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Retrospect and Prospect of Chinese Educational Reform: Postprint

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Abstract

[目的/意义] Education is the foundation of national rejuvenation and social progress, and serves as the guarantee for implementing the nation's five major development concepts of "innovation, coordination, green development, openness, and sharing." China has the world's largest population, and the Chinese government has consistently prioritized education development, establishing the world's most extensive education system. The reform of education in China has thus consistently attracted widespread attention.

[方法/过程] This paper reviews the objectives and developmental trajectory of Chinese education reform since the reform and opening-up, analyzes existing problems, and provides prospects for future education reform and development.

[结果/结论] The analysis indicates that although Chinese education reform has achieved remarkable success in expanding the scope of education and made considerable progress in improving education quality and promoting education equity, moving forward, certain problems remain prominent. There is a need to deepen reform, promote education equity, improve education quality, and reform the education management system to address the challenges that globalization and the new technological revolution pose to education.

Full Text

Preamble

Review and Prospect of China's Education Reform

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Abstract

[Purpose/Significance] Education is the foundation for national rejuvenation and social progress, and the guarantee for implementing the country's five development concepts of "innovation, coordination, green development, opening up, and inclusiveness." China has the world's largest population, and the Chinese government has always prioritized education development, establishing the world's most massive education system. China's education reform has consistently attracted widespread attention. **[Method/Process]** This paper reviews the objectives and development trajectory of China's education reform since the reform and opening-up period, analyzes existing problems, and presents prospects for future education reform and development. **[Result/Conclusion]** The analysis shows that although China's education reform has achieved remarkable success in expanding educational access, and made considerable progress in improving education quality and promoting equity, outstanding problems remain for the future. Further deepening of reform is needed to promote education equity, improve education quality, reform the education management system, and address challenges brought by globalization and the new technological revolution.

Keywords: Chinese education; comprehensive reform; education modernization

Classification Number: G521

As a socialist country, China implemented a planned economic system for an extended period after its founding, and education was no exception. China's education management system, school program offerings, enrollment plans, and graduate job assignments were all conducted according to plan. Since the reform and opening-up in the 1980s, to adapt to national economic and social development, China began to break the constraints of the traditional planned system and launched unprecedented reforms across multiple aspects of education.

1 China's Education Reform in the Past Three Decades

Since the founding of the People's Republic, China's education development has experienced eight stages, among which the four education reforms since the reform and opening-up are particularly significant [1,2]. The main objectives of these reforms were to adapt to national economic and social development needs, increase education supply, expand access to education, improve education quality, and reform the education management system.

1.1 Expanding Access to Education

Increasing education supply, comprehensively expanding enrollment at all levels and types of education, and improving the educational attainment of the population have been the focus of China's education reform over the past three decades.

As early as 1985, at the beginning of China's reform and opening-up, the

Central Committee of the Communist Party issued the *Decision of the Central Committee of the Communist Party of China on the Reform of the Education System* (hereinafter referred to as the *System Reform Decision*). This decision delegated responsibility for developing basic education to local governments and proposed the step-by-step implementation of nine-year compulsory education, while also striving to develop early childhood education and special education.

In 1993, China launched its second post-reform education reform, with the Central Committee and the State Council issuing the *Outline for Education Reform and Development in China* [3]. One of the goals set in this *Outline* was to significantly improve the educational attainment of the entire population by the end of the 20th century, primarily through the basic universalization of nine-year compulsory education. Specifically, this meant achieving universal nine-year compulsory education in regions covering 85% of the national population, with a focus on basically eliminating illiteracy among young and middle-aged adults. By 2000, China aimed to basically eliminate illiteracy among young and middle-aged adults, raising the non-illiteracy rate among this group to approximately 95%.

As reform and opening-up deepened, China's economic and social development created further demand for expanding educational access. In June 1999, China began its third round of education reform with the Central Committee and the State Council promulgating the *Decision on Deepening Education Reform and Promoting Quality Education*. Building on the foundation of ensuring the achievement of the "two basics" goal by 2000 (basically universalizing nine-year compulsory education and basically eliminating illiteracy among young and middle-aged adults) and further consolidating and improving upon it, this *Decision* emphasized expanding the scale of senior secondary education and higher education. By 2010, the gross enrollment rate for higher education among China's same-age population was to reach approximately 15%. Additionally, it once again called for effective measures to gradually increase education investment, with the goal of achieving national fiscal education expenditure accounting for 4% of Gross National Product [4].

In July 2010, China launched its fourth post-reform education round. In this reform, the State Council promulgated the *National Outline for Medium and Long-Term Education Reform and Development (2010-2020)* (hereinafter referred to as the *Outline*) [5]. The *Outline* once again proposed the goal of achieving universal education: by 2020, basically universalizing preschool education, consolidating and improving nine-year compulsory education, and universalizing senior secondary education with a gross enrollment rate of 90%. Higher education massification levels were to be further improved, with a gross enrollment rate of 40%. To guarantee education funding, the *Outline* again proposed increasing the proportion of national fiscal education expenditure to GDP, reaching 4% by 2012.

1.2 Improving Education Quality

Beginning in the 1990s, China's education reform began to focus on improving education quality, proposing that reforms should aim to enhance the quality of education for all citizens.

The *Outline* promulgated in 1993 explicitly stated that in the field of basic education, there must be a genuine transformation of educational concepts, shifting from exam-oriented education to quality-oriented education [3].

The *Decision* promulgated in 1999 comprehensively articulated the connotation of quality education from both theoretical and practical perspectives, unprecedentedly pointing out specific directions and paths for its implementation [6]. This *Decision* required quality education to run through all levels and types of education and all aspects of education, while organically integrating moral, intellectual, physical, and aesthetic education in all links of educational activities.

In the *Outline* promulgated by the State Council in 2010, it was explicitly proposed to comprehensively improve higher education quality, with the goal that by 2020, several universities would reach or approach world-class levels.

1.3 Reforming the Education Management System

Due to the influence of the planned economic system, China's education management system had strong planned economy characteristics and was once called "the last bastion of the planned economy." Reform of China's education management system has always attracted considerable attention, with most reforms over the years including it as a component, particularly regarding higher education management. The *System Reform Decision* promulgated in 1985 first proposed reforming higher education enrollment plans and graduate job assignment systems while expanding university autonomy. The *Decision* promulgated in 1999 again pointed out the need to accelerate reform of enrollment examination and evaluation systems, changing the situation of "one exam determining one's entire life."

After the 15th National Congress of the Communist Party, China accelerated higher education management system reform. Thirty-one provinces, autonomous regions, and municipalities directly under the central government, as well as 50 central departments, participated in reforms through "co-construction, adjustment, cooperation, and merger." After 1998, China adjusted the management systems of 93 regular higher education institutions, 72 adult higher education institutions, and many secondary specialized schools and technical schools formerly under nine abolished State Council departments. Over a period of nearly ten years, the reform of the macro management system of higher education was basically completed, forming a new system of two-level management by central and local governments with division of responsibilities.

To implement the strategy of revitalizing the nation through science and education and to regulate private education at all levels, in December 2002, the Ninth

National People's Congress Standing Committee passed the *Law of the People's Republic of China for Promoting Private Education*. The introduction of this law used legislation to regulate and promote the healthy development of private education while safeguarding the legitimate rights and interests of private schools and students. Meanwhile, with the promulgation of the *Vocational Education Law of the People's Republic of China* in 1996, China's vocational education reform and development also entered a new stage of rule-of-law education.

2 The Status of China's Education Reform Implementation

Since 1985, China's education reform has spanned more than three decades. Over these thirty-plus years, China's national economy and social development have achieved globally remarkable accomplishments, and education reform has continued to deepen. Many goals of China's education reform have been realized. Whether in rural or urban areas, free compulsory education has been universalized, vocational education has achieved rapid development, and higher education has reached a new stage of universalization.

In 2012, China's actual education funding achieved the goal of "national fiscal education expenditure accounting for 4% of GDP," realizing a goal proposed in 1993 that was to be achieved by 2000. Simultaneously, national fiscal education expenditure achieved a high growth rate of 28.3% [7]. This changed the situation of severe education funding shortages, provided strong guarantees for the smooth implementation of China's education reform, and is considered a milestone event in China's education history.

In terms of compulsory education, according to a report from China's National People's Congress, by 2000, China had achieved the goal of basically universalizing nine-year compulsory education nationwide as scheduled, with the "universal nine-year education" population coverage rate reaching 85% and the illiteracy rate among young and middle-aged adults dropping below 5% [8]. In the relatively backward western regions, this rate reached 98% by the end of 2007 [9]. According to the Ministry of Education's statistical bulletin, by the end of 2010, all 2,856 counties (cities, districts) nationwide had achieved the "two basics," with national "two basics" population coverage reaching 100% [10].

In higher education, since 1997, higher education institutions gradually implemented a tuition system, and in 1998, higher education began to expand enrollment, significantly increasing access to higher education [11]. The latest statistical bulletin on China's education development shows that in 2015, China's higher education gross enrollment rate reached 40.0% [12]. Meanwhile, the college entrance examination system is also undergoing corresponding reforms, first by gradually abolishing the unified national examination and gradually implementing provincial-level unified or joint proposition.

In vocational education, by 2015, the proportion of students enrolled in secondary vocational schools among all senior secondary students reached 43.0% [12]. For preschool education, in 2015, China's three-year preschool gross en-

rollment rate reached 75.0%, achieving the planned target ahead of schedule [12]. Meanwhile, China has established a relatively complete financial aid policy system for students from economically disadvantaged families ranging from preschool to graduate education.

From the data perspective, the development of China's basic education, vocational education, and higher education has achieved the goals set by successive education reforms regarding expanding education coverage and increasing education supply. However, in terms of promoting education equity, improving education quality, and reforming education management, some contradictory problems remain prominent.

3.1 Prominent Issues of Education Equity

Over the past thirty-plus years, despite rapid economic development, the gap between original urban and rural development levels has not been eliminated but has continued to expand. The goal of equitable education proposed in the 2010 *Outline* has encountered significant social obstacles. Due to unbalanced urban-rural development, cities have superior fiscal, economic, and human resources, and their investment in basic education is generally far better than in rural areas. Even within cities, there are substantial differences between schools.

Although in 2012 China's actual education investment achieved the goal of "national fiscal education expenditure accounting for 4% of GDP," there are drawbacks in the management and use of education funds, including unreasonable allocation structures and low efficiency of limited education funds, with the gap in education resources between urban and rural areas remaining substantial.

In China, the school selection issue for primary-to-secondary transition has attracted widespread social attention. Many parents spare no effort to secure places for their children in good schools, even spending large sums of "school selection fees" to pave the way for their children to enter key schools [13]. Generally speaking, the school selection phenomenon has both advantages and disadvantages, but the disadvantages outweigh the advantages. The prevalence of school selection leads to enrollment inflation and strained teaching resources in individual schools, with children from better-resourced families having easier access to good schools, which in fact constitutes a new form of educational inequity. On the other hand, in vast rural areas, the consolidation of rural primary and secondary schools that began in 2001 has concentrated education resources in township areas, causing numerous village schools to disappear and substantially reducing the number of village primary schools and teaching points. Rural teachers face unemployment, and many rural children drop out of school due to long distances to schools.

The higher education enrollment system is another important aspect of inequity in Chinese higher education. Currently, the most criticized aspect of China's college entrance examination system is the uneven distribution of enrollment quotas among provinces. Specifically, many key universities have far higher ab-

solute and relative enrollment numbers in economically developed provinces and municipalities than in other provinces. Moreover, the current college entrance examination system generally does not allow students with non-local household registration to take the exam locally and occupy local enrollment quotas, creating difficulties for children of migrant workers who work long-term in other provinces without local household registration.

The unbalanced allocation of higher education resources is another prominent problem in Chinese education. Currently, China's universities are primarily public, with only a small number of private institutions. Public universities include ministry-affiliated, provincial, and municipal universities. Since the 1990s, the state has successively implemented projects such as "Project 211" and "Project 985" to provide key support for university construction or specific disciplines, creating different strata among China's public universities. The 2015 State Council's *Overall Plan for Coordinated Advancement of World-Class Universities and First-Class Disciplines* proposed that by 2020, several Chinese universities and a group of disciplines would enter the ranks of world-class levels, with some disciplines entering the forefront of world-class disciplines; by 2030, more universities and disciplines would enter world-class ranks, with several universities entering the forefront of world-class universities and a group of disciplines entering the forefront of world-class disciplines, significantly enhancing the overall strength of higher education; and by the middle of this century, the number and strength of world-class universities and disciplines would enter the forefront globally.

However, China's higher education funding and policy support have consistently favored key universities that already possess strong research capabilities, with this basic direction remaining unchanged. Consequently, stratification among Chinese universities is obvious and becoming increasingly prominent [14].

3.2 Excessive Administrative Control in Education Management

China's education system has consistently maintained the government's leading role and is managed in an administrative manner. Within schools, managing administrative affairs according to a certain division of power to form a hierarchical management system is indeed an important measure needed to ensure smooth implementation of policies and improve management efficiency and effectiveness. However, due to an imperfect system, institutions such as faculty congresses and school affairs committees often exist in name only, and the operation of school administrative power itself lacks adequate checks and balances. This easily leads to school administrative power frequently interfering with teaching and academic affairs, causing the allocation of academic resources within schools, teacher promotion, and cadre appointments to be subject to pressure from administrative power [15].

On the other hand, since the vast majority of schools rely on government fi-

nance, school development is largely subject to government administrative orders. Schools' enrollment plans, program design, and educational models are guided by administrative directives, leaving schools with little autonomy. Chinese schools must expend considerable energy applying to government departments for various education resource projects, making it difficult for them to truly operate according to educational laws, meet social and economic development needs, and maintain competitiveness.

3.3 Low Education Quality

Whether in the 2010 *Outline* or the 1999 *Decision*, promoting quality education has been a major task for Chinese education. However, due to the persistence of some deep-seated systemic obstacles, the phenomenon of “teaching for exams and learning for exams” is widespread in China's basic education. Exam scores and enrollment rates remain the main criteria for teachers evaluating students, principals evaluating teachers, and society evaluating schools. This exam-oriented education results in Chinese school graduates generally lacking creativity and having weak ability to adapt to society.

Another issue that has a huge impact on China's education quality is the excessive homework burden on primary and secondary school students. To enter top schools and universities, teachers often assign overloaded homework, deteriorating students' physical and mental health, which has attracted widespread concern in Chinese society [16]. “Reducing burden”—that is, requiring reduced student pressure—has become a particularly popular term.

In terms of cultivating high-end talent, since the reform and opening-up, the Chinese government and relevant management departments have attached great importance to cultivating innovative talents and leading figures. The *Outline* explicitly proposed that by 2020, some universities would reach or approach world-class levels. China has adopted numerous talent policy measures to stimulate talent development, such as the “Thousand Talents Plan” and the “Changjiang Scholars” program. However, despite noticeable improvements in the strength and level of Chinese universities in recent years, there remains a considerable gap between Chinese higher education and education powerhouses in overall quality.

An international comparative study aimed at measuring engineering education quality shows that China, like India, still has low engineering education quality [17]. A *Financial Times* article once pointed out that with the expansion of Chinese universities, China graduates four times as many engineering undergraduates annually as the United States, but the vast majority are of low quality [18]. These phenomena have triggered the famous “Qian Xuesen's Question”—why can't Chinese schools cultivate outstanding talents? Furthermore, how can the goal of building world-class universities proposed in the *Outline* be achieved? In 2009, former Premier Wen Jiabao specifically raised these deep-level questions to China's education community.

3.4 Vocational and Private Education Development Still Lagging Behind Ideal State

China's vocational education is far from meeting the needs of China's economic and social development [19]. The government-dominated model of degree-based vocational education limits the independent development of vocational colleges, whose program offerings and educational content cannot be determined according to timely needs and trends [20]. The main operators of social vocational education and enterprise vocational training are basically private individuals or enterprises. These vocational education schools are severely constrained by lack of qualified teachers and financial support. On the other hand, the upward mobility of China's vocational education is limited by the education system. Graduates of higher vocational colleges do not receive bachelor's degrees, and if they wish to continue undergraduate studies, they must pass the "upgrading from junior college to undergraduate" exam [21].

This results in low social recognition of vocational education and tight student sources. Although China promulgated the *Law for Promoting Private Education* in 2002, China's private education remains unsatisfactory. While private education has considerable scale, its level and reputation are indeed not high [22]. Currently, China lacks an independent authoritative management institution for private education, leaving it in an awkward situation where "anyone can approve, anyone can manage, and yet no one manages." Some private education institutions have chaotic internal management, causing adverse social impacts, and incidents of arbitrary charges, high fees, and misappropriation of education funds occur from time to time. Moreover, most private education institutions suffer from tight funding, poor educational conditions, and concerning education quality.

3.5 Limited Degree of Education Internationalization

Education internationalization in the context of globalization has high strategic significance. However, compared with European and American countries, the degree of internationalization of Chinese education is not high. In basic education, since the 1980s, China has been committed to promoting basic education internationalization against the backdrop of globalization. However, China's current basic education internationalization has diverse models and large quantities but low quality. The main problems are that the understanding level of internationalization concepts and service quality need improvement, the level of basic education internationalization is unbalanced across different regions, and the standardization of some basic education internationalization practices needs strengthening [23,24]. Moreover, there are four major misconceptions in China's basic education internationalization: superficially borrowing foreign education concepts, statically understanding education internationalization, formally emphasizing international cooperative relationships, and promoting education internationalization without integration [25]. In contrast, European and

American countries create policy space conducive to promoting internationalized education through national legislation or policies, emphasize international exchanges and cooperation among teachers, students, and schools, and focus on integrating international elements into curricula.

Currently, the internationalization of Chinese education is mainly reflected in higher education internationalization. In higher education, although China has established an internationalized education concept, a sound working system and mechanism for internationalization have not yet been fully formed. Although most Chinese universities have established international cooperation and exchange offices (Hong Kong, Macao, and Taiwan offices) and similar institutions, and international exchanges are relatively active, there remains a considerable gap from true internationalization. For example, the proportion of international students among the total student population is not high, and international competitiveness is insufficient; the number of foreign teachers is small, and the proportion of teachers with international education backgrounds is not high. Moreover, although some universities have made obvious progress in curriculum internationalization, teaching content still cannot meet the needs of internationalized education [26]. In contrast, in 1989, 77% of four-year universities and 46% of two-year colleges in the United States had already offered at least one course with international content in general education curricula. Additionally, the internationalization of Chinese higher education is mainly undertaken by a group of key universities centrally supported by the state, with insufficient development of private universities. In developed countries such as Japan, private universities receive nearly three-quarters of all types of international students [27].

4 Future Prospects for China's Education Reform and Development

After decades of exploration and development, China's education has achieved remarkable accomplishments. Especially since the reform and opening-up, China's education capacity to serve socioeconomic development has continuously strengthened, and the gap with internationally advanced education has gradually narrowed. However, problems in Chinese education remain prominent. China is a large education country but not yet an education powerhouse.

Five years after the release of the 2010 *National Outline for Medium and Long-Term Education Reform and Development*, the National Center for Education Development Research and other departments conducted monitoring of education modernization in 15 sub-provincial cities in 2015 [28]. The monitoring indicators were determined according to the level of education modernization development. According to the monitoring report, problems in Chinese education mainly manifest in: (1) In terms of education popularization levels, the 15 sub-provincial cities show obvious regional characteristics in education popularization levels, with severe differentiation even in eastern coastal regions; (2) Ed-

ucation equity levels show: first, imbalance between schools, between counties, and in urban-rural integration; second, inconsistency between economic development levels and the ability to solve the problem of children of migrant workers attending public schools; (3) Regarding education condition guarantee levels, differences in school-running conditions between cities are significant, with the highest inter-city difference coefficient for per-student public fiscal budget education expenditure reaching five times, and the highest difference in per-student teaching and auxiliary building area reaching four times. Sub-provincial cities are cities with high levels of economic and social development in China (excluding four municipalities directly under the central government), and their education should be among the better-developed in China. The existing problems indicate that substantial work remains to be done in China's education reform and development.

In October 2015, the Fifth Plenary Session of the 18th Central Committee of the Communist Party of China was held in Beijing. The meeting emphasized that to achieve the development goals of the "13th Five-Year Plan" period, it is necessary to firmly establish the development concepts of innovation, coordination, green development, opening up, and inclusiveness [29]. These five concepts point out the direction for accelerating education modernization in China: (1) The innovation concept aims to innovate talent cultivation models and stimulate education development vitality through innovative education systems and mechanisms; (2) The coordination concept essentially promotes balanced education development, with the goal of improving overall education development levels; (3) The green concept aims to comprehensively promote quality education and cultivate new-era talents in moral, intellectual, physical, and aesthetic aspects; (4) The opening-up concept aims to enhance resource integration capabilities; (5) The inclusiveness concept continues to vigorously promote education equity. The proposal of these five concepts further enriches and develops the content of education modernization and serves as an action guide for comprehensively deepening education reform in the new era.

In March 2016, the *13th Five-Year Plan for National Economic and Social Development of the People's Republic of China* was approved and officially released at the Fourth Session of the 12th National People's Congress [30]. In Chapter 59, "Promoting Education Modernization," of Part XIV, the main goals for education reform and development during the "13th Five-Year Plan" period were proposed: accelerating the improvement of the modern education system, comprehensively improving education quality, promoting education equity, and cultivating socialist builders and successors with all-round development in morality, intelligence, and physical fitness. This chapter includes five sections: "Accelerating Balanced Development of Basic Public Education," "Promoting Integration of Vocational Education and Industry," "Enhancing Universities' Capacity to Cultivate Innovative Talents," "Accelerating the Construction of a Learning Society," and "Enhancing Vitality of Education Reform and Development," which deploy basic education, vocational education, higher education, lifelong education, and education system and mechanism reform. Additionally, this chapter includes a

special column listing ten major projects for promoting education modernization. Compared with the 2010 *National Outline for Medium and Long-Term Education Reform and Development (2010-2020)*, which set the goal of basically achieving education modernization by 2020: (1) achieving higher-level universal education; (2) forming inclusive education benefiting all people; (3) providing richer high-quality education; (4) building a complete lifelong education system; and (5) establishing a vibrant education system, these goals are consistent with those in the “13th Five-Year Plan.” Furthermore, comparing these reform and development goals with those of the previous three reforms shows they are generally the same, representing further advancement and deepening based on previous reforms. Of course, future Chinese education must not only continue to address persistent issues of equity, quality, and system mechanisms, but also establish a modern education system adapted to economic and social development under the circumstances of globalization and informatization.

Both the 2010 *Outline* and the educational deployment of the *13th Five-Year Plan* provide comprehensive, systematic top-level design for future education reform and development at the strategic level. However, in the specific implementation process, some problems remain difficult to resolve, with obvious gaps between top-level design and reality. In the future, how to remove obstacles on the path of education reform and achieve healthy development of Chinese education will require greater efforts from the government and society.

To this end, the following issues particularly need to be addressed: (1) Effectively establish the education concept of cultivating people as the fundamental purpose, truly establish a scientific education evaluation system, reverse the phenomenon of evaluating schools by enrollment rates and students by scores, so that quality education can be truly and comprehensively implemented; (2) Solve the problem of unbalanced education development, narrow gaps in education resources and school-running conditions between regions, and promote targeted poverty alleviation in education, focusing on the central and western regions, northeast regions, and solving the marginalization of children of migrant workers; (3) Optimize education structure, actively develop vocational education, improve vocational education’s school-running capacity and level, and establish a long-term mechanism for integrating industry and education and school-enterprise cooperation to solve the problem of vocational education’s insufficient capacity to serve economic and social development; (4) Diversify talent cultivation, broaden talent development channels, enhance students’ sense of social responsibility, innovative spirit, and practical abilities, and deeply integrate socioeconomic development with talent cultivation models; (5) Transform and optimize government management systems and mechanisms, avoid existing phenomena of overstepping, absence, and misplacement of authority, improve school self-development and self-discipline mechanisms, promote separation of education management, operation, and evaluation, and advance modernization of education governance; (6) With the advancement of globalization and the fourth industrial revolution, a series of new questions and challenges have been raised regarding education concepts, models, teaching methods and means, as

well as school forms, teacher roles, and education management systems and mechanisms. Particularly, in-depth research on these issues and active responses to these challenges are needed [31].

In summary, over the more than thirty years since reform and opening-up, China's education reform and development have achieved tremendous accomplishments, and China has the world's largest education population. However, China is not yet an education powerhouse and still needs further reform to break some constraints of the traditional planned system and establish a modern education system adapted to economic and social development under the circumstances of globalization and informatization. On the one hand, Chinese education needs to strive to solve education equity problems and form truly inclusive education benefiting all people. On the other hand, it needs to stimulate market vitality by developing private education and vocational education to provide richer high-quality education and build a complete lifelong education system that helps improve education quality at all levels and types of schools. Moreover, it is crucial to establish a vibrant education management system, actively respond to challenges from the new industrial revolution to education, and achieve the goal of modernizing education governance.

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Note: Figure translations are in progress. See original paper for figures.

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