

The Analysis of the Macro-Market Environment for STEM Education based on PEST Model

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Abstract

STEM education consists of the four disciplines of science, technology, engineering and mathematics, aiming to cultivate children's scientific literacy, technological literacy, engineering literacy and mathematical literacy. With the implementation of China's education policy and the importance attached to education by all sectors of society, STEM education has become a hot topic of discussion in the education industry as well as other related industries. This paper is based on the macro background of STEM education and uses the PEST analysis model to analyse four aspects: political, economic, cultural and social, with the aim of making some suggestions and countermeasures for the improvement and development of STEM education in China.

Keywords

STEM; Educate; Macroscopic Environment.

1. Introduction

Under the vigorous promotion of education reform, the education industry has consciously integrated new ideas, new thinking and new resources into classroom teaching, improving the quality and efficiency of the original education model while promoting the transformation of the STEM education model. STEM education has built a good environment for many children to grow up in. More and more teachers are slowly discovering the advanced, innovative and integrated nature of the STEM education concept in practice, accepting it and applying it to their own daily classroom teaching.

2. Macroscopic Environment Analysis based on PEST Model

2.1. Political Environment Analysis

The promulgation of the Regulations on the Implementation of the Law of the People's Republic of China on the Promotion of Private Education (2021) and the Law of the People's Republic of China on the Promotion of Private Education (2004) have established the legitimacy of private education, and the private education community has been looking forward to it for a long time and has high expectations. The long-term expectations reflect the industry's recognition and desire for the governance and development of private education according to law; The high expectations are that the revised "Implementation Regulations" can play a major role in stabilizing development expectations, clarifying the direction of development, and leading the sustained and healthy development of private education.

Article 52 of the Regulations for the Implementation of the Law on the Promotion of Private Education (2021 Revision) points out that people's governments at all levels and relevant departments shall improve the support policies for private schools in accordance with the law, and give priority to supporting private schools with high school running quality, obvious characteristics and remarkable social benefits.

The Outline of the National Medium and Long-term Education Reform and Development Plan (2010-2020) points out that it is necessary to vigorously support private education. Private education is an important growth point for the development of education and an important force for promoting educational reform. Governments at all levels should regard the development of private education as an important work responsibility, encourage funding and donation of funds to run schools, and promote social forces to establish education in various forms such as independent organization and joint organization. Support private schools to innovate institutional mechanisms and education models and improve quality.

On June 25, 2021, the State Council issued a notice on the "Outline of the Action Plan for the Scientific Quality of the Whole People (2021-2035)", which clearly proposed to carry out actions to improve the scientific quality of adolescents for primary and secondary school students. Specifically, it includes: stimulating the curiosity and imagination of young people, enhancing scientific interest, innovation awareness and innovation ability, and cultivating a large number of young people with the potential of scientists; Guide the transformation of teaching methods, advocate heuristic, inquiry-based, and open teaching, protect students' curiosity, and stimulate curiosity and imagination; Promote the deep integration of information technology and science education, and promote scenario-based, experiential and immersive learning; Establish a scientific and diversified discovery and cultivation mechanism, and conduct personalized training for young people with potential scientists; Strengthen the guidance of family science education and improve parents' awareness and ability of science education. Strengthen the scientific enlightenment education of preschool children. Obviously, the transformation to quality education will become an inevitable trend in the development of education in China, and more education enterprises will accelerate the layout, transformation, and quality education, which also strongly supports this.

On July 24, 2021, the General Office of the CPC Central Committee and the General Office of the State Council issued the Opinions on Further Reducing the Homework Burden and Off-campus Training Burden of Students in the Compulsory Education Stage. Under the strong impetus of the "double reduction" policy, a large number of K12 education and training institutions have upgraded their brand expansion categories and carried out multi-business line layout. The transformation of teaching content from subject training to quality training has become one of the important choices of many K12 education and training institutions.

In summary, the evolution and deepening measures at the policy end also reflect the continuous improvement of the children's quality education system and the increasingly mature regulatory mechanism.

2.2. Economic Environment Analysis

Quality education has been advocated for many years, the market size continues to grow, according to statistics, between 2015 and 2019, the quality education market size increased from 264.2 billion yuan to 528.6 billion yuan, CAGR At 19%, the new crown epidemic has caused a certain impact on quality education in the short term, so the scale of the quality education market has shrunk in 2020, but the demand continues to exist and in the context of strict policy management of subject education and encouragement of quality education, the demand and supply of quality education are expected to usher in new growth.

In terms of training goals, with the development of economy and society, in addition to explicit skills, parents will pay more attention to the cultivation of implicit qualities and future-oriented abilities, pay attention to the shaping of children's underlying character, and quality education will usher in a new stage of development. Internet giants, discipline training institutions and entrepreneurs continue to pour in, and the business between institutions is also interpenetrating, intensifying competition. At the same time, the influx of a large amount of capital has driven a wave of mergers and consolidations within the industry, intensifying

industry competition. In addition, technology continues to permeate quality education. The quality education industry has entered the window period of reshaping the industry pattern, the original extremely dispersed competition pattern has been broken, and more subdivided leaders will appear.

2.3. Social Environment Analysis

As a new generation of parents in contemporary China's post-80s and post-90s, their educational concepts are more advanced and forward-looking, they have invested more money in their children's education, and they are also full of expectations for the improvement of their children's core quality. From the perspective of educational philosophy, they hope that their children will become all-round players with sound personality, rational thinking ability, self-management ability and problem-solving ability. Parents whose children are at different academic stages have invested in quality education courses to varying degrees, and parents have shifted from excessive attention to their children's intelligence and skills to personalized and humanized quality improvement.

Most parents of kindergarten students will focus on the interests and strengths of young children when choosing education and training for young children, and choose art courses, language ability improvement courses, STEM education courses, etc. The reason why parents of kindergarten choose such courses is because social training can enrich their children's extracurricular life and choose to participate in education and training from the perspective that children like. Pay attention to the cultivation of children's interests and specialties and pay attention to the significance of education and training to enrich children's extracurricular life. Young children themselves lack the active awareness of sufficient identification ability, so the type of education and training is replaced by parents.

According to the analysis of the parent groups of primary school students and junior high school students, under the background of the double reduction policy, parents have gradually got rid of the traditional concept of education and training in the past, and in response to the call of the state, the choice of education and training institutions has gradually changed from traditional K12 education and training institutions to quality education institutions.

It can be seen that there is a big problem that parents only start from the perspective of what they think "the child needs", but this is not necessarily what the child needs, and may even cause mental damage to the child. Education and training institutions should be deeply aware of this aspect and conduct a guided test for children before starting STEM curriculum education, giving advice to parents to see if the child is suitable for STEM courses and what type of courses are suitable for participation.

Education policy orientation is the "barometer" of the development prospects of quality education in China, since the concept of quality education was proposed in China in the 90s, quality education has undergone a change from "dominant within the system" to "commercial operation". In 1999, the Third National Education Work Conference since the reform and opening up was held in Beijing, with the theme of "Deepening Education Reform and Comprehensively Promoting Quality Education". In the same year, the "Decision of the CPC Central Committee and the State Council on Deepening Education Reform and Comprehensively Promoting Quality Education" was issued, which clarified the goals, contents, and safeguard measures of quality education. This is to officially promote quality education to the whole country in the name of the country, and at the same time, it also marks that quality education has entered the stage of comprehensive implementation. Subsequently, every year of the government work report, quality education is involved. In 2006, the Compulsory Education Law was revised, and quality education was written into it, and quality education finally rose to the national will. By 2010, the "Outline of the National Medium and Long-term Education Reform and Development Plan (2010-2020)" was introduced, and the

implementation of quality education was elevated to the level of the strategic theme of China's education reform and development.

In 2013, the General Office of the Ministry of Education issued a notice on the "Ten Thousand Miles to Reduce Burdens" activity for schools in the compulsory education stage, with the theme of publicizing typical experiences, standardizing school-running behavior, updating educational concepts, and creating a good atmosphere.

In 2014, the Ministry of Education organized and issued the Convention on Self-Discipline of Off-campus Training Institutions for Primary and Secondary School Students, calling on relevant training institutions to strengthen industry self-discipline. Every year, the Ministry of Education issues a document to deploy compulsory education enrollment and enrollment work, with special emphasis on eliminating the need to link extracurricular training with the enrollment and advancement of primary and secondary schools, and to prevent the establishment of economic interests with primary and secondary schools and their teachers in any way, such as enrollment. Emphasize strict examination of the qualifications of training institutions, standardize the scope and content of training, and make education and training institutions with students in school as the main object become useful supplements to school education. Strictly investigate the enrollment linked to schools, the transmission of benefits, and the conduct of public-school teachers teaching in education and training institutions. Explore the establishment of a negative list system and a joint supervision mechanism and strengthen the rectification of unlicensed education and training institutions.

In 2018, the General Office of the Ministry of Education, the General Office of the Ministry of Civil Affairs, the General Office of the Ministry of Human Resources and Social Security, and the General Office of the State Administration for Industry and Commerce jointly issued the Notice on Effectively Reducing the Extracurricular Burden of Primary and Secondary School Students and Carrying Out Special Governance Actions for Off-campus Training Institutions, focusing on the illegal operation of off-campus training institutions in disciplines such as major safety hazards, unlicensed or unlicensed.

In July 2021, the General Office of the CPC Central Committee and the General Office of the State Council of the People's Republic of China issued the Opinions on Further Reducing the Homework Burden and Off-campus Training Burden of Students in the Compulsory Education Stage, which clearly stated that schools should ensure after-school service time, and stipulated that the end time of after-school service should not be earlier than the local normal off-hours in principle, and implement the problem of "3:30 p.m. after class".

It can be seen that there is a more obvious encouragement tendency at the policy level, and the introduction of special policies to restrict extracurricular exam counseling, the overall industry development prospects are promising, coupled with the catalysis of online and live broadcast technology, new business forms are frequent, and the accelerated inflow of capital further promotes the development of the industry. In the future, with the further introduction of substantive incentive policies and the blessing of capital technology, the development prospects of the quality education industry are very promising.

2.4. Technical Environment Analysis

The supply side responds to the impact of the epidemic, the demand side generates integrated demand, and OMO comes into being, which will become a new trend in the development of education and training.

OMO focuses on the two industry cornerstones of effect and service, broadening the service radius and improving the educational effect through model innovation. At the same time, the integration of science and technology provides unlimited imagination space. For institutions, OMO is one of the key means to achieve product differentiation, reduce customer acquisition costs and deepen moats; OMO does not have a clear boundary and scope. Each institution

explores its own solutions under the OMO model based on its own understanding of technology and education.

With the advent of the 5G era, the widespread application of emerging technologies such as AI, big data and cloud computing will promote the innovation of OMO education models. Compared with 4G, 5G has significantly improved in terms of network delay and reliability, access density of regional devices, and average network bandwidth. In the field of education, 5G will bring some major changes. First, it will greatly improve the interactivity of mobile online education. Under the 5G network, live video can achieve 4K/8K ultra-high definition, low latency, and real-time classroom interaction. Second, promote the evolution of offline education models. Under the 5G network, everything is interconnected, and the existing offline classroom can be built into a smart interconnected classroom. Third, blur the boundaries of existing teaching models, fully open online and offline teaching links, and create a closed loop of teaching experience. Based on 5G, AI, AR/VR, big data and other technologies are expected to further exploit their potential. 5G+AI can better achieve personalized teaching. Under the 5G network, students' information can be captured in real time to form a complete record, which can achieve higher quality adaptive learning through in-depth analysis of artificial intelligence and big data. 5G+AR/VR can improve the classroom experience. Currently, computing and transmission capabilities based on mobile devices can be implemented in the cloud, which greatly reduces the size of the device and even achieves wear-ability. Students can engage in immersive learning anytime, anywhere, which is conducive to improving the teaching effect.

3. Conclusion

In summary, although STEM education has entered China relatively late, it has been driven by the macro environment and relevant policies, and has developed rapidly, with STEM becoming a highly respected and effective form of integrated interdisciplinary education in China. At present, the STEM education industry is still developing and in the blue ocean stage, STEM education enterprises should balance and grasp the needs of schools and parents for further education and quality improvement, follow the policy trend and seize the advantage of the blue-ocean market".

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