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REVIEW

An Ecological Systems Framework to Enhance Inclusive Education in the Singapore Mainstream Schools

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ABSTRACT

This article examines how inclusive education has been implemented in the context of mainstream schools in Singapore. An Ecological Systems framework is then proposed for a multi-level approach to be adopted to enhance inclusivity in these schools. First, the framework serves to identify factors revolving a child with special needs at various ecosystemic levels. These include his family, friends, school, government agencies, sociocultural context and developmental changes that could have a profound influence on his cognitive, social and emotional development. Next, the ecosystemic framework is used to propose recommendations that can translate the latest policy shift towards mainstream inclusion into practices that can facilitate meaningful inclusion for students with special needs. To translate these recommendations into actions would require a reform of the traditional roles of schools and teachers, strengthening of interconnections among the systems, and the formation of new support networks for children with special needs and their parents. Last but not least, inclusive education should not be seen as an end itself, but part of a bigger movement to build inclusive societies around the world. The Ecological Systems Framework proposed in this paper is exploratory and non-empirical in nature, focusing on its potential utility in current and future policy formulation in driving inclusive education in Singapore. It can also serve as a conceptual blueprint for specific agencies or stakeholders within a particular system when they craft their action plans to support inclusive education.

Keywords: *Ecological Systems Theory, inclusive education, special needs*

1. INTRODUCTION

1.1. Historical Origin of Special Education in Singapore – The Excluded

Before the Compulsory Education Act (CEA) was revised in 2019, children with special educational needs (SEN) in Singapore were frequently left out of mainstream schooling. This remained true despite that the first Report of the Advisory Council for the Disabled: Opportunities for the Disabled (1988) had long advocated for the inclusion of special education within mainstream schooling whenever feasible, noting that enrollment in a special school should only be considered when a child's educational needs cannot be adequately met in a regular school setting. The Advisory Council for the Disabled was established by the then Minister for Education, Dr Tony Tan, and one of the major milestones achieved by this council was that the Ministry of Education (MOE) became an equal partner with the National Council of Social Service (NCSS) in the funding and management of special education [1].

Despite the participation of the MOE from 1988 onwards, children with special needs (CwSN) continue to receive education in government-funded special education (SPED) schools. They were also excluded from the CEA implemented in 2003. This segregation model for special education is largely attributed to the historical origins of special education schools. Prior to 1988, special education in Singapore was provided by seven voluntary welfare organisations in 11 special schools, and fully funded by the Singapore Council of Social Service, which is later renamed the National Council of Social Service [1]. Such segregation of CwSN from their neurotypical peers also suggests a biomedical model of viewing disability back then.

From a biomedical standpoint, disability is viewed as a medical condition that falls outside what is considered normal, with attention centered on what the individual lacks or cannot do. The primary goal is to treat or cure the underlying condition, or at least reduce its effects [2]. This leads to CwSN being seen as “patients” rather than learners, and they are excluded from mainstream education based on the assumption that they would not be able to benefit from or effectively participate in mainstream classrooms [3]. Mainstream schools, where teachers are trained primarily in delivering the national curriculum, were not deemed as suitable institutions for CwSN. Such children, when enrolled into a mainstream primary school, are often described as not being ‘right-sited’, and should be transferred to a separate institution where their needs can be better catered for.

1.2. The Rights to Education - Including the Excluded

In Singapore, similar to many other countries, basic education is often a prerequisite for employment, which will affect an individual’s economic independence and the ability to survive. The right to receive education is therefore of equal importance to CwSN. Education is also an important part of their rehabilitation process, as they develop their capacities to become more independent to be integrated into the main stay society [3].

Access to education is a fundamental right that every child is entitled to. Over the past two decades, numerous international frameworks and policies have been established to champion equitable educational opportunities for individuals with disabilities. The United Nations Convention on the Rights of the Child (CRC) stressed that “education is a right, not a privilege, and that the child’s participation and full development must be supported in all educational goals, setting and practices. Existing identifiable barriers to implementation of the child’s rights to education can be overcome; and education must respect individual, contextual and cultural differences” [4]. For children who have disabilities in specific, Article 23 of the CRC provides that "…the disabled child has effective access and receives education (…) in a manner conducive to the child's fullest possible social integration and individual development, including his or her cultural and spiritual development" [5].

Similarly, it is stated in Article 24 of the Convention on the Rights of Persons with Disabilities (CRPD) that disabled persons should not be denied access the general education system due to their disability [6]. They should be able to receive both primary and secondary education that is inclusive, quality and

free. They should also receive the support required to facilitate their effective learning within the general education system [6].

In the Salamanca Statement on Principles, Policy and Practice in Special Needs Education and a Framework for Action in 1994 [7], ninety-two governments and twenty-five international organisations proclaim their belief that:

(i) every child has the right to education and must be given the chance to attain a satisfactory level of academic achievement
(ii) every child differs in terms of their characteristics, areas of interest, skills and learning needs. Education systems and their programmes should be designed to support the wide diversity of learner profiles
(iii) children with SEN must be given access to regular schools which should be child-centric in pedagogy and practice

Although Singapore did not participate in the World Conference in Special Needs Education at Salamanca and was not a signatory to the Salamanca Statement and Framework for Action on Special Needs Education, Singapore signed the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) in November 2012 and ratified the convention on 18 July 2013 [8,9]. In response to the global shift towards inclusive education, Singapore has been progressively aligning its education policies and initiatives towards mainstream inclusion, where previously excluded CwSN are now integrated into the mainstream schools since the amendment of the CEA in 2019. The commitment to inclusive education is also expressed in the latest Enabling Masterplan 2030 [10].

1.3. Inclusive Education in Singapore – Excluding the Included

Despite the movement towards inclusive education, barriers that impede effective mainstream inclusion continue to exist. These barriers have led to the current situation where CwSN have been included into the mainstream primary schools, but apart from being together with their neurotypical peers in the same physical space, there has been little evidence of meaningful inclusion that is characterised by an organisation-wide shift in mindset, intentional planning, equitable (not equal) allocation of education resources, learner-centric pedagogical practices, and collaboration with all the stakeholders in education [11]. As a result, the CwSN who have been included are in fact, experiencing exclusion in an environment where attitudinal, physical and systemic barriers are limiting their participation in the mainstream education system.

1.3.1. Attitudinal Barriers

In a qualitative study that explored curriculum modifications for the inclusion of students with special needs (SwSN) in three Singapore mainstream primary schools, majority of the teachers expressed concern over having insufficient time to plan and implement differentiated instruction to support inclusive education [12]. Teachers are also found to hold restricted understandings of differentiated instruction, leading them to equate differentiated instruction with content or workload reduction for students perceived to have lower abilities [12]. There are also teachers who shared that they do not practise differentiated instruction to avoid stigmatising SwSN, whom in their view, would not want to be given a different worksheet from the rest of the class and be deemed different in a negative way [12]. Such attitudes and beliefs of the teachers would result in lowered expectations and the lack of response to learner profiles, which would not lead to meaningful access to the curriculum by the SwSN.

Attitudes of the neurotypical peers is another stumbling block faced by SwSN in their mainstream school experience. Some neurotypical peers may not exercise sensitivity to the sensorial needs of the SwSN, and some may take advantage of students lacking verbal skills. For example, students diagnosed with

autism spectrum disorder (ASD) may experience difficulties interaction with their peers due to their difficulty in reading social cues. As a result, they may have a higher chance of being subjected to bullying and micro-aggressions in school [13]. Such incidences are most likely to be under-reported in school and fail to raise attention from the parents or teachers when the victims are not fully aware of the bullying they are subjected to, or lack the verbal skills to relate the incidents and express their distress. Again, such negative attitudes would impede the students from positive and meaningful social experiences that schooling can provide.

1.3.2. Physical Barriers

While the profile of the student population in mainstream primary have changed significantly, the physical learning spaces in the mainstream classrooms and common spaces have not undergone much changes. The layout and structure of the schools have not adopted a neuro-inclusive design that takes into considerations the sensory sensitivities of neurodiverse students [14]. Factors such as ambient lighting, seating arrangements and access to quiet spaces have not been considered together with the policy of mainstream inclusion [14]. Simply securing a place in mainstream schools is not enough. Fostering a learning environment that embraces neurological differences is essential for helping neurodiverse students develop a sense of identity and feel that they truly belong.

1.3.3. Systemic Barriers

In the qualitative study by Strogilos et al. [12], factors such as big class size, the need to deliver a prescribed curriculum that directly leads to a high stakes national examination, as well as the lack of effective resources to support students of diverse learning needs, have been identified as significant stumbling blocks towards the creation of an educational system where every student can meaningfully access the curriculum. A research study commissioned by the MOE to look at educators' perspectives on inclusion also revealed that teachers in mainstream schools feel that there is insufficient training to prepare them for inclusion [15]. Large class size, coupled with a high number of students with SEN, as well as the lack of support from the allied educator (AED) also make it difficult to implement inclusive education [15]. Self-efficacy of teachers and limited support from the school leadership and parents are also recurring issues brought up in similar studies [16,17].

Furthermore, there is a lack of clarity on what inclusive education entails in the Singapore context, causing policymakers, service providers, families, caregivers and even persons with disabilities to have contesting views on what "inclusive education" should be [13]. The lack of a national policy about inclusion from which the mainstream schools can develop their inclusive programmes and practice, as well as the absence of ethical guidelines on what counts as inclusion also creates confusion and pedagogical inconsistencies in schools [13].

Table 1. Systemic Barriers to Inclusive Education In Selected ASEAN Countries

Country	Main systemic barrier(s) encountered

Indonesia	• Limited access to formal education for children with disabilities or SEN due to:
	  ○ Lack of funding
	  ○ Lack of appropriately trained teachers in the field of SPED
	• Segregation model of education where special schools for each major disability are mandatorily set up in each province

Philippines	• Robust leadership and a supportive, open-minded teaching staff in successfully integrating students with disabilities into mainstream education • Lack of teacher training to support students with disabilities in regular classrooms. • Teachers feel ill-equipped to carry out inclusive pedagogical practices, on top of inadequate teaching resources, resulting in a segregation model of education

The systemic barriers described above are not unique to Singapore. Table 1 shows the barriers in other Asian countries in their journey towards enacting inclusive education [18]. This makes the Ecological Systems Framework a promising framework not just for Singapore, but one that can be easily adapted for use in other countries facing similar challenges.

2. INCLUSIVE EDUCATION THROUGH AN ECOSYSTEMIC LENS

"It takes a village to raise a child" is a very apt saying to capture the ecological layering of societal, community, and family contexts that affect an individual child's developmental trajectory and long-term well-being [19]. Against the backdrop of the attitudinal, physical and systemic barriers impeding meaningful inclusion in the mainstream schools, the Ecological Systems Theory by Urie Bronfenbrenner [20] is a parsimonious model that researchers and practitioners can utilize to synthesise and understand all the factors that need to be considered in relation to SwSN within the Singapore mainstream school environment.

2.1. Bronfenbrenner's Ecological Systems Theory

Bronfenbrenner [20] offers a conceptualisation of the child's environment as a multi-layered set of nested and interconnected environmental systems, all of whose 'agents' influence the development of the child, but with varying degrees of directness [21]. This means that human development does not occur in isolation but is the product of ongoing interactions between the individual and his or her environment [22]. This developmental environment is categorised into five interrelated and nested systems, namely the microsystem, the mesosystem, the exosystem, the macrosystem and the chronosystem. Together, they constitute a single ecological system in which an individual lives as shown on Figure 1. Table 2 describes each of the five systems and examples based on the Singapore context are provided as well [20].

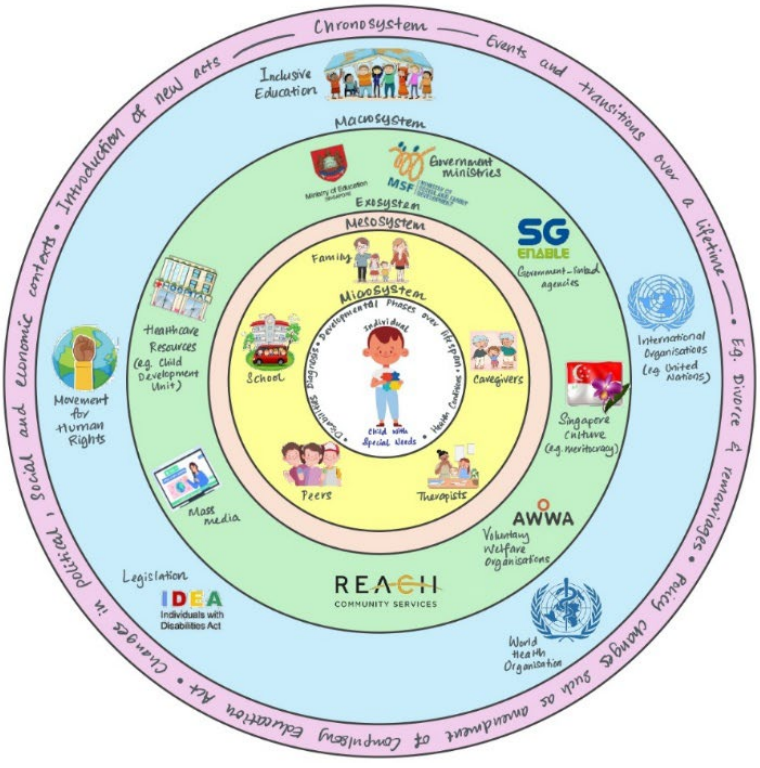

Figure 1. Bronfenbrenner's Ecological Systems Theory Applied to A Child with Special Needs

Table 2. Bronfenbrenner's Ecological System Framework: The Singapore Education Context

Microsystem	
Description	Examples
• The setting in which the child has direct social interactions with.	• Impact of parenting style on child (e.g. authoritarian, permissive, autocratic) • Parent's image and expectations of child • Caregiving arrangement for child / caregiver profile • Relationships with classmates and other peers in school • Interactions with the school SEN officers or counsellor • Design, layout of school building and accessibility to amenities
Mesosystem	
Description	Examples
• Involves the relationships between two or more microsystems in the child's life • Involves the interactions among individuals and settings in the microsystem (Manzon et al., 2015)	• Parent-teacher communication • Negligent parenting leading to child's mistrust in school teachers • Lack of coordination between teacher and SEN officers • Inconsistent rules and consequences set by parents and teachers • Lack of shared vision or common understanding of inclusive education and differentiated instruction among classroom teachers, SEN officers and Allied Educators
Exosystem	
Description	Examples
• A system of indirect influences and includes systems that have influence but are those which a child has no direct contact with	• A parent venting frustration from work on the child at home • Retrenched parent unable to provide adequately for the child • Policies from the MOE (e.g. CEA) • Availability of therapy services near the child's home • Availability of developmental screening services in school • Media coverage on topics related to persons with disabilities
Macrosystem	
Description	Examples
• Encompasses the overarching cultural paradigms, socio-economic and political structures, policies, and prevailing ideologies (Manzon et al., 2015)	• International conventions on human rights and inclusive education (e.g. CRC, CRPD) • Sociohistorical context underpinning the segregation mode for SPED • Sociocultural views of disability (e.g. biomedical model, social model, ecosystemic model) • Prevailing ideologies towards education and inclusivity • Availability or absence of legislation to enforce human rights to education
Chronosystem	
Description	Examples
• Adds the dimension of time and includes the transitions and shifts in one's lifespan • Reflects the impact of changes and continuities in the wider context of the child (Manzon et al., 2015)	• Divorce, separation, remarriage, loss of custody experienced by the child • Involvement of MOE in the SPED sector from 1988 onwards • Amendment of the CEA sixteen years later in 2019 • Paradigm shift from segregation mode to mainstream inclusion since the development of the Salamanca Statement on Principles, Policy and Practice in Special Needs Education • Occurrence of developmental anomaly after early developmental screening phase • Changes in societal context with the launch of the Enabling Masterplan 2030 to promote inclusivity from early childhood to adulthood, as well as to look into the well-being of caregivers

2.2. Key Tenets of the Ecological Systems Framework

Besides providing a dynamic and comprehensive framework to understand how the development of a child is influenced by the interactions within his or her unique ecological system across time, Bronfenbrenner's ecological systems framework is also useful in the formulation and evaluation of future policies and practices to implement and enhance meaningful inclusion in Singapore mainstream schools. This is due to the key tenets underpinning this framework:

(i) Emotional-behavioural problems faced by a child with special needs may not only stem from the individual; they can also arise from the child's interactions with other people [24].

(ii) Problematic behaviour can arise from a cyclical loop of mutual interactions, where each action is a response to preceding actions and a trigger for future reactions among the participants [25].

(iii) Contrary to other human development theories that are age-based or linear in progression, the ecological framework comprises of a set of overlapping systems [24].

(iv) Furthermore, within each system, the components are interdependent in nature, meaning that a change in any one component will result in repercussions across the whole system [25].

(v) Effective intervention strategies must take into consideration the distinct ways in which all participating parties, such as the students, parents, and teachers, shape interpersonal interactions [25].

3. RECOMMENDATIONS TO ENHANCE INCLUSIVE EDUCATION: AN ECOSYSTEMIC APPROACH

The earlier section highlighted the various barriers that limit the meaningful participation by SwSN in the mainstream education system in Singapore. Recommendations based on research findings and proposed frameworks by researchers in related fields would be presented here to address those barriers. Grounded in Bronfenbrenner's Ecological Systems Theory, these recommendations would be proposed at the microsystem, mesosystem and exosystem levels.

3.1. Microsystemic Level

3.1.1. Peers

Establishing positive peer relationships is critical to building social competence. Such social competence, however, is challenging for some SwSN [26]. Therefore, the school can implement peer interaction programmes, social integration activities, and include explicit social skills training for SwSN and their neurotypical peers. Core values related to inclusivity, such as compassion, kindness, humility, gentleness and patience, should also be included in the Character and Citizenship Education (CCE) curriculum. This will help to foster a sense of connectedness for SwSN and create a cohesive and supportive learning environment for them.

3.1.2. Parents and Caregivers

The prevalence of dual-income households in Singapore has led to parents facing competing work obligations and logistical mismatches between home and school schedules, thereby restricting their capacity to participate in their child's development in school. Another barrier arising from this lack of time is the practice of leaving the upbringing and care-giving of their child to grandparents, domestic helpers and student care centres [23]. Therefore, initiatives or programmes aimed at building parenting skills, raising awareness of parenting styles and their implications, as well as educating parents on the developmental phases of their child, should be modified or extended to include other caregivers or caregiving bodies. The alignment of expectations and upbringing styles across parents, caregivers and caregiving bodies would provide a more stable environment for the child with special needs and reduce anxiety or distress arising from the transitions among home, school and caregivers.

For parents of CwSN, the option of continuing to work full-time while entrusting their child to caregiving facilities may not be available, as they often worry that the caregivers would not be able to understand the needs of their child or manage the behavioural challenges associated with the child's developmental anomaly. Hence, it is not uncommon to find that one of the parents would give up his or her job to take care of the child full-time. For these parents who have given up their career, income and social circles outside home, and vested all their time onto the child with special needs including empathy, care and helping them develop pro-active and effective ways of managing the emotional-behavioural challenges faced by their child should be provided. Self-care for these parents should also be promoted to improve their well-being, which would have a positive impact when they care for their child.

Chia & Chia [27] proposed a 2PH model that comprises of three key phases: phileogogy, parakaleogogy and heutagogy, to show how parents of CwSN can be involved in helping their children in a more proactive and effective way (Figure 2).

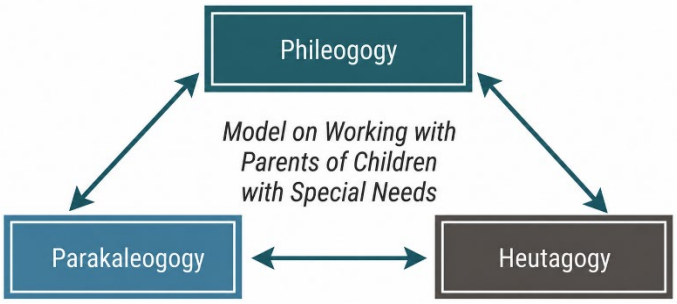

Figure 2. 2PH Model on Working with Parents of Children with Special Needs (Chia & Chia, 2015)

In Greek, *phileo-* means to love and *gogy-* means to lead. The practice of phileogogy then means to lead with love [27]. According to Galinsky's Six Stages of Parenthood, parents begin to conceptualise their parental role at the pre-natal stage, where they construct images of birth and parenthood in their minds. This internal imaging persists across the lifespan, with the parents continuously modifying and reconciling their initial images so that they become congruent with reality. They may also modify their own behaviour to match the image they have [28].

Hence, when parents of CwSN were first informed of their child's diagnosis, their most basic hope of a healthy, neurotypical child is shattered. They may go through a process of grieving before they adjust their mental image of their child to be consistent with the diagnosis of disability. They may also remain in a stage of denial and insist that the child they have still matches the image in their mind. These parents may reject learning support programmes conducted in smaller group settings offered by the school and insist that their child receives the same lessons in the big-class setting with the other peers, which, may deprive the child of the differentiated instruction based on his or her learning profile.

In the process of communicating with parents of CwSN, the first thing to do is not to convince them of the diagnosis or persuade them into acceptance. Time and private space should be given to them to grieve over the loss of their wished-for child, before providing them with support to create new dreams for their child [27]. Support groups can also be formed for parents of CwSN, facilitated by teachers trained in special needs education, SEN officers, Allied Educators, school counsellors and the school key personnel. Parents of neurotypical children should also be included to provide support and understanding and strengthen the commitment to building an inclusive school community.

The next phase is **parakaleogogy**, which means to lead and guide along the way [27]. When implementing policies or key initiatives from the MOE for instance, the school can act as an active agent to facilitate trans-disciplinary collaboration among those who are providing support services for the child. Bringing up a child with special needs may give rise to feelings of setbacks and isolation, so having to

seek support services for the child offered by different providers or agencies can be overwhelming for the parents. Future policies can rethink the role of schools in the endeavour to build a truly inclusive environment where the parents and their CwSN can have a dignified and meaningful existence.

The third and last phase is **heutagogy**, which means to lead with a self-determined choice of action. After the parents have gone through the first phase, they may have reconciled with their situation and come to accept the reality of their child's developmental or SEN. Having interacted with those supporting their child and receiving more information in the second phase, the parents would then be able to make more informed decisions on what works best for their child's development.

The success of the 2PH model above will hinge on the relationship between the school and the parents (mesosystemic level). The effective use of this framework will free parents from the grief cycle and enable them to take new steps in their child's new developmental trajectory, albeit it being anomalous.

3.1.3. School professionals

First of all, school professionals such as the teachers, heads of department, school leaders, school administrative staff, SEN officers, Allied Educators and school counsellors should demonstrate a supportive approach towards SwSN and their parents. Establishing a common view on the nature of disability is also crucial, as their view of disability would influence their interactions with the CwSN and their parents.

Different from the biomedical model described previously, the social model offers a wider lens to view disability. In the social model, disability is a social construct in which the environment, broadly defined as physical and structural barriers, as well as societal attitudes, beliefs and values, either supports or limits one's participation in society, and thus the experience of disability [2]. This social model of disability resonates with Bronfenbrenner's ecological systems framework to a large extent, as both recognise the impact that the environment has on a person with disability. Therefore, when working with CwSN, school professionals, especially the teachers who interact with the children most frequently, would be transformed into active agents of change if they shift their focus from the child's medical diagnosis to the social barriers that are impeding their integration and development.

Secondly, research conducted among pre-service teachers in Singapore and Australia suggested that training in SPED and confidence in teaching students with disabilities have a favourable impact on teachers' attitude toward inclusion [29]. Therefore, in-service training for teachers or on-the-job training for school teachers can include training in SPED, as well as practicum in SPED schools, Child Development Clinics in local hospitals, family service centres, or charity organisations like Asian Women's Welfare Association (AWWA) and Association for Persons with Special Needs (APSN). Currently, pre-service teachers only go through a 12-hour module on special needs and serve their practicums in mainstream schools. However, with the move towards mainstream inclusion in Singapore, pre-service teachers who would be deployed to teach in mainstream schools should serve practicums not just in mainstream schools, but also in SPED schools.

3.2. Mesosystemic Level

3.2.1. Strengthening home-school partnerships

To engage parents of CwSN successfully, establishing effective channels of communication and alignment of expectations and beliefs about the child is vital [30]. Information related to their child's placement in the mainstream education system and the education pathways leading from this system, curriculum modifications that have been made to facilitate their child's learning in class, school-based programmes that can build their child's social skills, school amenities that can cater to their child's

sensorial needs and in-school support services available could be shared through educational technology (EdTech) apps designed to facilitate communication and engagement between teachers and parents (e.g. Parents Gateway, SeeSaw and ClassDojo). Dissemination of information can also be done via face-to-face seminars, digital brochures and handbooks.

Easy access to key information relating to their child would aid parents to make more informed decisions pertaining to their child's engagement in school, and it would also reduce the time spent by teachers to address individual queries from parents and avoid unnecessary misunderstandings due to the lack of information or timely updates. While a significant amount of time and effort is required to break down traditional barriers between home and school, the eventual establishment of a strong and positive home-school partnership would also reap significant long-term benefits that would in turn influence the child's microsystem positively.

3.2.2. Streamlining Intra-school Support Services

In a mainstream school, the people who interact directly with a student with special needs typically includes the form teacher, subject teachers, SEN officers, Allied Educators and the school counsellor. Information pertaining to the student's profile (e.g. personal particulars, family background, medical conditions, diagnosis, psychological assessment reports), observations made during lessons, feedback or issues raised by parents, are not shared through an established channel or common database. Each party has limited access to the student's information, and their actions taken or decisions made are based on asymmetric information. The lack of information also leads to inaction to address the student's needs or the adoption of developmentally inappropriate practices.

The process of referring a student suspected of a learning disability or developmental anomaly is also akin to navigating a maze in a mainstream school and deters teachers from taking timely measures to acquire support services for the student. For example, the difficulty in getting all the sections completed for a Case Referral Form deters teachers from raising the red flag. After the submission of the referral form, there is also no clear channel to communicate the outcome determined by the school's Case Management Team, much less an update from the SEN officer on whether the case will be taken up by the psychological branch in the MOE.

The student population in a mainstream school is much larger than that of SPED schools, so SEN officers working in mainstream schools would be overloaded and lack the capacity to take on all the cases referred. Training and deploying more support staff such as SEN officers and Allied Educators, as well as streamlining of procedures to gain access to support services for the SwSN, would be needed to sustain inclusive education in mainstream schools.

3.2.3. Establishing a Child-centred Multi-disciplinary Support Network

Apart from promoting greater synergy and closer collaboration amongst the existing school professionals that interact directly with the student with special needs, having a multidisciplinary team comprising of professionals from the fields of psychology, education therapy, speech and language therapy and occupational therapy should not only exist in SPED schools. Against the backdrop of the amended CEA, parents of CwSN would face more institutional barriers to place their child in a SPED school so as to access the support services there. Yet, the provision of such social medical services is currently unavailable in mainstream schools, resulting in delayed intervention, and feelings of helplessness and despair, especially for parents of lower socioeconomic status who might find private therapy services outside school unaffordable.

Mainstream schools can be supported through teacher preparation programs at institutions such as the National Institute of Education (NIE), as well as through outreach personnel from Special Education

(SPED) schools. These SPED schools could further serve as resource hubs for mainstream schools, offering direct assistance to SwSN. External support by resource personnel from various agencies, departments and institutions, such as advisory teachers, educational psychologists, speech and occupational therapists should be coordinated at the local level [7]. In Singapore, mainstream schools are grouped into clusters based on geographical locations and these school clusters can facilitate resource sharing as well as community partnership. This decentralised approach of cluster schools taking on the shared responsibility of meeting the specific learning needs of pupils in their area and resource deployment will greatly enhance the flexibility and autonomy of localised support networks.

A comprehensive support network described above would enable SwSN to access the curriculum meaningfully and participate as fully as they can alongside their neurotypical peers.

3.3. Exosystemic Level

3.3.1. Strengthening of Inter-agency collaboration

Currently, both the MOE and the Ministry of Social and Family Development (MSFD) are involved directly in parent engagement. Being the key policy-making bodies relating to parents and their children, streamlining of the corresponding administrative structures to provide seamless, sustained forms of parent engagement across the developmental stages of the student would be vital [23]. Research has shown that longer lasting benefits can be reaped if a close inter-agency collaboration is established to formulate and implement key initiatives in both the education and social services fields, and follow-through support for the children and their families is provided over a period of several years. Furthermore, bureaucratic red tape can also be reduced if a common database relating to child and family members is shared and applications for support services can be streamlined or managed seamlessly. Increased access to information by each ministry and seamless application through a one-stop platform such as SG Enable would reduce barriers for parents who are seeking help for their CwSN.

The MOE and the MSFD can also collaborate with other research institutions such as the National Institute of Education to develop a context-specific model for parent engagement that is rooted in a thorough, systemic analysis of the practices and beliefs of stakeholders in Singapore. Such synergistic collaborations would also lead to the formulation of research-based policies and the provision of strong administrative support needed to implement these policies [23]. To date, there has been limited research done on engaging parents of CwSN, and even less on parents whose CwSN are enrolled in mainstream schools. With the increasing number of SwSN in the mainstream schools, research and supporting initiatives aimed at supporting this group of parents and children is much needed.

3.3.2. Extension of Key Initiatives across Developmental Phases of the Child

A student with special needs is most likely to require support services and an inclusive environment throughout his or her lifespan, although the degree and nature of support may vary over time, based on the growth of the child, as well as the changes within and around the student. There has been rising emphasis on early intervention and many of the recent key initiatives are targeted at the early childhood and primary school sector. As these SwSN transit to secondary and tertiary education institutions, these initiatives need to be extended across the development phases of the student to avoid a cliff effect when support services suddenly fall short.

Table 3 shows the key initiatives or programmes implemented so far at the different school levels, and it is evident that extension of current initiatives needs to be looked into in the near future, as the existing primary school SwSN moves into their next phase of life and transits to secondary and post-secondary institutions, and eventually into adulthood [10].

Table 3. Key Initiatives for Inclusive Education across Educational Levels in Singapore

Preschool	Primary School	Secondary & Tertiary institutions
• Development Support Programme designed to offer educational assistance and targeted intervention for children experiencing mild developmental challenges • Developmental Learning Support Programme • Early Intervention Programme for Infants and Children (EIPIC) to provide support services involving therapy and education • Integrated Child Care programme to facilitate a child's transition into mainstream primary education	• Allied Educators for Learning & Allied Educators for Behavioural Support deployed into mainstream primary schools • MOE-aided Dyslexia Association of Singapore Literacy Programme to support students with dyslexia • Training on special needs for all pre-service teachers • School-based Dyslexia Remediation (SDR) intervention programme for elementary level 3 and 4 students with dyslexia • Two SPED Needs Support officers per primary school to support SwSN • Student Development Teams to look into the holistic development of all students • Five to ten teachers per school to be trained in Special Needs Education	• Allied Educators introduced into mainstream secondary schools • One SPED Needs Support officer per secondary school support for SwSN • Training in basic SEN awareness and support tertiary academic staff

Source: Enabling Masterplan 2030: Working Together Towards an Inclusive Singapore [10].

4. CONCLUSION

Over the past twenty years, social policy has been increasingly focused on fostering integration and community involvement while actively combating exclusion. Inclusion and participation are essential to human dignity and to the enjoyment and exercise of human rights [7]. For SwSN to have equitable access and participate meaningfully in inclusive schools, a unified approach needs to be adopted, not only by the school professionals, but also by the families, peers and other support service providers in the healthcare, social services and mass media sectors.

At a broader level, while driving inclusive education is the joint responsibility of the MOE and MSFD in Singapore, other ministries need to be involved in driving inclusive education too -- for example, transport to enable CwSN or disabilities to get to school, planning so that buildings are accessible and contain neuro-inclusive features, child protection to make sure that children are safe, and government budget allocation to ensure sufficient funding is available. A promising move towards this has been encapsulated in Singapore's latest Enabling Masterplan 2030 [10].

The ecosystemic framework is therefore suggested as it offers a mechanism for analysing and changing interactional patterns that can be employed by individuals at the dyadic level, as well as at larger institutional levels for inclusive education to be enacted [25]. Schools that prioritize student-centered inclusion help to prepare students to build a society that values the diversity and dignity of every person, including individuals with disabilities. The successful reform of schools and other related social institutions to materialise inclusive education, and ultimately, an inclusive society, depends on the quality of interactions within and between the various systems.

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6. COMPETING INTERESTS

The author has declared that no competing interests exist.

7. FINANCIAL DISCLOSURE

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8. ARTIFICIAL INTELLIGENCE DISCLOSURE

No generative AI or AI-assisted technologies were used in the preparation of this manuscript.

9. DATA AVAILABILITY STATEMENT

Not applicable. No primary data were generated or analysed in this study.

10. ETHICS APPROVAL

Not applicable. This study did not require ethics approval.

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