's educational governance has a long history and is constantly in the state of innovation and change along with social changes. From the perspective of technology, the impact of technology on education is multi-layered, multi-dimensional and multi-directional, and the update of technology is independent of the update of governance, but also integrated with the update

of governance. Therefore, we can analyze the long period evolution of educational governance based on the long period theory of national governance and innovation.

3.1. Governance rigidity triggers tension in reform

The social ecosystem is in a state of continuous change and evolution. Education is dependent on the social system and is constantly changing and updating, but the institutional arrangement is relatively static and significantly rigid. Old technology tools cannot meet the needs of new governance, resulting in rigid governance and triggering the reform tension between national governance and education system. Under the old governance pattern, this tension was manifested in both internal and external needs: inside the education system, because the traditional education governance system equated education with official selection, some outstanding talents who did not meet the needs of the feudal rule were eliminated by the state^[5] Education reform is urgently needed to correct the imbalance of talent cultivation. Outside the education system, the original traditional education governance model is no longer suitable for the rapidly developing society, and the problems of target replacement and value extrusion are becoming more and more prominent, and the demand for reform is increasingly strong. After the emergence of new technology, the reform tension of the old pattern promotes the improvement of the governance capacity and the perfection of the governance system of technology-empowered countries, forming a new governance pattern.

With 5 g, the emergence of emerging technologies such as artificial intelligence, update the technology application of broke the education management of time and space constraints, breaking the education the relationship between the governance body, directly or indirectly, quick impact under the new management pattern of the original accumulation of dominant or recessive order, and lead to the original pattern of governance is no longer suitable for quick update of the society, The tension between technological renewal and social governance appears again, and brings more uncertainty, forcing the governor to seek a new balance point again to deal with the challenges brought by the development of newer technology.

3.2. Technological leap speeds up pattern renewal

Technology can speed up the renewal of governance. In the new educational governance pattern, the state uses the characteristics of technology to respond to the needs of change, and uses abstract technical tools (such as educational informatization policy and system) and concrete technical tools (such as educational management system, performance evaluation system) to achieve the replacement of new technology to old technology. At the same time, technology also bring on cognitive change, such as thinking controversy over the wisdom of education, online education, multiple subject of educators, learners and managers with a better understanding of the collaborative governance, further enrich the connotation of education field technical management, so as to realize the new logic to replace the old logic, finally realizes the new governance to the replacement of the old governance.

However, the energy that education and governance obtain from technology is not the same. Technology usually affects education itself first, and then affects educational governance through education. Before the transformation from the old governance pattern to the new governance pattern, the education system has been constantly developing and changing with the social ecology, such as online classroom and multimedia teaching, but the corresponding governance system has not been formed. However, after education governance enters a new pattern, technology begins to present a "geometric level" update iteration, and also acts on education itself rather than education governance, leading to a growing gap between education and governance before the emergence of a new governance pattern. Updated technology will have a huge impact on the established governance system, challenge the existing government management system and laws and regulations, the digital divide between the government and society begins to emerge, education governance is faced with policy lag, privacy risk, development inequality and the risk of technogatism.

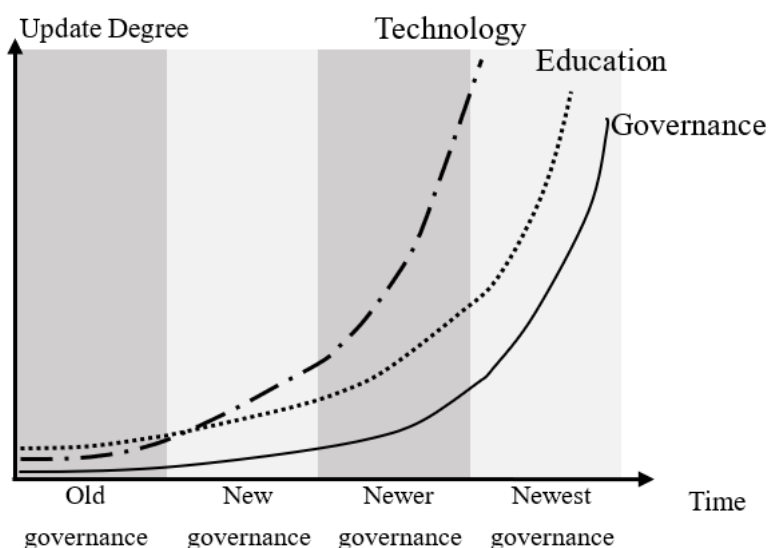


Fig. 1 Update degree of technology, education and governance in different governance

3.3. Technology with the same frequency to achieve governance beyond

The renewal of governance pattern always lags behind that of education ecology, because technology is embedded in education, but not fully embedded in governance. In order to solve the conflict between governance pattern and education system, it is necessary to establish a new governance pattern beyond the existing new governance pattern. In particular, embedded technology has broken the old pattern of governance, to speed up the updating of education ecology, a new management pattern of the country under the principle of technical rationality and specialization, using the representational and the abstract technology tools to carry out the education management, this technology is only a role in the process of governance means, and update the governance structure is the use of technology tools to improve governance efficiency directly, Technology and governance are updated in the same frequency: the country carries out educational governance through technical rationality and professional principles, and uses technological tools to improve self-governance efficiency, and technology and governance are mutually influencing and promoting. In reincarnation and alternative technology and governance, a formation of long period evolution of education management technology is not only the means of management education is to improve its governance tools, finally to realize the coordinated development of education and management, management pattern and the education of ecological gradually fit, makes up for the technology to update and governance is still the stillness of the gap, The modernization of governance capacity and system will be realized.

4. The path of technology promoting educational governance

With the deepening influence of technology in the field of education, education is no longer just a public good in the traditional sense, but has become an emerging industry. Therefore, the analysis of educational governance can draw lessons from the theoretical model of industrial economics. At the same time, education itself still has the attribute of public goods and is the key research object in the field of public management. However, the traditional analysis method of public management has its limitations. In addition, the impact of technology on education is always revolutionary. SCP model can be used to analyze the strategic adjustment and behavioral change of the industry when it is exposed to superficial impact, which helps us clarify the path of technology promoting education governance.

Therefore, referring to the SCP model in industrial economics, this paper regards technological update as external Shock and analyzes the path of technology-promoted educational governance from three aspects: organizational Structure, government Conduct and technological Performance.



Fig. 2 SCP model of technology promoting education governance path

4.1. Organizational structure: Cognitive remodeling drives governance change

Compared with other areas of people's livelihood, the renewal of education governance is relatively slow, and the liberation of cognition and thought takes some time. However, the geometric development of technology will undoubtedly accelerate the reshaping of cognition and further drive the reform of governance. On the one hand, the development of technology itself is based on the progress of cognition, which lays a foundation for the liberation of human thought and constitutes the epistemological and methodological basis for the reform of government governance. On the other hand, technology provides a new method for changing public organizations and the relationship between government and citizens, which directly drives the reform of educational governance. Its openness and uncertainty will impact the traditional governance system.

4.2. Government behavior: Multi-dimensional interaction improves collaborative effectiveness

Educational governance involves multiple subjects, with different division of labor among the state, market and family, and different roles of learners, teachers and managers. This means that in order to realize the modernization of educational governance, we must pay attention to how to absorb multiple subjects to participate in collaborative governance. The application of big data, artificial intelligence and other technologies provides a new method for multi-subject interaction and forms a means of multi-governance. The construction of a unified digital governance platform is a powerful tool for the collaborative development of government departments. Technology connects the individual actions of various government departments into a whole, promotes the formation of a pattern of co-construction, co-governance and sharing, and thus improves governance efficiency.

4.3. Technical effect: differential development boost grasp the law

Although our country education governance capabilities have made great progress, but the regional difference of education level and education level of management is still very obvious, it is a tough challenge for education management, but also can yet be regarded as a method of promoting regional imbalance because education governance help learning backward area, follow the experience of shed light on the regularity of human management and decision-making, Improve the scientific management and decision-making, so as to promote the promotion of governance capacity, the formation of a backwardness advantage.

5. Conclusion

Using the theory of long period of governance, this paper finds that the educational governance with technology embedded will experience three governance patterns: old pattern, new pattern and updated pattern, and finally form the governance pattern of technology and governance updating with the same frequency. At the same time, technology presents different characteristics in different governance patterns: under the new governance pattern, the principle of technological rationality and specialization plays a role in the process of educational governance; Under the updated governance pattern, the updated technical tools become an operational path to improve the efficiency of national governance. In the final technological governance pattern, the rapid iterative technology and the

constantly updated governance pattern develop in the same frequency. Specifically, the path of technology promoting educational governance can be understood from three aspects: organizational structure, government behavior and technological effect. Therefore, at the current stage, this paper puts forward the following policy recommendations:

5.1. Change the concept of governance thinking and optimize the mode of technical governance

For the impact that technology may bring to governance, educational participants, especially government departments, should actively change the thinking concept of governance, regard technology as the epistemological and methodological basis of government governance reform, and drive the governance reform with the change of cognition. Relevant governance subjects need to accurately recognize the plasticity of technology, establish a systematic and integrated governance concept, break through the original traditional governance system, optimize the existing governance mode with the rapid development of technology, and give full play to the role of technology empowerment.

5.2. We will improve the system of collaborative governance based on diversity

The development of technology provides tools and means for diversified governance, especially in the field of education with diverse participants, it is more necessary to form a multi-party cooperation and linkage governance mechanism of the government, society, schools, parents and students, so as to fully mobilize social forces and promote the modernization of governance. However, at present, digital islands and data barriers are still the key factors hindering technological governance. Therefore, it is necessary to give full play to the advantages of digital technology, strengthen information exchange and sharing, reduce the information cost of governance, and establish and improve the new mode of cooperative governance.

5.3. We will promote the use of technical standards and treat uneven development objectively

At present, the updating speed of technology is much faster than the updating speed of governance. In order to bridge this gap as far as possible, on the one hand, relevant laws and regulations need to be improved, which not only promotes the standardized use of technology to protect user privacy security, but also creates a good policy environment for the use of technology to promote the implementation of technology application. On the other hand, we should treat the problem of unbalanced regional development objectively, combine with the general law of technology application, encourage the less technologically developed areas to learn from the experience of the developed areas, and form the advantage of technology governance.

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