

The Impact of the General and Vocational Streaming Policy on the Development of Emerging Industries

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Abstract. In the current context of the rapid development of global emerging industries, the demand for technically skilled talents in emerging industries continues to expand. However, the current general and vocational streaming (GVS) policies face inadequacies in matching talents with industry needs. This paper analyzes the GVS policies in China and other countries (such as Germany and Nordic countries) based on examples and interviews to examine the application and existing issues of GVS policies in practice. The study shows that policy reforms, school-enterprise cooperation, course content updates, and enhancing students' lifelong learning abilities are key to improving talent training for emerging industries. GVS policies should keep pace with industrial development and be continuously optimized to meet the dynamic talent needs of emerging industries, thereby promoting the healthy development of the national economy.

Keywords: General and Vocational Streaming; Vocational Education; Emerging Industries; Educational System Reform.

1. Introduction

In the current international society, driving the development of emerging industries has become a crucial part of national strategy. Given the current international situation, countries are actively promoting the development of domestic emerging industries. To drive rapid development, the demand for technically skilled talents continues to increase. However, vocational education is not perfectly aligned with emerging industries, presenting numerous challenges for further development. Firstly, skills lag behind industrial change and development; vocational education curriculum updates often fall behind the pace of industrial technological transformation. As a result, graduates' skills and technologies may not meet the latest demands of emerging industries. For example, the burgeoning artificial intelligence technology in recent years is still experiencing talent shortage, and the establishment of related majors has only been carried out in the past few years. Secondly, there is a lack of rapid adaptability among personnel in related industries. Rapid development in emerging industries requires employees to quickly adapt to changes, continuously learn, and update skills. However, the existing vocational education system may not have adequately emphasized the cultivation of such abilities. Furthermore, there is a disconnect between theoretical knowledge and practical application. The gap between industry practice and teaching means vocational education graduates require additional on-job training to adapt to the work environment. These issues to some extent impede the development of emerging industries and require reforms in GVS policy to accelerate their advancement. According to the "2023 China Strategic Emerging Industries Development Report," the Chinese government is highly attentive to the development of emerging industries. How to develop future strategic emerging industries, grasp the historical orientation of the new stage of development, and form a batch of globally competitive world-class industry clusters have become urgent issues for the Chinese government to clarify. In the current international society, driving the development of emerging industries has become a crucial part of national strategy, and the development of emerging industries is inseparable from high-quality talents in related fields. Under the environment of strong demand for high-quality talents, the GVS policy, as an important policy for optimizing vocational education resources and training more technically skilled talents, is valuable to study. Exploring the impact of the GVS policy on the development of emerging industries

has become the theme of this study.

In recent years, the Chinese government has been actively promoting the GVS policy to better meet the needs of emerging industries for technically skilled talents. On October 12, 2021, the General Office of the CPC Central Committee and the State Council issued "Opinions on Promoting High-Quality Development of Modern Vocational Education," which stated that "vocational education is an important part of the national education system and human resource development, bearing the important responsibilities of cultivating diverse talents, inheriting technical skills, and promoting employment and entrepreneurship." This policy aligns closely with the current national strategy to drive the rapid development of emerging industries. It is foreseeable that the implementation of the GVS policy will significantly impact the development of emerging industries.

However, the current development of China's GVS policy still faces many problems. For instance, Zhao Zhiqun pointed out various issues the current GVS policy in China encounters in the article titled "Challenges and Countermeasures Facing General and Vocational Streaming," such as widespread misunderstandings or prejudices against vocational education in society, concerns of parents and students about the prospects of secondary vocational education, and the disconnection between vocational education models and actual vocational demand, among others [1]. Considering the current state of rapid development of emerging industries and the specific implementation and development of China's GVS policy, studying the impact of the GVS policy on the development of emerging industries will be beneficial to promoting their mutual advancement, which is of great significance.

2. Literature Review

Amid the rapid development of emerging industries, the question of how to adjust and optimize China's policy on the diversion between general and vocational education to better serve the needs of emerging industries has garnered extensive attention from the academic community. In recent years, many scholars have conducted research and discussions on this issue, offering valuable opinions and suggestions. This paper will now organize and discuss the relevant literature.

Some papers start from the needs of the industry and point out the new requirements of emerging industries for the types and training standards of talents. For example, the article "Research on Talent Vocational Education Training Models for Emerging Industries Based on Human Capital Enhancement" proposes the construction of new types of vocational education training models to achieve a high degree of match between talents and industry needs [2]. Other papers believe that the current general-vocational diversion model is not conducive to the cultivation of talents for emerging industries and suggest studying adjustments to the diversion policy, such as eliminating compulsory requirements and providing more policy choices for different regions. These views all reflect that general-vocational diversion should follow up closely with industrial changes, adapt to the current state of industrial development, and accommodate the direction of future emerging industries development.

Similarly, research has also summarized lessons from international experiences. For instance, the paper "Global Experiences, Common Trends, and Policy Recommendations for General-Vocational Diversion" cites the successful experiences of countries like Germany, emphasizing that the latter stages of high school should adopt more diversion and integration methods, establish diverse types of high schools, and optimize the mechanism for vocational education students to advance to higher education, which has important reference value for better guiding general-vocational diversion in our country [3]. Moreover, a large body of literature comparing Chinese and foreign practices hopes to learn from international success stories, stressing deep collaboration between enterprises and schools, driving innovation and updates in the professional settings of vocational schools.

Beyond macro-level analysis, on the micro-level, some papers have analyzed the motivations behind students' choices in rural areas through data analysis, providing a basis for formulating differentiated

policies. Additionally, some studies have explored from a personal development perspective the impact of secondary vocational education on employment and self-growth. These literatures have provided a direction for this research, suggesting that viewing individuals' perceptions of general-vocational diversion policy from a micro perspective and combining it with macro perspectives would be more beneficial for research progression.

Overall, domestic literature on this topic has identified inadequacies in the general-vocational diversion policy in serving emerging industries and proposed various ways to improve it, such as emphasizing industry-education-research cooperation, offering more choices to regions, and focusing on individual growth needs. These perspectives have great reference value in promoting policy optimization. Future research could, based on this foundation and considering the actual conditions of different regions in our country, propose specific and actionable reform plans to drive the development of emerging industries.

Additionally, international scholars have conducted numerous studies on this policy. According to the research by Mattias Nylund and Per-Åke Rosvall, general-vocational diversion in Nordic countries emphasizes the principle of equality [4]. The education system needs to provide programs that allow students to freely transition to higher education or the job market. The core of this policy is to coordinate educational content with industry needs, which is crucial for emerging industries because these industries require skills and knowledge that adapt to industrial transformations, implying that the design of general-vocational diversion policies must closely follow the pace of industrial development.

In Erika Gericke's research, Germany's example shows that career guidance is effective in both general and vocational education [5]. Gericke emphasizes that informed decision-making in career choices is crucial to the success of vocational education. To a certain extent, if students can make career choices based on information from the market, then general-vocational diversion policies will effectively promote the alignment of talents and skills, thereby supporting the needs of emerging industries.

In summary, in the view of international scholars, general-vocational diversion policies should align with industry development, especially against the backdrop of rapid development of emerging industries [6]. The effective alignment of education and careers demonstrated by general-vocational diversion policies plays a crucial role in ensuring the supply of talents for emerging industries and in cultivating technically skilled personnel who can adapt to industrial transformations. On the other hand, assessing the effectiveness of vocational education within general-vocational diversion policies hinges on whether it can gain recognition and support from all sectors of society; if the relevant education garners broad support, emerging industries and relevant educational institutions will be able to connect smoothly, thereby facilitating the entry of technically skilled personnel into related industries and driving the rapid development of emerging industries [7]. In conclusion, general-vocational diversion policy is a critical content of educational system innovation, and its impact on the development of emerging industries cannot be overlooked [8].

3. Analysis of Domestic and Foreign Current Policies

3.1. Basic Situation of China's GVS Policies

China's GVS policy began with the Central Committee's decision on deepening educational system reforms in 1985. The policy aims to implement general and vocational streaming in high school education while continuously adjusting and developing under the basic principle of maintaining a generally equivalent ratio of admissions between general and secondary vocational schools. This policy seeks to popularize high school education in China, build a complete vocational education system, and cultivate high-quality technically skilled workers [9].

At present, the GVS policies in different stages and regions of China vary. Based on current policies, there are no clear GVS regulations at the level of middle school education, following the guiding

principle of implementing nine-year compulsory education. In high school, the GVS becomes more apparent. Depending on their academic performance and personal interests, students can choose to enter either a general or vocational high school. General high schools focus on the study of theoretical knowledge in preparation for university education; vocational high schools emphasize skill and practical operation training, preparing for direct employment or further vocational education.

3.2. Basic Situation of Germany's GVS Policies

Germany's GVS policy is an education system with stages set based on different educational goals and student development directions. The implementation of this policy allows students to receive education and training in the most suitable areas for them, preparing for future professional development or further academic education [10]. This GVS policy provides students with diverse learning and career development paths by establishing clear educational types, offering corresponding opportunities for future academic progression and career development. Specifically, Germany's GVS policy is mainly reflected in the bifurcation of high school education into general education and vocational education. German secondary education divides students from the ages of 10 to 15 or 16 into the first phase, including types of schools such as a pre-vocational school, intermediate school, gymnasium, and comprehensive school. These school types are differentiated by different educational goals and students' future development directions. Among them, the pre-vocational schools pay more attention to vocational education and practical operations. Starting from this stage, students should have a clearer understanding of their future development paths, and the GVS begins to take shape [11].

After completing the first stage of education, around 15 to 16 years old, students enter the second stage of education, similar to the high school phase in China. During this stage, the educational system remains bifurcated into general education and vocational education. Students can enter different educational tracks based on their previous school types [12]. If students were previously enrolled in gymnasiums, they would continue into higher gymnasiums to prepare for university education and qualify for general university admission after passing Germany's "Abitur" examination at the end of 12th or 13th grade. Students who previously studied at pre-vocational schools, intermediate schools, or comprehensive schools mostly enter higher vocational schools, technical colleges, or specialized vocational schools, with successful 12th-grade graduates qualifying for admission to universities of applied sciences, or they may choose to continue internships or employment.

3.3. Nordic Countries

Nordic countries exhibit common characteristics and face similar issues regarding GVS policy, but there are also many differences in their specific implementation models and systems. Nordic welfare states, such as Sweden, Finland, Denmark, Norway, and Iceland, are strongly influenced by the principle of equality and committed to providing students with opportunities to transition to higher education and work life through upper secondary level vocational education and training (VET). Sweden and Finland traditionally prioritize general school-based education, while Denmark, Norway, and Iceland have a long tradition of apprenticeship training, which has greatly influenced the development of their vocational education [13]. While there are many differences in the main forms of vocational education among Nordic countries, they face similar issues such as low inflation rates, high youth unemployment, and social exclusion. These social problems further hinder the connection between vocational education and businesses, impacting the development of emerging industries in these countries to some extent. However, each country's solutions to these problems differ. For instance, Denmark's recent approach is to move towards Sweden's model by increasing the integration of different courses and the hours of general subjects; Sweden, on the other hand, is approaching Denmark's model by adding more workplace-based learning elements. Despite these reforms, the Nordic countries' education models still maintain GVS; that is, students choose between academic or vocational education tracks, affecting the types of knowledge they access and value, as well as others' perceptions of their capabilities. Furthermore, Nordic countries are increasingly influenced by

neoliberal ideas internationally, such as efficiency orientation, new public management, and labor market responsiveness, among others, which all have impacted the development of their education models [14].

In summary, the situation surrounding GVS policies in the Nordic countries exhibits complexity. Although sharing common welfare state characteristics and a common direction for solving similar issues, they show different paths and challenges in vocational education organization, policy execution, and reform outcomes. The problems they face warrant further in-depth reflection on the development of current GVS policies [15].

4. Research Results

4.1. Development Trend in Vocational Schools

In recent years, along with the development and changes in China's GVS policy, the number of graduates from vocational education has also varied. As observed in the following figure 1, the total number of vocational education graduates in China has shown a downward trend in recent years. This presents certain impacts on the development of companies that need technically skilled talents. In response to this situation, the Chinese government has recently implemented new revisions to the Vocational Education Law, repealing the GVS policy after junior high school graduation, which officially took effect on May 1, 2022. This represents the first major amendment to the Vocational Education Law in nearly 26 years and reflects the Chinese government's high regard for and proactive exploration of vocational education reform. Under the influence of this policy, the number of graduates from secondary vocational schools has rebounded. However, overall, the scale of vocational education in China is still decreasing.

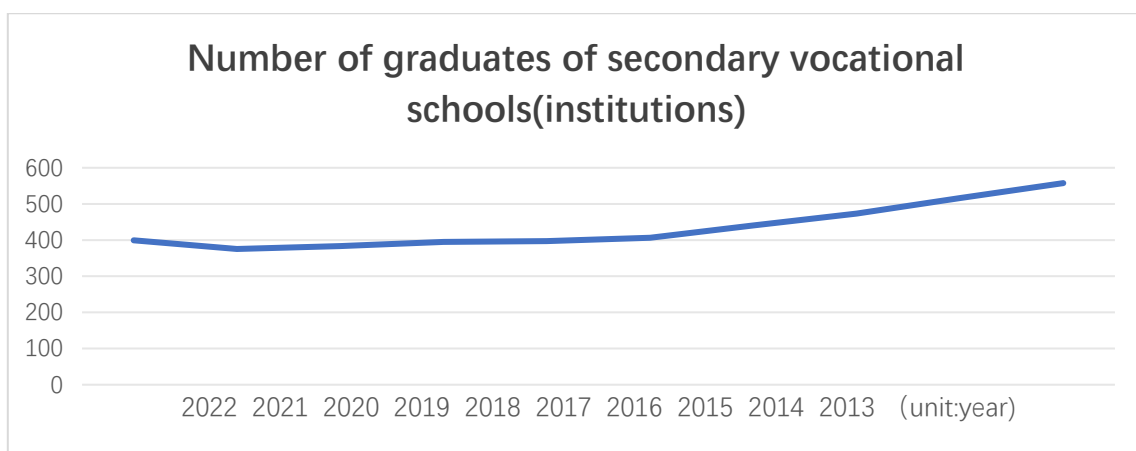


Fig.1 Number of graduates from secondary vocational schools (institutions) (10,000 people)

The yearly decline in secondary school graduation numbers is influenced by many factors. An analysis of actual data and relevant literature reveals the following reasons. Firstly, influenced by societal attitudes, in contemporary China, society does not advocate for vocational education, and failure to enter universities through examination-oriented education to obtain higher qualifications is seen as a failure, with vocational schools often being viewed as a choice for "failures." In addition, the matching of vocational education with corresponding positions and alignment with related professions is lacking, with many graduates from vocational schools often facing the situation of "graduation equals unemployment." Besides the two reasons mentioned, many other factors affect the enrollment of vocational education students in China, which this paper will not elaborate on.

4.2. Micro-level Exploration

To delve deeper into the effects of GVS policy on student development, the author visited a vocational high school in Beijing, made contact with relevant personnel, and interviewed several students to

gather more information. The following presents selected responses from students representative of the issues discussed (interviewees are pseudonyms), showcasing the thoughts and attitudes of students growing up in vocational education:

4.2.1. Interview Record One

Researcher: What abilities do you think are needed to enter the emerging industry of new energy vehicles?

Xiao Q: To enter the new energy vehicle industry, you first need the passion and curiosity for new technologies, as this field is evolving every day. If you don't like learning new things, you might find the technology you just mastered is outdated tomorrow. Then there's professional skills, like battery technology and electric motor control. And you can't be afraid of dirtying your hands—how else are you going to build a car, right? Of course, teamwork spirit is also necessary because cars are made by a group, not DIY at home. I'm always working with classmates, but I wonder how it'll be to work with others in the company. Hey, getting in isn't even sure yet; normally I don't think about what's needed or what I've learned.

4.2.2. Interview Record Two

Researcher: What skills and technologies has the school taught you, and do you think these can help you qualify for jobs in the new energy vehicle industry?

Xiao M: At school, the teachers taught us a lot of things, from the basics of car structure to electronics to the current new energy technologies. It feels like I've learned whatever I could. But to be honest, what the school teaches is still more theoretical, and if we talk about practical application, I might need to get my hands dirty and tinker a bit more. However, the school emphasizes teamwork projects and practical training, which fits the new energy vehicle industry because no one will be building a car alone, right?

4.2.3. Interview Record Three

Researcher: Currently, regarding entering this industry, what difficulties do you feel you're facing? What additional skills do you need to help you secure a position in this field?

Xiao C: Difficulties? Firstly, the competition is fierce, and I feel like I'm new to society and don't understand anything. As for skills, while I have some understanding of battery technology, the new energy vehicle industry covers a broad range of knowledge. For example, autonomous driving technology is hot lately, and I feel I need to catch up on that. Additionally, lack of practical experience is an issue; no matter how rich in theoretical knowledge, it's futile without actual experience.

4.2.4. Interview Record Four

Researcher: Regarding the GVS policy, how do you wish to promote its better adaptation to the development of emerging industries?

Xiao K: For the GVS policy, I think the key is to strengthen the alignment between vocational education and industry. After all, what we learn is meant to solve practical problems, right? The policy should encourage cooperation between enterprises and our schools, launching internships that allow us students to directly enter companies, gain early exposure to cutting-edge technologies and work environments. That way, we won't just graduate with a piece of paper but with real skills and experience. And who wouldn't want to sort out their job while still in school, doesn't that sound great?

The above interview records allow us to peek into the specific conditions of the GVS policy in actual operation. In the vocational education process following GVS, it is common for students to learn technical and knowledge-related industries and then obtain enterprise positions introduced by schools. Through interviews, we can identify some issues, which will be discussed below.

Firstly, under the existing vocational education system, students struggle to gain practical experience. Since the acquired knowledge should ultimately serve the development of emerging industries,

students should actively participate in the daily work of related industries during their education to gain more comprehensive experience and practical skills. As for the GVS policy, it is necessary to consider how to promote the post-streaming education to connect with enterprises, providing more internship opportunities for students to master relevant technologies and skills through actual practice.

Further concerns lie in the rapid development of technical skills. Emerging industries, which are rapidly evolving through cutting-edge technologies, also experience noteworthy growth rates in related technology and skill development. Often, the knowledge and technology learned by students in schools cannot keep pace with the actual demands of enterprises. In response to this issue, the general and vocational education streaming policy should promote a deep integration of general and vocational education. Efforts should be made to cultivate students' autonomous learning abilities and practical literacy, with the aim of developing more technically skilled talents who possess a depth of long-term learning through the advancement of the streaming policy, thus further propelling the development of emerging industries.

The final point, akin to the first, is to further promote the connection between vocational education and enterprises. Different from providing students with more practical experience as in the first point, facing the current employment pressure in China, many students are confronted with the challenging situation of "graduating only to become unemployed." On one hand, emerging industries face a shortage of technically skilled personnel; on the other, graduates struggle to find jobs that match their skills. Interviews reveal that "entering enterprises early while still in school" is something many students hope for. In light of this, it is recommended that emerging industries could develop deep collaboration with relevant schools, possibly adopting the cooperative education models seen in Germany. This way, enterprises could better acquire the talents they need, while students could secure jobs in advance, which would greatly alleviate employment pressure to some extent.

5. Conclusion

China's emerging industries are rapidly developing, and there is an urgent need to establish an education system that supports the development of these industries. In terms of the current developmental trend of emerging industries and the advanced international experience with general and vocational education streaming policies, China's promotion of innovation and optimization in this policy could unfold in the following ways:

Strengthen Industry-Education Integration: Post-streaming, for students who have entered vocational education, establish school-enterprise cooperation models. This involves enterprises participating in the design and updating of educational curricula, ensuring that the content of education is synchronized with industry demands. Policies should encourage corporate involvement in education, direct collaboration with vocational schools to cultivate talent, and provide support for vocational education in terms of funding, technology, and philosophy, thereby promoting the long-term development of vocational education and streaming.

Update Educational Content and Technology: Continuously upgrade the technological equipment and instructional content of vocational education, ensuring students are exposed to the latest industrial technologies and work methodologies. Stay abreast of relevant knowledge and technology, enhancing the mastery of new technologies, with the aim of adapting to positions in emerging industries and providing more impetus for enterprise development.

Increase Practical Teaching: Facing the general lack of practical experience among students and the difficulty of applying learned knowledge and skills to actual work positions, the state should issue relevant policy documents to encourage school-enterprise cooperation, increase work internships, simulated operations, and other practical components, allowing students more opportunities to directly apply their skills and strengthen their hands-on experience.

Emphasize Lifelong Learning: Throughout the streaming process, do not overly stress the differences between the two education models, but rather promote a certain degree of integration between general

and vocational education. In view of the current rapid development of technology, cultivate students' learning, cognitive, and social skills, thereby enhancing their adaptability to the development of emerging industries. In vocational education, foster students' lifelong learning capabilities, encouraging graduates to continually learn new knowledge and skills throughout their careers to adapt to the evolving changes in emerging industries.

By addressing these aspects, the hope is to drive innovation and development in the general and vocational education streaming policy. With the renewal and improvement of the education system, further support for the development of relevant emerging industries can be provided, offering more momentum for economic growth.

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