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Analysis of the Reform of Primary and Secondary Education Streamlining in Singapore

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Abstract: Education streamlining, as a crucial activity for talent development, requires rational planning to meet the dual demands of individual self-realization and national participation in international competition. The streamlining activities in primary and secondary education in Singapore have entered a new phase of "teaching according to students' aptitude." The reform focuses on enriching streamlining paths and transforming streamlining criteria. This has resulted in three main characteristics of Singapore's current primary and secondary education streamlining: cultivating diverse talents, promoting social integration, and pursuing educational equality. This has propelled Singapore's education towards creating a non-discriminatory principle and ensuring a fair competitive environment for everyone, providing robust support for various vulnerable groups. While the ongoing streamlining has achieved certain results, it has also presented challenges for the continuous advancement of the reform.

Keywords: Singapore, primary education, primary and secondary education streamlining, diverse talents, educational equality

1. Introduction

Education streamlining is an activity that classifies talent development. In a narrow sense, education streamlining occurs within the school education system, determining the direction of students at a certain stage of education. The purpose of streamlining is to meet the needs of both social and individual development. Streamlining in primary education plays a foundational and guiding role in the entire streamlining system. Currently, China's primary and secondary education resources are abundant, but high-quality educational resources are scarce, leading to an accumulation and a tendency towards monopolization, resulting in prominent issues of educational inequality [1]. To pursue educational fairness, the "lottery system for elementary-to-middle school transition" has emerged. While the random assignment policy ensures fairness in the allocation process, it does not guarantee the fair distribution of high-quality junior high school educational resources [2]. In practice, there have been informal rules such as flexible policies, elite alliances, and the prevalence of "connections" in the disguised streamlining process [3]. In the primary and secondary school stages, educational streamlining distributes educational resources, seeking a reasonable balance between educational fairness and quality. Optimizing educational streamlining is a topic that requires long-term attention and discussion.

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The purpose of education streamlining in Singapore has long been geared towards meeting the different demands for human capital types at specific stages of economic development. The education streamlining system is closely linked to economic development policies, social modernization planning processes [4]. In response to students' needs for personal development and society's call for diversified talents in the face of global competition [5], Singapore has gradually reformed primary and secondary education streamlining. This aims to construct a flexible streamlining system, seeking optimization in the balance between educational fairness and quality.

2. Pathways of Reform in Primary and Secondary Education Streamlining in Singapore

The reform of Singapore's education streamlining mechanism has been a long-term endeavor aligned with the national strategic goal of creating a "Thinking School, Learning Nation." The objective is to encourage society to view education as a lifelong learning process, addressing the issue of the education system's excessive focus on grades and scores at the expense of students' learning motivation. The reform in the field of education streamlining revolves around two main threads: enriching education streamlining pathways and transforming the criteria for education streamlining.

2.1. Expanding Paths to Higher Education and Educational Diversity

In the era of globalization, the focus of educational development in Singapore's primary and secondary education streamlining system has shifted from academic achievement to innovation and diversity [6]. The system now provides more diverse education pathways, primarily targeting students with special talents and those facing academic challenges, accompanied by a comprehensive enhancement of diversity in school education.

Firstly, there is a broader development pathway for students with special talents. In addition to basic academic education, more diverse education paths and admission channels are provided for students with specific talents. In 2004, Singapore established its first independent specialized school offering both academic and sports courses. In 2008, the first specialized pre-university arts school was founded, catering to students with talents and interests in sports or the arts. The expansion of types of secondary education schools adds diversity to students' academic pathways. In 2004, the Direct School Admission for secondary schools (DSA-Sec) was officially implemented, functioning as a self-admission plan. Before the Primary 6 Leaving Examination, schools can establish their own selection criteria and admit students in advance based on a certain proportion. Students can compete for admission based on a wide range of talents and abilities [7]. In 2019, the application for DSA admission no longer incurs any fees, and separate academic level tests are not allowed. The application process is entirely managed through the national official website, eliminating separate application channels. The elimination of fees aims to better assist students from low-income families in participating in the program, while the prohibition of separate academic level exams aims to correct deviations in the actions of some schools that still consider academic levels as prerequisites for personal ability assessments. The official and unified management of the application process helps prevent schools and parents from exploiting separate application channels for unfair admissions.

Secondly, there are targeted educational pathways for students facing academic challenges. To address the "long tail effect" [8] in student performance on the PISA test, where in the 2018 PISA test, the difference in reading scores between the top 10% and bottom 10% of students was one of the largest among participating countries and economies [9], Singapore has introduced targeted educational pathways within the education streamlining system. In 2007 and 2009, the Ministry of Education in Singapore established two specialized schools specifically for students who could not pass the Primary 6 Leaving Examination. The admission eligibility criteria explicitly state that students applying for admission must meet the following conditions: students who, after 1 to 3

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attempts, cannot enter any secondary school; students who have only taken the Primary 6 Leaving Examination once need to provide a recommendation from their primary school principal. These two specialized schools have significant autonomy, with curricula focusing on practical skills aligned with Singapore's labor skills qualification standards. They collaborate with social industries, providing students with practical and employment opportunities. The establishment of specialized schools has played a significant protective role in ensuring that students facing academic challenges continue to receive formal education. In 2018, then Minister of Education, Ong Ye Kung, emphasized the philosophy of Singapore's education system as "keeping the floor open without capping the ceiling." He specifically mentioned that the Ministry of Education allocates the most resources to four specialized schools, followed by students in the general vocational and general academic streams. The investment in resources for each student is around SGD 24,000 per year, compared to less than SGD 15,000 per person for other publicly funded schools and autonomous schools [10].

Thirdly, there is encouragement for each school to develop unique strengths. By focusing on the development of unique strengths for each school, there is a comprehensive enhancement of diversity in school education. In 2012, the Ministry of Education stopped publishing school rankings in various national exams, weakening the tendency towards an education system solely based on scores and exams. The action to develop each school's distinctive strengths was carried out simultaneously. The Ministry of Education allocated SGD 55 million specifically to support schools in developing their unique educational features or advantage programs, such as outdoor education, applied learning, and aesthetic appreciation. According to the Ministry of Education's response, by 2013, approximately 73% of secondary schools and 66% of primary schools had established their unique areas of strength [11]. In 2017, there was a focus on creating distinctive programs for each school, with specific actions such as applied learning plans and lifelong learning plans. The former aims to encourage students to apply what they learn in class to solve real-world problems, while the latter aims to help students better understand society through activities such as arts, sports, and volunteering. Each secondary school receives a total of SGD 100,000 in plan funding annually from the Ministry of Education to ensure that all secondary schools have sufficient resources to provide comprehensive education for students.

2.2. Introduction of Subject-Based Streamlining Criteria

Traditional streamlining in Singapore's primary and secondary education system, characterized by hierarchical streaming based solely on overall performance, presented difficulties in student mobility between streams and failed to meet the personalized developmental needs of students. Consequently, Singapore introduced a subject-based banding system, replacing hierarchical streaming, which began as a trial in primary schools and gradually expanded to the secondary school level.

Firstly, the preparatory stage involved the initial planning of the subject-based banding system. The shift from hierarchical to subject-based streamlining in Singapore is manifested through the introduction of the Subject-Based Banding (SBB) system. SBB emphasizes the selection of subject combinations based on the difficulty level, where schools offer standard and foundation courses for each compulsory subject. Students, considering their individual situations and strengths, combine subjects at standard and foundation levels [12]. The process involves three steps: diagnostic assessment, where all students participate in a school-wide exam, and schools recommend a subject combination based on the exam results for Grade 5; formative assessment, where students engage in learning based on the previously confirmed course arrangement, and schools mid-way evaluate students' performance, allowing adjustments to subjects that may not be suitable; and summative assessment, where students register for the Primary School Leaving Examination based on their final subject combination.

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Secondly, the preliminary experiment involved the initial implementation of the subject-based banding system at the primary school level. Singapore first introduced the subject-based banding system at the primary school level, replacing hierarchical streaming. In 2006, the Ministry of Education announced the discontinuation of the EM1-3 streaming mechanism for Primary 5 and 6 in 2008, initiating subject-based streamlining through the implementation of Subject-Based Banding (SBB). Under this new streamlining mechanism, four subjects are involved in primary school streamlining: English, Mother Tongue, Mathematics, and Science. Each subject provides standard and foundation courses. The timeline is as follows: at the end of Primary 4, students take an internal exam, and based on the scores, the school recommends a subject combination for Grade 5. While the school recommends the subject combination, the final decision rests with the parents. Therefore, schools engage in active discussions with parents, providing them with students' exam results, past performance records, considering students' interests and hobbies, and ultimately offering course selection advice. This helps parents complete the course arrangement and fill out the option form. At the end of Primary 5, students take exams corresponding to the subject combination, and the school provides feedback to parents. Students and parents can then make adjustments to subjects based on their learning experiences, changing the teaching level of subjects.

Thirdly, the full-scale promotion involved the comprehensive implementation of the subject-based banding system at the secondary school level. The term "comprehensive" holds three meanings: first, expanding the range of subjects to include humanities, such as geography, history, and English literature, in addition to the original four subjects from the "Primary 6 Leaving Examination"; second, extending participation to all schools, with the comprehensive subject-based banding system planned to be implemented in all secondary schools in Singapore within three years; third, enriching the teaching levels by subdividing the original two teaching levels into three, labeled as G1, G2, and G3. In 2014, the Ministry of Education in Singapore initiated the Subject-Based Banding (SBB) system in 12 secondary schools, expanding to all schools offering mainstream courses in 2018. Ordinary stream students whose Primary 6 Leaving Examination scores meet the standard level can choose standard courses with higher teaching levels starting from the first year of secondary school. However, at this stage, the subjects available for selection are limited to the four subjects from the Primary 6 Leaving Examination: English, Mother Tongue, Mathematics, and Science. In 2020, the Ministry of Education officially upgraded the subject-based banding system to the comprehensive subject-based banding system [13], aiming to adapt to the more complex environment of secondary education compared to primary education, ensuring a smooth transition from primary to secondary education streamlining.

3. Characteristics of Current Primary and Secondary Education Streamlining in Singapore

The ongoing reform of primary and secondary education streamlining in Singapore is a continuously progressing and step-by-step educational initiative. It represents a reevaluation of the rationality and timeliness of the country's educational streamlining, accompanied by proactive measures. Following the reform, three prominent features characterize the current primary and secondary education streamlining in Singapore: recognition of diverse educational achievements, a weakened hierarchical inclination in streamlining, and support for groups with lower academic achievements.

3.1. Recognition of Diverse Educational Achievements, Fostering Diverse Talents

The goal of Singapore's educational reform is to shift from an exam-centric focus, considered high-risk, to fostering creativity and comprehensive capabilities required for modern global development [14][15]. As a component of talent development, the streamlining mechanism supports the realization

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of these new educational objectives by establishing specialized institutions and introducing direct admission programs. The direct admission program requires students to achieve a minimum exam score in the Primary 6 Leaving Examination to qualify for entry into their chosen school. While alleviating the exam stress on students, this system also assesses the foundational knowledge of students with special talents. Non-academic education is not only incorporated into the curriculum but is also formally integrated into the academic assessment for progression. This recognition of achievements beyond academics, including sports, arts, character, and leadership skills, signifies Singapore's emphasis on the importance of holistic development and non-academic capabilities. Academic achievement, however, retains its significance, as a nationwide standardized academic test remains a component of all educational pathways. The direct admission program evaluates students based on a combination of criteria, ensuring the recognition of diverse educational achievements.

3.2. Weakened Hierarchical Inclination, Promoting Social Integration

A highly differentiated educational streamlining structure implies a hierarchical system [16], fundamentally distinct from diversity. Hierarchical streamlining categorizes students, leading those in lower categories to experience lower self-esteem and self-efficacy, resulting in sustained negative effects on their learning. Additionally, students from different streams rarely have opportunities for shared learning and communication, deepening the mutual alienation. These hierarchical labels extend into society, where students' academic achievements and stream categorizations become closely tied to their personal identities [17], fostering social stigmatization and group alienation that persists from school education into societal life. Therefore, Singapore's education streamlining system aims to weaken hierarchical differentiation, promoting social integration. The reform includes a shift in streamlining patterns, eliminating the use of academic performance for stream categorization and introducing subject-based streamlining. By removing the three-tiered labels of superiority or inferiority and introducing combination labels based on subjects, Singapore's streamlining system, although still categorizing subjects into three levels, requires a more detailed analysis for student comparison. This approach considers both strengths and weaknesses, thus mitigating the hierarchical effects. Importantly, subject-based class placement means student interaction is no longer limited to a fixed ability category. The diverse combination of abilities fosters varied student groups, providing opportunities for interaction and communication among students from different backgrounds, contributing to the development of harmonious relationships.

3.3. Support for Groups with Lower Academic Achievements, Pursuing Educational Equality

Whether the practical implementation of streamlining mechanisms can overcome the intergenerational transmission of social inequality is still inconclusive. However, there is a general consensus that educational streamlining mechanisms are closely linked to educational opportunity inequality [18]. This necessitates that streamlining mechanisms, at the very least, should avoid exacerbating educational inequality and strive towards relative equality. This paper terms the factors causing inequality within the streamlining system as structural flaws in the educational streamlining system. The focus of educational development shifts with national and global societal development, and the structural flaws and specific educational issues resulting from streamlining mechanisms are not constant. They undergo changes or shifts during dynamic development. In the 21st century, the rapid development of educational marketization has led to an overall decline in the quality of school education, with students gaining high-quality educational opportunities externally through economic advantages. The gap between students with low and high academic levels continues to widen, with evident racial disparities among students with low academic achievements [19]. The existing

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educational streamlining system has become a tool exacerbating opportunity inequality. In response to this issue, the educational streamlining system undergoes intervention, expanding opportunities for disadvantaged students and increasing their access to educational resources. It provides high-quality specialized school education for students with low academic achievements, coupled with a high degree of autonomy and resource allocation to reduce the dropout rate in secondary education. In comparison to mainstream schools, greater resource allocation and funding are provided, not only to ensure the educational environment for students with low academic achievements but also to underscore the commitment of Singapore's Ministry of Education to establish high-quality non-academic school education, breaking the inherent link between "access to quality education" and "academic education."

4. Conclusion

Singapore regards education as a crucial avenue for driving national development. The current streamlining of primary and secondary education in Singapore is characterized by increased flexibility and fairness. It promotes the creation of a nondiscriminatory principle and ensures a fair competitive environment for everyone, providing robust support for various disadvantaged groups, and the reforms have shown initial effectiveness. The overall academic performance of the group with lower academic achievements has been uplifted. Comparing data from PISA in 2009 and 2018, while the average scores of all students have improved, the proportion of students with poor reading performance remains stable. The gap in science scores between the top 10% and bottom 10% of students has narrowed by 19 points, and the gap in mathematics scores has narrowed by 27 points. There is an increased likelihood for minority ethnic groups to continue receiving formal education. According to the "Education Statistics 2021" released by the Singapore Education Bureau [20], after completing compulsory education in primary and secondary stages, the percentage of Malay students entering high school education increased from 89.3% in 2011 to 94.4% in 2020, and for Indian students, it increased from 92.5% in 2011 to 94.7% in 2020. The impact of family economic status on academic performance has not further widened.

However, the implementation of the new streamlining system has encountered practical challenges, posing new obstacles to the continued progress of the reform. At the parental level, the utilitarian tendency of Singapore's education, historically regarded as a crucial tool for driving economic development, has proven challenging to shift away from the traditional exam-oriented education. The utilitarian trend in education has resurfaced. Non-academic educational activities are becoming a new competitive trend, perpetuating the competitive landscape of academic education. Affluent families view diverse educational pathways as multiple options for educational investment, while economically disadvantaged families lean toward investing in traditional academic education competitions, perpetuating high-intensity educational competition in new forms. At the school level, there is room for further expansion of group integration in the educational environment. When introducing subject-based streamlining criteria, the Singapore Ministry of Education did not impose mandatory requirements on the curriculum for all schools. "Elite schools" that exclusively offer advanced courses and "vocational schools" that exclusively offer basic courses still exist. Research indicates that interacting with peers from different academic backgrounds benefits students in cultivating social-emotional skills, improving learning skills, and breaking stereotypes to reduce conflicts [21]. However, for schools that provide only a single level of education, these positive impacts do not occur, and students in these schools represent the highest level of homogeneity. Enhancing communication among student groups with the greatest differentiation in school education to continually improve the rationality of primary and secondary education streamlining is a challenge that the Singapore Ministry of Education needs to consider.

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