



SMC 2019

Singapore Model Cabinet

(Education in Singapore)

First Topic

Mental Well-being of Students in Singapore

Second Topic

Future-ready Curriculum

Mental Well-being of Students in Singapore

Introduction

Singapore has a reputable education system that is respected around the world—one that boasts quality facilities, committed teachers, and well-crafted pedagogies. Furthermore, the education ministry hopes to instil the best in its students to prepare them for the future. Combining all these factors, Singapore has topped the charts of multiple studies comparing different education systems worldwide, such as PISA (Coughan, 2016). Teachers are centrally trained at the National Institute of Education and teaching is regarded as a rewarding career (Jeffreys, 2016), motivating them to work hard to support the next generations. Moreover, various education pathways have been implemented, as can be seen in Figure 1.1, and have been structured such that students from all kinds of backgrounds and abilities are able to learn both in and out of the classroom setting.

Singapore's Education System : An Overview

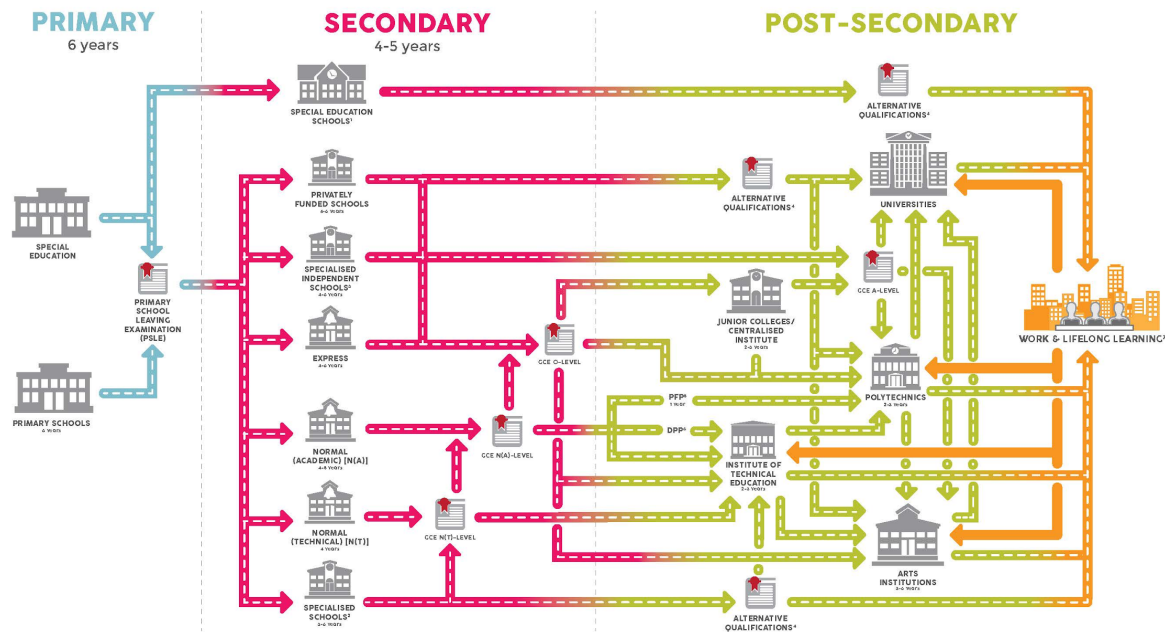


Figure 1.1: An overview of the education system (Ministry of Education, 2018)

The Singaporean education system has been labelled as a 'pressure cooker,' in a bid to highlight the stress faced by students. Stress tends to be the precursor for mental illnesses such as depression, which is the most common mental illness in Singapore (Esch, 2002; Institute of Mental Health, 2011). Thus, the role that stress plays in mental health issues in our society cannot be ignored. Other worrying trends include higher suicidal tendencies amongst younger students and a greater number of students self-harming (Samaritans of Singapore, 2016; The Straits Times, 2015). The stigma surrounding mental health issues is slowly fading as more Singaporeans realise the seriousness of the issue. It is thus imperative to examine the reasons that give rise to the mental illnesses, and implement strategies to address the issue.

Historical Overview of Milestones in the Education Landscape

Year / Time Period	Significant Changes
1965	Singapore is an independent country with a largely illiterate population (Coughlan, 2016)
2003	Compulsory Education (CE) introduced - states that students must undergo primary schooling
2008	Holistic Health Framework (HHF) - A student's mental and social health should be taken care of together with one's physical health. This can be ensured through a supportive school culture and environment and well-trained teachers who can look out for their students.
2012	Top scorers for national examinations will henceforth not be published
2016	Grading system for Primary School Leaving Examinations (PSLE) to be changed with effect from 2021
September 2018	<u>Reduced emphasis on academic results</u> 1. Primary 1 and 2 students will not have examinations but will instead be assessed by their teachers through other mediums like quizzes (Hermes, 2018). 2. Students in Secondary 1 will not have mid-year examinations from 2019. The same will begin applying to Primary 3, Primary 5 and Secondary 3 Students in 2020 and 2021. 3. In 2019, a framework will be set-up such that there will only be one class test per term for each subject which will contribute to the year-end results. Worksheets, classroom work and homework will be used by teachers for the assessments instead. 4. Report books will not reflect a student's position in class or the cohort.

2019	<u>Integration of students with special needs</u> Students with moderate to severe Special Educational Needs (SEN) will be included under the CE are required to attend a government school for a minimum of six years.
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Additionally, since 2003, primary education has been made compulsory for all students residing in Singapore. Despite the requirement only being for six years of compulsory schooling, the literacy rate for individuals above 15 years old remains high at 97.2% as recorded at the end of 2017, a slight increase from the previous record of 97% (Department of Statistics Singapore, 2018). The record for number of individuals with post-secondary qualifications, however, is much lower at 54.2% at the end of 2017, which is a slight increase from the previous one at 52.8% (Department of Statistics Singapore, 2018). This could hence suggest that there could be a main contributing factor preventing a massive percentage of individuals from pursuing tertiary education. Streaming has supposedly allowed for a decrease in dropout rates today, to a virtual zero (Teng, 2018). The benefits of streaming should definitely be acknowledged and it could even be considered as desirable to continue on with streaming to bring out every student's best academic potential.

Current Situation

Singaporean students are given a lot of homework to supplement and enhance their learning after school. They do not have much time to spare owing to their long school hours which typically start early in the morning and end sometime in the afternoon or even later, subject to the student's schedule. They may go home even later due to their commitments in Co-Curriculum Activities (CCAs). Also, there is still a relatively large emphasis on academic achievements in Singapore. In addition to the long hours in school--typically 7 hours for secondary school--students are often given homework to supplement their learning during curriculum time in schools (Teng, 2016).

Studies have also highlighted how students who spent more time on homework were shown to have more symptoms of depression (Levy, 2017). Many students also find themselves exhausted after completing their homework, with side effects such as headaches, loss of appetite and weight, and even sleep deprivation (OxfordLearning, 2016). There is a significant number of students who grapple with the issue of heavy academic workload and suffer from stress, which adversely affect their mental well-being.

Students interviewed by The Straits Times said they feel very stressed or want only about an hour of work (The Straits Times, 2017). Thus, the role of homework in the education system and its ties to the mental wellbeing and stress of students need to be evaluated. Proponents of decreasing the time spent on homework point to studies that show that children who spent more time doing homework were shown to have more

symptoms of depression (Levy, 2017). This is due to the exhaustion after completing homework, resulting in students being unable to take some time for themselves or interact with their loved ones. In fact, Singaporean students spend 9.4 hours weekly on just homework which is well above the global average of 5 hours recorded by an OECD study (Teng, 2014).

Meanwhile, countries such as the United States have introduced homework reform or homework policies, such as Khan Lab School that has a no-homework policy; students are reported to have lower stress levels (Mountain View Voice, 2016). Similarly, students in Finland spend little to no time on homework and students are reported to have the lowest levels of stress in the world (PISA, 2015). Finnish students are assessed by their teachers instead of taking examinations making their learning process more pleasant (Singh, 2017). They rarely get any form of homework, and sit for their first major examination only at the age of 16. In Germany and Switzerland, vocational training opens up more educational and career opportunities but it is conversely known in Singapore to be the pathway for students who have been academically-challenged (Teng, 2018). In the aforementioned countries, it is highly respectable to have undergone vocational training and gone on to work in the sector of one's expertise. However, the same cannot necessarily be said about students in Singapore as it is not common for students to choose such a path unless they are unable to keep up with the academic rigour in mainstream schools.

In addition to the learning in schools, a significant number of students attend tuition classes to supplement their learning in schools. In fact, 80% of primary school students attend these private tuitions (Wise, 2016). These tuition classes are often perceived to be critical in helping one achieve academic success as they supplement students' learning. Although these classes aim to develop students into well rounded individuals, the reality is that many students tend to feel overwhelmed and burdened by these additional programmes, which leave little free time for students, and also impact their mental well-being adversely.

However, critics argue that homework is imperative for academic achievement. Students in Britain who spend about two to three hours of homework per night, more than the average time spent by a Singaporean student daily, were almost ten times more likely to do better in the GCSEs than those who do not do any homework (BBC, 2018). As academic achievement is tightly linked to the mental wellbeing of students (Cheung, 1993), reducing time spent on homework or removing homework all together might actually be a source of stress for students who wish to have more practice.

Academic Competition

Academic competition is another major source of stress among Singaporean students. Primary school students are currently required to take the Primary School Leaving Exams (PSLE), a high stakes examination for students as it determines the type of stream and school students can enter. At 12 years of age, students compete with one another as they vie for the limited vacancies at top schools. Students also take other

major examinations such as the 'O' and 'A' Levels also pose great threat to students' mental welfare due to immense amount of stress inflicted on students as they prepare for them.

Academic achievement is strongly emphasised in Singapore and the cultural pressure to excel is often manifested as a fear of failure in school. Counsellors have had visits from children who were scolded by their parents for not doing better despite achieving high grades or even being made to re-sit the PSLE despite clearing it on the first attempt (Teng, 2016). Another case saw a young boy meet his death as he was too scared to reveal his poor results to his parents which was described as a "wake-up call" for parents who do not notice the undue pressure on their children to perform well at school. This cultural pressure, commonly referred to as 'kiasu,' has resulted in high expectations on students to achieve academically, manifested in the staggering amount of money spent on tuition; the tuition industry in Singapore is worth S\$1 billion (The Straits Times, 2016). In addition, the streaming process in Singapore, where students are streamed according to their academic ability at various stages in school exacerbates the emphasis on grades. Proponents of academic streaming after PSLE and the O Level examinations believe that streaming allows students to enter a school which matches their ability and thus, maximise their potential (TODAY, 2016). However, it elevates the status of certain schools--those with more competitive entry--and thus, increase the demand for such schools. This is because the more competitive schools are regarded as 'good' schools with top students, teachers, and facilities.

The impact of stress on students can be seen from the increase in the number of suicides amongst teenagers in 2015 which was twice the number reported in 2014 (The Straits Times, 2016). According to the Samaritans of Singapore, a suicide prevention centre, the number of suicide cases reported in 2016 of individuals aged from 10 to 19 was 22, an average of almost 2 cases per month (Tan, 2018). The veneration of academic success has become a culture among Singaporeans.

Streaming and Stereotypes

There are different streams to better allow students to cope based on their academic abilities and performance at PSLE. The streams are Normal Academic, Normal Technical, and Express. High performing students could opt for the Integrated Programme (IP) which allows them to skip the 'O' Levels and take the 'A' Levels or International Baccalaureate (IB) instead at the Junior College affiliated to their secondary schools. The different streams hence allow everyone to choose a pathway not only according to their abilities but also by what they wish to pursue in the future.

In addition, Singaporean students are streamed from Primary Three, with the students of similar abilities in the same class. According to Mr Ng Choon Ho, an educator and principal, weaker students or slower learners will not need to feel pressured to keep up with the faster students if streaming is conducted (Teng, 2018). However, clinical psychologist, Carol Balhetchet (Teng, 2018), believes streaming very clearly reveals the students who are not as academically strong as their peers and not all of them will be able to improve to become stronger to switch back to learn with the stronger students.

This subsequently labels them which makes these students feel less capable as compared to their peers at a young age. Stereotypes of weaker students are quickly formed which amounts to pressure put on them to improve and get into top streams. Regardless, the labels continue to remain with them which subsequently wedge artificial boundaries between students of different academic capabilities. This segregation between students of different academic abilities also potentially results in decreased self confidence and self esteem among the students who are perceived to be academically weaker, as argued by sociologists (Teng, 2018).

Bullying

Another cause for mental illnesses amongst students is bullying. Singapore has the third highest rate of bullying in the world, with the most common form of bullying being mocked by other students (Organisation for Economic Cooperation and Development, 2015). A survey shows that 20% of primary school students have been bullied, with being called names or mocked is the most common form of bullying (Children's Society, 2007). Unfortunately, name-calling is not often actively condemned by teachers as it is not seen as 'harmful' (Children's Society, 2007). This encourages name-calling or mocking in school by other schoolmates and thus, indirectly encourages the proliferation of bullying. However, effects of bullying, whether it is physical or verbal, are long-lasting and horrific. The most common effects include lower self-esteem, anxiety and self-harm (Smokowski, 2005). Thus, the role of bullying in the mental well-being of students cannot be ignored.

Measures to tackle students' mental health issues

Prevention - Awareness and Education

Schools are actively trying to keep mental health issues at bay and ensure that students are generally educated about them. The Health Promotion Board (HPB) offers a Mental Health Literacy Programme for Educators so that they are able to spot initial signs of mental illnesses in their students. However, this course only teaches how educators can support youth from the ages of 13 to 18 and not younger. However, the trend of an increasing number of students struggling with mental health issues from a younger age suggests that more needs to be done to help younger students as well. HPB also partners schools by conducting talks to ensure that students lead an all-rounded healthy lifestyle. While these talks raise students' awareness of the illness, students may not be able to prevent it from occurring in themselves or their peers. The Singapore Mental Health survey done in 2010 revealed that 1 in 8 Singaporeans have a mental disorder (Institute of Mental Health, 2012) and furthermore, there were 27 teenage suicides in 2015, which was the highest figure recorded in 15 years (Mohandas, 2017). Thus the effectiveness of these talks and workshops needs to be evaluated and they should be re-structured to ensure maximum impact on students' lives. Some schools have also started peer-helper initiatives in the past few years for students to speak to their peers and/or juniors to help them with any issues they might face, or help them to highlight more serious causes for concern to teachers or counsellors. Nonetheless, the large number of students struggling with mental health issues warrants an evaluation of the effectiveness of these strategies.

Workshops, talks, and campaigns by public health services, such as Health Promotion Board (HPB), and private companies are also carried out. This varies from school to school as each school has counsellors that can organise several activities to help meet the needs of the students (Ministry of Education, 2015). This decentralised approach allows for more targeted activities as counsellors and educators are likely to be more familiar with the varying student profiles and needs in the different schools. For example, HPB conducts the Next Step Assembly Talk to prepare graduating secondary school students with skills required to handle the stress of entering a new phase of life (Health Promotion Board, 2018). Additionally, schools put out booths during the week of World Mental Health Day to dispel myths and raise awareness of signs of mental illnesses that many may miss (The Straits Times, 2016). Non-governmental organisations such as Touch Community Services have also conducted activities to increase awareness of the issue of mental health, such as an activity that allows secondary school students to understand what it feels like to have depression through the use of virtual reality headsets (Choo, 2018).

MOE has created a tiered system to aid students who already exhibit signs of mental illnesses (Ministry of Education, 2018). The first tier involves teacher intervention. Some teachers-- aoften form teachers--of each school undergo training to identify and learn specific signs of mental illness or extreme stress and ways to handle such cases. If the student's mental health does not improve, the second tier would be to refer those students to an appointed school counsellor who has training or experience in

counselling. In extreme cases, the last tier would be to refer the student to external care centres (Ministry of Education, 2015).

It has been shown that proper teacher intervention may be as effective as intervention of professional counsellors or therapists if teachers are well-educated in the subject of mental health (Franklin, 2012). While some school counsellors in Singapore are retired teachers, who may not necessarily have been educated formally in counselling (Kok, 2013), this system has the potential to be effective if all teachers and counsellors are properly trained and able to accurately identify which of their students might be needy of intervention. On the contrary, such assistance, when only rendered to some upon identification might leave unnoticed cases till its too late.

Besides the assistance that can be rendered within schools, there are also other Non-Governmental Organisations such as Tinkle Friend or Samaritans of Singapore (SOS), which are suicide hotlines that students can call when they are in need of help. About 1900 of such calls were made to SOS in 2016 from individuals aged 5 to 19 which was a 70% increase from 2012. While the students are able to raise their concerns through these hotlines anonymously, it is alarming that they are not able to hold free conversations with peers or trusted adults. As such, it may be important to examine why the programmes in schools may not be working for a group of students and how they may be improved further.

Different schools also have varying levels of support. The perceived 'elite' schools have programmes in helping stressed-out students to cope, such as Anglo-Chinese School (Independent) that has three full-time counsellors and church staff (Mohandas, 2017). This is a luxury that not many students in other schools receive, causing an imbalance in the amount of help that can be extended to students in need.

Moreover, it is difficult to detect or help students, particularly younger ones, who have mental health issues. They tend to want to speak to only their friends and not emotionally mature adult, posing a challenge for schools and counsellors to help them (Mohandas, 2017). Meanwhile, these friends themselves may not be able to help their friends due to their inexperience and may even provide misleading advice. Former Social and Family Development Minister Tan Chuan-Jin said it was "not reasonable to expect teenagers to take crisis calls from their suicidal peers" (Mohandas, 2017). Hence, in spite of the existing measures targeted at students, the problem can partly be attributed to students' unwillingness to share the issues they are facing. the problem may stem from the unwillingness of the students themselves.

Treatment

Similar to peer counselling that has already been introduced to some schools, peer support networks will be implemented in all primary and secondary schools (Ministry of Education, 2017). Selected students would be trained in skills to support their friends that are undergoing stress or other problems that are pressuring them. Peers are often the first point of contact for students going through emotional problems (Rickwood,

2007). Additionally, it has been shown that positive peer support can be effective in helping students overcome their challenges (Cowie, 2017). Training peers would thus refine their counselling skills and ensure they are providing proper advice to their friends (Pereira, 1997). Another benefit is that this peer programme creates an atmosphere of 'care' in the school which may be motivating and encouraging for students who are under school-related stress (Naylor, 1999). This initiative has been implemented as pilot programmes in schools like Raffles Institution where twenty-nine students are trained in basic counselling services as part of Peer Helpers Programme (The Raffles Press, 2016). Peer counselling is a common aspect of many teenagers' lives and the development of this form of counselling might reap benefits for students (Rickwood, 2007).

Moreover, Character and Citizenship Education (CCE) has been integrated into the school curriculum. The CCE syllabus includes social and emotional competencies in which students are taught how to manage their emotions and how to act in a moral and socially acceptable way (Ministry of Education, 2014). This hopes to instill good stress management skills and also promote values such as respect in students which may be an impetus for students to be kind in how they treat others to prevent bullying (Ministry of Education, 2014).

Conclusion

Due the mounting pressure put on Singaporean students, mental health issues continue to prevail even after all the programmes that have put in place in order to help the students. This is mainly due to the challenges faced in the implementation of such programmes in order to ensure that they are truly effective in helping students with their mental health issues. Hence, it is an urgent task to discuss these issues, de-stigmatise them in society and also find feasible solutions that would work best in the long run.

Questions for Discussion

1. What do you think is the definition of success in Singapore? Do you think there is there a need to redefine our perception of 'success' in education?
2. Do you think the recent measures introduced by MOE to reduce stress among students are effective in addressing the students facing mental health issues in Singapore?
3. Should the education system also house the responsibility of better ensuring the mental well-being of students? How can we strike a balance between achieving the goals of education and taking care of students' welfare?
4. Suggest how NGOs can be involved in the prevention of mental health issues among Singaporean students?
5. Do you think that mental health issues among students are an inevitable part of schooling? What do you think can be done within the education system to minimise the effects of these and ensure students' welfare, without compromising on academic rigour?

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Developing a Future-Ready Curriculum in Singapore

Introduction

The precarious nature of the 21st Century global economy has led to a huge change in the demands of the economies worldwide (Horsky, 2004). This transformation is consequential; it does not only signify a physical change in the working of various jobs but also a huge shift in how employees are hired. More employers are moving away from using education certificates as qualifiers, evident in how 21CC (21st century competencies) are being valued higher than ever in employment (Tan, 2017). The increasing presence of technology in the workforce is also another critical aspect of the abovementioned change. Technology is rapidly changing the nature of jobs across industries. As a result of the interconnectedness of the world today, the effects of the changing economy in nations globally has spilled over into Singapore. In light of this, Singapore has made plans to move towards an innovation-based economy where skills and innovation are valued over physical input. This shift, both overseas and locally, has increased the importance of evaluating the adequacy of the education system in Singapore in preparing the youth for the workplace.

The education system has been characterised by its content-heavy and exam-centric curriculum (Horsky, 2004). However, in light of changes in workplace skills, the Ministry of Education (MOE) has introduced several policies or initiatives to modify the curriculum to meet students' needs. The policies or initiatives introduced aim to enhance students' socio-emotional ability, critical thinking, and ICT skills (Figure 2.1). As Singapore transitions towards an innovation-based economy where skills and

innovation are valued over physical input, the education system has also morphed to ensure students are 'future-proof' (Tan, 2017). 'Future-proof' or more appropriately, future-ready often refers to learning in a digital age to prepare them for the opportunities of today and tomorrow (International Center for Leadership in Education, 2015).

With that, it is vital to explore the various policies and initiatives that have been introduced to modify our curriculum to suit the demands of this century as seen in the next section.

Historical Overview of Initiatives in the Education system

Year	Policy/Initiative	Aim
1997	Thinking Schools, Learning Nation (TSLN): Restructuring the education system to meet the new demands of the 21 st Century.	TSLN aims to prepare students for the future and encourage youth to view education as a lifelong learning process.
1997	First Masterplan for Information and Communications Technology (ICT) in Education (Masterplan 1): Provided a foundation for the provision of basic ICT infrastructure in schools.	The Masterplan seeks to equip schools with hardware, software and network connectivity and has a target that 30% of the curriculum time would use computers.
2003	Masterplan 2: Pervasive and effective use of ICT in classrooms for teaching and learning processes.	The Masterplan intends to strengthen use of ICT in classrooms and encourage pervasive use of ICT in curriculum.

2005	Teach Less, Learn More (TLLM): Syllabus content trimmed to enhance critical thinking skills and inquiry-based learning in students.	TLLM aims to create an education system that nurtures creativity, critical thinking and lifelong learning.
2009	Masterplan 3: Build on the previous two Masterplans and continue efforts to increase use of ICT in schools.	The Masterplan hopes to develop students' self-directed and collaborative learning through the use of ICT.
2010	21CC Framework: Competencies that have been identified by MOE that are increasingly important in the 21 Century.	The framework seeks to underpin the education that students receive to fully prepare them for the future.
2012	Values in Action (VIA): Learning experiences that enable students to contribute to the community.	VIA aims to create socially responsible citizens and foster student ownership over how they can contribute to the community.
2013	Applied Learning Programme (ALP) and Learning for Life Programme (LLP).	ALP focuses on interdisciplinary knowledge and applying skills to real-world settings while LLP aims to nurture students' characters and values. Both were launched in 2017.
2015	Masterplan 4: Productive use of ICT to nurture subject mastery and 21 CC.	This Masterplan aims to build on the previous Masterplans and expand the use of ICT beyond collaborative learning and self-directed learning to the whole curriculum.

Figure 2.1: Table to highlight key changes in policies pertaining to education (Tan, 2017)

A future-ready curriculum tends to be centralised around three aspects: 21CC, socio-emotional skills, and Information and Communications Technology (ICT) education. The policies and initiatives introduced in Figure 2.1 seeks to address all aspects. For the first aspect, the interweaving of 21CC into the curriculum is promoted by Thinking Schools Learning Nations (TSLN), Teach Less Learn More (TLLM) and the 21CC Framework. TSLN seeks to cultivate the love for lifelong learning in students. Lifelong learning refers to education beyond the boundaries of the school syllabus and it aims to encourage students to discover, construct and question knowledge on their own, paving the way for the development of problem-solving and critical thinking skills (Aspin, 2012). TSLN would hence be the foundation in which the other two initiatives, TLLM and 21CC, would be built upon. Specifically, TLLM aims to develop critical thinking skills in students by streamlining syllabus content to have a more inquiry-based curriculum than one with heavy rote memorisation. Inquiry-based curriculum is a form of active-learning which enables students to take a deeper approach towards studying, encouraging students to pick up an analytical mind and develop more sophisticated levels of intellectual development (Biggs, 2003). The policies thus complement each other, working in tandem to expand students' intellectual capability. This is important because critical thinking is rapidly evolving to be a highly sought-after quality in the workforce today (Tan, 2017). The last initiative, the 21CC Framework, will be explored further under Current Situation.

Values-in-Action (VIA) and Learning for Life Programme (LLP) seeks to nurture the characters of students. Interpersonal skills such as empathy and mutual respect are critical in the workplace. The workplace is full of diverse people from different backgrounds, especially in today's globalised world. There is a need for employees to have the interpersonal intelligence to communicate and respect other employees so that they could work more efficiently (Doyle, 2016). The importance of socio-emotional skills cannot be sidelined. For example, VIA hopes to develop the feeling of empathy and care in students towards the community while LLP sought to build up interpersonal skills through three different areas, in which specific schools are allocated to an area. The three areas are Community and Youth Leadership, the Arts, and Sports. Through these areas, students are exposed to real-life situations where they can develop their emotional intelligence through interaction with others. These two initiatives are a key part of MOE's efforts in moulding characters of students by emphasising the significance of character-building. Lastly, the third aspect revolves around the use of ICT, which will be explored further in the next section.

Current Education landscape

21CC Framework

The global economy is evolving towards a more innovation-based economy which is fuelled by innovative and skilled workers. This dramatic change requires a shift in the education system too. The 21CC Framework compiles the competencies that are central to the work culture of many Multinational Corporations (MNC). For example, some of the skills most sought after by employers include communication and interpersonal skills (Holtzman, 2017). The introduction of the 21CC Framework came at the apex of globalisation and technological disruption in the economy.

The 21CC Framework has been implemented by MOE in a bid to prepare students to stay relevant in this ever-changing world. As seen in Figure 2.2, the Core Values describe the values that would underpin the knowledge and skills that students should have. The framework also states the social and emotional competencies that would enable students to manage challenging situations and develop a sense of empathy in them. The outer ring signifies the emerging competencies required for the globalised and ever-changing world. Thus, the framework was created with the intention of developing attributes in students that would secure their future in a world full of uncertainty.



Figure 2.2: 21st Century Competencies (Ministry of Education, 2018)

MOE seeks to infuse 21CC into the curriculum. In order to promote critical thinking skills, MOE has cut content for all subjects by 30% and reform examinations so that they encompass critical thinking skills (Ong, 2018). For example, mathematics classes have been modified from drills in routine problems to posing mathematical questions in the context of Singaporean issues. This enables students to hone their critical thinking and problem-solving skills as they do not simply learn just mathematical concepts but rather how to comprehend and apply what they have learned to formulate a solution (Wong, 2016). Moreover, MOE has introduced the subject Project Work for all Junior

Colleges. Project Work differs greatly from the other academic subjects as it is a project-based subject that is done in teams. This move aims to develop students' curiosity, resourcefulness, teamwork, creativity, and collaboration, all of which are skills highly valued in today's global world (Low, 2019). Additionally, MOE has invested in improving the quality of physical education, arts, and music classes in schools to enable students to develop physical robustness, enhance their creative and expressive capacities, and shape their personal, cultural and social identity (Low, 2019). Furthermore, MOE has mandated that a portion of curriculum time be dedicated to Character and Citizenship Education (CCE) since 2014, in which students are taught values and competencies. MOE's efforts to discreetly and explicitly impart 21CC to the students tie together to ensure a future-ready education system is in place.

Schools have tried to implement the 21CC framework into their curriculum. MOE has given schools the autonomy to form their own initiatives in instilling the 21CC values and competencies

Evaluation of the Effectiveness of the 21CC Framework

The 21CC Framework seeks to prepare students for the future. However, the effectiveness of the framework in achieving the goals that it set may be too unilateral. This is exemplified in how the 21CC Framework in Singapore is progressively emphasising competition and economic rationality, resulting in a lack of emphasis on other skills such as interpersonal skills (Tan, 2017). This limits the effectiveness of the framework in developing future-ready students.

The 21CC Framework is relatively successful in slowly changing the grade-orientated and exam-driven view of education. It promotes the importance of skills beyond the academic sphere (Shin Leong, 2014). Additionally, Singaporeans students top the world in problem-solving skills through teamwork (Organisation for Economic Cooperation and Development, 2017). This could be a reflection of the success of the 21CC Framework in integrating skills like critical thinking and problem-solving into the curriculum. Thus, it is fair to view the 21CC Framework as a successful effort by MOE in future-proofing the education system.

Increasing access to ICT

The role of technology in workplace has grown over the years. The increasing use of various forms of technology can be seen in how workplace automation is expected to double in three years from now (Sregantan, 2018). This greater involvement of technology in the workplace is due to the wider variety of functions that technology provides today. An example of this would be the increasingly sophisticated Artificial Intelligence (AI) technology. AI is the computational models of human behaviour and intelligence (Massachusetts Institute of Technology, 2017). As AI's role in the economy expands, many jobs risk being obsolete. This is exemplified in how 47% of current jobs are at risk of falling victim to automation in a decade or two (Williams, 2017).

With increasing number of jobs losing its relevance and the nature of many jobs being changed in the 21st Century, it is indispensable that the next generation of workers must

have the competencies and skills to meet the demands of this digital age. Thus, there is a need for schools to ensure that their student are technologically-savvy. Recognising this need, the Singapore government has introduced three Masterplans which seek to increase the use of ICT in the curriculum (Figure 2.1). The first Masterplan hoped to create a learning environment which highly involves ICT, ensuring students are technologically-savvy by the time they graduate from their respective schools. The second Masterplan strengthened use of ICT in school and also wanted to expand to include more innovative uses of ICT. Lastly, the third and fourth Masterplans seek to include 21CC into the curriculum through use of ICT. This helps to train students in self-directed learning and collaborative learning as they explore and find creative means to use ICT in their everyday school life (Low, 2019). These plans have resulted in an increasing number of students being highly competent in ICT skills and in collaborative learning (Tan, 2011). Collaborative learning is an essential skill which is growing in importance as the years go as workplaces rely more on the collaboration of ideas and knowledge to succeed (Low, 2019). Collaborative learning and applying the use of ICT concurrently provides students with the opportunity to further hone their 21CC and technological skills.

In addition to ICTs, coding is slowly being introduced into the curriculum. Coding is often referred to as the language of the future. More than 90% of professions today require digital competencies including programming (European Commission, 2018). For example, banking companies are increasingly creating applications to enable Internet Banking. Thus, the critical role of coding in today's age cannot be ignored. Singapore

has begun introducing coding into the curriculum of several schools. This is exemplified in the recent introduction of computing as a subject for 19 secondary schools (Lee, 2016). It shows a move on MOE's part to provide students with opportunities to be exposed to programming skills and acquire skills that are relevant to the economy of the future. Additionally, learning coding can help develop critical thinking and creativity which are values that are regarded highly in this digital age (Underwood, 1990; Tan, 2017) .

Overall, the implementation of ICTs into classrooms and the introduction of coding into the curriculum allows students to keep up-to-date with the technological advancement today.

Evaluation of the Effectiveness of ICT education

ICT classes can be perceived as effective in developing technological skills in students. It is exemplified in how Singaporean students have better ICT capability than their peers in countries where use of ICT in class is more prevalent--such as in Australia and New Zealand--and even rank number one in the test for digital skills (Davie, 2015). However, this may be due to the strength of Singaporeans students in math and sciences rather than digital literacy (Schleicher, 2015). Hence, the role of ICT education in developing the digital literacy of students may be minimal.

On the other hand, coding classes can be a positive learning experience for students. Including coding can increase access to computing skills for students from various

backgrounds who cannot afford private classes outside. Additionally, coding classes helps to encourage students who would typically not pick up computing, especially young girls, to be interested in computer science, and thus pursue their passion in this field (Husain, 2017).

However, coding is an extremely niche subject which may not be enjoyed by many. The inclusion of coding into the curriculum would thus be fruitless if many students do not want to partake in it.

Role of Stakeholders in developing a future-ready education system

Other than the MOE and school, other stakeholders can play a role in developing a future ready education system. As the economy undergoes a technological revolution, students and companies alike are affected as the economy is forced to make changes, which can be time consuming and costly. Thus, their role in ensuring the next generation is future-ready is crucial.

A way that companies are getting involved in the education process is through internships. Internships not only help students to hone their soft skills and be familiarised with corporate culture (Economic Development Board, 2017), but also provide the ability for students to apply the 21CC that they have picked up throughout their education career in the workplace context. Some companies, such as those in the maritime sector, also have funds to offer students financial support in their development of specialised skills related to the industry of their interest (Aggarwal, 2018).

Another critical stakeholder would be Non-Governmental Organisations (NGOs). NGOs play an important role in society through promotion of social issues. NGOs can complement the efforts by schools and provide students a more holistic education which prepares them best for the future. This is exemplified by 21C Girls, which is an organisation that teaches girls coding. 21C Girls aims to equip girls with important computational knowledge via free classes so they have the ability to lead future industries (21C Girls, 2019). This shows a way NGOs can fill the gaps in the future-ready curriculum and provide students from diverse backgrounds with an avenue to develop their digital literacy which is critical in the global economy of today and in the future.

Another NGO that aids students to develop 21CC is Youth Corps Singapore. It provides Singaporean students with platform to volunteer their time on worthy causes, such as educating the elderly on how to go cashless, learning how to upcycle unwanted items, and even befriending other students with mental disabilities. These activities help volunteers to develop their interpersonal and communication skills, on top of making them confident individuals who are ready to take on new challenges in our evolving world. All these skills are integral to mastery of the 21CC among Singaporean students.

Challenges in Building a Future-Ready School

Despite having some of the best test scores in the world, there is very little innovation from our youth, which is attributed to the risk-averse and conservative mindset the Singaporean education system and its educators have allegedly been nurturing (Paulo, 2018). In addition, other challenges that the MOE faces to ensure that its initiatives are effective include the differing availability of resources and curriculum structures due to the flexibility and autonomy that MOE grants to various schools in implementing 21CC and ICT classes. Additionally, teachers who have a more 'traditionalist' view of education, believe that education should be the transmission of knowledge between the teacher and the student who would act as a passive receiver, are less likely to accept a greater use of ICT in the curriculum (Chai,2010). This could pose a huge obstacle to MOE's efforts.

Additionally, students in Singapore are still extremely grade-driven with a high percentage of students being overly concerned with their grades (OECD, 2017). This shows that the culture of grades and results are still prioritised over learning and gaining skills, of which the latter is the aim of TSLN (Figure 2.1). Thus, the initiatives may not be as effective in changing the attitude of Singaporeans towards education which could pose a stumbling block to the transformation of schools to be more future-ready. Overall, the inadequacy and insufficiency of the current initiatives in promoting the holistic education of students is still evident and thus, is a challenge in the advocacy of a future-ready education.

Questions for Discussion

1. To what extent do you think that the Singaporean education system been successful in nurturing future-ready students?
2. Are the measures from NGOs, schools, and the government sufficient to 'future-proof' Singaporeans? What do you think are some ways to improve the future readiness of Singaporeans, students and existing workers alike?
3. How do we determine how and how much to change our current curriculum and pedagogies to better prepare students for the future? What are some trade-offs that we might need to consider or make?

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