Tracking in Education: A Four Country Comparative Study

Introduction

Tracking, also known as streaming, is the practice of placing students into different courses, study programs or schools, based on their abilities, achievements and interests. This practice allows teachers to prepare instruction that meets students' needs (Chmielewski, Dumont and Trautwein 2013, 926), with limited concern over leaving slow learners behind or not stretching fast learners enough.

Tracking has been practiced, although in different forms, in both developed and developing countries. For instance, Germany and Hungary track student progress from as early as age 10, while the United Kingdom, Japan and the United States tend to keep their lower secondary schools comprehensive before streaming students at the upper secondary level. This paper reviews, from a comparative perspective, the tracking practices in four Asian countries: Singapore, South Korea, Vietnam and Cambodia. The aim is to learn from a diversity of experiences to improve Cambodia's streaming practice.

Methodology

This paper is based mainly on documents, including existing literature and educational policies of each case study country. The literature review was supplemented with information gathered from the researcher's informal conversations with a chemistry teacher at an upper-secondary school in Cambodia, and with her colleagues in Vietnam and South Korea.

Singapore and South Korea have been successful in building their modern education systems, so their experiences in applying tracking practice are significant for Cambodia. Though still at an early stage of development, Vietnam surpassed world expectations, achieving a remarkable mean score of 511 on its first participation in 2012 in the Programme for International Student Assessment (PISA) compared to the average score of 494 for OECD countries (OECD 2014a).

Eng Sokha, research intern, Education Unit, CDRI. Citation: Eng Sokha. 2017. "Tracking in Education: A Four Country Comparative Study." *Cambodia Development Review* 21(2): 13-16.

Overview of tracking practices in each country

Singapore

Singapore has practised tracking since 1979, with students from primary school upwards placed into different courses of study through exams, tests and school reports (Kam and Gopinathan 1999, 103). The idea behind introducing tracking at grades 5 and 6 was to enable school children to reach their potential by understanding differences in academic attainment and growth (OECD 2011).

Tracking practice has now been refined to subject-based banding. This allows children to realise their potential based on their strengths and interests, providing greater flexibility by offering them the choice of a combination of standard and foundation subjects (MOE of Singapore 2016a). For example, students who excel in languages (English and Chinese, Malay or Tamil) but struggle in mathematics and science may choose two language subjects at standard level and take mathematics and science at foundation level. The school recommends a subject combination based on the results of exams in grade 4, and parents can fill out an option form to indicate their preferred choice. In grade 5 students take a subject combination chosen by their parents. At the end of the year, the school assesses students' ability to cope with their chosen subjects. Then, in grade 6, students take the subject combination recommended by the school, and sit for the national Primary School Leaving Examination (PSLE) (MOE of Singapore 2016a).

At secondary school, depending on PSLE results, students are grouped into one of three courses: express, normal (academic) or normal (technical). The difference between express and normal (academic) is that the express course provides mother tongue instruction at a higher level. Students on the normal (technical) course take computer applications as a compulsory subject, as well as English language, a mother tongue language and mathematics (MOE of Singapore 2016b). Singapore's secondary education system provides flexibility, allowing students to move from one course to another depending on their performance and assessment from the school principal and teachers.

South Korea

The South Korean education curriculum remains comprehensive (common courses) until grade 10 (Nuffic 2013). The aim is to ensure that students acquire the basic knowledge and skills they need for everyday life. From grade 11, there are two types of high schools: general high school for those who wish to go on to higher education, and vocational high school[1] for those who intend to join the workforce on leaving school (Kim, J-H. Lee and Y. Lee 2003, 5). The division (tracking) at general high school is based on field of study, not ability, into science and humanities, to prepare students wanting to study science, engineering or social sciences at university. Students from different tracks study at the same school, and every student takes the same predetermined classes without changing classroom (Kim, J-H. Lee and Y. Lee 2003, 5). Korea also has special high schools to provide programs for gifted students in natural sciences and mathematics; for example, students can graduate from a two-year program at Seoul Science High School and continue to top-ranked universities or academic institutions (Choi and D-S. Hon 2009, 45).[2]

The curriculum allows students to choose from elective courses at grade 11. Those who opt for humanities and social sciences choose from subjects such as Korean language, moral education and social studies; and science students select such subjects as mathematics, science and technology. In addition, all students must complete a core set of compulsory subjects (MOEST Korea 2008). Thus South Korean tracking practice allows a degree of heterogeneity in the classroom and knowledge transfer or sharing between students. However, the exchange of ideas, or knowledge spillover, might occur only in compulsory classes such as foreign language, and might be limited to advanced subjects in each track; for instance, students following the social science track would have limited opportunity to take advanced science courses.

Vietnam

Vietnam keeps its education curriculum comprehensive until grade 9 (UNESCO 2007). Tracking was first applied from grade 10 to grade 12 in 2006/07. Aiming to provide a wider choice, the curriculum was divided into three tracks: natural sciences, technology, and social sciences and foreign languages. The school principal or school council can decide how many tracks or which track the school should offer after getting approval from the Provincial Department of Education and Training (Fredriksen and Peng 2008). Requirements for the three tracks are knowledge or skill standards in all curriculum subjects. For example, to take natural sciences, students must have achieved advanced level physics, chemistry, biology and mathematics in the entrance exam. Still, students in each track have to take the same compulsory subjects (e.g. art, civic education, foreign language, geography, history, literature, mathematics, sciences, technology, sport and military education), with six hours a week devoted to their elective subjects (WES 2012).

Cambodia

Tracking in Cambodian schools starts at grade 11. Two different tracks are offered: science and social studies. The tracking system was introduced to give students the opportunity to develop their interests and shape their program of study by choosing up to four elective courses across the two tracks (MOEYS 2004). The science stream covers chemistry, physics, biology, earth and environmental studies; and social studies covers morality and civics, history, economics and geography. All students have to take four compulsory courses: Khmer literature, foreign language (English or French), basic (four hours a week) or advanced mathematics (eight hours a week), and physical and health education and sport.

Similarly to South Korea and Vietnam, Cambodia allows tracking within school, meaning that students take different classes according to their ability and subject choice. Whereas Singapore and Vietnam stream students based on ability, exam results and subject scores, Cambodia, like South Korea, mainly streams students based on their interests.

Discussion and implications

Singapore is a world leader in education and tops most major global education rankings. In the PISA 2012 assessment of problem solving, Singaporean

1 For the purpose of this paper, vocational high schools are not included in the discussion.

2 Special high schools, both private and public, have autonomy in selecting students, designing curricula and setting admission criteria.

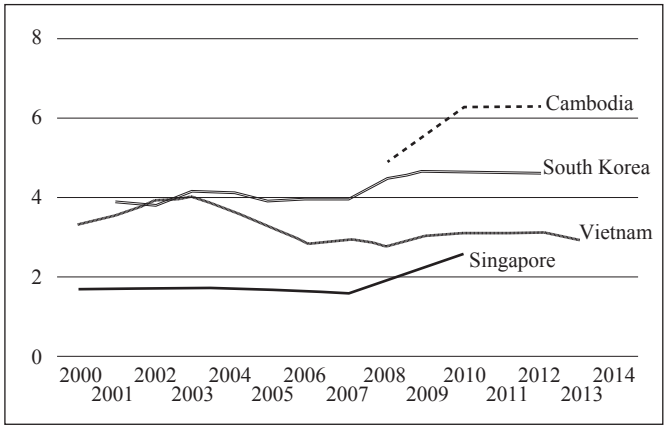
students performed particularly well on knowledge-acquisition tasks and interactive items (OECD 2014b). The country's sustained success has been attributed to several factors, including close alignment between policy and practice, recruitment of high quality teachers and school principals, and a focus on teacher training and development for continuous quality improvement. In addition, basic mathematics and science courses starting at elementary level equip children with a solid foundation for success at school (OECD 2011).

Notably, educational tracking in Singapore, which allows students to choose from different pathways or streams, has reduced student dropout rates, improved education quality and developed the skill sets required in a capital- and skill-intensive economy (OECD 2016). Even though tracking allows schools to develop curricula to meet students' needs and interests, there was initial criticism that it could have "adverse effects on student motivation and self-concept that would flow from the streaming-labelling process" (Kam and Gopinathan 1999, 113). Overall, in taking lessons from Singapore's education system, one must be mindful of its advantages as a very small city state with a relatively large government, strong social networks and a pervasive sense of community.

Increased government investment in education and effective use of foreign aid, first focusing on universal primary education and then secondary education to meet labour market demands, allowed South Korea to progressively improve the quality of teachers, instruction and school facilities. In 1954, 4.2 percent of total government budget went to education, rising to 15.2 percent in 1960. A special fund was created and additional tax revenues allocated to support curriculum development in the 1980s and 1990s. In addition, between 1960 and 1990, the government allocated 12.5 percent of development aid to education (Kim et al. 2015) (Figure 1). Financial investment aside, the perception of education as a tool for upward social mobility is a big factor behind South Korea's educational success (Sorensen 1994, 28).

The national education curriculum in South Korea was designed to impart comprehensive knowledge until grade 10, with tracking applied from grade 11. From an equality perspective, tracking seems to give students the freedom to choose their own courses in either social sciences or natural sciences. However, placing students into different tracks based on their interests rather than abilities might not provide the homogeneity that would allow teachers to design better instruction; for instance, students who are not good at science could opt for the science track.

Figure 1: Government spending on education as share of GDP, 2000–12



Note: Cambodia data is only available for 2000 to 2010.
Sources: TheGlobalEconomy.com;
UNESCO www.theglobaleconomy.com/compare-countries/

Although not well documented, Vietnam's tracking practice is systematic. Students are placed into different tracks based on exam results or subject knowledge, and schools have autonomy to design the tracking to meet students' needs. Analysis of Vietnam's performance in education quality highlights two key success factors. First, Vietnam has been committed, for several decades, to investing in education in order to tackle illiteracy, increase enrolment rates and set minimum standards for education across the country; and second, Vietnamese teachers are qualified and student attendance is high (Bodewig 2013).

Similarly to South Korea, Cambodia's tracking practice gives students freedom to shape their study program and develop their interests through elective courses. This has reduced the burden of having to take too many subjects, some of which they might not be particularly interested in, in the final year of high school. Students can focus more on their specialisation subjects. On the downside, Cambodia still lacks a mechanism for implementing its tracking system. Securing sufficient resources and matching teachers to subjects remain critical issues at secondary school, especially for vocational subjects which in 1999

had the lowest matching rate of 5-20 percent.[3] By contrast, core subjects such as mathematics, Khmer language and sciences had matching rates of 85-95 percent (UNESCO-IBE 2011).

Cross-country evidence highlights that tracking policy should place as much importance on building students' interest and confidence in a subject area as on frequent assessment of student progress and subject knowledge. To determine how frequent assessments should be and who should be involved in separating students into different tracks, it is important to consider the nature of the tracking policy and whether it is to start at primary school, lower secondary school or upper secondary school. For instance, because Singapore applies tracking from primary school (grade 5), it is important to involve parents in decisions about which subjects best fit their child's aptitude and talent, in addition to the school's assessment. On the other hand, if tracking starts at secondary school, it might not be necessary to involve parents in the same way; however, students' ability needs to be assessed and students need guidance on choice of subject area.

In Cambodia it is important not to undermine student motivation in choosing a track. For example, students may opt for the science track partly because they believe they would achieve high scores in the national exam. It stands to reason that in order to make informed and responsible choices for themselves and build on their strengths, students need sufficient information and knowledgeable guidance. In turn, teachers need to accurately interpret each student's knowledge and ability in order to assess their aptitude and potential and guide them on the right choice of subjects.

An assessment of each track is needed to measure the effectiveness of tracking practice in Cambodia and to find ways to improve the overall quality of education. In addition, critical reviews of best practices from other countries' experiences of tracking and curriculum development are needed for benchmarking the quality of education and adapting those foreign practices to ensure that they fit the Cambodian context and culture. Cambodia's education system might also need to consider promoting gifted schools that will allow talented students with an aptitude for science to reach their maximum potential.

Further research is needed to critically examine the practice of tracking at upper secondary schools in Cambodia to form a sound education policy and improve the quality of education. For example, randomised control trial studies can be a useful way to evaluate the effectiveness of tracking. It is important that further studies look at school autonomy, the role of the school principal and teachers, and how these factors affect on the quality of education under a tracked system.

References

Bodewing, Christian. 2013. "What Explains Vietnam's Stunning Performance in PISA 2012?" http://blogs.worldbank.org/eastasiapacific/what-explains-vietnam-s-stunning-performance-pisa-2012.

Chmielewski, Anna K., Hanna Dumont and Ulrich Trautwein. 2013. "Tracking Effects Depend on Tracking Type: An International Comparison of Students' Mathematics Self-Concept." *American Educational Research Journal* 50(5): 925–957.

Choi, Kyong Mi, and Dea Sik Hon. 2009. "Gifted Education in Korea: Thee Korean High Schools for the Mathematically Gifted." *Spring* 32(2): 42-49.

Fredriksen, Birger, and Tan Jee Peng. 2008. "An African Exploration of the East Asian Education Experience." Washington, DC: World Bank.

Hanushek, Eric A., and Ludger Woessmann. 2006. "Does Educational Tracking Affect Performance and Inequality? Differences-in-Differences Evidence across Countries." *The Economic Journal* 116: 63–76.

Kam, Ho W., and S. Gopinathan. 1999. "Recent Developments in Education in Singapore." *School Effectiveness and School Improvement* 10(1): 99–117.

Kim, Jinhee, Woojin Cho, Mugyeong Moon, Hyeyoung Park, Ji Min Cho, Ju-Hyoung Park, Yunjeong Choi and Jieun Song. 2015. *Education for All 2015 National Review Report*: *Republic of Korea.* http://unesdoc.unesco.org/images/0022/002297/229721E.pdf.

Kim, Taejong, Ju-Ho Lee and Young Lee. 2003. *Mixing versus Sorting in Schooling: Evidence from the Equalization Policy in South Korea.* KDI School Working Paper Series 03-07. doi.org/10.2139/ssrn.482962.

3 100 percent matching means that a mathematics teacher, for example, teaches only maths.

Continued on page 27