Asia Pacific Journal of Education

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/cape20

A mixed-methods evaluation of an ecological systems approach for supporting young children from low-income backgrounds in Singapore

Huichao Xie, Heidi Layne, Mardiana Bte Abu Bakar, Mercy Jesuvadian, Ng Ee Lynn, Chew Ping Phoon, Rita Lim, Stephanie Chai, Loh Jie Ying, Jing Cheah & Kenneth Poon

To cite this article: Huichao Xie, Heidi Layne, Mardiana Bte Abu Bakar, Mercy Jesuvadian, Ng Ee Lynn, Chew Ping Phoon, Rita Lim, Stephanie Chai, Loh Jie Ying, Jing Cheah & Kenneth Poon (2024) A mixed-methods evaluation of an ecological systems approach for supporting young children from low-income backgrounds in Singapore, Asia Pacific Journal of Education, 44:3, 659-680, DOI: 10.1080/02188791.2024.2390656

To link to this article: https://doi.org/10.1080/02188791.2024.2390656

Published online: 16 Sep 2024.

ASIA PACIFIC JOURNAL OF EDUCATION
2024, VOL. 44, NO. 3, 659–680
https://doi.org/10.1080/02188791.2024.2390656

Routledge
Taylor & Francis Group

A mixed-methods evaluation of an ecological systems approach for supporting young children from low-income backgrounds in Singapore

Huichao Xie[a], Heidi Layne[b], Mardiana Bte Abu Bakar[c], Mercy Jesuvadian[c], Ng Ee Lynn[c], Chew Ping Phoon[d], Rita Lim[d], Stephanie Chai[c], Loh Jie Ying[c], Jing Cheah[d] and Kenneth Poon[c]

[a]School of Education, University College Dublin, Dublin, Ireland; [b]Faculty of Education and Psychology, University of Jyväskylä, Jyväskylä, Finland; [c]National Institute of Education, Nanyang Technological University, Singapore; [d]NTUC First Campus, Singapore, Singapore

ABSTRACT

The number of low-income families in Singapore is increasing. Young children from impoverished backgrounds are at risk of development gaps and challenges. Research has shown that the accumulation of risk factors from adverse childhood experiences can lead to weaker outcomes later in life. The NTUC First Campus (NFC) launched the Child Support Model (CSM) to serve children and families from vulnerable, low-income backgrounds with a range of financial, social and learning support. A 3-year evaluation study using mixed-methods design was conducted to understand the effects of the CSM and the active ingredients in CSM. A cohort of 58 children from families making a monthly income of SGD $3,500 or less participated in the quantitative component where children's language and cognitive outcomes and classroom engagement were measured at three time points in 2019 (Kindergarten 1) and 2020 (Kindergarten 2). Participating children's parents and teachers were interviewed in the qualitative component and reported their perspectives and experiences in CSM.

ARTICLE HISTORY
Received 23 August 2023
Accepted 16 March 2024

KEYWORDS
Program evaluation; early childhood education; low-income; developmental outcome; well-being; involvement

Singapore has been reported to have achieved remarkable economic success and has become one of the high-income economies in recent decades (World Bank, 2023). However, the number of families experiencing challenges to make ends meet has been increasing in Singapore. According to the Ministry of Social and Family Development (Department of Statistics, Singapore, 2020), the number of households receiving ComCare's financial aid increased by 15.2% from 83,353 in 2016 to 96,040 in 2020. Additionally, 2020 saw the highest number of households receiving financial aid, with the government disbursing 56% more financial aid compared to the year before (Tan & Han, 2020). New programmes such as KidSTART have been launched by the Singapore government to provide more support to these families such as information support and parenting training. KidSTART started in 2016 and collaborates with partners such as preschools, hospitals, social services, and family services organizations to support young children and their families living with low monthly household income of SGD$2,500 and below (KidSTART, 2023).

Recent research in neuroscience and child development has indicated the importance of the earliest years of life in strengthening the resilience and reducing the risk in the life-long development

CONTACT Kenneth Poon kenneth.poon@nie.edu.sg National Institute of Education, Nanyang Technological University, Singapore

and well-being of children from low-income backgrounds (Knudsen et al., 2006; Shonkoff & Phillips, 2000). Findings from longitudinal studies using data from the Perry Preschool and the Abecedarian Project have demonstrated positive outcomes that high-quality early childhood education could have on the educational and well-being outcomes of children from low-income backgrounds (e.g., Campbell et al., 2002; Schweinhart & Weikart, 2002). New initiatives such as the Head Start and Early Head Start in the United States have been set up with the aim to overcome the lack of resources and opportunities by providing comprehensive support to young children and families from low-income backgrounds. The potential long-term effects of such preventive support in early childhood demonstrated convincing evidence for alleviating perpetuating poverty and enhancing lifelong wellbeing for children and families involved (e.g., Cannon et al., 2017; Reynolds et al., 2018).

Comprehensive and preventive supports for this population have recently emerged in Singapore. Inspired by Bronfenbrenner's (1994) ecological systems framework, a major early childhood education service provider in Singapore, NTUC First Campus (NFC) developed the Child Support Model (CSM). Launched in 2016, the CSM programme aims to mitigate risk factors faced by children and families from low-income backgrounds by applying an ecological systems approach to ensuring sustainable well-being and learning outcomes. This CSM programme built on the resources and supports provided in KidSTART and expanded beyond the government initiatives to provide holistic and integrated supports to its network of 144 childcare centres. These include individualized teaching assistants (mentioned as classroom co-facilitators or CCFs below) in the classroom and covering children and families with a monthly household income of SGD$3,500 or below,[1] which is higher than the KidSTART eligibility. Table 1 lists the available supports provided in CSM, depending on the individual needs of each child and family. As one of the pioneer preventive programmes in Singapore following the ecological systems framework since 2016, it is important to evaluate the efficacy of the CSM programme. Appendix A)

The current evaluation study, as a collaborative project between the NFC and the research team at the university, was conducted in 2019 to 2021 to address the following questions about the CSM programme. The research team aimed to address these questions to better understand the efficacy of the CSM programme and to inform future improvements:

RQ1: What are the effects, if any, of the CSM on the well-being of children from low-income families?

RQ2: What are the effects, if any, of the CSM on the learning outcomes of children from low-income families?

Table 1. Available supports in CSM.

Type of Support	Description
Financial Support	Financial assistance schemes for school fees and school-going expenses. Programs and workshops such as ***You've Got Talent (YGT)*** program, ***Family & School Together (FAST)*** education tours for families and ***Parenting Years (PY)*** workshops that share parenting approaches and practical parenting skills with families for free.[4]
Social Support	***Child Enabling Executives (CEEs)*** are deployed to centres with a high number of children from low-income families. A CEE's role includes encouraging families to bring their children to school, monitoring children's well-being and learning, and providing dedicated attention and support to families who require social assistance.
Learning Support	On top of the classroom curriculum, children gain access to a variety of learning support programs based on their identified needs. Tier 1: ***Classroom Co-Facilitators (CCFs)*** supported select Nursery – Kindergarten 2 children to enable them to learn at their individual pace during small-group learning sessions. Tier 2: ***Read-to Reach*** **(RTR)** and ***FLAiR*** are small-group language and literacy intervention programs. *Tier 3:* ***Development Support and Learning Support Programme*** **(DS-LS)** by Learning Support Educators (LSEDs) provided one-on-one intervention for Kindergarten 1 and Kindergarten 2 children with mild developmental needs.

RQ3: What are the parents' experiences with the CSM?

RQ4: What effect, if any, does the CSM have on vulnerable families?

In addition to the primary questions listed above, [name of education service provider] also expressed interest in understanding what centre leaders and professionals perceived as effective practices in CSM and potential areas for improvement. These questions were also addressed in the current study, although not as the primary focus.

Methods

This study utilized a convergent mixed-methods research design (Creswell & Clark, 2017) to generate an in-depth understanding of the experiences, practices, needs, and perceptions of children, families, and professionals in CSM. Data were collected using multiple measures (i.e., survey questionnaires, direct assessment, observation in class, and interviews) and were analysed separately. Results from multiple sources of data were merged and triangulated to inform a comprehensive understanding of the topic of interest.

Mixed-methods design

This research was grounded in a mixed-methods paradigm. Mixed-methods research, as described by Creswell (2009, p. 4), is "an approach to inquiry that combines or associates both qualitative and quantitative forms". It involves a pragmatic philosophical approach to designing research which employs a mixture of both qualitative and quantitative methods to consider multiple perspectives. Hence, this study adopted a pragmatic combination of methods and data for an investigation that best answers the research questions (Creswell et al., 2003; Johnson et al., 2007). Specifically, this research gathered and analysed quantitative data to investigate the children's development and qualitative data to illuminate the program's effect on children from low-income families.

Case study method

Case study is an empirical method that investigates a certain phenomenon in depth and within its real-world context and is therefore suitable for this study (Yin, 2018). Forming case studies have been recognized as a useful method when exploring an area where little is known or where researchers want to have a holistic understanding of the situation, phenomenon, episode, site, group or community (Kumar, 2011). The case study approach is an intensive study of a single, relatively bounded, unit (the case) or a small number of units (the cases), to understand a larger class of similar units (Gerring, 2004, 2007). An intensive study of multiple cases, also known as the multiple case study method, was used to develop understanding on how the CSM supports children from low-income families. This research examined children's language and learning, and well-being and involvement in learning as the embedded unit of analysis. Further data gathering and analysis factored in their interaction and relationships with their bio-ecological environments across different levels.

This case study method combined quantitative and qualitative data, allowing the investigation of more complex phenomena. As described earlier in the section, quantitative data was collected from 58 children. Then through 21 case studies, we constructed a more in depth understanding of the multiple cases through seeking connections (and possibly some discrepancies) to the larger quantitative data. For case study children's confidentiality, any names used in this report are not real names of participants but are assigned pseudonyms.

Participants

This evaluation research project involved 58 children (24 boys, 34 girls) who were enrolled in CSM over 10 NFC childcare centres. To be eligible for CSM, parents' combined monthly household income was SGD$3,500 or below. The participants' families and centre staff, including children's classroom teachers, principals and CSM professionals, also participated in the study. See Table 2 for further demographic information about the total sample.

From the total sample, 14 children were recruited for in-depth case studies. Likewise, their families and their childcare centres, including the CSM professionals, were involved in the qualitative aspect of data collection. These 14 case studies were selected using purposeful sampling to ensure information-rich cases are included in the sample (Palinkas et al., 2015), based on the experiences and knowledge of two members on the research team who were overseeing the CSM being implemented in 144 childcare centres. First, four out of the 10 childcare centres in the total sample were chosen. Next, five to eight children from each centre were selected as case study children/families. The case study sample selection criteria considered diversity in terms of ethnicity, language, income level, and other salient child and family characteristics that were provided by the childcare centres.

In addition to child participants and their caregivers, the participants in this study also included 28 professionals. Among them, 13 were classroom teachers, four were centre principals, four were Child Enabling Executives (CEEs), four were CCFs, and three were Learning Support Educators (LSEDs).

This study was reviewed and approved by the Nanyang Technological University Institutional Review Board (IRB protocol ID IRB-2018-06-028).

Table 2. Child and family characteristics.

Variables	Quantitative sample $n = 58$	Qualitative sample $n = 14$
	Mean (SD) Count (Percent)	Mean (SD) Count (Percent)
Gender: Male	24 (41.4%)	4 (28.6%)
Child's age in months (End of Wave 2)	76.81 (3.59)	
Ethnicity		
Chinese	27 (46.6%)	6 (42.9%)
Malay	29 (50.0%)	8 (57.1%)
Indian	2 (3.5%)	-
Other	-	-
Child's IQ on Raven's	18.6 (5.2)	n.a.
Family structure		
Dual parents	41 (70.7%)	10 (71.4%)
Single parent	12 (20.7%)	2 (14.3%)
Single mother	10 (17.2%)	1 (7.1%)
Single father	2 (3.5%)	1 (7.1%)
Guardian/foster parent	5 (8.6%)	2 (14.3%)
Main caregiver's educational attainment		
No formal education	3 (5.6%)	-
Primary to post secondary education	41 (69.6%)	8 (61.5%)
Diploma/professional qualification	9 (16.1%)	3 (23.1%)
University to post-graduate	4 (7.1%)	2 (15.4%)
Others	1 (1.8%)	-

Procedures

The study employed a mixed-methods approach using qualitative in-depth data collection methods on case study families and case study centres complemented by quantitative measures to understand child development and quality of the learning environment. Quantitative data on children's well-being and learning development were collected by administering the Brigance Inventory of Early Development III (IED), Laevers Well-being Scale (L-W) and Laevers Involvement Scale (L-I) on the child participants. Data collection on these measures took place in three waves from January 2019 to December 2020. Qualitative data on the experience of families and professionals were collected through interviews from January 2019 to the first half of 2021. See Figure 1 for more details on the time frames for each data collection method.

Quantitative measures

Child and Family Demographic Surveys. Demographic questionnaires were developed by the research team to collect information on child and family characteristics. The main respondents of the demographic questionnaires for centres were the CEEs, who worked very closely with the children, families, and classroom teachers. A caregiver version of the demographic questionnaire was distributed to parents and guardians in English and Mother Tongue languages (i.e., Mandarin and Malay) to collect data that the centres did not have (e.g., employment status of caregivers). Both sets of demographic surveys could be completed either online using Qualtrics or during an interview using hard copy forms. The child and family demographic data were collected to facilitate an understanding of the individual child and family when interpreting case study results. These demographic data also provided a description of the sample, which is helpful in evaluating the external validity of the quantitative results in the study.

Laevers Involvement and Well-being Scales (L-I and L-W). The Laevers Scales were developed by Dr Ferre Laevers and his team (Laevers, 2015) to measure the involvement and well-being of children in a preschool setting. Involvement refers to a state when a child focuses his/her attention on a specific task that is not too easy or demanding, and is rarely distracted. Well-being refers to a state when children feel at ease, act spontaneously, are able to rest and relax, show vitality and self-confidence, and are aware of their feelings and emotions; these are indicators of secure mental health (Laevers, 2015). There were a total of six instances of observations each for L-I and L-W for each child, collected during different activities and in different settings, such as intervention sessions, curriculum time, outdoors, and routines. To enhance the records, the research team also developed a list of environmental variables to document availability of one-to-one support, number of adults and children present, and teaching approach of the curriculum, all of which could affect children's involvement and well-being scores during each observation. Both the Laevers scales were used as

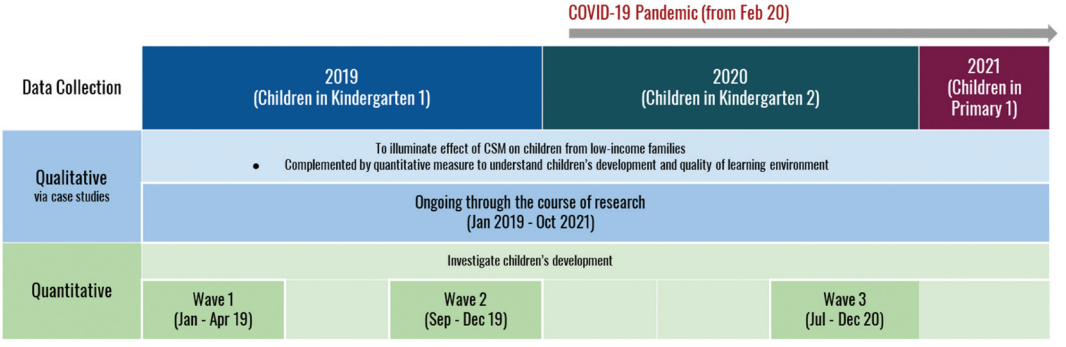

Figure 1. Timeline for data collection.

process measures rather than outcome measures in this study. The L-I measures children's participation in classroom activities as a process measure for learning, while the L-W measures children's state as a process measure for well-being. Data on these process measures offered rich information in interpreting children's learning and well-being outcomes.

Strengths and Difficulties Questionnaire (SDQ). The questionnaire has 25 items that are used to assess behavioural adjustment in children and adolescents aged 3–16 years (Goodman, 1997). It is frequently used in clinical and research settings to identify children at risk of developing social, emotional, or behavioural issues, as well as to measure the success of intervention (Liu et al., 2013; McCrory & Layte, 2012). The instrument employs a 3-point scale of not true, somewhat true, and certainly true to generate scores for five subscales: (1) emotional problems; (2) conduct problems; (3) hyperactivity/inattention; (4) peer problems; and (5) prosocial behaviour, each of which includes five items. An overall difficulties score is calculated using all subscales (excluding the prosocial subscale), with a higher score indicating worse behavioural adjustment. The total difficulties scores are then categorized into a four-fold classification as follows: (1) close to average; (2) slightly raised; (3) high; and (4) very high. As for the prosocial subscale, higher scores on the prosocial behaviour subscale indicate greater prosocial abilities. In the current study, the questionnaire was completed by teachers, either via hard copy or online via Qualtrics. The SDQ offered a measure of children's well-being outcomes in this study.

Brigance Inventory of Early Development, Standardized, Third Edition (IED-III Standardized). The language subscale and academic/cognitive subscale of the IED-III Standardized (French, 2013) were used to collect data on children's learning outcomes. The IED-III is a thorough standardized assessment instrument that offers data on children's development from birth to 7 years 11 months. The assessment consists of five domains: physical, language, academic skills/cognitive, adaptive behaviour, and social and emotional development. In this study, only the language and academic/cognitive domains were used. The IED-III Standardized has been adapted and normed on the Singapore population to be sensitive to the Singapore population and context (Poon et al., 2017). The IED-III scores were used as outcome measures on children's learning in this study.

Data analysis

Qualitative data analysis. Field notes, observation records, and interview records were transcribed by the research team because of the sensitivity of the data and to further avoid misinterpretation as some data was collected using mother tongues of the research participants and some in English. The data were analysed using thematic coding based on grounded theory (Strauss & Corbin, 1990). Grounded theory represents a systematic method in developing theory in the context of the phenomenon of the study, in this case, the effects of the Child Support Model (CSM) in Singapore early childhood education classrooms. Based on the codes, the thematic summary of the findings was developed as demonstrated in the figures in the next section.

Quantitative data analysis. Quantitative data were analysed using SPSS, version 23 software. Descriptive statistics were applied to examine the means, standard deviations, and distribution of test scores and observation scales. Repeated-measures ANOVA was conducted to examine changes in scores across wave 1 to wave 3. If the main within-subject effect was significant, we followed the omnibus test with pairwise comparisons using the Bonferroni approach to control for familywise Type-I error.

Results

As shown in Figure 1, by triangulating qualitative data and quantitative data, the study has addressed the evaluation questions and provided evidence on the effectiveness of the CSM programme. Findings addressing each evaluation question will be described in this section.

RQ1: what are the effects, if any, of the CSM on the well-being of children from low-income families?

Qualitative data were coded to inform the understanding of the CSM's effects on children's well-being. Figure 2 provides a summary of the four major themes derived from qualitative data, which will be elaborated below.

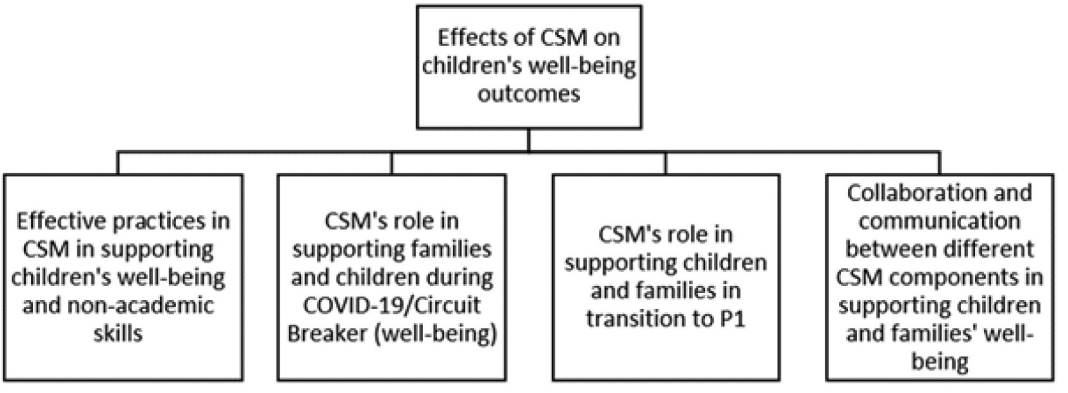

Figure 2. Summary of qualitative themes of effects of child support Model (CSM) on children's well-being outcomes.

Theme #1: effective practices for supporting children's well-being

From the qualitative perspective, the outcomes of children's learning and well-being largely depended on the process that scaffolds the children in ensuring they received adequate support. In CSM, we had identified some of the effective practices in supporting children's overall well-being and non-academic skills, which often featured collaboration between different CSM components and professionals as the key factor. Children's well-being depended on the quality of relationships and well-being of the families as well as their immediate environment (Bronfenbrenner, 1994). The well-being outcomes were also influenced by the role CSM played in supporting the children during the COVID-19/Circuit Breaker[2] restrictions, as well as the transition process from pre-school to primary school.

In CSM, children's learning and well-being at home and in school were closely monitored. For example, the CEEs actively observed children to understand their socio-emotional and academic well-being, besides looking out for signs of physical violence or other factors that might affect the children. The CEEs were regularly updated on children's development and progress in school. Apart from monitoring, CSM professionals had reported that they did recognize the importance of children's well-being and building rapport with them. According to parents, overall, CSM provided opportunities for their children to be involved in activities like the field trips, known as the Family & School Together component.

To understand children's well-being in the classroom, researchers used the L-W, which included elaborate indicators of different domains for children's well-being: "Happiness and Satisfaction", "Social Functioning", and "Dispositions". As shown in Figure 3, researchers noted that during core curriculum learning activities, there were not many opportunities to observe children's social initiatives and interaction with peers, as well as dispositions such as child's openness and interest in exploring/experimenting and pleasure in sensory experiences. This was mainly because the teaching approach by classroom teachers has been observed to be more teacher-directed, and thus, there was a lot more teaching and delivering of information compared to opportunities for the children to explore. As the Laevers Scales were grounded in a more play-based pedagogy, some

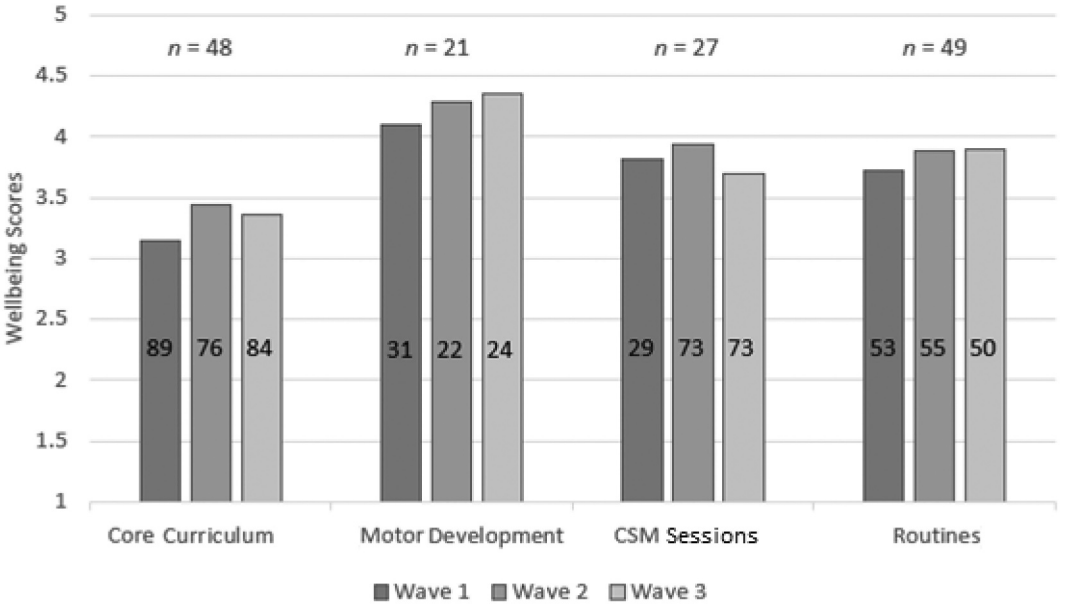

Figure 3. Laevers well-being mean scores across four activities in waves 1, 2 and 3. *Note*. The numbers within the bars indicate the number of observations used for each activity, while *n* on the top of the bars indicate the number of children observed for each activity.

children's scores were considerably lower for "Dispositions'"as the teachers" pedagogical approach had been observed to be more structured, where teaching took place within the parameters of set curriculum and learning objectives. Therefore, children could have lower L-W scores during core curriculum learning (i.e., below 3.5). However, children scored better during CSM sessions which offered more individualized attention; and during routines that were noticeably more flexible. Children's L-W scores were also generally high during outdoor activities as they had opportunities to interact and play more freely due to the more children-centred nature of such activities. Figure 4 demonstrates children's L-W scores across wave 1, wave 2, and wave 3 in four types of activities.

Theme #2 and #3: COVID-19 support and transition to P1

CSM's role in supporting children in terms of well-being was not limited to within the context of the classroom, as it continued to provide support at home when the COVID-19 pandemic hit and during the Circuit Breaker lockdown period. This included ensuring that the children and their families' basic needs were met for example, by providing food rations and supermarket vouchers, and continuing to monitor children's well-being at home during lockdown by phone or video calls. In addition, CSM also played an important role in supporting children as they transitioned to Primary 1. According to most parents, their children were adapting well to the new primary school environment. Children were enjoying learning in Primary 1 and some pointed out that their children were experiencing good social life.

While most children were adapting well to primary school, some children faced challenges, such as getting along with their peers. This could be due to the limited interaction with other children due to the COVID-19 distancing measures, interpersonal problems, and a weak command of English. Some other concerns from parents included their children's ability to focus on tasks, lack of confidence in voicing thoughts and needs, and completing routine tasks independently.

Theme #4: collaboration and communication between different CSM components in supporting Children's well-being

To ensure that children were well-supported in terms of well-being, there were indicators that CSM professionals worked closely together to collaborate and communicate with each other. Furthermore, CEEs collaborated with the child protection services and social workers in the community, when needed. There was evidence that they regularly updated and exchanged information, as well as supported CSM professional counterparts by sharing and exchanging strategies and resources. However, we also observed some gaps in the collaboration process amongst CSM professionals, teachers, and parents. For example, communication can be more difficult when the parent's primary language is not English, and the school personnel does not speak the parent's primary language.

Supplemental findings from quantitative data: children's well-being outcomes across three waves

Quantitative data supplemented the qualitative findings by documenting children's well-being on the SDQ in three waves. As demonstrated in Figure 4, the overall trend of SDQ scores showed an increase from 38 to 40 children whose SDQ scores fell in the "close to average" range from wave 1 to wave 3. The number of children whose SDQ scores fell in the concerning ranges (i.e., "slightly raised", "high" and "very high") reduced from 17 in wave 1 to 15 in wave 3. A repeated-measures ANOVA showed a significant main effect across three waves ($p < .05$). Bonferroni pairwise comparisons reveal that children's mean SDQ difficulties score in wave 2 ($M = 7.84$, $SD = 5.38$) was significantly lower than in wave 1 ($M = 9.35$, $SD = 5.75$), $p < .0.016$. There were no significant differences between SDQ scores at wave 2 and wave 3. This indicated a reduction in the children's challenges in socio-emotional wellbeing as observed by their teachers and the reduced challenges were maintained at wave 3 in spite of restrictions during the COVID-19 pandemic.

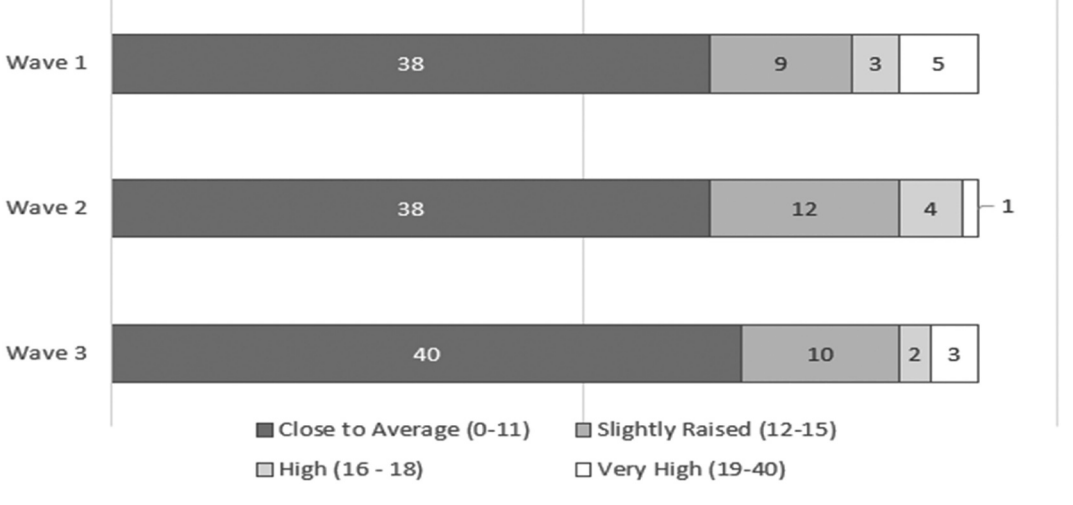

Figure 4. Strengths and difficulties questionnaire (SDQ) total difficulties scores in four categorizations ($n = 55$). *Note*. The numbers within the bars indicate the number of children with scores that fall within each category.

RQ2: what are the effects, if any, of the CSM on the learning outcomes of children from low-income families?

Theme #1: CSM support in children's learning

To better understand children's learning outcomes, some qualitative evidence is provided here to understand the learning support provided by CSM that may have had an effect on the outcomes, as summarized in Figure 5. CSM components, such as Read-to-Reach (RTR) and Classroom Support Programme (CSP) focus on providing children with small group learning opportunities and more individualized support in large group settings. During these CSM sessions, the professionals were observed to be directly supporting and scaffolding the children's learning. For example, the CCFs from the CSP supported children by assisting them in fine motor skills (e.g., handwriting), as well as reinforcing lessons learnt in class. CCFs were observed to provide learning support in large group settings as well as more individualized pull-out sessions. As a result, some children were observed to be engaged and confident and made progress over the three waves of data collection. Some parents also noticed improvements in children becoming more expressive and improving in their speech, as well as improvements in reading and handwriting. A number of parents shared that their children had developed confidence and the ability to learn independently. Both researchers and parents observed that socio-emotional support in learning received less attention in comparison to academic skills.

Researchers observed some effective pedagogical practices in CSM sessions in terms of supporting children's learning. The individualized attention and scaffolding, as well as the step-by-step approach in some of the RTR and CSP components were practices that were documented. The CSM professionals were also observed to have good understanding of individual children's abilities and dispositions. For example, one CCF was found to have effectively grouped children based on his/her understanding of children's abilities and dispositions and provided more guidance to children who required more support. Some CCFs had been observed to use a variety of scaffolding methods to support children in learning. This includes asking questions, employing different strategies to explain concepts, repetition, and verbal reinforcement, as well as recalling information and applying prior knowledge in learning. However, it was noted that the implementation of CSP component was observed to vary across different centres and professionals, thus, the documented effective practices did not apply to all. In addition, the CCFs' teaching strategies were tied to the teaching methods applied by the classroom teacher and their working relationship with the individual teacher. RTR

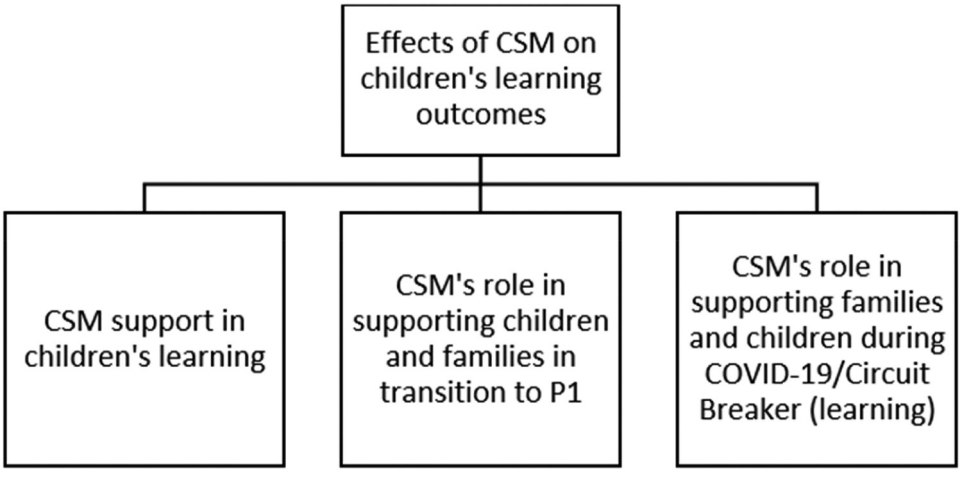

Figure 5. Summary of qualitative themes of effects of child support model (CSM) on children's learning outcomes.

programme, however, followed structured lesson plans instead of accommodating to the needs of individual children, and children who could follow the instructions were therefore observed to be more involved during these small group lessons.

The study used L-I to observe children's involvement during learning sessions such as the whole-class curriculum sessions and CSM sessions like RTR. During curriculum sessions in class, although generally children were observed to be involved during lessons, there were a lack of opportunities to observe certain indicators such as creativity and complexity, which are important indicators of involvement on the L-I. This is largely due to the structured and teacher-directed approach that the teachers adopted, which also affected the CSM sessions. Additionally, non-Chinese-speaking children (e.g., children of Malay and Indian Singaporean ethnicities) were observed to have lower L-I scores during Chinese lessons which were compulsory in the bilingual preschool program. Researchers noted that these children showed signs

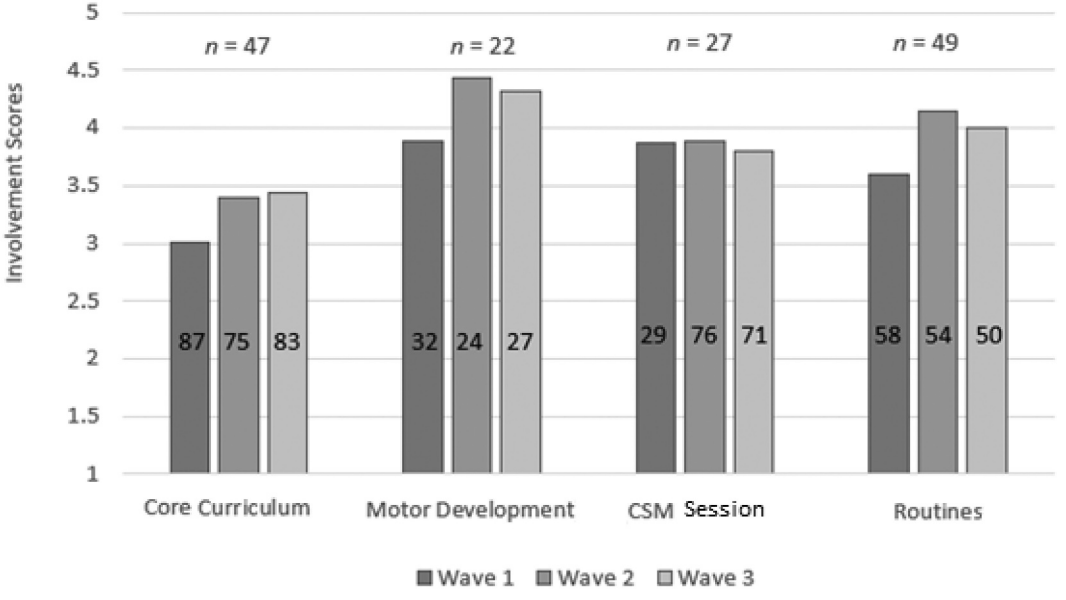

Figure 6. Laevers involvement mean scores across four activities in waves 1, 2 and 3. *Note*. The numbers within the bars indicate the number of observations used for each activity, while *n* on the top of the bars indicate the number of children observed for each activity.

of being lost or bored, and at times were left to participate in activities such as drawing or colouring by themselves, while their peers practiced their Chinese language skills. Researchers also noted how children could appear tired during CSM sessions like RTR, which were quite content-intensive with a higher adult–child ratio. In one instance, based on the observation notes, a child complained that an RTR lesson was too long. Figure 6 demonstrates children's L-I scores across wave 1, wave 2, and wave 3 in four types of activities.

As listed in Table 3, significant correlations in the positive direction were found between L-I and L-W scores and the use of a child-centred teaching approach in both waves 2 and 3 during core curriculum sessions. In CSM sessions during Wave 2, the correlations were not significant for CSM sessions but still significant in core curriculum sessions.

Table 3. Correlation coefficients between observed child involvement (L-I) and well-being (L-W) with level of child-centeredness in teaching approach.

	Child-Centeredness in Teaching Approach	
	Wave 2	Wave 3
Involvement (L-I) in core curriculum	.273*	.371**
Involvement (L-I) in CSM	.118$^{n.s.}$	.220**
Well-Being (L-W) in core curriculum	.239*	.321**
Well-Being (L-W) in CSM	.162$^{n.s.}$	.252**

*$p < .05$; **$p < .01$; n.s. = not significant.
L-I = Laevers' Involvement Scale; L-W = Laevers' Well-Being Scale.

Themes #2 and #3: learning support during the COVID-19 circuit breaker period towards transitioning to P1

Like well-being, the CSM support in learning was not limited to the classroom context, as it extended to supporting children in home-based learning (HBL) during the 2020 COVID-19 Circuit Breaker period. The restrictions during Circuit Breaker meant that children were unable to attend school, and this had impacted and disrupted children's learning and development. The centres and CSM provided HBL support mainly through providing learning resources, lessons on Zoom, and continuing to monitor children's learning at home. In some cases, the CSM facilitated the loan of tablet devices and provided SIM cards for families to access the internet. According to the teachers, they regularly recorded teaching videos and tried to cover different domains. However, some parents mentioned the lack of internet connection and computer equipment as a challenge, especially for those with multiple school-aged children in the family.

CSM played an important role in supporting children's learning for their transition to primary school, as CSM components like RTR, CSP, and FLAiR (i.e., a small-group language and literacy intervention programme) were geared towards helping the children prepare academically for Primary 1. In some cases, the learning support programmes were observed to continue online during the Circuit Breaker period, but to a limited extent. A number of parents found that CSM had helpful components with good academic support for their children mainly with literacy, and there were some who found the CSM to be well rounded in terms of primary school preparation. Some parents highlighted the strong support that was provided during the Circuit Breaker period and HBL. However, even with CSM support, some parents still struggled to support their children with HBL due to their working hours and taking care of younger siblings.

In Primary 1 follow-up interviews with some of the case study parents, most parents shared that their children were coping and doing well in terms of learning in Primary 1. Some children felt motivated, while some felt competitive. Some parents whose second language was not Chinese Mandarin raised concerns about their children facing some challenges in terms of Mother Tongue language learning. They identified the limited resources and opportunity to practice Mother Tongue language during preschool as one of the main factors since the learning expectations of every child are the same for each Mother Tongue in primary school. Some children also faced challenges in terms of academics in Primary 1 – such as struggling to keep up with lessons in school, sometimes due to weak command of English. Among the 53 child participants in the study, only 16 (30%) continued to receive learning support in Primary 1 from the school they are enrolled in.

Supplemental findings from quantitative data: children's language and academic/cognitive outcomes across three waves

A repeated measure ANOVA revealed a significant within-subject main effect across three waves, both on children's language ($p < .01$) and on their academic/cognitive development ($p < .001$). Bonferroni pairwise comparisons reveal that children's learning in language, as measured on the IED-III, showed a significant improvement ($p < .00003$) from wave 1 ($M = 92.00$, $SD = 13.32$) to wave 2 ($M = 96.05$, $SD = 11.53$), and maintained at a similar level with no significant change from wave 2 to

Table 4. Means, standard deviations, and one-way analysis of variance in IED language composite and academic/cognitive composite ($n = 58$).

	Wave 1 *M* (*SD*)	Wave 2 *M* (*SD*)	Wave 3 *M* (*SD*)	*F*(1, 57)	η^2
IED Language Composite Score	92.00 (13.32)[a]	96.05 (11.53)[a,b]	94.79 (13.61)[b]	6.05**	.10
IED Academic/Cognitive Composite Score	88.63 (13.15)[c]	92.26 (12.70)[c,d]	91.88 (13.99)[d]	9.39***	.14

**$p < .01$; ***$p < .001$.
Pairwise comparison using Bonferroni approach results indicated by: ap < .00003; bp > .05; cp < .00003; dp > .05.

wave 3 ($p > .05$). Similarly, IED-III academic/cognitive scores showed a significant increase ($p < .00003$) from wave 1 ($M = 88.63$, $SD = 13.15$) to wave 2 ($M = 92.26$, $SD = 12.70$) and did show a significant change in wave 3 ($p > .016$). Table 4 summarizes IED-III scores across three waves. This illustrated the gains in children's learning from wave 1 to wave 2. It is worth noting that the children were able to maintain the learning progress during wave 3, in spite of significant learning disruptions in 2020 due to the COVID-19 pandemic.

RQ3: what are the parents' experiences with the CSM?

Themes #1 and #2: supporting families in well-being and parenting

Figure 7 provides a summary of the themes dericved from qualitative data that are relevant to parents' experiences with the CSM. Not all parents recognized the term "Child Support Model" without being prompted with some names of specific CSM professionals, and did not always connect the term CSM with the specific support and arrangements associated with the model. For example, some parents reported that they were not sure about the role of the CCFs, who usually work with their child in the classroom. On the other hand, some parents were able to report some CSM support programmes as being helpful. The CEEs were seen as a key component of the program and their main role was to connect the family with a range of support resources, mediate the learning of parenting strategies from CSM professionals, and maintain close communication with school professionals. Overall CSM has supported families in different, sometimes challenging events in life. A single father explained the impact the programme has had for him in supporting the development of his children in terms of healthier nutrition:

Researcher: Then about the child support model, what is your experience with the child support model?

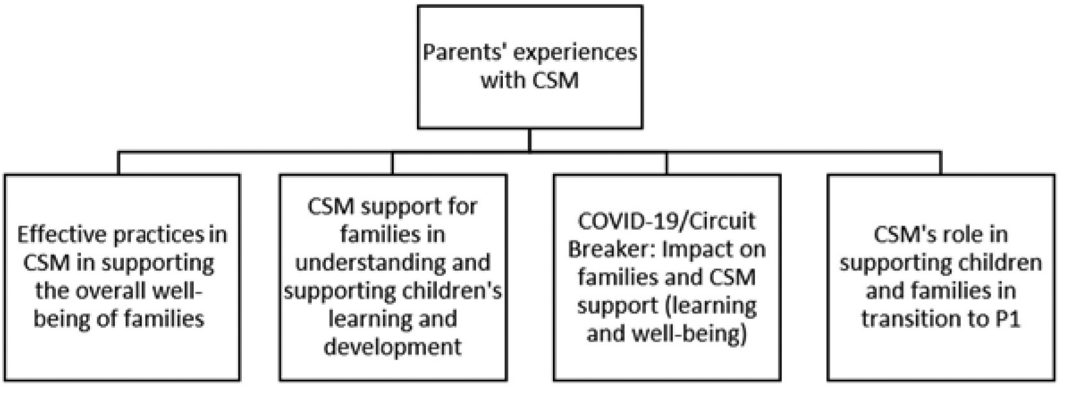

Figure 7. Summary of qualitative themes covering parents' experiences with child support Model (CSM).

Parent: It's good, it's good. The thing is, I can claim that I am a father. And I want to be the best father. But I don't know how the method is. The proper method to be a good father in terms of education-wise . . . Before this, I just feed them with potato chips, maggi, I don't know how to cook. But since they in childcare, I surprised that they can eat healthy meals, noodles everything. So I prefer them at school, that time when I was alone with them. So Saturday also I can choose not to send them, but I still send them because I want to have C37 eating porridge. C37's sister also. Only sunday they will have my McDonalds".

Theme #3: Supporting Families & Children during COVID-19/Circuit Breaker

Parent participants reported that the CSM professionals checked in with them to ensure basic needs were met and provided them with HBL resources. CSM had provided them with food rations, supermarket vouchers, and health-related care packages (varied across centres). As one parent stated, "We received a Sheng Shiong (supermarket) voucher of $80, and rice, oil, and a lot of practical stuff. It's really well thought through". Besides assisting the families with their basic needs, CSM had also provided them with HBL resources for the children to carry on with learning at home during the COVID-19 Circuit Breaker. This included conducting lessons on Zoom, providing different activity materials, with one parent mentioning that the school assisted them by providing tablet devices. Children were unable to attend school over the Circuit Breaker period and online lessons were also found to be joyful.

Theme #4: supporting children & families in transition to primary 1

While several parents found the registration process straightforward, some were unfamiliar with the procedures of primary school registration. In this case, CEEs had assisted them with the registration, and provided them with relevant information. Most of the parents found that the CSM was helpful in terms of helping them and their children transition to Primary 1. Some found the CSM to be comprehensive with a wide range of support and networks, helping their children to catch up with literacy skills, and being independent in their daily routines. One parent pointed out that the strong support during the Circuit Breaker/HBL period had helped with the transition. In most cases, parents reported that their children were adapting well in Primary 1.

As one parent said, "Yeah yeah, she's doing fine actually in school so no, no learning support in school, not on any extra programs". However, there was a parent (whose first language was not English) who indicated that her child was struggling with schoolwork, but she felt unequipped to help. She said, "(translated into English) But I do feel that she wasn't able to absorb everything that was taught. I don't know . . . I can help her with Chinese, but English, I am a bit afraid. So, I thought that for some English and Math questions, she completed her work based on guesswork.[3] Our English proficiency is still lacking". Also, another parent mentioned how she was concerned over the learning behaviour of her son during the preschool years, but the teachers mentioned that it was very difficult to get into counselling. She continued to be concerned during Primary 1 that there was no counsellor to explain the challenges her son was facing, and she mentioned being really lost in trying to obtain support.

RQ4: what effect, if any, does the CSM have on vulnerable families?

Summary of qualitative themes of effects of child support model on vulnerable families

As described in previous sections, CSM was designed to support children and families in terms of learning and well-being. Qualitative data in this study indicated evidence that the CSM provided financial and social support for families, as shown in Figure 8. The families who were receiving CSM did not have "uniform" qualities; each having their unique sets of strengths and challenges, but generally came from a lower-income background. In terms of the case study families, more than a third (35.7%) of them were dual-income families, as much as those who had income from one working parent. While some reported struggling to making ends meet,

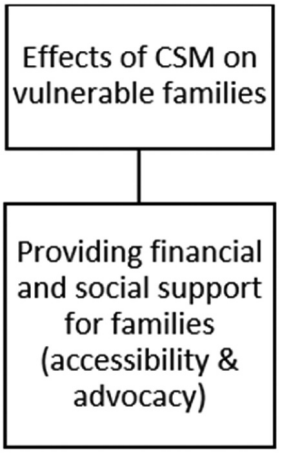

Figure 8. Summary of qualitative themes of effects of child support Model (CSM) on vulnerable families.

there were also parents who could afford to provide additional learning resources beyond CSM programs, such as supplementary classes.

Some case study families were also facing more serious circumstances, for example, those with child protective service intervention, family violence, unemployment, and child management issues. Overall, the families reported to enjoy spending time together as a family and many of them had support networks from their families and relatives beyond CSM. One mother also mentioned that she felt embarrassed to ask for support, so she used their own family networks when in need of extra support.

CEEs bridge families to relevant resources and assistance

At the forefront of assisting families who were facing complex issues, such as financial, employment, and social issues, were the CEEs. To support them in terms of accessibility in getting resources and advocacy in ensuring their overall well-being, CEEs assisted families in receiving financial aid and subsidies by working with various stakeholders and organizations for resources and directing parents to relevant channels for assistance/resources. CEEs also assisted the families in getting school fees assistance, and assisted parents in finding and maintaining their jobs. In one example, a parent shared that the CEE had helped her husband in writing his resume for his job applications, which was successful. In another instance, the CEE played a crucial role in keeping a child in school even though the family was not able to pay the school fees. The unpaid school fees accumulated stress for the family, and they were about to withdraw their child from the school. However, the CEE worked consistently to keep the child in school and to find subsidies for the family to cover the fees. For this case study child, the school and the interventions that CSM offered were paramount for the transitioning to school and learning English.

CEEs act as communication bridges for families

As the families may feel unequipped and unfamiliar in working with other stakeholders, CEEs employed their understanding of the families and expertise in the field to help the families by acting as a communication bridge. CEEs had worked with the families' social workers, and in one example, was the main person who assisted a parent in communicating with the child protection officer. CEEs also helped some families in communicating and following up with their children's learning and development. When families struggled to communicate with the school or teachers, CEEs would usually come in and facilitate in bridging them. Additionally, a CEE

shared that she had accompanied parents and children to undergo the child development test for the DS-LS, especially those who did not speak English and were unfamiliar with the elaborate procedures.

Principals play an active and direct role in linking families to resources and support

Besides the CEEs, principles were instrumental in supporting the families and linking them to resources. Usually, the principals worked closely with the CEEs to assist the families and advocate for them, especially with their understanding of the families' situations and backgrounds. This included securing financial aid for the families and helping them to navigate the complex system in applying for assistance.

Discussion

The results summarized above illustrated how children and their families experienced the CSM provided by NFC and its childcare centres, especially during the challenging time of the COVID-19 pandemic and in preparing for the transition to primary school. This section applied Bronfenbrenner's ecological systems framework (1994) to discuss how the CSM supported children and families at the microsystem, mesosystem, and exosystem levels. Implications for improvement and future efforts in supporting young children and families from low-income backgrounds are also discussed in this section.

CSM: addressing children's and families' needs through a multilevel approach

As documented in this study, the CSM has many components, each focusing on very specific needs of children and families. Applying the ecological system's framework (Bronfenbrenner, 1994) helps organize and structure the components of CSM and identify room for improvement. Figure 9 demonstrates the roles CSM plays at each level of the ecological system.

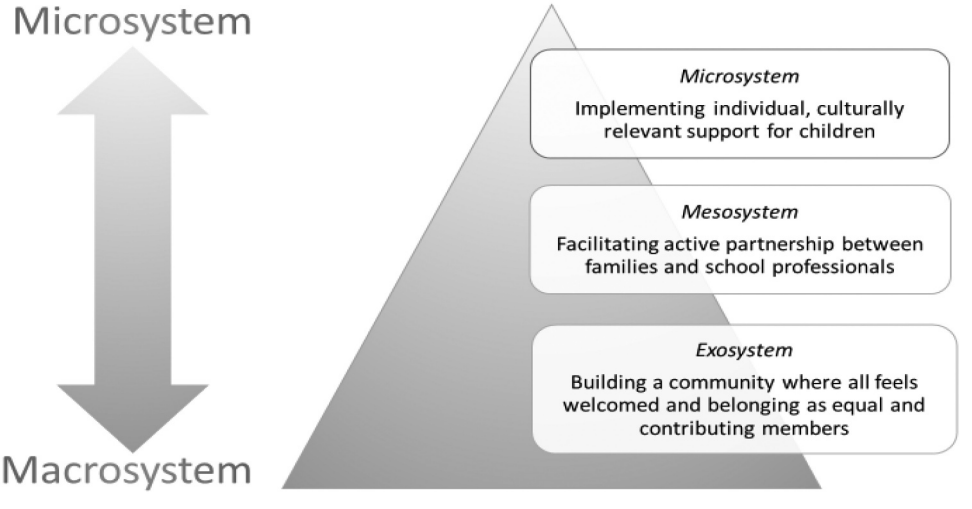

Figure 9. Model of multilevel intervention for children from low-income families to access quality education.

Microsystem-level

The CSM implements individualized, culturally relevant support for children and such practices can be improved. Children exemplifying well-being and involvement in learning indicate that children are experiencing developmentally appropriate and culturally relevant support in their immediate environment (Ebbeck et al., 2012; Howard et al., 2012; Laevers, 2017). Understanding the quality of learning experiences based on observed children's socioemotional and active learning behaviours has been widely employed for assessing effectiveness and quality of school programmes (Declercq, 2011; Ebbeck et al., 2017; Howard et al., 2012; Sando et al., 2021). Using the Laevers Scales observations, including the L-I and the L-W, complemented by the classroom environmental variables and overall classroom observations, we can gain a sense of the learning experiences and adult-child interactions that are motivating and meaningful to the children. As shown in Table 3, such findings suggest that the implementation of more child-centred activities may contribute to better involvement and well-being of children. Child-centred approaches are associated with higher social competence, fewer problem behaviours in young children, improved academic learning, socio-emotional development, creativity and divergent thinking skills (Bennett, 2005; Chambers et al., 2016; Sylva et al., 2004).

Mesosystem-level

The CSM builds communication and collaboration between the family and multiple stakeholders. It can be further improved to facilitate more active partnerships among them. The collaborative partnerships among stakeholders (i.e., children, families, and school professionals) in the CSM was a key factor to the programme's quality support at the children's micro-level. In addition, the quality of partnership with different stakeholders has an effect on the quality of the learning experiences. Active partnership among the microsystems (i.e., child, family, teachers, CSM professionals) is essential for constructing more individualized, culturally relevant support for the children. Center leadership and CSM professionals' retention were observed to have a positive impact on the quality of partnership as indicated through the different case studies. For future programme development, the CSM may strive to encourage families to play more active participatory roles in designing the supports for them and their children. Although relatively good-quality partnerships were observed between families and CSM professionals, families seemed to be more often involved in passive roles to provide consent or to follow through suggestions from the school. Moving forward, families could be encouraged further to actively participate as equal partners in the planning and decision-making of learning supports for their children instead of only involving them for consent purposes. Considering families as active partners at the planning stage, instead of passive partners in the program is paramount, which was not always the case observed in the case study's families. A family-centred approach to providing support requires the school professionals to focus on capacity-building by interacting, treating, and involving parents and families (Dunst & Espe-Sherwindt, 2016; Mas et al., 2022; Rouse, 2012). It was reported that professionals who underwent capacity-building professional development and reported higher-levels of self-efficacy were more likely to form partnerships with families and adopt participatory practices (Dunst et al., 2019).

Exosystem-level

The NFC adopted an ecological systems approach to intervention that provides indirect support at the exosystem level. It developed the CSM as a new initiative to support children and families from low-income backgrounds, and hired and trained 90 professionals for the newly developed roles such as CEE and CCF, so as to scale the CSM across its network to more childcare centres.

More can be done at this level to further strengthen the capacity and competencies of school professionals. As the CSM is refining its services to address specific needs of children and families, professionals taking different roles in the CSM may need to adopt a more efficient approach to teamwork, such as the transdisciplinary teaming approach (King et al., 2009). In addition, as school professionals are working with children with very different needs in the same classroom, they would

also benefit from training on inclusive attitudes and practices. For professionals in CSM, it is crucial that they do not apply a deficit-based discourse when working with children and families from low-income backgrounds. The deficit-based discourse, in general, suggests that deficiencies in the children and their home environment are the main contributors to their poor engagement in schools (Teo, 2018). The contemporary attitudes that underpin CSM, such as family-centred practice, building active partnerships between school and families, and designing shared aims at the institution level, should be promoted and made aware among the professionals and these shared attitudes can guide CSM professionals' approach to facilitating learning for diverse children.

Limitations

The current study utilized a mixed-methods design and supplements qualitative data with quantitative inquiry. However, the findings were drawn based on descriptive data without sufficient control to establish causal relationships. Findings need to be interpreted with caution.

The small sample size in the quantitative analyses has limited the capacity to apply advanced statistical models such as path analysis and latent profile analysis to further inform the understanding of the data. Future research with a larger sample size is needed to validate some of the findings reported in this study, such as the relationships between child-centred teaching approach and children's involvement and well-being.

Conclusion

This collaborative study between researchers and practitioners has documented and reported rich evidence on the effects of the CSM program based on multiple sources of data across 3 years. Findings from a mixed-methods evaluation demonstrated the resilience of young children and their family from low-income backgrounds, even during the challenging times of the COVID-19 pandemic. Our rich data from case studies demonstrated how such resilience was well supported by the CSM programme using an ecological systems approach. Implications have been drawn to inform programme development and policy making. For example, children's well-being may be further enhanced when teachers applied a more play-based pedagogical approach, offered more individualized attention, and made an effort to strengthen the collaborations with families and communication within the school personnel; children's learning may benefit from having individualized classroom support and scaffolding for learning, as well as a less teacher-directed environment and more linguistically and culturally sensitive curriculum and learning opportunities; families from low-income backgrounds benefited from the comprehensive supports offered in CSM, but some expected to play more active participatory roles in decision-making about how they can be better supported; school professionals in CSM have developed the capacity and confidence in supporting children and families from low-income backgrounds, but can further benefit from more professional development opportunities and support to their own well-being. Future research is needed to follow up on the implementation and outcomes of the programme development as summarized above and to inform generalization of effective practices as identified in this study to more early childhood programmes serving children and families from low-income backgrounds.

Notes

1. A household income of SGD$3,500 or below is less than the 20th percentile of monthly household income in the population of Singapore (Department of Statistics, Singapore, 2020).
2. Circuit Breaker refers to a series of restrictions enacted from 7 April 2020 to 1 June 2020, including but not limited to stay-at-home order and school closure (Sin, 2020).
3. The researchers interpret "guesswork" as "guessing".
4. In the second half of 2020, YGT was conducted in smaller groups and FAST was replaced with take-home activity kits due to COVID-19 restrictions. NFC initiated "Bright Horizons Fund Care Package for COVID-19" and "Digital Kampung Programme" to assist low-income families with financial and digital access.

Acknowledgements

The authors are grateful to Dr Fred Ebbeck, Former Senior Academic Advisor of NTUC First Campus, for advising this project.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the NTUC First Campus Co-Operative Limited under an external grant [NTUC-Effect of Child].

Notes on contributors

Huichao Xie is an Assistant Professor at the University College Dublin in Ireland. She completed her teaching licence and Ph.D. training at the University of Oregon in the United States. Before starting her academic career, she worked as an educator and teacher trainer for ten years with children with or at risk for developmental disabilities and their families and teachers. Her research focuses on developing, adapting, and validating instruments, practices and procedures for parents and teachers to understand and support children's learning needs. Before joining the faculty at the University College of Dublin, Huichao was an Assistant Professor at the National Institute of Education of Nanyang Technological University in Singapore.

Heidi Layne is a Senior Lecturer in Global and Sustainable education at the University of Jyväskylä and Adjunct Professor in Sociology of Education at the University of Helsinki. Her research interests are on cultural and social sustainability, family well-being and qualitative research methods. For the past two years she has lead Education for Emergencies research project. She has research experience both in Finland and Singapore in relation to the everyday multiculturalism in the school context and education pathways for student with immigrant and lower-income family backgrounds.

Mardiana Abu Bakar is a Lecturer with the Policy, Curriculum and Leadership Academic Group at the National Institute of Education of Nanyang Technological University in Singapore.

Mardiana Abu Bakar is a Lecturer with the Policy, Curriculum and Leadership Academic Group at the National Institute of Education of Nanyang Technological University in Singapore.

Ng Ee Lynn is a Senior Education Research Scientist at the Center for Research in Child Development at the Office of Education Research at the National Institute of Education of Nanyang Technological University in Singapore.

Chew Ping Phoon with a strong interest in improving the lives of children and families, Mrs Phoon Chew Ping joined NTUC First Campus in 2015. As the Chief Child Support Officer (2015 to 2020), she developed and implemented NFC's holistic and integrated Child Support Model for children from low income backgrounds and children with developmental needs. She held the appointment of Deputy CEO (Development) till her retirement in 2022, where she provided leadership to Child Support programmes, Curriculum and Pedagogy for NFC preschools, and Human Resource.

Rita Lim joined NTUC First Campus as she was drawn to its mission to make quality child development and care services accessible to families, including those from disadvantaged backgrounds. She has since experienced various portfolios including teacher, principal, adult educator and manager of learning programmes. She believes strongly in merging the art of teaching and the science of data to improve teaching practices and decision making. Her research interests include inclusion, low income, mentoring and teacher leadership.

Stephanie Chai is a Senior Research Associate at the Center for Research in Child Development at the Office of Education Research at the National Institute of Education of Nanyang Technological University in Singapore.

Loh Jie Ying was a former Research Assistant in the funded research project described in this paper.

Jing Cheah having a keen interest in education research, Jing has dedicated her career to exploring various topics within education, including investigating children's learning needs, effectiveness of teaching practices, as well as the well-being of educators in their professional environments. She believes in harnessing the potential of data science methods to uncover insights in children's educational outcomes.

Kenneth Poon is Lien Foundation Chair Professor of Education (Psychology and Human Development) at the National Institute of Education, Nanyang Technological University. His research interest focus on developmental

psychopathology, early intervention, assessment of children and youth with neurodevelopmental disabilities, autism spectrum disorders, intellectual and developmental disabilities.

ORCID

Huichao Xie http://orcid.org/0000-0002-0606-2777

Data availability statement

Data sharing is not applicable to this article as no new data were created or analysed in this study.

References

Bennett, J. (2005). Curriculum issues in national policy-making. *European Early Childhood Education Research Journal*, *13* (2), 5–23. https://doi.org/10.1080/13502930585209641

Bronfenbrenner, U. (1994). Ecological models of human development. *Readings on the Development of Children*, *2*(1), 37–43.

Campbell, F.A., Ramey, C.T., Pungello, E., Sparling, J., & Miller-Johnson, S. (2002). Early childhood education: Young adult outcomes from the abecedarian project. *Applied Developmental Science*, *6*(1), 42–57. https://doi.org/10.1207/S1532480XADS0601_05

Cannon, J.S., Kilburn, M.R., Karoly, L.A., Mattox, T., Muchow, A.N., & Buenaventura, M. (2017). *Investing early: Taking stock of outcomes and economic returns from early childhood programs*. RAND. https://doi.org/10.7249/RR1993

Chambers, B., Cheung, A.C., & Slavin, R.E. (2016). Literacy and language outcomes of comprehensive and developmental-constructivist approaches to early childhood education: A systematic review. *Educational Research Review*, *18*, 88–111. https://doi.org/10.1016/j.edurev.2016.03.003

Creswell, J.W. (2009). Editorial: Mapping the field of mixed methods research. *Journal of Mixed Methods Research*, *3*(2), 95–108. https://doi.org/10.1177/1558689808330883

Creswell, J.W., & Clark, V.L.P. (2017). *Designing and conducting mixed methods research*. Sage publications.

Creswell, J.W., Plano Clark, V.L., Gutmann, M., & Hanson, W. (2003). Advanced mixed methods research designs. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research* (pp. 209–240). Sage.

Declercq, B. (2011). Levels of well-being and involvement of young children in centre-based provision in. *South African Journal of Childhood Education*, *1*(2). https://doi.org/10.4102/sajce.v1i2.85

Department of Statistics, Singapore. (2020). *Key household income trends, 2020*. https://www.singstat.gov.sg/-/media/files/publications/households/pp-s27.pdf

Dunst, C., & Espe-Sherwindt, M. (2016). Family-centered practices in early childhood intervention. In B. Reichow, B. A. Boyd, E.E. Barton, & S.L. Odom (Eds.), *Handbook of early childhood special education* (pp. 37–55). Springer International.

Dunst, C., Espe-Sherwindt, M., & Hamby, D.H. (2019). Does capacity-building professional development engender practitioners' use of capacity-building family-centered practices? *European Journal of Educational Research*, *8*(2), 515–526. https://doi.org/10.12973/eu-jer.8.2.513

Ebbeck, M., Warrier, S., & Goh, M. (2017). Early experiences matter: A relationships-based curriculum for the birth-to-three age group. *Early Childhood Education Journal*, *46*(1), 83–92. https://doi.org/10.1007/s10643-017-0847-9

Ebbeck, M., Winter, P., Russo, S., Yim, H.Y.B., Teo-Zuzarte, G.L.C., & Goh, M. (2012). Measuring children's involvement as an indicator of curriculum effectiveness: A curriculum evaluation of a selected child study centre in Singapore. *Early Child Development & Care*, *182*(5), 609–619. https://doi.org/10.1080/03004430.2011.566329

French, B.F. (2013). *Brigance inventory of early development (IED III): IED III standardization and validation manual*. Curriculum Associates.

Gerring, J. (2004). What is a case study and what is it good for? *The American Political Science Review*, *98*(2), 341–354. https://doi.org/10.1017/S0003055404001182

Gerring, J. (2007). *Case study research: Principles and practices*. Cambridge University Press.

Goodman, R. (1997). The strengths and difficulties questionnaire: A research note. *Journal of Child Psychology and Psychiatry and Applied Disciplines*, *38*(5), 581–586. https://doi.org/10.1111/j.1469-7610.1997.tb01545.x

Howard, J., Miles, G.E., & Rees-Davies, L. (2012). Computer use within a play-based early years curriculum. *International Journal of Early Years Education*, *20*(2), 175–189. https://doi.org/10.1080/09669760.2012.715241

Johnson, R.B., Onwuegbuzie, A.J., & Turner, L.A. (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research*, *1*(2), 112–133. https://doi.org/10.1177/1558689806298224

KidSTART. (2023). *About Us*. https://kidstart.sg/about-us/

King, G., Strachan, D., Tucker, M., Duwyn, B., Desserud, S., & Shillington, M. (2009). The application of a transdisciplinary model for early intervention services. *Infants & Young Children*, *22*(3), 211–223. https://doi.org/10.1097/IYC.0b013e3181abe1c3

Knudsen, E.I., Heckman, J.J., Cameron, J.L., & Shonkoff, J.P. (2006). Economic, neurobiological, and behavioral perspectives on building America's future workforce. *Proceedings of the National Academy of Sciences*, *103*(27), 10155–10162. https://doi.org/10.1073/pnas.0600888103

Kumar, R. (2011). *Research methodology: A step-by-step Guide for beginners* (3rd ed.). Sage Publishing.

Laevers, F. (2015). *Making care and education more effective through wellbeing and involvement. An introduction to experiential education*. Research Centre for Experiential Education; University of Leuven.

Laevers, F. (2017). How are children doing in ECEC? Monitoring quality within a process-oriented approach. In N. Klinkhammer, B. Schafer, D. Harring, & A. Gwinner (Eds.), *Monitoring quality in early childhood education and care: Approaches and experiences from selected countries* (pp. 178–201). German Youth Institute.

Liu, S.K., Chien, Y.L., Shang, C.Y., Lin, C.H., Liu, Y.C., & Gau, S.S.F. (2013). Psychometric properties of the Chinese version of strength and difficulties questionnaire. *Comprehensive Psychiatry*, *54*(6), 720–730. https://doi.org/10.1016/j.comppsych.2013.01.002

Mas, J.M., Dunst, C.J., Hamby, D.W., Balcells-Balcells, A., García-Ventura, S., Baqués, N., & Giné, C. (2022). Relationships between family-centred practices and parent involvement in early childhood intervention. *European Journal of Special Needs Education*, *37*(1), 1–13. https://doi.org/10.1080/08856257.2020.1823165

McCrory, C., & Layte, R. (2012). Testing competing models of the strengths and difficulties Questionnaire's (Sdq's) factor structure for the parent-informant instrument. *Personality & Individual Differences*, *52*(8), 882–887. https://doi.org/10.1016/j.paid.2012.02.011

Palinkas, L.A., Horwitz, S.M., Green, C.A., Wisdom, J.P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and Policy in Mental Health and Mental Health Services Research*, *42*(5), 533–544. https://doi.org/10.1007/s10488-013-0528-y

Poon, K.K., Chong, N.X., & Lim, I. (2017). *The brigance inventory of early development III, standardized (IED-III standardized): Findings from the Singapore norming study* (Unpublished technical report). National Institute of Education,

Reynolds, A.J., Ou, S., & Temple, J.A. (2018). A preschool to 3rd grade preventive intervention and educational attainment at 35 years of age. *Journal of the American Medical Association Pediatrics*, *172*(3), 247–256. https://doi.org/10.1001/jamapediatrics.2017.4673

Rouse, L. (2012). Family-centred practice: Empowerment, self-efficacy, and challenges for practitioners in early childhood education and care. *Contemporary Issues in Early Childhood*, *13*(1), 17–26.

Sando, O.J., Kleppe, R., & Sandseter, E.B.H. (2021). Risky play and children's well-being, involvement and physical activity. *Child Indicators Research*, *14*(4), 1435–1451. https://doi.org/10.1007/s12187-021-09804-5

Schweinhart, L.J., & Weikart, D.P. (2002). The perry preschool project: Significant benefits. *The Journal of At-Risk Issues*, *8*(1), 5–8.

Shonkoff, J.P., & Phillips, D.A. (Eds.). (2000). *From neurons to neighborhoods: The science of early childhood development*. National Academy Press.

Sin, Y. (2020). *Singapore ends COVID-19 circuit breaker: How does it affect you from June 2*. The Straits Times. https://www.straitstimes.com/singapore/singapore-ends-covid-19-circuit-breaker-how-does-it-affect-you-from-june-2

Strauss, A., & Corbin, J.M. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Sage Publications, Inc.

Sylva, K., Melhuish, E., Sammons, P., Siraj-Blatchford, I., & Taggart, B. (2004). *The effective provision of pre-school education (EPPE) project: Final report: A longitudinal study funded by the DfES 1997–2004*. Institute of Education, University of London/Department for Education and Skills/Sure Start.

Tan, T., & Han, G.Y. (2020, October 9). Close to 80,000 people received financial aid through ComCare in the past year. *The Straits Times*. https://www.straitstimes.com/singapore/community/close-to-80000-people-receive-financial-aid-through-comcare-in-the-past-year

Teo, Y. (2018). *This is what inequality looks like*. Ethos Books.

World Bank. (2023). *Overview of Singapore*. https://www.worldbank.org/en/country/singapore/overview

Yin, R.K. (2018). *Case study research and applications: Design and methods* (6th ed., p. 352). Sage Pbulishing.

Appendix

Appendix A. Glossary

CCF: Classroom Co-Facilitators

CSM: Child Support Model

CSP: Classroom Support Programme

CEE: Child Enabling Executives

HBL: Home-based learning

IED-III: Brigance Inventory of Early Development, Standardized, Third Edition

L-W: Laevers Well-being Scale

L-I: Laevers Involvement Scale

LSED: Learning Support Educator

RTR: Read-to REACH

SDQ: Strengths and Difficulties Questionnaire