Journal for the Education of the Gifted
36(3) 290–306

DOI: 10.1177/0162353213494821
jeg.sagepub.com
SAGE

Addressing the Needs of the Gifted in Singapore

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Abstract

The tiny, multicultural nation of Singapore has a long history of provisions for gifted students. Beliefs about ability and talent development are strongly influenced by traditional Confucian perspectives that view environmental factors as dominant in the development of talent. Early identification is not stressed and working hard is emphasized at home and school. Like many other countries, Singapore has been broadening its conceptions of giftedness and diversifying its talent development efforts in recent years. The government has recently announced its vision to achieve global recognition and leadership for outstanding accomplishment in the arts and sports and continues its unwavering pursuit of global leadership in science and technology. Here we describe the various ways this broadening and diversification is reflected in programming, instruction, and research in gifted education.

Keywords

gifted, talent development, high ability, special schools

Gifted Education in Singapore

Conceptions of giftedness are grounded in culture. Culture and contexts shape beliefs and values about ability and talent development. Political, social, and economic realities further shape these beliefs and values. To understand the mission, goals, and models of gifted education in Singapore therefore requires some understanding of the local culture and contexts in which high-ability children are taught. The aims of this article are to briefly describe the culture and contexts that shape gifted education in Singapore, to highlight the ways in which broadening conceptions of giftedness have contributed

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to increased diversification in educational practices and programs, and to highlight important research contributions.

Contexts and Culture in Singapore

Singapore is a tiny multiracial nation of 5 million people located at the southern tip of the Malaysian Peninsula in Southeast Asia. It is one of the world's most densely populated countries and, in 2010, it led the world in economic growth with a stunning expansion of 14.7%, making the per capita GDP of Singapore greater than that of many Western European countries (Singapore Department of Statistics, 2013). Approximately 77% of the population is Chinese, 13% is Malay, and 9% is Indian (Singapore Department of Statistics, 2012). English is the official language. The nation is often admired around the world for its remarkably rapid transition from a third world country to a first world country in just three decades (Lee, 1998), a feat often attributed to the nation's strong national leadership, strong work ethic, and excellent educational system, which has always been a national priority. The country is recognized globally for its outstanding educational system, which relies heavily on high-stakes exams to determine secondary and postsecondary educational placement (McKinsey & Company, 2007; Ministry of Education [MOE], Singapore, 2010).

Singaporean culture is not as Chinese as China or as Western as England. Many citizens view the local culture as a fascinating and, at times, frustrating mix of Eastern and Western mindsets and values. For example, many parents and teachers hold a traditionally Confucian view of ability that sees environmental forces as dominant in the development of talent. They perceive children as relatively equal in potential but differing in rates of development and in motivation. This perception is aligned with an incremental view of ability as described by Dweck (2006). Singaporeans believe that talents like mathematical capacity and athleticism can be developed to a high level through hard work and persistence. Therefore, parenting and teaching practices reflect a common view that anything is possible with hard work. As a result, there is little emphasis on early identification, and children are expected to work hard on academics from an early age. It is widely believed that every child possesses hidden gifts and talents, and that it is the *moral obligation* of teachers, parents, and students to develop these precious human capabilities and capacities. All children are screened for giftedness in Grade 3 by means of three national exams designed locally for this purpose. Each year, about 500 students (1% of the age cohort) are selected for the formal Gifted Education Program (GEP; MOE, Singapore, 2004; Y. Y. Ng, 2012).

Singaporean students are globally recognized for their superior academic achievement. They ranked among the top three in the world in the 2011 Trends in International Mathematics and Science Study (TIMSS; International Association for Evaluation of Educational Achievement, 2011). They also ranked in the top five worldwide in reading, mathematics, and science in the 2009 Program for International Student Assessment (PISA; Organisation for Economic Co-operation and Development [OECD], 2010). In a study by the Grattan Institute, the Australian public policy think tank, Singapore, together with Shanghai, Hong Kong, and South Korea, was

listed as a center of high academic performance in East Asia (Jensen, 2012). The report noted that Singapore had made major improvements in reading literacy in the past decade and that its students were able to problem solve and not resort to rote learning (E. Asian Students, 2012).

Students in Singapore are taught by well-trained teachers, and schools are equipped with the latest technical and computer facilities. The aim of the MOE, which oversees the development of the entire system, is to help the students "discover their own talents, to make the best of these talents, to . . . realise their potential, and to develop a passion for learning" (MOE, Singapore, 2012c, para. 1).

History of Gifted Education in Singapore

Singapore has a long history of unofficial provisions for high-ability youth that began during colonial days when many of these students attended elite schools such as the Raffles Institution or Chinese High where an accelerated and advanced curriculum was provided. Officially, gifted education was initiated in Singapore in 1984 for two reasons. The first was educational. Singaporeans believed that intellectually gifted children need a high level of mental stimulation and challenge, which may be difficult to address in a regular classroom setting. It was believed that because lack of challenge may contribute to an array of potential problems for gifted children, such as underachievement, boredom, or social difficulties, specialized education should be provided to specifically address gifted children's need for intellectual challenge and complexity.

The second reason for gifted education in Singapore was sociopolitical. As a small, vulnerable nation, Singapore has only its people to rely on for advancement and success. The country has no natural resources. It is considered advantageous to the nation to nurture the ability of talented children. Similar to many countries in Asia and to many developing countries, the stated purpose of gifted education in Singapore continues to be to prepare talented youth for "responsible leadership and service to country and society" (MOE, Singapore, 2013, para. 2).

The inception and provision of the GEP in Singapore was piloted by the government's agency, the MOE, under the auspices of the Gifted Education Branch in 1984 (MOE, Singapore, 2012a). The GEP was formally introduced as self-contained classes. Primary students who scored in the top 0.5% on their year-end grade-level exams and primary 6 students who scored similarly on their national exam were selected. With a student population of 40,000 children, this represented about 200 gifted students. They were clustered in classrooms of 25 students each in two primary schools and two secondary schools in 1984. Teachers who had outstanding academic and professional qualifications and who shared the belief that these children required special programming were specially selected to teach these gifted students.

By 2001, the program had been extended to include GEP classes in nine primary schools and seven secondary schools. In response to positive feedback and favorable academic results, MOE asked the Gifted Education Branch to share its curriculum,

pedagogical knowledge, and skills with mainstream classroom teachers. As a result, pedagogies and enrichment once reserved for the highest achievers were adapted and integrated into the mainstream educational experience for advanced learners in mainstream schools.

Not long after the GEP was extended, an external international panel was invited to review the upper secondary and junior college education in Singapore. The panel was charged with casting a vision for upper secondary education in Singapore and with developing a revised framework for upper secondary and junior college curriculum. In its report, the panel expressed concerns that older students were inadequately prepared for the demands of a knowledge-intensive economy and highlighted the need to shift the system's emphasis from efficiency to diversity. The panel strongly recommended "freeing up the system to allow new pathways in education" (Report of the Junior College, 2003, "Introduction," para. 5), and suggested that these changes could be enabled by "allowing Integrated Programs (IPs) that combine Upper Secondary and JC education seamlessly; specialized schools for special talents in the arts, sports and mathematics and science; alternative, internationally-recognized curricula; and a few privately run schools" (Report of the Junior College, 2003, "Introduction," para. 5). These recommendations were accepted by the MOE, and as a result, by 2005, the secondary GEP was limited to four secondary schools and by 2007, the MOE implemented a Revised Gifted Education Framework that phased out the secondary program within a year. Today, the primary program is still vibrantly operative in nine primary schools catering to the top 1% of each age cohort and the IP or School Based Gifted Education is offered in seven secondary schools.

In addition to providing cognitively challenging academic programs, the GEP is known for the wide variety of enrichment opportunities it offers gifted pupils. These include camps, carnivals, field trips, and competitions in virtually all domains. The aim of these programs is to provide mentoring opportunities for students in their area of passion. Most of these programs center on partnerships with tertiary institutions, industry, or community. Examples of special programs include the Creative Arts Program, the Moot Parliament Program, the Science Research Program, the Defense Science Program, and the Biotechnology Program.

Provisions for high-ability youth in Singapore have continued to expand and diversify rapidly in the past decade. In the sections that follow, we describe these recent efforts and their implications for research and programming, as well as the challenges they present.

Broadening Conceptions of Giftedness and Diversification of Talent Development

Like several other Asian countries, Singapore has been broadening its conceptions of giftedness and diversifying its talent development programs. These changes are observed in three developments in the past decade: the establishment of the IP, the opening of four special schools for domain-specific talents, and special provisions for exceptionally gifted children and homeschooled children.

The IP

The IP is a school-based gifted program that began in five secondary schools in 2004. It includes intact classes where pupils follow the GEP curriculum and proceed directly to the university-qualifying exams or the International Baccalaureate (IB) Diploma without taking the intermediary examinations. The aims of the IP are to develop intellectual curiosity, research interests, and real-world research competencies. Today, 18 schools offer an IP that, in addition to providing cognitively challenging academic programs, also provides considerable enrichment, including camps, carnivals, field trips, and competitions in many domains.

Special Schools

The initiative in 2004 to develop specialized schools to serve the top 5% of students in specific domains of talent further illustrates Singapore's broadening conceptions of giftedness and its efforts to develop national talent in nonacademic domains. The Singapore Sports School was launched in 2004, followed by the National University of Singapore High School of Mathematics and Science (NUS High), the School of the Arts Singapore (SOTA) in 2008, and the School of Science and Technology, Singapore (SST) in 2010. A brief description of each school follows.

Singapore sports school. In 2006, the Singapore government announced its aim to become 1 of the top 10 countries in Asia in sports. It established the Sporting Culture Committee to promote support for athletics and to develop athletic talent. In 2008, it stated that producing world sports champions was a national goal. To achieve that end, the government announced the Multi-Million Dollar Awards Program to reward world-class champions. At the same time, it developed a long-term strategy to achieve these dreams by focusing on the identification and talent development of youth gifted in sports (Martindale, Collins, Wang, McNeill, Lee, Sproule, & Westbury, 2010; Wang, Sproule, McNeill, Martindale, & Lee, 2011).

The Singapore Sports School was established as a boarding school that offers intensive training in 10 sports together with a rigorous academic program. The sports offered are badminton, bowling, fencing, football, golf, netball, shooting, swimming, track and field, and table tennis (Low, 2012). Sport-specific selection trials are a key component of the admission process. Students at the school work with world-class coaches in their respective sports areas, and have the option of taking the IB Diploma Program or the General Certificate of Education Ordinary-Level (GCE O-Level) examinations to qualify for university admission. The latter are high-stakes subject exams taken by secondary students in many countries around the world, similar to SAT subject exams.

To help effectively identify these students and understand the factors and practices contributing to optimal development of their talent, Martindale and his colleagues (2010) developed a reliable tool to measure effective processes in the development of talented athletes. C. K. J. Wang and his colleagues (2011) then used this tool to measure the impact of talent development factors on gifted adolescent athletes. Their research findings are discussed in a later section of this manuscript.

Although a new program, there is some evidence that the Singapore Sports School program is succeeding in its goal to develop athletes who excel academically and athletically. Outstanding sports students have obtained up to nine distinctions in the O-Level examinations, have secured scholarships for their postsecondary education, and are pursuing advanced degrees in competitive fields (Low, 2012). Since its opening in 2004, Singapore Sports School students have garnered six world championship titles and 58 gold medals in world competitions.

NUS High. NUS High is an independent secondary boarding school affiliated with Singapore's National University. It offers a 6-year IP for adolescents talented in math and science. The program leads to a NUS high school diploma that is recognized by local and international universities. It does not offer O-Level or A-Level examinations or IB. NUS High students are "nurtured to make distinguished contributions as Pioneers, Achievers, Thinkers & Humanitarians" (NUS High, 2013, p. 3). Students are admitted only in Years 1 and 3. Selection for admission to Year 1 is determined via performance on the school's specially designed, 3-hour selection test, followed by a half-day camp for short-listed students. The process is similar for selection at Year 3, except that short-listed students participate in an interview instead of a camp. While attending the school, students can concurrently enroll in university courses from the Faculty of Science, Faculty of Engineering, Faculty of Arts and Social Sciences, and School of Computing at Singapore's National University if they meet the respective expected academic competency level.

Complementing the core curriculum is a 6-year developmental program called the Da Vinci Program that focuses on developing students' research, innovation, and enterprise in multiple disciplines "so that they can be a polymath on the frontier of research and innovation in this fast-changing world" (NUS High, 2012a, para. 2). The school also provides a special program called Einstein+ that aims to help exceptionally gifted students develop their talents to their fullest potential. Students selected for this program are provided with accelerated exposure to advanced topics in science and mathematics targeted to support them in their research (NUS High, 2012b).

SOTA. Singapore's government has recently invested significant resources to compete in the Asian Renaissance of the 21st century. The vision articulated in the government report is to become a global arts city (Ministry of Information, Community and the Arts, 2000). One of the six key strategies for developing the arts mentioned in the report is to "recognize and groom talent." Initiated by the Ministry of Information, Communications, and the Arts in 2004, Singapore's first magnet school for the arts, SOTA, opened its doors in 2008. It is Singapore's first attempt to provide talent development programs for artistically talented adolescents, local and foreign, in an independent school setting. The top 5% of each school cohort in the nation are screened for artistic talents. All applicants must participate in a selection platform called the Talent Academy, which includes live auditions, personal interviews, and portfolio reviews with experts in the relevant arts domain (see http://www.sota.edu.

sg/Admission/AboutAdmission/tabid/799/Default.aspx#q1). In addition, all applicants must also complete a writing exercise. International applicants are required to take a math test as well.

Selected students undertake a compacted and intensive ability-driven academic program and a one-to-one practical training program, in addition to participating in a broad range of learning and performance experiences. The school embraces a 6-year integrated arts and academic curriculum covering academic and foundational studies in four arts disciplines (music, dance, theater, and the visual arts) before specialization. Students may later specialize in a specific arts area. Music students, for example, receive in-depth lessons in historical studies, critical listening, composition, theory and analysis and score reading, and instrumental studies and also have individual practice time. They attend ensemble and orchestra performances and participate in prestigious overseas international summer programs and competitions (Singapore Arts School, 2012). Classes at SOTA are small, with 20 to 25 students in each. Pedagogical approaches used by teachers, artists, and mentors involve experimentation, expression, engagement, discovery, and interdisciplinary approaches. There is an emphasis on student-centered instruction and the development of 21st century skills, citizenship and character, leadership, intra- and interpersonal skills, performance and technical skills, critical thinking skills, creativity, and insight. Students are also given personalized time and space for reflections and to design and execute creative productions. In addition, they have opportunities to interact and work with visiting artists and performers and be engaged in other off-campus programs and tours. Their abilities are showcased in public performances, exhibitions, internships, and other creative endeavors.

SST, Singapore. The SST, Singapore, was opened as an independent secondary school in 2010 with approximately 200 high-ability students selected from an application pool of about 1,000. The aim of the school is to nurture talented youth to become innovators and entrepreneurs in applied science and technology. It offers a 4-year program that prepares students to sit for the O-Level examinations required for entry to the university. According to its website, "SST caters to students who learn best in an active applied learning environment, where conceptual understandings and transference of disciplinary content knowledge and skills are fostered through cognitively demanding hands-on applications set in real world situations" (SST, Singapore, 2012, para. 2). Multiple criteria are used in the initial selection process, including scores on three different exams, grades, extracurricular achievements, and testimonials. Short-listed students are then invited to participate in a selection exercise that involves various activities designed to assess their learning aptitudes.

In addition to the core subjects offered in local secondary schools, students at SST may choose from a broad array of course offerings such as biotechnology, fundamentals of electronics, and media studies (SST, Singapore, 2012). The school exploits information and communication technology (ICT) to maximize the delivery of its applied program. The school's strong partnerships with industry leaders further enhance the experiences it can offer students, who are expected to conduct research in authentic situations and develop an innovative and entrepreneurial mindset. Students

at SST are encouraged to be creative, inventive, and experimental and to become thinkers and leaders in their fields of interest.

Special Provisions

Exceptionally gifted students. Since 2000, approximately 20 children among students participating in gifted programming in Singapore have been formally identified as exceptionally gifted. Provisions for these students are made on a case-by-case basis. The MOE makes provision for early admission to primary school and early admission to university when exceptionally gifted students are judged to be ready. The oldest in this group of exceptionally gifted children is an 18-year-old currently enrolled at the National University of Singapore (NUS). Another has left the country for overseas study, and the rest are in the local schools (Y. Y. Ng, 2012).

Homeschooling. It is reported that a small but growing number of children in Singapore are homeschooled and are granted exemption from compulsory education through an application process. Some are taking the Cambridge International General Certificate of Secondary Education (IGCSE) before the recommended ages of 14 to 16 (Chia, 2012). The IGCSE is recognized by employers and academic institutions around the world as a qualification based on achievement in individual subjects, similar to Advanced Placement exams or SAT subject tests. Students receive an IGCSE qualification for each subject in which they pass the relevant exam. It is an international alternative to the standard curriculum in many countries. For instance, Ezra, a local Chinese boy, took the IGCSE for mathematics and was a top scorer when he was 9 years old (Chia, 2012).

Broadening conceptions of giftedness and increasing diversification in programming and supports are also reflected in the focus of recent research in gifted education in Singapore. S. L. J. Tan (2011) reviewed 56 journal articles and book chapters on gifted education research in Singapore and noted that about 75% of them focused on four topics: correlates of high achievement, affective concerns of gifted students, instructional practices, and models of talent development. She noted that there is limited research available on creativity, parenting, and twice-exceptional students. The little research that has been done on creativity has focused on teachers' perspectives of creativity (A. G. Tan, 2001), creative thinking (Keun & Hunt, 2006), styles of creativity (Ee, Tan, & Ng, 2007), and strategies for developing creative thinking (A. G. Tan & Law, 2002).

In the next section, we highlight several recent studies that we believe illustrate the ways in which local research is contributing to a better understanding of gifted students worldwide.

Gifted Education Research in Singapore

Gifted education research in Singapore is conducted through three avenues. The MOE conducts research for internal use and typically does not publish it or make it available

to the public. Ministry officers and teachers often conduct research as part of their graduate studies, and local academics also undertake research.

There is a tightly aligned, tripartite relationship in Singapore between national educational research, classroom practices, and school programs and national policies. Therefore, as conceptions of giftedness broaden, it is not surprising that recent research efforts are also broadening in topic and in methodologies. Investigations in the last decade have expanded to include nonacademic domains and more social and emotional issues. Researchers have studied instructional practices (A. G. Tan, 2001; U. P. Tan, 2005; VanTassel-Baska et al., 2008); social and emotional characteristics of gifted students (Pramathevan, 2010; U. P. Tan, 2005; T. Y. Tan, 2010; S. L. J. Tan, 2011); the needs and characteristics of and effective strategies for twice-exceptional students (W. Wang, 2011; Wong, Neihart, & Tan, 2008); and talent development processes in nonacademic domains (Garces-Bacsal, Cohen, & Tan, 2011; Keun & Hunt, 2006; C. K. J. Wang et al., 2011). In this section, we choose to highlight research on twice-exceptional students and in nonacademic domains as some of the best examples of the tight alignment between national policy, school programs, and classroom practices and of the broadening that is taking place in gifted education research in Singapore.

Twice-Exceptional Students

Although Singapore has a long history of special education, the practice of inclusive education is very new, and the country has no legal mandate for it. Historically, most children with moderate to severe disabilities have been educated in segregated special schools. These realities have impacted schools' capacity to make appropriate provisions for twice-exceptional students. However, a significant investment of resources to support children with special needs in mainstream schools began in 2004 in concordance with the government's vision of Singapore becoming a more inclusive society. The Ministry worked with the National Institute of Education to train teachers and paraeducators (aides) to provide appropriate support and intervention for children with special needs in mainstream schools (Lim & Tan, 2004; Poon, Musti-Rao, & Wettasinghe, in press). Today, all primary schools and one third of secondary schools have at least one resource teacher to support children with special needs and plans are underway to recruit more (MOE, Singapore, 2012d). Parallel to this growing interest in meeting the needs of children with special needs, research into the needs and characteristics of twice-exceptional children is emerging (W. Wang, 2011; W. Wang & Neihart, 2012; Wong et al., 2008).

In a very recent qualitative study, for example, W. Wang and Neihart (2012) examined the self-perceived emotional and behavioral strengths that high-achieving twice-exceptional students attributed to their academic success. In-depth, semistructured interviews were conducted with six adolescents formally identified as gifted and having a learning disability. Interpretive phenomenological analysis revealed similarities and contrasts with related research conducted in Western contexts. For example, similar to work done by Reis and her colleagues (Reis, McGuire, & Neu, 2000; Reis & Neu, 1994; Reis, Neu, & McGuire, 1995), W. Wang and Neihart concluded that coping

strategies, effort, and reliance on relationships were the strongest enablers of academic performance. However, unlike twice-exceptional students reported on in Western contexts, Singaporean twice-exceptional students reported high academic self-concept and self-efficacy. In addition, results showed that relationships with teachers, parents, and peers were endorsed by the students as the biggest contributor to students' academic success, accounting for 36% of the coded responses. Specifically, findings demonstrated that relationships with parents, teachers, and peers influenced their motivation, their academic self-efficacy, and their strategy use. The students spoke of teachers who increased their motivation by arousing their interest in the subject and of peers whose example and encouragement inspired them to study hard. Students gave numerous examples of ways that their relationships with peers and parents led them to particular learning strategies, and they often mentioned the ways in which relationships directly affected their academic self-efficacy. W. Wang and Neihart's work added value to the understanding about what helps twice-exceptional students succeed by highlighting that supportive relationships are helpful through the role they play in mediating behavior and motivation. It also highlighted the significant contribution of culture and context and the need to evaluate the needs and characteristics of gifted children in their sociopolitical contexts.

The recent changes in national policy and the increased awareness regarding the needs of children with special needs have influenced teachers of the gifted as well. Although the MOE and many gifted education teachers have long recognized that the program includes identified gifted children with specific learning disabilities, attention-deficit/hyperactivity disorder (ADHD), or an autism spectrum disorder, it is only in recent years that systematic efforts have begun to monitor the performance and adjustment of these students. Efforts to provide appropriate accommodations or interventions to twice-exceptional students tend to be school- or classroom-based rather than program wide. As more research is done in this area and inclusive practices increase throughout the education system as a whole, we are optimistic that training to equip teachers to support students with special needs will include information about identifying gifts and talents in this population as well.

Nonacademic Domains of Talent

After the MOE accepted the recommendations of the external international panel in 2003, efforts were made to implement them quickly through revised policies and programming by building more special schools and encouraging mainstream schools to develop their own niche areas. The effort to formally identify children talented in nonacademic domains and to develop their talents prompted researchers to investigate measures and processes to do so effectively (Garces-Bacsal et al., 2011; Martindale et al., 2010; C. K. J. Wang et al., 2011).

For example, C. K. J. Wang and his associates used psychometric testing, interviews with coaches and athletes, and content analysis to develop a valid and reliable tool to monitor talent development environments (Martindale et al., 2010). They then used this tool and three additional scales to explore the impact of talent

development factors on the goals of 374 talented athletes from the Singapore Sports School (C. K. J. Wang et al., 2011). They wanted to understand how the talent development environment influences personal characteristics of talented athletes. Using self-determination theory (Deci & Ryan, 1985) as a theoretical framework for their work, C. K. J. Wang and his associates (2011) tried to identify the environmental factors that predicted four different types of achievement goals. They measured students' aspirations, achievement goals, and basic psychological needs. Aspirations included extrinsic (e.g., wealth, fame, image) and intrinsic (e.g., personal growth, community contributions, meaningful relationships). The four achievement goals included a mastery-approach goal (e.g., "I want to perform as well as it is possible for me to perform"), a mastery-avoidance goal (e.g., "I am often concerned that I may not perform as well as I can perform"), a performance-approach goal (e.g., "It is important for me to do well compared to others"), and performance-avoidance goal (e.g., "My goal is to avoid performing worse than everyone else"). Basic psychological needs included autonomy, relatedness, and competence.

A series of hierarchical regression analyses demonstrated that higher autonomy predicted greater pursuit of extrinsic goals and higher perceived competence predicted intrinsic and extrinsic goal pursuit. Higher relatedness was negatively associated with extrinsic goal pursuit.

The authors observed several important applications of their findings for the development of sport talent in Singapore. One was the need for coaches to "play a strong hand in promoting intrinsic goals in order to overcome the influence of a typically externally driven sport culture" (C. K. J. Wang et al., 2011, p. 273). A second important finding was the observation that satisfying the need for relatedness appeared to be key to promoting intrinsic goal pursuit in young talented athletes. As a result of the study, the researchers had many follow-up discussions about talent development in sports with teachers from the Singapore Sports School. Another study is planned for the near future.

The opening of SOTA and the government's push to establish Singapore as an arts hub for Asia has understandably spurred research into arts talent development. Garces-Bacsal et al. (2011) used case study methodology to investigate the experience of flow among 14 adolescents talented in academics and the arts at SOTA. Their findings also identified environmental supports that facilitate the development of artistic talents in Singaporean youth. This study was an important contribution to the field in general because research has suggested that the experience of flow contributes significantly to artists' commitment to their art forms, yet there is very little research available generally about engagement and motivation in the talent development of artistically gifted youth (Csikszentmihalyi, Rathunde, & Whalen, 1996). Using the lens of flow theory to interpret their results, their findings pointed to the dynamic interaction between talent, sociocultural context, and physical environment. The students perceived their arts school to be a place where they felt a deep sense of belonging and kinship with their peers and teachers/mentors. The authors identified several themes with implications for educators. These included the provision of immediate feedback as students progress in their talent development, the importance of psychological safety to express

one's artistic sensibilities, the balance of fun and rigor that keeps students engaged academically and artistically, and the role of mentors in inspiring young talent to persevere.

Very recently, Garces-Bacsal (2013) explored arts students' perceptions of their family's influences on their talent development. She conducted 27 in-depth interviews with 14 adolescents nominated by their arts teachers as those with the greatest motivation and potential in academics and their art form. The art forms included dance, music, theater, and visual arts. A particular strength of this study was the extended time of engagement the research team spent in the School of the Arts where the students attended.

Garces-Bacsal (2013) identified three major strands from the interview data: parents' occupational background, students' perceptions of parental support and family activities, and values and influences that contribute to talent development in the arts. Parents' background varied. Although all were university educated, 29% had limited interest in the arts. Half had a moderate to high interest or background in the arts, either performing themselves or frequently attending arts events or activities. A strong majority (71%) of the students reported that their parents went out of their way to support their talent development in the arts and 29% described their parents' support as "distant," but allowing them autonomy and space for growth. Among values and influences contributing to talent development in the arts, respect, hard work, and discipline were consistently reported by all participants in the study as three that characterized their families. Gratitude was another commonly reported value, especially to be thankful for the people who had helped them develop their talent and for the things they enjoyed. Finally, although the students in this study reported strong support overall from their parents for their arts talent, they also consistently mentioned that parents emphasized the importance of academics over the arts.

Results of Garces-Bacsal's (2013) study are too recent to observe what influence, if any, they might have on school practices or programming, but like C. K. J. Wang et al.'s (2011) study at the Singapore Sports School, they highlighted the role environmental influences can play in domain-specific talent development. They also challenge the stereotyped view of imperious, regimented Asian parenting and affirm the observation in Western studies that there is considerable variability among families even within one sociocultural context.

Challenges in Gifted Education

We believe that gifted education in Singapore confronts three main challenges. The first has to do with the nation's heavy reliance on high-stakes testing. It is a challenge that confronts all educators in Singapore, not just those working with gifted students. As teachers move toward greater differentiation in the curriculum and more inclusive practices, the tension grows between trying to meet expectations to prepare children to do well on national assessments and meeting their individual intellectual and affective needs and interests. With the broadening of conceptions of giftedness, gifted class sizes in GEP and IP have been on the increase and there are few if any paraeducators

available to assist teachers. The government's persistent effort to create alternative pathways to success is a positive step toward resolving this tension.

Related to assessment concerns is the issue of streaming or tracking. Streaming is one of the three cornerstones of the Singapore educational system. There is a strong, widely held belief that because children vary in their learning abilities, they are best served by being ability grouped to learn at their optimal pace. As evidence to support this, Ministry officials point to the high graduation rates in Singapore schools compared with other developed countries. Most students (98.4%) complete 10 years of schooling and all are employable upon graduation, regardless of the stream they are in (E. H. Ng, 2008). Streaming is believed to be the best way to help children realize their fullest potential. Until recently, this practice has meant that some children could miss opportunities for appropriate challenge or enrichment because of their early track placement. Now, however, ability grouping is subject-based in primary schools and, in recent years, provisions have been made for children to move up into more accelerated or advanced streams when they demonstrate capacity to handle the more challenging work.

Finally, the third challenge that gifted education will always face in Singapore is the government's requirement for the provision of evidence it makes a difference in the achievement of high-ability students. Gifted programs in Singapore are constantly being reviewed and improved upon by the stakeholders. Even parliamentary members question their efficacy and relevance from time to time (Y. Y. Ng, 2012). The MOE must continually review and upgrade the gifted programs under its purview and collect data to validate the added value that gifted education provides.

Future Directions for Research and Program Development

As educational programs for the development of gifts and talents in the world take on new forms and focus, a recent effort is the provision of integrative programs across disciplines. In the United States and Korea, the tendency is to offer a curriculum or subject involving science, technology, engineering, and mathematics, or STEM fields (e.g., STEM Education Coalition, 2012); at times, art is also included (STEAM). Singapore is no exception. Interdisciplinary lessons have been increasingly used to promote learning and discovery in recent years. An example is a competition in the GEP curriculum called "Creative and Heuristic Applications of Science (CHAOS)" (MOE, Singapore, 2012b). It is an Internet-based competition for gifted adolescents to apply creative and heuristic problem-solving skills to open-ended, real-world science-related problems using interdisciplinary methods. Students are required to propose solutions from various disciplines in a cohesive manner, and to rationalize or justify the links between these disciplines when presenting them. Another example is the strong push to include instruction and real-world experience in applied research in teacher training and secondary schooling.

Further expansion and development of arts programs is another future trend. Beginning in 2012 and for the next 5 years, the government will spend up to Singapore $40 million on arts education (Oon, Chen, & Toh, 2012). Artistically inclined students

will receive a quality arts education that their parents could only dream of a generation ago. The curricula will include hip-hop, stop-motion animation, guitar, drama, puppetry, calligraphy, Bhangra dance, and cartooning. Some schools will take a more interdisciplinary focus, such as using art and crafts to teach mathematics. The National Arts Council in Singapore will be giving awards to schools with exemplary arts programs. These efforts are attempts to encourage more creative endeavors in gifted and talented youth. The development of creativity—whether in arts or science—appears to be a national goal in the coming years. As a result, we expect to also see an increase in applied research in related areas.

Summary

The main aim of GEPs in Singapore today is to develop intellectual depth and high-level thinking and to nurture creativity and innovation in high-ability pupils (Y. Y. Ng, 2012). The nation has seen considerable expansion and diversification of its programming options and provisions for a wider range of gifts and talents in the last decade in particular. There is also now some diversity in identification procedures across domains of talent. Talents in nonacademic domains like dance, theater, music, visual arts, and sports are now identified and enhanced through rigorous talent development programs. All programs for high-ability youth offer a differentiated curriculum aimed at developing targeted cognitive and social-emotional abilities as well as specific character traits (MOE, Singapore, 2004).

We continue to see practices once reserved for top-performing students extended to all schools in Singapore. Sometimes the focus is on developing creative thinking whereas other schools choose to carve a niche for themselves in a specific talent domain like dance, digital media, or environmental science (Chew, 2012). Quality instruction, enrichment, advanced and accelerated curriculum, creative learning activities, and camps and competitions characterize these programs. Gifted education efforts are systematic, structured, and open-ended at times to encourage critical and creative thinking and to inculcate the joy of learning and discovery.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

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