Consultancy Study on the Effectiveness of the Provision of Quality Kindergarten Education in Hong Kong under the Kindergarten Education Policy

Technical Report

Prepared by

Nirmala Rao, Carrie Lau, Stephanie Chan and Ben Richards

with

Diana Lee, John Bacon-Shone and Patrick Ip

The University of Hong Kong

February 2022

Contents

List of Tables

List of Figures

List of Appendices

Introduction

Background

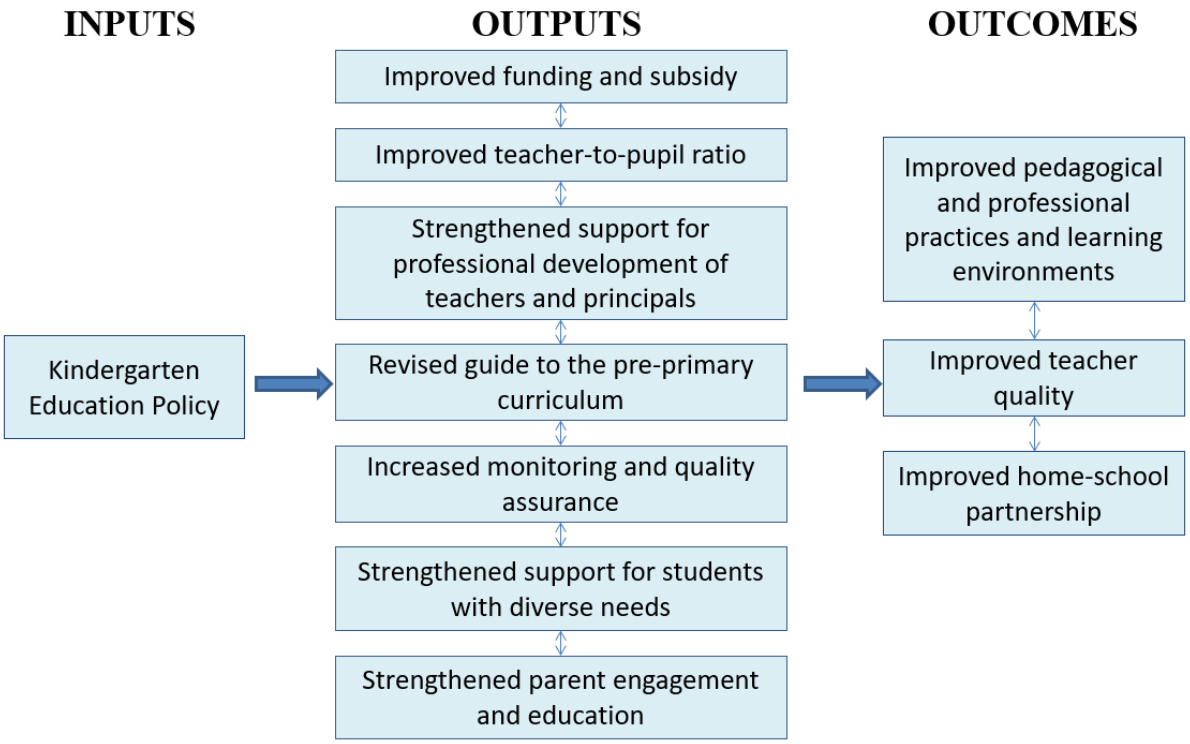
The Government of the Hong Kong Special Administrative Region commissioned The Faculty of Education, The University of Hong Kong to conduct a study on the effectiveness of the provision of quality kindergarten (KG) education under the KG education policy (KG policy) that was implemented in Hong Kong starting from the 2017/18 school year.

This study considers whether the quality of KG education has changed as a result of the implementation of the KG policy, and has 3 main objectives: (i) to examine the effectiveness of the provision of quality KG education in Hong Kong under the KG policy; (ii) to identify good practices and areas for improvement for KGs; and (iii) to investigate school factors that are conducive to the development of quality KG education.

This Final Report provides a summary of findings from the Pre-policy phase (from June to September 2017), Wave 1 (from November 2017 to September 2018), Wave 2 (from April 2019 to September 2019), and Wave 3 (from June 2020 to November 2020). The data were collected through (i) classroom observations; (ii) principal, teacher and parent questionnaires; and (iii) principal, teacher, and parent interviews.

It is important for any evaluation study to have an articulated theory of change. In this instance, we were interested in how and why the KG policy was expected to lead to the desired change, i.e. improved quality in KG education in Hong Kong. The KG policy has led to improved funding and subsidy, improved teacher-to-pupil (TP) ratio, strengthened support for professional development of teachers and principals, implementation of the revised guide to the pre-primary curriculum, increased monitoring and quality assurance, strengthened support for students with diverse needs, and strengthened parent engagement and education. These outputs were, in turn, assumed to lead to positive outcomes as shown below in Figure 1.

Figure 1. Theory of Change



Research questions

There are 6 key research questions relevant to the KG policy set to be answered in the Final Report. The section on "General discussion and conclusions" of this report is structured around these 6 key research questions:

1. What are the impacts on learning and teaching of the students (e.g. in curriculum planning, teaching methods, and students' engagement in learning activities)?
2. What are the impacts on catering for students' diverse needs (e.g. teachers' understanding of their specific needs, support to their learning, collaboration with relevant experts/ external organisations, and teachers' training in this regard)?
3. What are the impacts on school management and organisation (e.g. transparency, holistic planning in resource deployment, and school culture and atmosphere)?
4. What are the impacts on teachers' professional development including school policy relating to teachers' development (e.g. staffing structure/ hierarchy)?
5. What are the impacts on parents' engagement (e.g. more diverse communication channels, and promotion of parent education)?
6. What are the school factors that are conducive to the development of quality KG education?

Sampling and participants

Study 1

The sample of the study comprised the target sample of 100 KGs, plus an oversample of an additional 20 to compensate for anticipated non-response and attrition. In Wave 1, KGs were randomly sampled from a complete list of all KGs participating in the KG education scheme (Scheme). The probability of a KG being selected was weighted to the number of teachers in each KG to ensure that the sample represented teachers at KGs in Hong Kong. The sample was stratified by district to ensure geographical representation. Stratification ensured that a minimum of 5 KGs from each geographical district were included in the sample, with larger numbers in more populous districts.

Random sampling with replacement[1] was used to ensure numbers of KGs meeting the selection criteria by school size and additional support to cater for students' diverse needs, specifically additional grant for support to non-Chinese speaking (NCS) students (NCS Grant) and participation in the On-site Pre-school Rehabilitation Services[2] (OPRS). Sampling with replacement was used such that, where possible, at least 1 small KG, at least 1 KG joining the OPRS, and at least 1 KG receiving the NCS Grant, were included in the sample in each district as far as possible. KGs were divided into large and small KGs, with "small" being defined as below the 25th percentile of all KGs covered by the Scheme in terms of the total number of enrolled students. Based on this, small KGs in this study refer to KGs with less than 89 enrolled students (irrespective of half-day or whole-day enrolment).

In Wave 1, 260 KGs were contacted, and a total of 121 KGs agreed to participate in the study, giving an overall acceptance rate of 46.5%. After the initial sample was constructed, resampling following rejection or non-response took place in 26 rounds. Table 1 below shows the composition of the final sample by district, and with the numbers of small KGs, KGs joining OPRS and KGs receiving the NCS Grant in each district of our sample established in Wave 1, Wave 2 and Wave 3. As shown in Table 1, in Wave 1, 1 district did not meet the minimum small/large KG criterion, 4 districts did not meet the OPRS criterion, and 3 districts did not meet the NCS Grant criterion. These cases arose mainly because of uneven distribution of KGs with these characteristics across districts. In these cases, there were no KGs present in the relevant district that met the criteria and had accepted participation in the study.

[1] Random sampling with replacement means that schools were sampled randomly in each district, but if selection of the randomly chosen school implied that the minimum criteria for school size, NCS Grant status, and OPRS participation for that district were not met, the sampled school was unselected and a different school from that district was randomly sampled in its place. If necessary, this procedure would be repeated until the minimum criteria were met.

[2] The Pilot Scheme on On-site Pre-school Rehabilitation Services was launched by the Government in 2015 and was later regularised in the 2018/19 school year. Inter-disciplinary service teams from the non-governmental organisations provide on-site services for pre-school children with mild disabilities and studying at the participating kindergartens and kindergarten-cum-child care centres. Inter-disciplinary service teams also render support services to teachers/child care workers and parents/carers.

Table 1. Number of participating KGs in Study 1 by district, KG size, OPRS and NCS Grant status

District	Total KGs			Small KGs			Receive support from OPRS			Receive NCS Grant[3]		
	Wave 1	Wave 2	Wave 3	Wave 1	Wave 2	Wave 3	Wave 1	Wave 2	Wave 3	Wave 1	Wave 2	Wave 3
Central and Western	6	5	6	1	0	1	0	5	6	0	0	3
Eastern	7	7	6	3	3	2	1	7	6	1	2	3
Islands	6	6	5	3	3	3	0	6	5	2	2	4
Kowloon City	7	7	7	1	1	1	1	7	7	3	3	3
Kwun Tong	7	7	5	4	4	3	1	7	5	2	1	2
Kwai Tsing	6	6	6	2	2	2	1	6	6	2	1	5
North	7	7	7	1	1	1	1	7	7	0	0	2
Sai Kung	7	5	5	2	1	2	1	5	5	2	0	2
Southern	6	6	6	1	1	1	1	6	6	1	1	5
Sham Shui Po	8	7	6	1	0	1	0	7	6	4	4	4
Sha Tin	7	6	6	2	2	2	3	6	6	1	1	1
Tuen Mun	7	7	7	1	1	1	1	7	7	4	5	5
Tai Po	7	7	6	0	0	0	1	7	6	0	2	4
Tsuen Wan	5	5	5	1	1	1	0	5	5	1	1	3
Wan Chai	6	5	4	4	3	2	1	5	4	4	3	3
Wong Tai Sin	8	8	8	3	3	3	3	8	8	1	1	5
Yuen Long	7	6	6	1	1	1	3	6	6	1	1	2
Yau Tsim Mong	7	7	7	2	2	2	3	7	7	3	3	4
Total	121	114	108	33	29	29	22	114	108	32	31	60

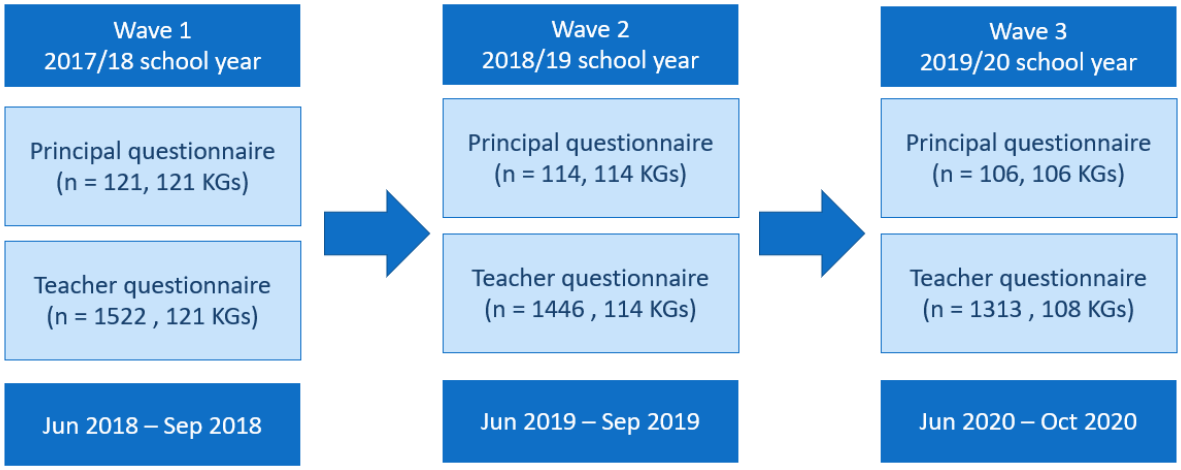
In Wave 1, there were 121 KGs participating in the study. In Wave 2, 7 out of 121 KGs were excluded from the analysis. These include 1 KG that withdrew from the study and 6 KGs that did not respond to us. Among the 114 participating KGs, 9 KGs had a new principal in Wave 2 (2018/19 school year). Out of the remaining 120 KGs (excluding 1 KG that had withdrawn in Wave 2), 12 KGs were excluded from Wave 3 (3 KGs withdrew from the study and 9 KGs did not respond to us). In Wave 3, among the 108 participating KGs, 11 KGs had a new principal (2019/20 school year). Within each participating KG, the principal and all registered teachers with a full-time employment contract were invited to complete questionnaires. In Wave 1 and Wave 2, all principals from the participating KGs completed their questionnaires; and in Wave 3, principals from 106 out of 108 KGs completed the questionnaires. The response rates[4] of teachers completing questionnaires for the three waves were 84.89% (1522 teachers), 82.11% (1446 teachers), and 74.65% (1313 teachers) respectively. Among these respondents, 85 principals and 510 teachers completed questionnaires in all three waves. Attrition is quite common in longitudinal studies. We are unable to determine the exact reasons of why teachers/

[3] During the course of the study, the terms of the NCS Grant were changed: in 2017/18 (Wave 1) and 2018/19 (Wave 2), a fixed sum of the grant was provided to KGs that had admitted at least 8 NCS students. From 2019/20 (Wave 3) onwards, a 5-tiered grant is provided to KGs based on the number of NCS students admitted (1 to 4 students, 5 to 7 students, 8 to 15 students, 16 to 30 students, and 31 or above students).

[4] The response rate was calculated by dividing the number of teacher participants by the number of teachers reported in the principals' questionnaires in each wave.

principals dropped out of the study, but some teachers/ principals may have left the school. In order to increase the likelihood that 100 KGs participated in all three waves of the study, we recruited 20 KGs in addition to our original target of 100 KGs. Hence, the response rate of principals and teachers for the three waves of our study from over 100 KGs is considered very satisfactory [5]. Figure 2 presents the implemented research design and number of participants for Study 1.

Figure 2. Implemented research design and number of participants[6] for Study 1



[5] In a major study targeting households with children aged 6 or under in the United States, the response rate ranged between 57.8% and 78.7%, depending on the part of the survey in question (McPhee et al., 2015). McPhee, C., Bielick, S., Masterton, M., Flores, L., Parmer, R., Amchin, S., Stern, S., and McGowan, H. (2015). *National Household Education Surveys Program of 2012: Data File User's Manual (NCES 2015-030).* National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.

[6] We collected 121, 114, and 106 principal questionnaires from 120, 113, and 106 principals in Wave 1, Wave 2, and Wave 3 respectively. This was because 2 of the participating KGs had the same principal in both Wave 1 and Wave 2.

Study 2

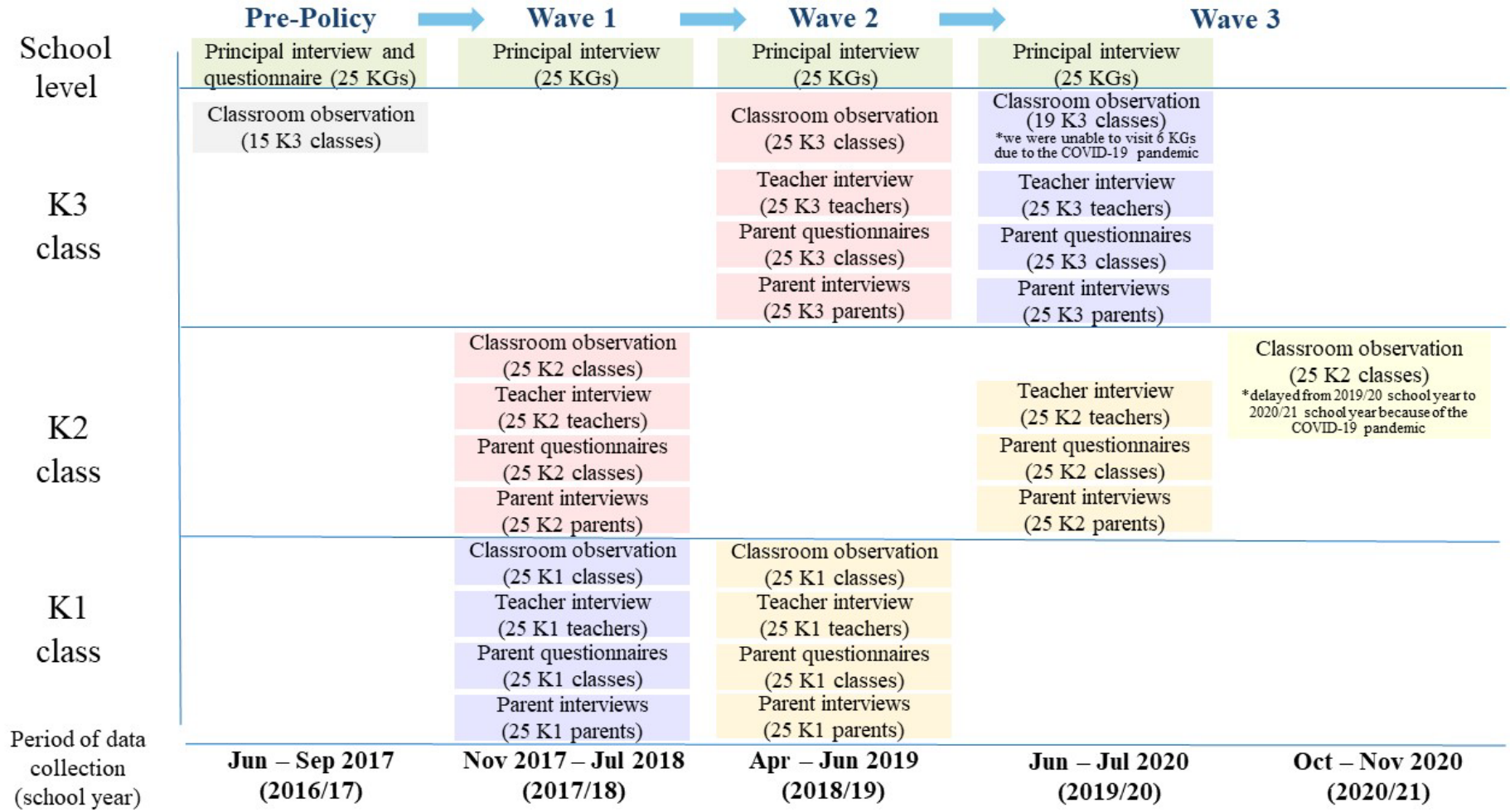
Figure 3 presents the implemented research design for Study 2. The sample of 25 KGs was drawn from the initial sample of 100 KGs used for Study 1 (i.e. the KGs before the oversample), with the probability of selection being in proportion to the number of students in the KG, making it representative of children in KGs in Hong Kong. To ensure that these 25 KGs are representative of the situation in Hong Kong, as with Study 1, the sample was stratified by district, and random sampling with replacement was used to ensure representation of KGs by NCS Grant status, OPRS status, and school size.

To understand the general situation before the implementation of the KG policy, 15 K3 classes in these 25 KGs were observed in the Pre-policy phase, with classroom observation data collected using the Early Childhood Environment Rating Scale-Revised (ECERS-R), the Early Childhood Environment Rating Scale-Extension (ECERS-E), the Sustained Shared Thinking and Emotional Well-being Scale (SSTEW), and the Measurement of Early Learning Environment (MELE) tools. At the Wave 1 phase, 25 K1 and 25 K2 classes from 25 KGs were observed. At the Wave 2 phase, we observed 25 K1 and 25 K3 classes from the same 25 KGs observed in Wave 1. In Wave 3, our original design was to follow the K2 (the same K1 classes observed in Wave 2) and K3 classes (the same K1 classes in Wave 1). However, owing to suspension of face-to-face classes due to the COVID-19 pandemic, we were unable to observe the K2 classes within the 2019/20 school year and only observed the K3 classes in the 2019/20 school year. Instead, we observed the 25 K2 classes in the first term of the 2020/21 school year (not observed in previous waves). Although we intended to observe the K3 classes from all 25 KGs, we only observed 19 K3 classes in Wave 3 because of suspension of face-to-face classes or different class resumption arrangements under the COVID-19 pandemic. While this deviated from our original research design, it should be noted that the observed 19 KGs and the 6 KGs that we had not observed were similar in terms of school size (mean number of students: 19 observed KGs = 201.9; 6 excluded KGs = 202.2), and proportion of students with special needs (19 observed KGs = 6.3%, 6 excluded KGs = 5.4%). Because of the similar school characteristics, we are confident that the decrease in sample size did not impact the findings.

In each wave, while the plan was to observe the same classes that we observed in previous waves (e.g. the K3 classes observed in Wave 3 ideally should be the K2 classes we observed in Wave 2), the observed classes may or may not be of the same group of children observed in previous waves in their respective class levels. This was because students were sometimes dispersed in different classes if KGs that had more than 1 class within each class level[7]. Classroom observation data in three waves were collected using the ECERS-E, SSTEW, and MELE tools whereas 4 domains of the ECERS-R were also used for K3 classes in Wave 3.

[7] While we tried to follow the same class of students as much as possible, in cases where it was not possible to follow the same classes because of the arrangement of individual KGs across class levels, we used random sampling to the maximum extent in our sampling such that error variance may be balanced out.

Figure 3. Implemented research design for Study 2



In both Wave 1 and Wave 2, parents of all children of the classes where observations took place were invited to complete a parent questionnaire. In Wave 1, a total of 879 parents (421 K1, 434 K2, 24 missing data on class level) completed the questionnaires; the response rate was 73.43%. In Wave 2, a total of 798 parents (395 K1, 354 K3, 49 missing data on class level) completed the questionnaires; the response rate was 83.20%. In Wave 3, we invited the parents of the K2 and K3 children in our original design in the 2019/20 school year to complete the questionnaires. We observed the K2 classes in the 2020/21 school year instead of the 2019/20 school year as originally planned because of suspension of face-to-face classes. Therefore, the K2 parents were not the parents of the observed classes in Wave 3. Furthermore, we were not always able to follow the same group of children in each wave, hence, some parents who had previously participated were not invited to complete the questionnaire. In Wave 2, among the 354 K3 parents, 146 parents also completed the questionnaires in Wave 1. Among the 431 parents in Wave 3 (154 K2 parents, 268 K3 parents, 9 missing on class level), 78 K2 and 122 K3 parents also completed in previous waves when their children were in K1 classes (Wave 1 for K3 parents, and Wave 2 for K2 parents).

In Wave 1 and Wave 2, (i) 1 teacher from each observed classroom was interviewed (a total of 50 teacher interviews); (ii) each KG principal was interviewed (a total of 24 principal interviews conducted with 24 principals as 1 of the principals was serving 2 out of the 25 KGs); and (iii) 2 parents from each KG, 1 from each observed class, were either randomly selected or selected through purposive sampling (in the case when we were able to invite the same parent who had participated previously) for interview in Wave 2 (a total of 50 parent interviews[8], see Table 2). In Wave 3, since we only observed K3 classes during our data collection stage for the interviews (2019/20 school year), instead of interviewing the teachers and parents of the observed K2 classes, we followed the teachers and parents who had been previously interviewed in Wave 1. However, where this was not possible, we randomly selected a teacher from the KG and a parent from the same K2 class as the parent we intended to interview.

Random selection of parents for interview was implemented by: (a) the teacher creating a numbered list of all children in their class; (b) the research team randomly selecting a number from the list; and (c) the teacher approaching the parent of the child corresponding to that number for interview. If written informed consent was not obtained for the interview from the selected parent, another child would be randomly selected with the same procedures until a parent agreed to participate.

[8] For cases where the same parents were not interviewed in previous waves, we used random sampling to the maximum extent in our sampling such that error variance may be balanced out.

Table 2. Total number of observations, questionnaires, and interviews in Pre-policy phase, Wave 1, Wave 2, and Wave 3

Study 1				
Data type	**Pre-policy**	**Wave 1**	**Wave 2**	**Wave 3**
Principal questionnaires[9]	25 (25 KGs)	121 (121 KGs)	114 (114 KGs)	106 (106 KGs)
Teacher questionnaires	N/A	1522 (121 KGs)	1446 (114 KGs)	1313 (108 KGs)
Study 2				
Data type	**Pre-policy**	**Wave 1**	**Wave 2**	**Wave 3**
Classroom observations	15 (15 KGs)	50 (25 KGs)	50 (25 KGs)	44[10] (25 KGs)
Parent questionnaires	N/A	879 (25 KGs)	798 (25 KGs)	431 (25 KGs)
Principal interviews	24 (25 KGs)	24 (25 KGs)	24 (25 KGs)	24 (25 KGs)
Teacher interviews	N/A	50 (25 KGs)	50 (25 KGs)	50 (25 KGs)
Parent interviews	N/A	50 (25 KGs)	50 (25 KGs)	50 (25 KGs)

Information of participating KGs, principals, teachers and parents

Table 3 presents the information of the participating KGs and Table 4 presents demographic information of the participating principals, teachers and parents.

Table 3. Information of the participating KGs in Study 1 and Study 2

	Study 1			Study 2		
	Wave 1	Wave 2	Wave 3	Wave 1	Wave 2	Wave 3
n	121	114	106	25	25	25
Percentage of KGs that offer half-day (HD) programme	57%	58%	54%	68%	75%	67%
Percentage of KGs that offer whole-day (WD) programme	49%	52%	51%	48%	63%	58%
Percentage of KGs that offer long whole-day (LWD) programme	41%	37%	37%	40%	29%	29%
Percentage of KGs that offer both HD and WD programmes	45%	45%	43%	44%	54%	50%

[9] We collected 121, 114, and 106 principal questionnaires from 120, 113, and 106 principals in Wave 1, Wave 2, and Wave 3 respectively, and conducted principal interviews with 24 principals of 25 KGs. This was because 2 of the participating KGs had the same principal.

[10] We intended to conduct classroom observations at 25 K2 and 25 K3 classes in Wave 3. However, we were unable to visit 6 K3 classes in Wave 3 because of the suspension of face-to-face classes or different class resumption arrangements under the COVID-19 pandemic.

Table 4. Demographic information of participants in Study 1 and Study 2

Respondents	Gender	**Wave 1**	**Wave 2**	**Wave 3**
Principals	*n*	120	113	106
	Females	118	106	100
	Male	1	1	1
	Not indicated	1	6	5
Teachers	*n*	1522	1446	1313
	Females	1447	1371	1254
	Male	25	22	26
	Not indicated	50	53	33
Parents	*n*	879	798	431
	Mothers	707	605	342
	Fathers	126	122	70
	Non-parent guardians	27	18	8
	Not indicated	19	49	11

Measures

Measures including classroom observation rating scales, questionnaires and interview protocols for principals, teachers, and parents were used in the Pre-policy, Wave 1, Wave 2 and Wave 3 phases. Appendix A includes information about the measures. With the exception of ECERS-R which was used in the Pre-policy and Wave 3 phases for K3 classes only, Wave 1, Wave 2, and Wave 3 (K2 classes) used the same set of measures (i.e. ECERS-E, SSTEW and MELE). A description of each measure is presented below:

Early Childhood Environment Rating Scale-Revised (see Appendix A1). ECERS-R [11] measures the overall quality of KG classrooms. The ECERS-R consists of 43 items and has 7 domains: (a) Space and Furnishings; (b) Personal Care Routines; (c) Language Reasoning; (d) Activities; (e) Interaction; (f) Programme Structure; and (g) Parents and Staff. Each item is scored on a 7-point scale with the following descriptors: 1 (inadequate), 3 (minimal), 5 (good) and 7 (excellent). The item "Nap/rest" (item 11) was dropped for consistency as there were half-day and whole-day Scheme-KGs participating in this study. Only 4 domains (i.e. Space and Furnishings, Personal Care Routines, Activities, and Programme Structure) were scored in Wave 3. We have not included all domains in ECERS-R because the other domains were tapped in the measures we used (i.e., ECERS-E, SSTEW, MELE).

Early Childhood Environment Rating Scale-Extension (see Appendix A2). ECERS-E [12] assesses the curricular aspects of quality. It consists of 15 items and contains 4 domains: (a) Literacy, (b) Mathematics, (c) Science and the Environment, and (d) Diversity. Each item is scored on a 7-point scale with the following descriptors: 1 (inadequate), 3 (minimal), 5 (good)

[11] Harms, T., Clifford, R. M., & Cryer, D. (2005*). Early Childhood Environment Rating Scale - Revised Edition.* New York, NY: Teachers College Press.

[12] Sylva, K., Siraj-Blatchford, I., & Taggart, B. (2010). *Assessing quality in the early years: Early Childhood Environment Rating Scale-Extension (ECERS-E): Four curricular subscales,* rev. 4th ed. New York: Teachers' College Press.

and 7 (excellent) The item, "Sounds in Words" (item 4) was dropped to be in line with the Chinese medium of instruction of KGs in Hong Kong[13].

Measure of Early Learning Environment (see Appendix A3). MELE (MELQO, 2016)[14] tool is used to measure global and domain-specific quality of stimulation in KG classrooms. MELE consists of 50 items and measures the following 9 domains: (a) Physical Environment; (b) Interaction; (c) Inclusiveness; (d) Teaching/Learning: Overview; (e) Teaching/Learning: Language and Literacy; (f) Teaching/Learning: Numbers and Numeracy; (g) Teaching/Learning: Nature and Science; (h) Teaching/Learning: Group activities; and (i) Teaching/Learning: Free-choice Indoor Activities. Before administering MELE, the contextual relevance of the scale was discussed, and 10 items from the Physical Environment, Safety and Hygiene domain[15], Interaction, and Language and Literacy were removed. These items pertained to school cleanliness and safety (e.g. availability of drinking water; handwashing facilities; covered classroom space), which were basic requirements for school registration of KGs and so unlikely to vary. We also dropped 2 items as we found that in the Hong Kong context, KGs were unlikely to vary on these items: (i) children's waiting time (KGs in Hong Kong had fairly structured routines and children rarely had to wait for long periods) and (ii) children's use of writing implements (writing implements were readily available in Hong Kong KG classrooms). Each item is scored on a 4-point scale, with 1 indicating low quality and 4 high quality.

Sustained Shared Thinking and Emotional Well-being Scale (See Appendix A4). SSTEW[16] measures the quality of practices that support children's skills in sustained shared thinking, emotional well-being, the development of strong relationships, effective communication and self-regulation. The scale consists of 14 items and has 5 domains: (a) Building Trust, Confidence and Independence; (b) Social and Emotional Well-being; (c) Supporting and Extending Language and Communication; (d) Supporting Learning and Critical Thinking; and (e) Assessing Learning and Language. Each item is scored on a 7-point scale with the following descriptors: 1 (inadequate), 3 (minimal), 5 (good) and 7 (excellent).

Principal Questionnaire (See Appendix A5). This self-developed questionnaire taps into the following: (1) School Information (e.g. number of students and staff); (2) Principal's and Teachers' Professional Development; (3) Home-school Partnership; (4) Catering for Diverse Needs; (5) School Curriculum; (6) Principals' Beliefs and School Perceptions; and (7) Principal Background Information (e.g. years of work experience, gender and age).

Teacher Questionnaire (See Appendix A6). This self-developed questionnaire includes questions on the following: (1) Teaching Duties and Practices; (2) Home-school Partnership; (3) Teachers' Professional Development; (4) Teachers' Beliefs and School Perceptions; and (5) Background Information (e.g. years of work experience, gender and age).

---

[13] This is because the grapheme (character) for Chinese represents a morpheme (unit of meaning) and not a phoneme (unit of sound) as in the case of the English language. The ECERS-E was developed for English language programmes.

[14] Measuring Early Learning Quality and Outcomes (MELQO) Project. (2016). *Measure of Early Learning Environments (MELE) Module.* UNESCO. Washington, DC.

[15] Since all items from the Safety and Hygiene domain were removed, the domain was not included in the measure used in this study.

[16] Siraj, I., Kingston, D. & Melhuish, E. (2015). *Assessing Quality in Early Childhood Education and Care: Sustained Shared Thinking and Emotional Well-being (SSTEW) Scale for 2-5-year-olds Provision.* London, United Kingdom: Trentham Books.

Parent Questionnaire (See Appendix A7). This self-developed questionnaire includes questions on (1) Home-school Partnership; (2) Parent-child Activities; (3) Views towards Your Child's School and (4) Student Background Information, including student age, gender, and family demographics (e.g. parental education).

Principal Interview. Principals were interviewed to elaborate on catering for students' diverse needs, home-school partnership, school governance, curriculum development and lesson design, and teacher and principal professional development. Additional follow-up questions within each topic were added in Wave 3 as requested by the Education Bureau (EDB) Consultancy Team. We also added 2 questions on the support for students with diverse needs and communication with parents under the COVID-19 pandemic.

Teacher Interview. Full-time registered teachers were interviewed to elaborate on catering for students' diverse needs, home-school partnership, school governance, curriculum development and lesson design, and teacher professional development. Additional follow-up questions within each topic and 2 new topics (changes in resource usage after KG joined the Scheme and school culture) were added in Wave 3 as requested by the EDB Consultancy Team. We also added 2 questions on the support for students with diverse needs and communication with parents under the COVID-19 pandemic.

Parent Interview. Parents were interviewed to discern their views and perspectives on the KGs (e.g. curriculum, support for learner diversity). They were also asked to provide information on their involvement and engagement with their children's learning and development at home and school. In Wave 3, a question on communication with the school during the COVID-19 pandemic was added.

Procedures

Classroom observations

Class observations were conducted between June and July 2017 (Pre-policy phase), between November 2017 and January 2018 (Wave 1), and between April and May 2019 (Wave 2). In Wave 3, classroom observations were conducted from June to July 2020 for K3 classes, and from October to November 2020 for K2 classes.

The procedures were identical in all phases. A team of 2 assessors observed each KG class. Half-day sessions were observed for 3 hours and whole-day sessions were observed for 6 hours, excluding naps and mealtimes. In Wave 3, all observed classes were half-day sessions because of the territory-wide class resumption arrangements under the COVID-19 pandemic.

Undergraduate and postgraduate students and graduates of Early Childhood Education degree programmes were trained to use ECERS-R, ECERS-E, SSTEW and MELE through a series of training workshops that lasted for 2 days, including 2 additional days of in-field practices in KGs. Observers were required to attain inter-rater reliability of at least 85% with an expert assessor, denoted as the Gold Standard, before collecting field data. Further, inter-observer reliability was calculated by examining agreement between the assessors and the Gold Standard in 3 of the 25 KGs observed in each wave. In Wave 3, all assessors had been previously trained and had the experience of participating in the previous rounds of class observation. These assessors had attended a refresher training before data collection.

Questionnaires and interviews

In Wave 1, we delivered the principal and teacher questionnaires to 121 participating KGs between June and August 2018. In Wave 2, we contacted the 121 KGs between March and September 2019, and the questionnaires were distributed to 115 KGs between June and August 2019.

As reported in the section "Sampling and participants", data from 7 out of 121 KGs (Wave 2) and 12 out of 120 KGs (Wave 3) were excluded from the analysis as the KGs had either withdrawn from the study or had not returned the questionnaires. Each KG was given 2 weeks to complete and return the questionnaires, but we accommodated the individual requests and schedule of certain KGs, especially in Wave 3 during the COVID-19 pandemic. The principal questionnaires and teacher questionnaires had been collected by September 2018 (Wave 1), September 2019 (Wave 2), and October 2020 (Wave 3).

For the 25 KGs that participated in Study 2, trained interviewers conducted the interviews with principals, teachers, and parents. Interviews were conducted with principals, teachers, and parents from the 25 KGs from June to July 2018 (Wave 1), from May to June 2019 (Wave 2), and from July to August 2020 (Wave 3). In the Pre-policy, Wave 1 and Wave 2 phases, all interviews were conducted face-to-face in KGs. In Wave 3, we adopted a flexible approach under the COVID-19 pandemic: all interviews with parents and teachers were conducted over the phone while interviews with principals were conducted via face-to-face meetings, video conferences or over the phone depending on interviewees' preferences.

Analysis plan

The analysis was conducted in 3 parts: (i) quantitative analysis of classroom observation data; (ii) quantitative analysis of principal, teacher and parent questionnaire data; and (iii) qualitative analysis of principal, teacher and parent interview data. The findings presented in this report were the overall situations found in the first 3 years since the implementation of the KG policy as well as the features analysed on the situations across Wave 1, Wave 2, and Wave 3 of the study. The quantitative analysis therefore involved reporting descriptive statistics of data collected from classroom observations and questionnaires. It did not use sampling weights because it was intended to report on observation scores and questionnaire responses within this study's sample of KGs, rather than to make inferences about all KGs in Hong Kong. Techniques such as regression were also used to examine relations between key variables.

The findings presented in the main body of this report are structured around the 7 key themes identified in the Theory of Change (Figure 1, p.8):

1. Improved funding and subsidy
2. Improved TP ratio
3. Strengthened support for professional development of teachers and principals
4. Revised guide to the pre-primary curriculum
5. Increased monitoring and quality assurance
6. Strengthened support for students with diverse needs
7. Strengthened parent engagement and education

This structure was designed to directly focus on the analysis of the different outputs that were expected from the KG policy and would enable the analysis to make reference to any

combination of observation, questionnaire and interview findings as appropriate, thereby taking advantage of the multiple sources of data collection provided by this study and maximising the potential for triangulation of findings from different sources.

Analysis of classroom observation data

The analysis plan for the classroom observation data was to first produce descriptive statistics (including means and standard deviations) of the observations from each wave, broken down by class levels (K1, K2, and K3), and then compare against the descriptive statistics from previous waves. Statistics were calculated both by domains and for an average of all items in the ECERS-E, SSTEW and MELE scales.

Subsequent to previous waves, we conducted some initial exploratory analysis of the factors underlying the classroom observation scales. After the completion of all waves of data collection, we have a unique opportunity to analyse the factor structure of all 3 scales with a substantially increased sample size compared to the exploratory analyses conducted previously. Sufficiently large sample size is highly important for establishing the reliability and validity of factor analysis, as documented in many methodological papers (e.g. Mundfrom et al., 2005[17]), so we feel strongly that including cases from all study waves is of the utmost importance to maximise the methodological rigour of the factor analysis findings. Although the factor analysis from previous waves was informative in an exploratory sense, we can now specify the factors in the dataset in a more rigorous way with the advantage of the larger sample.

The classroom observation component of the study provides a unique opportunity to examine the psychometric properties of 3 different scales at the same time – ECERS-E, MELE, and SSTEW – which were developed to focus on the measurement of preschool quality internationally. This offers much more detail and nuance than studies using only one observation scale. This was a key rationale for including several scales as part of the study design.

Because there are certain universally agreed upon elements of preschool classroom quality (including teacher-child interactions), it was expected that there are items on the 3 scales that we chose to use were similar and correlated with each other. Factor analysis enables us to examine the common elements of the scales and can allow us to group the similar items together in a way that identifies the distinct constructs being measured. Factor analysis deals with the overlap between items a statistically appropriate way.

One great advantage of using factor analysis with this dataset is that it is possible to identify dimensions across all 3 scales, which can be interpreted substantively in a way that is more intuitive and theoretically meaningful than simply taking the average of one or other of the scales. Another advantage is that factor analysis can identify the dimensionality of the scale and ensure that there is no over interpretation based only on items or subscales. We can take advantage of the unique opportunity this dataset provides to understand the different dimensions seen across these 3 scales combined.

In summary, we would use the factor analysis based on the data from all waves of the study because:

[17] Mundfrom, D. J., Shaw, D. G., & Ke, T. L. (2005). Minimum sample size recommendations for conducting factor analyses. *International Journal of Testing, 5*(2), 159-168.

1. The additional data collection during Wave 3 provides a larger sample size;
2. Factor analysis of 3 different and overlapping scales measuring preschool classroom quality gives us more nuanced information than most other analyses;
3. The scales were expected to overlap and factor analysis is an appropriate statistical technique to deal with this and identify distinct dimensions; and
4. The grouping of several items together for each dimension is psychometrically more robust than focusing on one specific item or a small subscale of items.

Factor analysis (principal component factors) was conducted on the domain scores (18 domains) from all observations across all 4 phases (Pre-policy, Wave 1, Wave 2, and Wave 3; n=159). The factor analysis generated 5 factors with eigenvalues of greater than one (see Table B1 and B2 in Appendix B). Eventually, only Factor 1 to Factor 4 (see Table 5) were retained because Factor 5 had low reliability (α=.39), and also had an eigenvalue of only slightly greater than 1 (1.03). Comparisons across waves were made in terms of the scores on the 4 factors. We also analysed certain domains and items pertaining to the KG policy measures and hypothesised impacts. These findings are reported under the relevant themes in this report.

Table 5. Retained factors, domains with high loadings, and alphas

Factor	Alpha	Domains with high loadings	Factor name[18]
Factor 1	0.82	All SSTEW domains; MELE Interaction; MELE Teaching and Learning: Overview	Supporting socioemotional and cognitive development
Factor 2	0.73	ECERS-E Literacy, Mathematics, Diversity; MELE Physical Environment, Teaching/Learning: Free-choice Indoor Activities	Learning environment, catering for learner diversity and free-choice indoor activities
Factor 3	0.58	ECERS-E Science and Environment; MELE Teaching/Learning: Nature and Science	Nature and living
Factor 4	0.59	MELE Interaction, Inclusiveness, Teaching/Learning: Language and Literacy, Teaching/Learning: Group Activities	Inclusiveness, group activities and teacher-child interaction

Since the MELE measure (4-point scale) was on a different scale than the other measures (7-point scale), all variables were rescaled to have a maximum score of 10. Mean factor scores (scale range 0 to 10) were calculated across each of the waves. A multilevel repeated measures model was run for each of the 4 factors using Stata's "mixed" command, with each factor score as the dependent variable and wave as the independent variable. This type of model is able to take into account the nesting of observations within schools, as well as the longitudinal nature of the data across waves, to test for statistically significant changes. One of the advantages of mixed models (compared to, for instance, repeated measures ANOVA models) is that they do not require equal numbers of observations per wave, and can therefore take advantage of all

[18] Factor names are adopted with reference to the domains of classroom observation tools (ECERS-E, MELE, SSTEW, ECERS-R) concerned as well as the guiding principles and relevant learning areas, such as Nature and living, of the Kindergarten Education Curriculum Guide.

data despite the differing numbers of observations across waves. The model was then run again with wave squared as the independent variable to create a quadratic model, and plots of estimated factor scores across waves were created.

Factor 1 (Supporting socioemotional and cognitive development) includes all 5 domains on the SSTEW measure (building trust, confidence and independence; social and emotional well-being; supporting and extending language and communication; supporting learning and critical thinking; and assessing learning and language), and 2 MELE domains (interaction; and teaching and learning: overview). The factor covers mainly aspects of interactional quality of practices that builds children's social and emotional well-being, relationship development, and skills in sustained shared thinking. Factor 2 and Factor 3 include domains from both ECERS-E and MELE. Factor 2 (Learning environment, catering for learner diversity and free-choice indoor activities) includes domains that are related to the classroom environment, and curricular quality that promote literacy, mathematics, and learner diversity, as well as the quality of free-choice indoor activities. Factor 3 (Nature and living) covers classroom quality on nature, science, and the environment. Factor 4 includes qualities that support interaction, inclusiveness, language and literacy, and group activities captured by the MELE scale.

To study the relationship between school factors and classroom quality, we also explored the associations of key variables (variables related to continuous professional development policy of schools, teacher engagement, participation and experiences as well as parent involvement) and examined the observation scores and changes in observation scores. Findings are reported under the section "School factors conducive to the quality of KG education" in this report.

Analysis of questionnaire data

Both inferential and descriptive analyses were conducted for analysing the questionnaire data across waves. In the analyses, the percentages of participants selecting each option in each question are reported. Even though each questionnaire was analysed separately, we compared responses from respondents (i.e. teachers, principals, and parents) to the same question. A comparison was made in the questionnaire responses between three waves in the themes examined in this study. The longitudinal nature of the dataset was examined to measure changes in questionnaire responses over time using latent growth curve modelling, based on the subset of respondents with repeated measures across waves.

Analysis of interview data

The principal, teacher, and parent interviews were analysed qualitatively. The analyses focused on enabling the understanding of the diverse range of practices and comparing the practices across waves, under the KG policy and the processes by which staff and parents were responding to the KG policy. We followed a two-stage thematic analysis approach (Fereday & Muir-Cochrane, 2006)[19]. Data were analysed using NVivo Version 12 (QSR International, 2018)[20]. In Wave 1, we first identified themes deductively from interview transcripts based on a codebook of themes we had developed *a priori* based on our underlying theory (Theory of Change) and the literature. Broadly speaking, the themes fall under the 7 major themes, namely,

[19] Fereday, J. and E. Muir-Cochrane (2006). Demonstrating rigor using thematic analysis: a hybrid approach of inductive and deductive coding and theme development. *International journal of qualitative methods* 5(1): 1-11.

[20] QSR International (2018). *NVivo, Version 12*. QSR International.

improved funding and subsidy, improved TP ratio, strengthened support for professional development of teachers and principals, revised guide to the pre-primary curriculum, increased monitoring and quality assurance, strengthened support for students with diverse needs, and strengthened parent engagement and education. This was followed by a second round of coding, in which we identified themes inductively from the data, to include observations that were not covered in the scope of our codebook. In Waves 2 and 3, we used the same codebook of themes developed in Wave 1 as the first round of coding. In the second round of coding, again themes were identified inductively from the data that were not covered in our Wave 1 codebook.

Findings and discussion

Overview of classroom observations

In presenting an overview of classroom observation results, observation data in all three waves were included in the analysis. In addition, a comparison is made between the Pre-policy K3 classes and the K3 classes in Wave 3. It should be noted that we observed different classes in Wave 1 (K1 and K2 classes), Wave 2 (K1 and K3 classes), and Wave 3 (K2 and K3 classes). One would expect that KGs would prepare children in K3 classes for the transition to primary school and teachers would be responsive to maturational changes in children. The study's design to observe different class levels was to ensure that it is possible to identify differences in the impact of KG policy between the years, and to allow us to make comparisons across class levels over time.

Domain scores

Statistics were produced for the Pre-policy, Wave 1, Wave 2, and Wave 3 classroom observation results. Tables B3 and B4 (presented in Appendix B) show the number of observations, means, standard deviations, minimums and maximums for each domain of ECERS-E, ECERS-R (only used for K3 in the Pre-policy phase and Wave 3), SSTEW, and MELE. Statistics are shown for all observations combined, and then individually for Wave 1 K1 classes, Wave 1 K2 classes, Wave 2 K1 classes, Wave 2 K3 classes, Wave 3 K2 classes and Wave 3 K3 classes. ECERS-R (used for the Pre-policy phase only), ECERS-E, and SSTEW were measured on a 7-point scale, whilst MELE was measured on a 4-point scale.

Domain scores can be interpreted as an average of the items within that individual domain, with higher numbers indicating greater classroom quality. The ECERS-R, ECERS-E and SSTEW scales have a maximum score of 7. A score of 1 is considered to reflect inadequate practice while a score of 7 is considered to reflect excellent practice[21]; and the MELE scale scores quality on a 4-point scale, from 1 (low) to 4 (high). Table B3 (in Appendix B) shows the classroom observation scores for ECERS-E, SSTEW and MELE by domain. Overall, classes had the highest ECERS-E mean score on the Literacy domain (3.39) and lowest on the Science and Environment domain (1.60). The highest mean score for SSTEW was on the Supporting and extending language and communication domain (4.72), and the lowest was on the Supporting learning and critical thinking domain (2.53). The highest MELE mean score was on the Interaction domain (3.59) and the lowest was on the Teaching/Learning: Nature and Science domain (1.97).

Mean scores on each scale overall, by class

Table B5 (in Appendix B) shows the mean scores on all items from each of the classroom observation measures, calculated by taking the average item score for ECERS-E, ECERS-R (only for the Pre-policy phase and Wave 3), SSTEW, and MELE. Results are shown for all

[21] Researchers have considered scores below 3 as "poor"; scores between 3.00 and 4.99 "average"; and scores above 5 as "good". The ECERS-R, ECERS-E and SSTEW scales were normed in Euro-American contexts, which have less structure and deploy different pedagogical approaches than kindergarten classrooms in Hong Kong. Hence, interpretation of the absolute scores of the scales is not meaningful. For example, preschools in different countries may score differently, but this does not indicate the countries with lower scores have lower quality. We consider the absolute ECERS-R, ECERS-E and SSTEW scores in our study to reflect average classroom quality. That stated, the focus of this study is to examine change in kindergarten quality after the implementation of the KG education policy and not on the absolute ratings per se.

observations overall, and also broken down by class level in each wave (Wave 1 K1, Wave 1 K2, Wave 2 K1, and Wave 2 K3, Wave 3 K2 and Wave 3 K3). As presented in Table 6, amongst the mean scores for ECERS-E, the one in Wave 2 K3 classes (2.81) was the highest, and the one in Wave 3 K3 classes (1.93) was the lowest. Mean SSTEW score in the Wave 3 K2 classes (3.97) was the highest and the one in Pre-policy K3 classes (3.10) was the lowest. Mean MELE score in Wave 2 K3 classes (3.27) was the highest and the one in Pre-policy K3 classes (2.73) was the lowest. Differences in K1 class scores across waves were tested for statistical significance using t-tests.

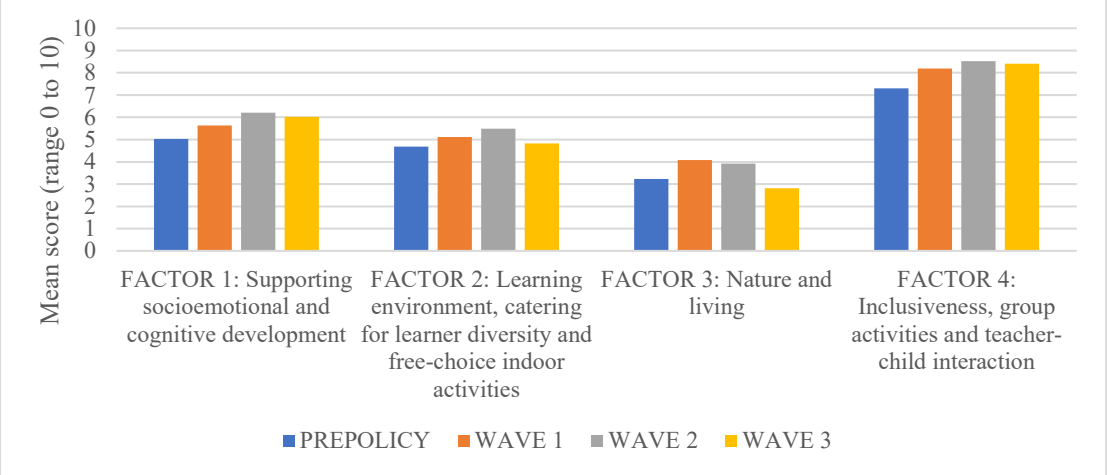
Table 6. Mean observation scores by rating scales, phases, and class levels (ECERS-E, ECERS-R and SSTEW are on a 7-point scale; MELE is on a 4-point scale) of classes observed in 25 KGs (Pre-policy n=15, Wave 1 n=50, Wave 2 n=50, Wave 3 n=44)

	Pre-policy	Wave 1		Wave 2		Wave 3	
	K3	K1	K2	K1	K3	K2	K3
ECERS-E	2.40	2.19	2.30	2.54	2.81	2.72	1.93
ECERS-R[22]	3.72	N.A.	N.A.	N.A.	N.A.	N.A.	2.58
SSTEW	3.10	3.32	3.47	3.71	3.73	3.97	3.13
MELE	2.73	2.89	2.96	3.08	3.27	3.13	2.81

Observation factor scores across waves

Figure 4 shows the mean factor scores (scale range 0 to 10) across each of the waves, for Factor 1 to Factor 4 and estimated factor scores based on a quadratic model. Across waves, classrooms had higher scores on Factor 4 (Inclusive, group activities and teacher-child interaction), and lower scores on Factor 3 (Nature and living). It implies the relative strength in the interactional quality and promotion of inclusiveness as compared with quality in terms of nature and science captured by the 3 scales we used in the study.

Figure 4. Factor scores across waves

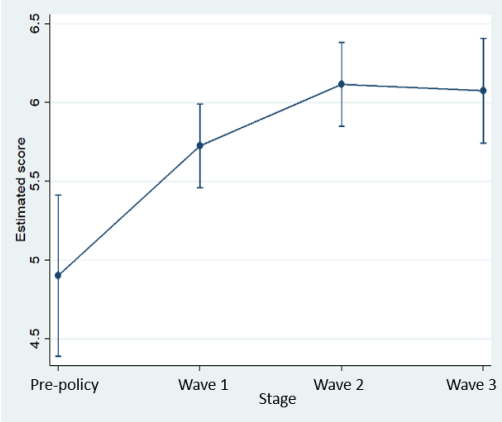


[22] The mean scores for ECERS-R are the average scores of the 4 ECERS-R domains common across Pre-policy and Wave 3 (i.e. Space and Furnishings, Personal Care Routines, Activities, and Programme Structure).

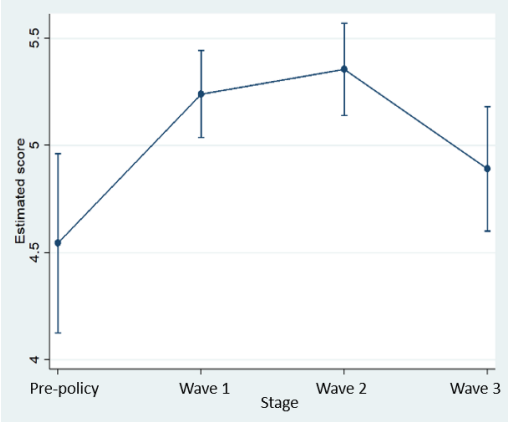
Comparing across waves, scores for Factor 1 (Supporting socioemotional and cognitive development), Factor 2 (Learning environment, catering for learner diversity and free-choice indoor activities), and Factor 4 (Inclusiveness, group activities and teacher-child interaction) increased progressively across waves between Pre-policy and Wave 2, and then decreased slightly during Wave 3. Factor 3 (Nature and living) scores were highest during Wave 1, before decreasing slightly during Wave 2 and then more substantially during Wave 3.

Next, a multilevel repeated measures model was run for each of the 4 factors using Stata's "mixed" command, with each factor score as the dependent variable and stage as the independent variable. This type of model is able to take into account the nesting of observations within schools, as well as the longitudinal nature of the data across waves. Multilevel repeated measures models were used once more, but this time using a quadratic model. The results for each factor are shown in Figure 5, and confirm the pattern seen for Figure 4 whereby for factors 1, 2, and 4 there was an increase in scores across the Pre-policy to Wave 2 phases, and a decrease during Wave 3. The findings suggest that classroom quality on these factors concerned improved over time up to Wave 2, and lowered in Wave 3. Since there were restrictions in place in classrooms under the COVID-19 pandemic, we are uncertain whether the changes in Wave 3 are accurate reflections of the quality under the KG policy.

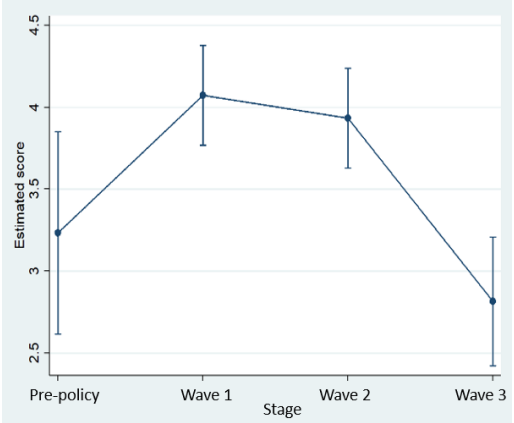
Figure 5. Figure showing estimated scores of 4 factors across phases



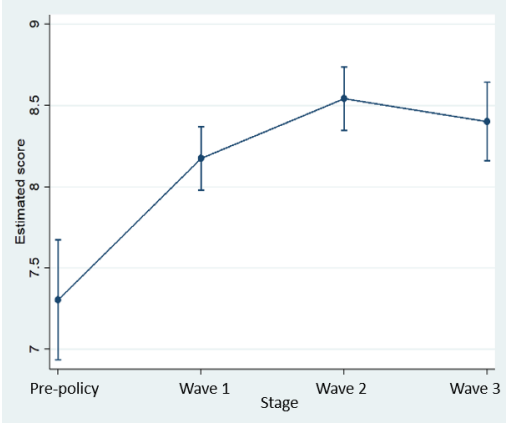
Estimated Factor 1 (Supporting socioemotional and cognitive development) scores across waves (quadratic model)



Estimated Factor 2 (Learning environment, catering for learner diversity and free-choice indoor activities) scores across waves (quadratic model)



Estimated Factor 3 (Nature and living) scores across waves (quadratic model)



Estimated Factor 4 (Inclusiveness, group activities and teacher-child interaction) scores across waves (quadratic model)

In the following sections, we present findings and discussion from the perspectives of the 7 outputs of the KG policy using the Theory of Change.

Theme 1. Improved funding and subsidy

1. 1. Grants received by KGs

According to principal questionnaire findings, the types and frequency of the different grants under the KG policy were similar across the waves. Main types included basic HD unit subsidy, WD unit subsidy, LWD unit subsidy, the grant for a cook, rental subsidy and tide-over grant (See Figure B1 in Appendix B). Other grants reported included the one-off start-up grant and the subsidy for parent-teacher associations (PTA)/ home-school cooperation. In Wave 2 and Wave 3, some principals also reported they had received the Promotion of Reading Grant for Kindergartens.

In Wave 3, principals interviewed were asked which grant(s) supported school development and catering for students' needs the most. Among these grants, NCS Grant (8 KGs), the HD/WD/LWD unit subsidy (7 KGs), and tide-over grant (5 KGs) were most commonly reported, followed by the Promotion of Reading Grant (3 KGs), grant for a cook (3 KGs), Premises Maintenance Grant (2 KGs), and rental subsidy (2 KGs).

1. 2. Usage of grants

Principal interviewees reported on the grants their KGs had received in each wave, and how they had utilised the grants. It should be noted that there was a change in the grants available to KGs during the course of the study. The Promotion of Reading Grant was offered starting from the 2018/19 school year (Wave 2). The provision of the NCS Grant has been enhanced since the 2019/20 school year. In the 2017/18 (Wave 1) and 2018/19 (Wave 2) school years, a fixed sum of the grant was provided to KGs that had admitted at least 8 NCS students. From the 2019/20 school year (Wave 3) onwards, a 5-tiered grant is provided to KGs based on the number of NCS students admitted (1 to 4 students, 5 to 7 students, 8 to 15 students, 16 to 30 students, and 31 or above students). In addition, because of the COVID-19 pandemic, KGs were provided with additional grants in the 2019/20 school year (Wave 3) for supporting KGs under the epidemic.

According to the principals, the grants received under the Scheme were utilised in similar ways across the waves. The grants were utilised to support staff cost (including teachers' salaries that were referenced to EDB's recommended salary ranges, salaries for cooks, janitors, and additional clerical staff to support the increased accounting demands of the KG policy). The principals also reported they had used the grants to support the daily operations of the KGs, purchase teaching materials and toys, subsidise the organisation of activities (e.g. outings), upgrade facilities, computing equipment and software, conduct renovation, and organise professional development activities for teachers.

Some principals elaborated on the tide-over grant they had received in supporting teachers' salaries in the interviews (Wave 1: 20 principals, Wave 2: 11 principals; Wave 3: 13 principals). While some found it very helpful in supporting their more experienced staff, some principals reported in Wave 1 and Wave 2 that it was difficult to settle their teachers' salaries with the grant if they would like to retain the more experienced teachers who had high salaries and maintain annual salary increment (Wave 1: 10 principals, Wave 2: 5 principals). In Wave 2, 5 principals reported that the challenge in utilising the funding was due to the high salary cost of retaining experienced teachers.

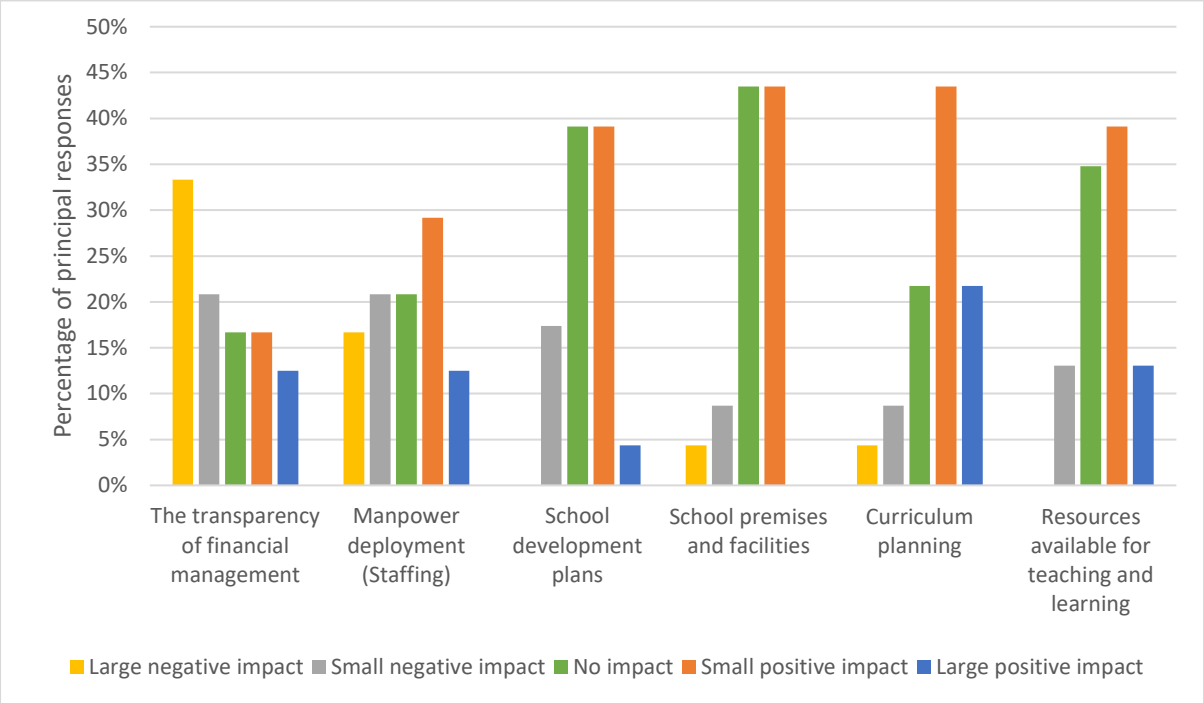
Analysis of the data from the principal questionnaires indicated that a proportion of the KGs had received an additional grant to support NCS students. The proportion of KGs receiving the grant was similar in Wave 1 and Wave 2 (Wave 1: 26% of the KGs [53% KGs admitted NCS students]; Wave 2: 26% of the KGs [53% admitted NCS students]). In Wave 3, 58% of the KGs had admitted NCS student(s), and nearly all of these KGs reported receiving the NCS Grant though all KGs with NCS student(s) admitted should have received the grant.

Among the 25 KGs that participated in Study 2, 14 KGs in Wave 1, 16 KGs in Wave 2 and 16 KGs in Wave 3 had admitted NCS students in the respective school year. There were 5 out of 14 KGs (with 1 to 53 NCS students) in Wave 1 and 6 out of 16 KGs in Wave 2 (with 1 to 49 NCS students) having received the NCS Grant. These KGs that received the NCS Grant were KGs that had admitted more than 8 NCS students that year. In Wave 3, all 16 KGs that had admitted NCS students reported receiving the NCS Grant. This means that around two-thirds of these 16 KGs received the NCS Grant only in Wave 3. Across waves, more principals reported using the NCS Grant to hire teachers, teaching assistants, or supporting staff to provide assistance to NCS students' learning or perform some translation work (Wave 1: 5 KGs, Wave 2: 6 KGs, Wave 3: 8 KGs). Some KGs also purchased teaching materials or picture books for NCS students (Wave 1: 2 KGs, Wave 2: 3 KGs, Wave 3: 7 KGs). The usage of NCS Grant in Wave 1 and Wave 2 was similar but more diverse in Wave 3. In Wave 3, principals reported purchasing training services (2 KGs) and translation services (1 KG) while 3 principals mentioned they had purchased toys for NCS students, with 2 of them specifying the items purchased were related to NCS students' culture.

A total of 3 principals in Wave 2 and 4 principals in Wave 3 reported receiving EDB's Promotion of Reading Grant for Kindergartens to purchase picture books and big books, and to organise seminars. In Wave 3, 9 principals reported that they had received the Anti-epidemic Grant and had used it on purchasing masks and cleaning and disinfecting agents. Under the COVID-19 pandemic in the 2019/20 school year, some principals also reported that they had refunded part of the school fees to the parents during suspension of face-to-face classes (3 KGs) or provided packages that included toys, masks, learning materials, etc. for the children and their families (3 KGs).

In the Pre-policy phase, principals reported in the questionnaires their perceptions of the impact of the new KG policy (see Figure 6). Around 40% to 65% of the principals reported that there might be small or large positive impacts on staffing, school development plans, school premises and facilities, curriculum planning and resources for teaching and learning. Around half (54%) of the principals reported that there might be small or large negative impact on the transparency of financial management.

Figure 6. Perceived impact of the KG policy in the Pre-policy phase



Note: 25 principals responded to the questionnaires in the Pre-policy phase.

After around 3 years, in Wave 3, principals responded to an overarching interview question on whether there were changes to the use of funding on operation under the KG policy in these 3 years. Some principals mentioned their KGs had hired more teachers or supporting staff or had had a more favourable TP ratio (14 KGs), a few mentioned that teachers had higher salary (4 KGs), and that the grant had helped to reduce parents' burden (2 KGs) after joining the Scheme. Some principals (2 KGs) appreciated that the funding from the KG policy had supported their school operations under the COVID-19 pandemic as they were able to support teacher salary and operational expenses. Some principals (3 KGs) reported the elevated demands in accounting, and the reduced flexibility in utilising funding as compared to the operations before the KG policy. Some principals (9 KGs) also mentioned that with more staff employed after the implementation of the KG policy allowed them to have the capacity for teachers to participate in professional development activities, prepare teaching plans, teaching materials, teaching videos and learning portfolios, and communicate with parents.

1. 3. Summary and discussion

According to the findings from the principal questionnaires and interviews, the types of grants and usage of grants under the Scheme had been similar across waves in the 2017/18, 2018/19, and 2019/20 school years. The principals mentioned how the grants were utilised in various aspects to support teaching and learning during the interviews, including supporting the operations of the KG (e.g. hiring teachers, additional teaching staff to support NCS students, clerical staff, cooks and janitors); improving the learning and teaching environment (e.g. renovations, upgrading and installing computing equipment); purchasing teaching materials; and organising professional development activities for teachers.

In Wave 2 and Wave 3, some KGs had received the Promotion of Reading Grant for Kindergartens in the 2018/19 and 2019/20 school years and they made use of the Grant to further promote reading in school. In Wave 3, principals also reported that they had received the one-off grants for anti-epidemic under the COVID-19 pandemic. With the enhanced measures for NCS Grant under the Scheme (from a fixed sum in the 2017/18 and 2018/19 school years for KGs that had admitted at least 8 NCS students to a 5-tiered grant in the 2019/20 school year), there was a substantial increase in KGs that received the NCS Grant from the first 2 waves to Wave 3, in which all KGs that had admitted NCS students received the NCS Grant. The KGs that had received the NCS Grant hired additional teachers or teaching assistants and purchased books and teaching materials to support NCS students' learning.

In the Pre-policy phase, more than half of the principals reported in the questionnaires that they expected a small or large positive impact of the KG policy on school premises and facilities and the resources available for teaching and learning, and more than half of the principals expected a small or large negative impact of the KG policy on the transparency of financial management. The range of responses indicated that principals had different views of the impact of the KG policy prior to the implementation. Revisiting the implementation of the Scheme in the 2017/18, 2018/19 and 2019/20 school years, some principals reported that they were able to hire additional teachers and staff and teachers with higher salary, and that they had the capacity to allow teachers to prepare for teaching, participate in professional development activities, and communicate with parents. These findings reflected that although there were mixed perspectives among the principals regarding the potential impact of the KG policy before policy implementation, the KGs utilised grants provided under the KG policy and also the extra anti-epidemic grants to make improvement on staffing and school resources.

Theme 2: Improved TP ratio

2. 1. TP ratio and classroom quality

Under the Scheme, the basic TP ratio requirement of KGs is 1:11 (excluding the principal), but there is flexibility for KGs in allocating manpower and arranging learning and teaching activities, as long as at any one time there is 1 teacher per a maximum of 15 students, calculated by the total number of teachers on duty (including the principal) and the total number of students present in the KG. The average TP ratio of classes observed in Wave 1, Wave 2 and Wave 3 were 1:9.5, 1:11.5, and 1:8.6 respectively.

No statistically significant correlation was found between the TP ratio and classroom quality as measured by any of the 3 scales (i.e. MELE, ECERS-E and SSTEW). We examined whether the TP ratio had been associated with 3 specific domains: (a) Interaction with Children (MELE); (b) Supporting and Extending Language and Communication (SSTEW); and (c) Diversity (ECERS-E). Putting the observations of all three waves together, no significant associations were found between TP ratio (recorded during class observations) and the 3 domains (ps>.05). We also examined whether the observed TP ratio was correlated with any of the 4 factor observation scores. No significant correlation was found, except for Factor 2 (Learning environment, catering for learner diversity and free-choice indoor activities), where there was a significant correlation between TP ratio and the scores of Factor 2 (Rho = .16, p<.05) with a larger number of students per teacher/ less favourable TP ratio correlating with higher scores. This may be due to different factors. First, teaching in large groups is a common pedagogical approach in KGs in Hong Kong and teachers are able to manage large group teaching well. This means that the quality of teacher-child interactions may have been facilitated in large group settings. Second, the items reflected in Factor 2 (Learning environment, catering for learner diversity and free-choice indoor activities) require children to work individually or in small groups and teachers typically move around the classroom to provide support to individual children as needed. The items are also concerned with children's access to learning corners, books, and materials for free play. It may also be possible that with more children per teacher, teachers make arrangement for children to independently access materials/ free-choice activities to a greater extent.

2. 2. Teacher-child interactions

From Section 2.1, we noted that the association between observed TP ratio and the score of Factor 4 (Inclusiveness, group activities and teacher-child interaction) was not significant. However, since quality related to interactions and catering for students' diverse needs in classrooms were the hypothesised outcomes of change in TP ratio, we compared the class observation scores on domain levels across waves (see Table 7). In MELE, there was a significant increase on the Interaction domain between Wave 1 and Wave 3. Meanwhile, there was a significant increase across waves in SSTEW domain 3 "Supporting and Extending Language and Communication" (p<.001), but no significant change in SSTEW domain 2 "Supporting Social and Emotional Well-being" (p>.05). In addition, the scores in Wave 3 were significantly higher for ECERS-E Diversity domain (p<.001).

Table 7. Classroom observation scores on domains and items related to teacher-child interactions in Wave 1, Wave 2, and Wave 3

Domain/item	W1 Mean (n=50)	W2 mean (n=50)	W3 mean (n=44)	p value of W1-W3 differences from t-test
MELE (4-point scale)				
Domain: Interaction*	3.56	3.63	3.74	$p = .042$
Item 3: Adults are verbally responsive to child-initiated questions or comments*	3.48	3.38	3.82	$p = .012$
Item 5: Scaffolding by teacher to help children work through the steps to solve problem errors	3.44	3.32	3.57	$p = .304$
Item 7: Behavioral indications of positive praise of children*	3.46	3.72	3.82	$p = .025$
SSTEW (7-point scale)				
Domain: Supporting Social and Emotional Well-being	2.92	3.78	3.39	$p = .188$
Domain: Supporting and Extending Language and Communication***	4.25	4.72	5.44	$p < .001$
ECERS-E (7-point scale)				
Domain: Diversity***	1.67	2.13	2.18	$p < .001$
Item 13: Planning for individual learning needs***	1.48	2.62	2.57	$p < .001$

Note: ***$p < .001$, **$p < .01$, *$p < .05$.

2. 3. Summary and discussion

There were no statistically significant associations between the TP ratio (as recorded within the classroom at the time of class observations) and most measures of classroom quality. There was, however, a significant correlation between TP ratio and Factor 2 (Learning environment, catering for learner diversity and free-choice indoor activities) observation scores, whereby a less favourable TP ratio (a larger number of students per teacher) was correlated with higher scores, indicating the quality of the learning environment was better for classrooms with less favourable TP ratios (a greater number of students per teacher).

Comparing scores between Wave 1 and Wave 3, classrooms in Wave 3 had higher scores in the domains of MELE Interaction, SSTEW Supporting and Extending Language and Communication, and ECERS-E Diversity, but scores were not significantly different for the SSTEW Supporting Social and Emotional Well-being domain. These findings indicate that the classroom quality on certain aspect of interactions and catering for diverse needs (including teachers' questioning, feedback, scaffolding, encouragement, and planning for individual learning needs) were found to be higher in Wave 3 than Wave 1 under the existing TP ratio.

Theme 3: Strengthened support for professional development of teachers and principals

3. 1. Teachers' confidence and self-efficacy

In questionnaires, teachers were asked "How confident are you in the following aspects in your teaching?" The patterns of teachers' responses to this were fairly similar across waves (Figure 7). More than 80% of the teachers surveyed were fairly confident or very confident in all aspects of their teaching ability, except for school policies and administration, school leadership, and school self-evaluation, in which around 25% to 40% of teachers were either not very confident or not confident at all.

For the subset of teachers who responded to all three waves (n=510), the results were similar, with more than 80% of teacher responses stating being fairly or very confident in each of the aspects of teaching, except school leadership (41% of respondents indicated "not at all" or "not very confident"), school policies and administration (34% "not at all" or "not very confident"), and school evaluation (22% "not at all" or "not very confident"). For these teachers it was also possible to examine their responses longitudinally. A mean score of each of the 11 aspects of teaching was taken, with 4 indicating "very confident", 3 indicating "fairly confident", 2 indicating "not very confident", and 1 indicating "not confident at all". The mean score in both Wave 1 and Wave 2 was 3.02 (close to "fairly confident") and in Wave 3 the mean score had increased slightly to 3.05. A multilevel repeated measures model, taking into account the nesting of teachers within schools, demonstrated that changes in mean scores across waves were not statistically significant (p=.086).

Teachers were also asked about their self-efficacy by responding to "How confident are you to do the following in your teaching?" on various tasks relating to teaching and learning (Figure 8). Responses were similar across waves. More than 80% of the teachers were confident in doing each of these activities in their teaching, with the exceptions that around 25% were not confident in (i) supporting students with diverse needs, and (ii) leading other teachers in the school to achieve their goals.

Results for the subset of teachers who responded to all three waves (n=510) were similar, although a slightly lower percentage of responses indicated lack of confidence in supporting students with diverse needs (19%) and leading other teachers in the school (22%). A mean score of all self-efficacy questions was created, ranging from 1 (not confident at all) to 4 (very confident). The mean score amongst these teachers was 3.13 in Wave 1, 3.14 in Wave 2, and 3.17 in Wave 3. A multilevel repeated measures model, taking into account the nesting of teachers within schools, demonstrated that this increase in mean scores across waves was statistically significant (b=.02 per wave, p=.011). This indicates that teachers' self-efficacy were higher over time in the course of the 3 years of implementation of the KG policy.

Teacher questionnaire respondents were asked about their confidence in supporting students with diverse needs (e.g. at risk of developmental delays, special needs, and NCS students). Of the teachers who responded to all three waves (n=510), multilevel repeated measures models showed that there was a significant increase in reported confidence in supporting students with diverse needs over time on this measure (b=.04, p<.01).

Figure 7. Teacher's confidence towards their ability in teaching, by wave (Teacher questionnaire; Wave 1 n=1522; Wave 2 n=1446; Wave 3 n=1313)

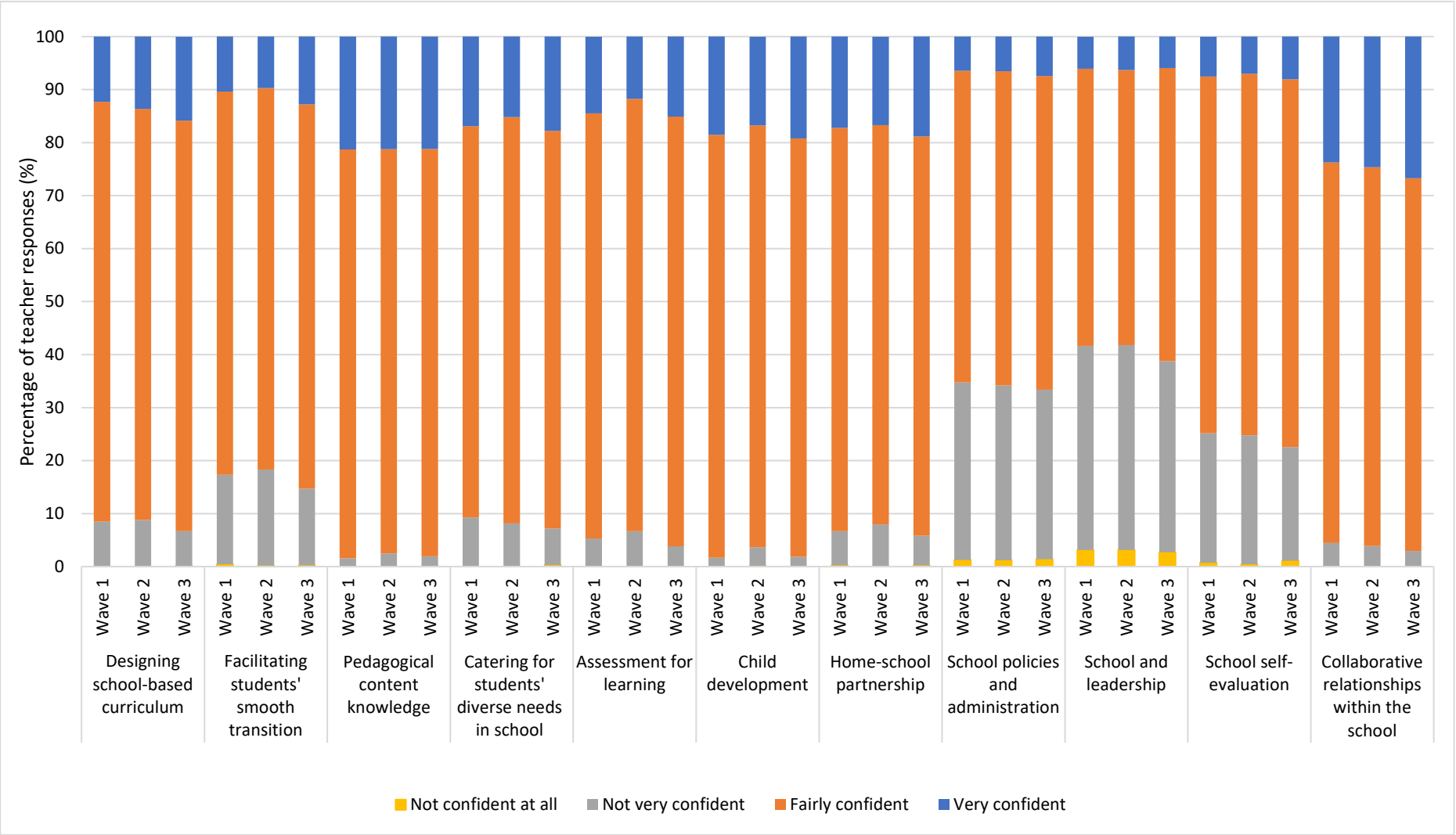
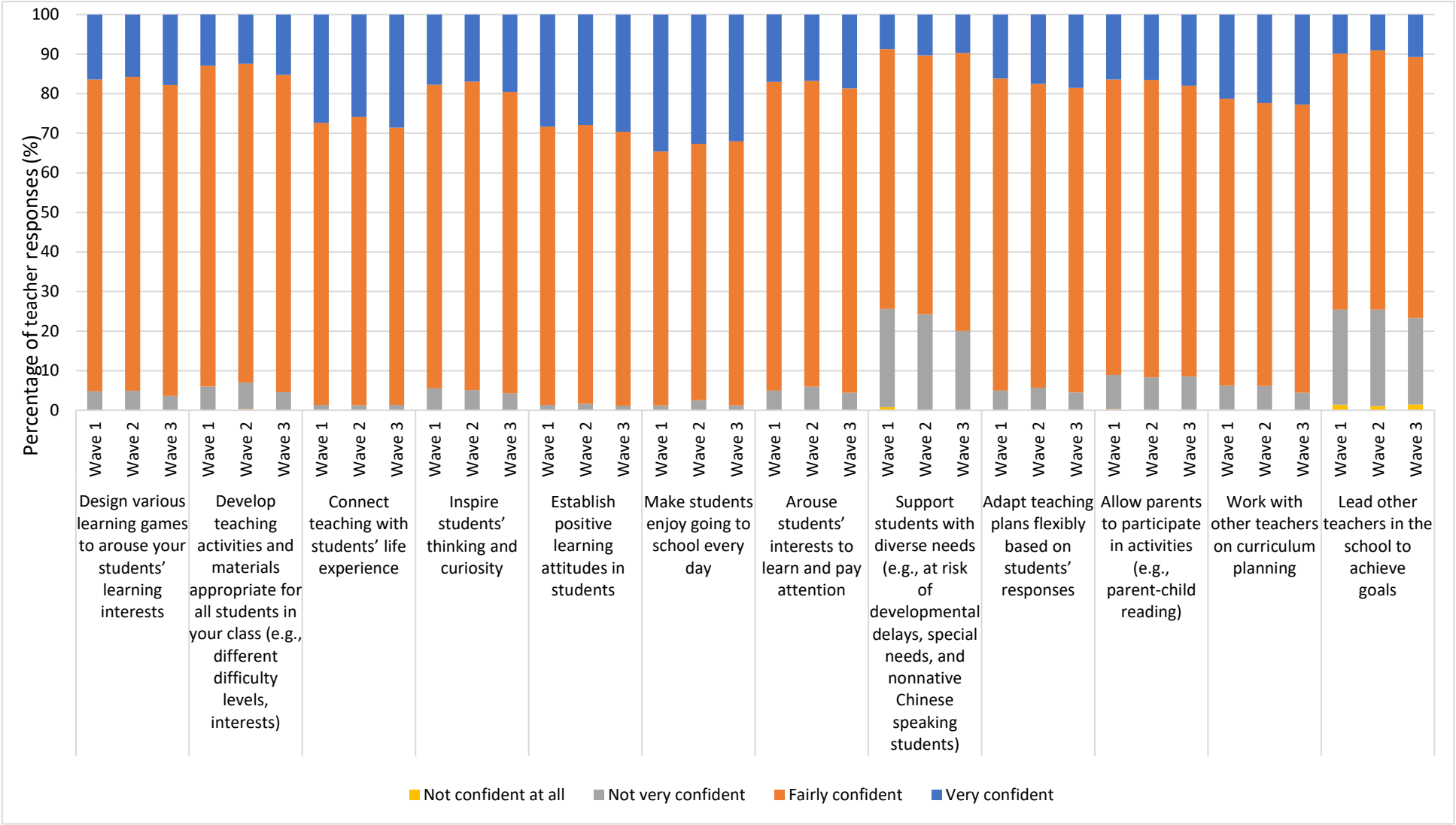


Figure 8. Teacher's self-efficacy, by wave (Teacher questionnaire; Wave 1 n=1522; Wave 2 n=1446; Wave 3 n=1313)

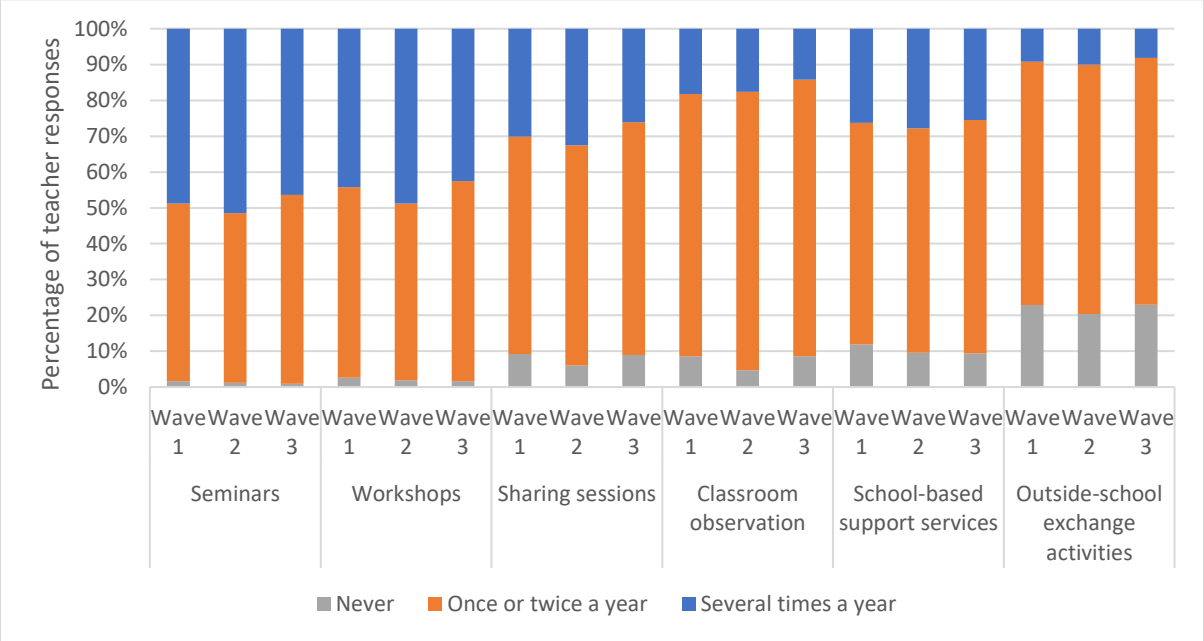


3. 2. Provision of professional development activities for teachers and principals

According to the Pre-policy questionnaires completed by the principals of 25 KGs, 87% of KGs reported that their teachers were required to attend professional development as part of the job requirement, and all KGs reported that on-site professional development activities were provided for their teachers. The frequency of on-site professional development activities varied. Workshops/ seminars were held on-site once or twice a year (44% KGs), several times a year (48% KGs), or more than once a month in some KGs (8% KGs). While peer observations were never conducted in 17% of KGs, most KGs had peer observations once or twice per year (67% KGs), or several times a year (16% KGs).

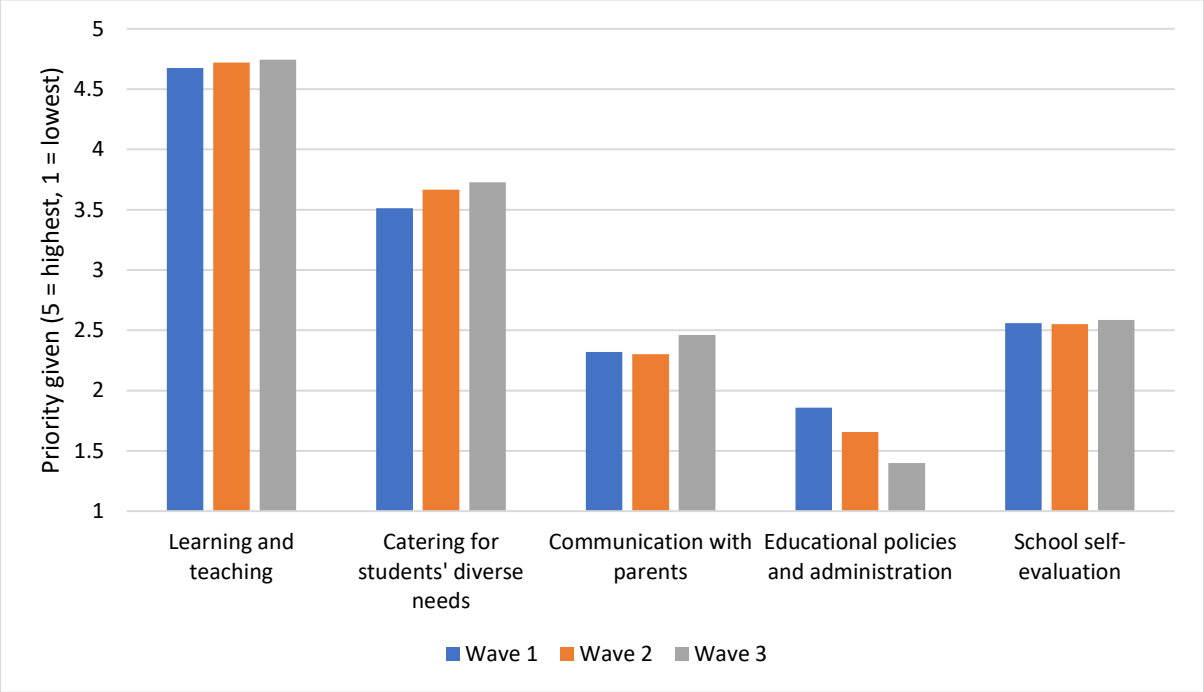
As presented in Figure 9, teachers reported on the frequency of the schools' provision of professional development activities on a three-point scale, "never", "one or twice per year", "several times a year" in Wave 1 to Wave 3. Nearly all teachers reported that they had the opportunity to attend seminars and workshops each year.

Figure 9. Frequency of professional development activities provided to the teacher (Teacher questionnaire; Wave 1 n=1522; Wave 2 n=1446; Wave 3 n=1313)



According to the responses obtained from principal questionnaires, KGs were providing diverse activities to enhance teachers' professional development, and many topics, including educational policies and administration, school self-evaluation, and communication with parents, had been covered in the activities. While arranging the activities for teachers, on average, principals placed the highest priority on learning and teaching, followed by catering for students' diverse needs, and school self-evaluation (see Figure 10). Rankings were very similar across waves.

Figure 10. Priority of the school arrangement of professional development activities for teachers as reported by principals (Principal questionnaire; Wave 1: n=121; Wave 2: n=114; Wave 3: n=106)



Principals reported on the number of hours of professional development (including seminars, conference and training workshops; but excluding pursuing programmes for higher qualifications) they expected each teacher would have participated in the school year, and teachers reported on the hours of professional development they expect to participate in the corresponding school year. For the Pre-policy phase, according to the principals, 13 out of 25 KGs (52%) reported that teachers were required to spend more than 20 hours on professional development activities per year. In the overall sample, we observed an increase in the proportion of principals and teachers surveyed who had expected that they would spend more than 20 hours on professional development activities from Wave 1 (45% teachers and 62% principals) to Wave 2 (53% teachers and 67% principals), and a decrease from Wave 2 to Wave 3 (46% teachers and 49% principals).

The subset of teachers (n=510) who responded to all three waves was examined longitudinally to test for significant changes in expectations of hours of professional development, using a multilevel repeated measures model. A linear model showed there was no significant change across waves overall ($p>.05$). However, the result of a quadratic model is consistent with the finding that average expectations for professional development increased between Wave 1 and Wave 2, and then decreased between Wave 2 and Wave 3. We believe that the decrease from Wave 2 to Wave 3 may be due to the restrictions in place because of the COVID-19 pandemic.

In the interviews, teachers were asked to share about the professional development activities provided to them. On the whole, the range of professional development activities reported was similar across waves. Topics related to catering for students' diverse needs and play had been the most frequently mentioned in all three waves but were reported by more teachers in Wave 1 (by nearly half of the teachers for both topics), whereas in Waves 2 and 3 these topics were mentioned relatively less (students with special needs: 11 teachers in Wave 2 and 10 teachers in Wave 3; training on supporting NCS students: 4 teachers in Wave 2 and 9 teachers in Wave

3; and training on play: 6 teachers in Wave 2 and 14 teachers in Wave 3). Meanwhile, teaching and learning topics, including language, picture book reading, physical activities, art, music, drama, religion, and moral development were mentioned across waves. Other topics included parent communication, child development, child assessment, child emotions, teacher stress management, child abuse, school leadership and administration, school self-assessment, curriculum development, transition to primary school, and bullying. Some new topics were mentioned in Wave 3 only. These included positive education (5 teachers), environment creation (2 teachers) and online teaching (1 teacher). Topics related to teacher stress management (Wave 1: 3 teachers, Wave 2: 1 teacher, Wave 3: 5 teachers) and home-school cooperation – including parent communication and parent education (Wave 1: 5 teachers, Wave 2: 6 teachers, Wave 3: 9 teachers) were more frequently mentioned in Wave 3 than other waves. A small portion of teachers from each year also reported attending seminars and workshops related to performance indicators, school self-evaluation and curriculum development.

Other than seminars, workshops, staff development days, school-based support programmes, and peer class observations, some teachers had had the opportunity to participate in exchange visits in local KGs (Wave 1: 3 teachers; Wave 2: 5 teachers; Wave 3: 4 teachers), and exchange visits outside Hong Kong, especially in Wave 2 when 11 teachers visited Mainland China and Japan. In Wave 1 and Wave 3, there were substantially fewer principals participating in exchange visits outside Hong Kong, with 3 and 2 teachers mentioning visiting KGs in Mainland China for the respective waves. We believe that the lower rates of participation in Wave 3 may be due to the restrictions in place because of the COVID-19 pandemic.

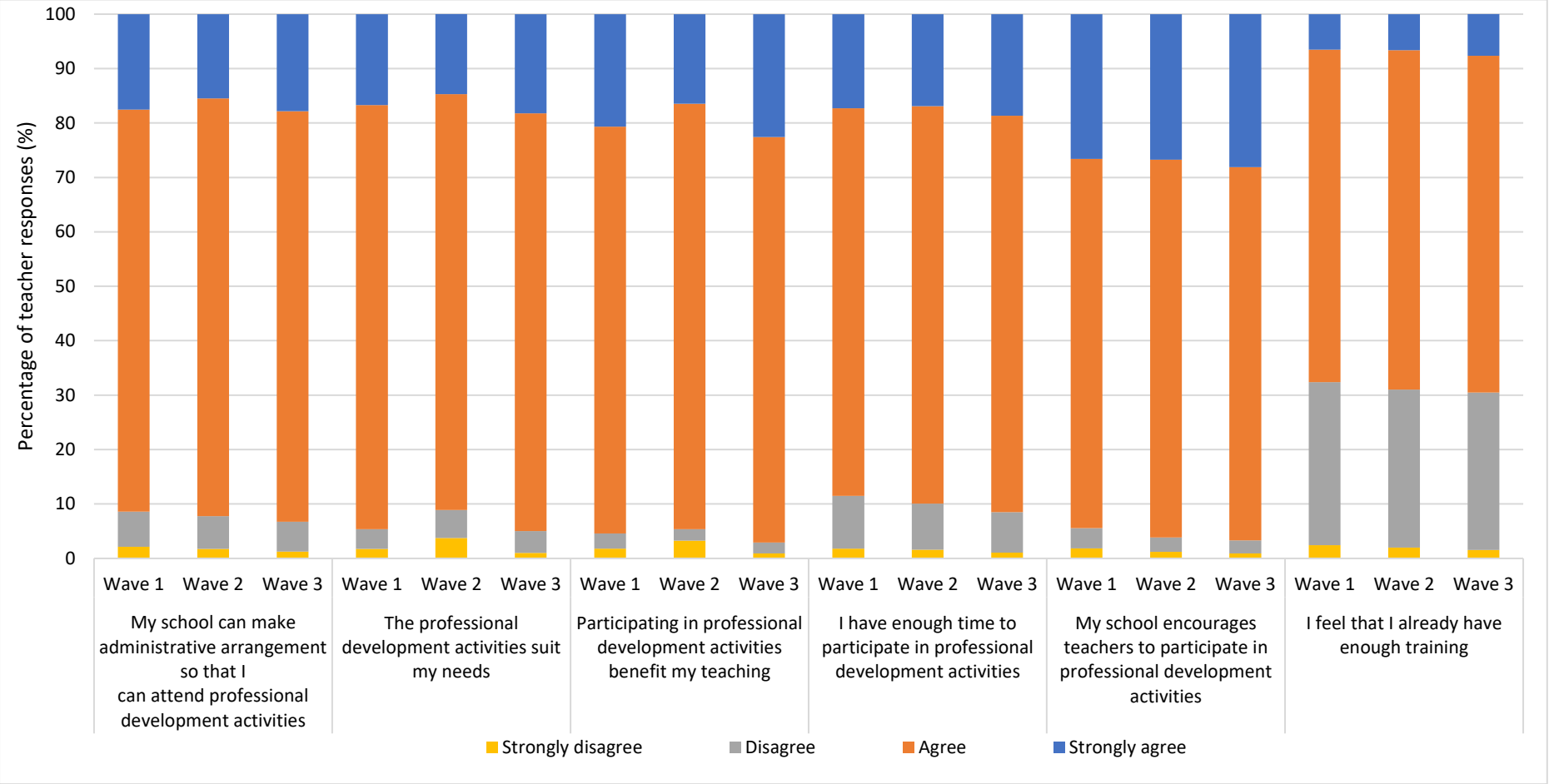
Teachers were generally positive about their school's arrangements for professional development activities. More than 90% of the teachers in all three waves agreed that professional development activities had suited their needs, benefitted their teaching, and that their schools had been encouraging about their participation. Meanwhile, a substantial minority (around 1/3) of the teachers reported that they had not had enough training (Figure 11). Multilevel repeated measures models examining the subset of teachers responding to all three waves (n=510) revealed no significant changes in views about professional development activities over time, except for a significant increase in the proportion of teachers agreeing that "I feel that I already have enough training" (b=.04, p=.012).

In Wave 3, teachers were asked in the interviews of their needs for professional development. The most frequently reported need was on supporting students with special needs (21 teachers), including to be equipped with in-class strategies and to identify children's needs. Art (7 teachers) and music (5 teachers) were also mentioned by some teachers. Other needs included those related to the topics of teaching and learning, curriculum and lesson design and play.

During the interviews, all principals in Wave 1 and Wave 2 and most principals in Wave 3 mentioned having participated in professional development activities. In Wave 2, some principals interviewed had participated in exchange visits outside Hong Kong in the 2018/19 school year (20% of the interviewed principals in Wave 1 and 40% of the interviewed principals in Wave 2). Exchange sites included Mainland China, Japan and Finland, and the themes of these visits had been related to free play in general. Some principals mentioned in Wave 1 and Wave 2 that they had attended EDB seminars on administration, including financial management (quotation exercises, sourcing, school fees), law and insurance (Wave 1: 16 principals; Wave 2: 9 principals). The topics of other EDB seminars attended by principals included Quality Review, education policy and curriculum. In Wave 3, 3 principals reported having attended seminars related to administration, financial management, or appraisal system,

and 2 principals reported having attended workshops designated for principals. Some principals mentioned having taken part in seminars with new topics in Wave 2, these included working with the media (4 principals), executive functions (2 principals), and effective communication with parents (2 principals). New topics in Wave 3 included positive education (2 principals). There were 2 principals reporting in Wave 3 that they had not participated in any professional development activities because they were cancelled due to the COVID-19 pandemic. Some common topics across three waves included learning and teaching English and Chinese, supporting students with special needs and NCS students, free play, and crisis management. In Wave 2, principals reported that they were sometimes unable to attend EDB seminars due to the limited capacity of the seminars.

Figure 11. Teachers' beliefs towards the school's arrangements of the professional development activities (Teacher questionnaire; Wave 1 n=1522; Wave 2 n=1446; Wave 3 n=1313)



3. 3. Professional development and classroom quality

In the questionnaires, principals reported on the average number of hours of professional development activities attended by teachers in their KGs in the school year. Examples include seminars, conferences, training workshops, and school-based professional support programmes. Calculation of polyserial correlations revealed that the number of hours reported by principals had been positively correlated with the scores of Factor 1 (Supporting socioemotional and cognitive development) and the score of Factor 3 (Nature and living) in Wave 1 only, and not correlated with any of the scores of the classroom quality factors in Wave 3 (Table 8). KGs with high quality classroom observation scores (in terms of Teacher-child interaction and Nature and science) had principals who reported that their teachers had gone through more hours of professional development activities in Wave 1, but there were no associations found in Wave 2 and Wave 3.

Table 8. Polyserial correlations between hours of professional development expected for teachers (as reported by principals) and class observation scores, by wave

	Wave 1 (n=50)		Wave 2 (n=50)		Wave 3 (n=44)	
	Rho	Std Err	Rho	Std Err	Rho	Std Err
Factor 1: Supporting socioemotional and cognitive development	.32*	.14	.19	.15	.07	.20
Factor 2: Learning environment, catering for learner diversity and free-choice indoor activities	.22	.14	.03	.18	.11	.17
Factor 3: Nature and living	.27*	.13	.21	.14	-.02	.16
Factor 4: Inclusiveness, group activities and teacher-child interaction	.22	.15	.20	.17	-.13	.22

Note*:* * $p < .05$.

We further explored whether the number of expected professional development hours reported by principals was related to overall observed classroom quality or changes in classroom quality or not. We took an average of all classroom quality items to calculate an overall composite variable representing classroom quality, scaled 0 to 10. Among the 25 KGs that we observed in Wave 1, we found that KGs with higher principal-reported hours of professional development had higher observed classroom quality (composite score of all quality measure items). However, there was no significant correlation between expected professional development hours and classroom quality in Wave 3. We are unsure whether this may be affected by the restrictions under the COVID-19 pandemic or not. Further, we examined whether KGs that increased their expected professional development hours (as reported by the principal) across waves also experienced an increase in observed classroom quality between wave 1 and wave 3. However, we found no significant difference ($p > .05$), perhaps due to a relatively small sample size of 25 KGs.

Teachers were also asked in the questionnaires the number of hours they had expected to spend on professional development each school year. Teachers reported among 6 choices (1 : 0 hours, 2 : 1 to 10 hours, 3 : 11 to 20 hours, 4 : 21 to 30 hours, 5 : 31 to 40 hours, 6 : over 40 hours). We found that the mean hours reported by teachers across waves were 3.5 (Wave 1), 3.3 (Wave

2), and 3.7 (Wave 3) respectively. This reflects that, on average, teachers reported between 11-20 hours and 21-30 hours of professional development each year.

We examined whether teachers' responses to questions relating to professional development were correlated with overall composite classroom quality scores or not. We calculated the average responses from teachers in each of the 25 KGs in Wave 3 and compared them with classroom observation scores across all waves (Pre-policy, Wave 1, Wave 2, and Wave 3). Some of the teachers' perceptions relating to professional development participation in Wave 3 were positively correlated with their schools' classroom observation scores (see Table 9). For example, schools with teachers who on average were more likely to agree that "My school can make administrative arrangement so that I can attend professional development activities" also on average had higher classroom quality scores (Rho = .26, $p < .05$). Significant positive correlations (ps < .05) were also found where teachers were more likely to agree that "The professional development activities suit my needs", "Participating in professional development activities benefit my teaching", "My school encourages teachers to participate in professional development activities", and "I feel that I already have enough training". This suggests that schools where teachers had positive responses to their professional development arrangements also had higher classroom quality scores on average.

Further, we examined whether teachers' responses to questions on professional development arrangements (at Wave 3) were associated with changes across waves in classroom quality scores. However, we found no significant associations in changes across waves (ps > .05), suggesting that whether or not schools had teachers with more positive or negative attitudes to their professional development arrangements was not related to changes in classroom quality over time.

Table 9. Polyserial correlations between KGs' professional development arrangements (as reported by teachers across three waves) and overall class observation scores in Wave 3

KG's professional development arrangement	**Rho**
My school can make administrative arrangement so that I can attend professional development activities.	.26*
The professional development activities suit my needs.	.18*
Participating in professional development activities benefit my teaching.	.21*
I have enough time to participate in professional development activities.	.14
My school encourages teachers to participate in professional development activities.	.22*
I feel that I already have enough training.	.17*
The school provides sufficient training opportunities and support to enhance teachers' professional competence	.09

Notes. *$p < .05$.

3. 4. Application of learning from professional development activities

Principals of the 25 KGs were asked during interviews on teachers' application of their learning from professional development activities. Some principals stated that teachers of their KGs were able to apply their learning from seminars or workshops to their teaching and curriculum development, particularly when the seminars or workshops had given assignments to teachers or had experts who would discuss plans, observe classes and reflect on the experience together with them. According to principals' reports in interviews, teachers at some KGs (Wave 1: 5

KGs; Wave 2: 24 KGs; Wave 3: 5 KGs) had been asked to share in meetings what they had learnt in the professional development activities, and some had also been requested to share how they put learning into practice. Teachers at a few KGs (Wave 1: 3 KGs, Wave 2: 3 KGs, Wave 3: 1 KG) had also been required to produce written reports on their learning. In Wave 3, the principals of 4 KGs also reported that either the principal or senior teachers had discussed with the teachers and provided advice to encourage teachers' application of their learning from professional development activities, 3 other principals mentioned assigning the teacher who had received professional development in a particular aspect (e.g. supporting students with special needs) to be in charge of relevant programmes at school.

Most of the teachers interviewed shared about their applying learning from professional development activities to teaching and learning (Wave 1: 46 teachers; Wave 2: 42 teachers; Wave 3: 47 teachers). The areas and ways of application reported by teachers were similar across three waves, with common topics including supporting children with special needs (Wave 1: 10 teachers, Wave 2: 7 teachers, Wave 3: 6 teachers), play (Wave 1: 9 teachers; Wave 2: 7 teachers; Wave 3: 10 teachers), music (Wave 1: 7 teachers; Wave 2: 5 teachers; Wave 3: 1 teacher), language and storytelling (Wave 1: 5 teachers; Wave 2: 7 teachers; Wave 3: 3 teachers), and learning areas involving nature and living as well as early childhood mathematics (Wave 1: 4 teachers; Wave 2: 2 teachers; Wave 3: 1 teacher). The application had mostly been related to applying strategies learnt to class or activity planning. While some had been related to learning through play, some had been about enhancing child-led elements in planning the curriculum and teaching, some on improving the environment, such as adding resources that enhanced the elements of play to the learning corners, others had been related to incorporating elements of play into different learning areas, for example, language and physical fitness.

In each wave, when teachers were asked about their application of learning from professional development courses, a few of the interviewed teachers appreciated the learning from the workshops on language education (Wave 1: 4 teachers; Wave 2: 4 teachers; Wave 3: 3 teachers). Teachers shared about directly applying the strategies they had acquired to their classes and seeing improvements in students' learning.

3. 5. Support for new teachers

Among the principals of the 25 KGs that responded to the Pre-policy questionnaire, 96% of the KGs reported that they had a mentoring programme at their KGs, and 75% reported that they provided additional support to new teachers at their KGs. In addition to mentoring programmes, the other types of support included induction seminars for new teachers (held by KGs, sponsoring organisations, or EDB), personnel arrangements that allowed more experienced teachers and new teachers to become partners in the same class, and workshops on specific topics, including picture books and parent-teacher communication.

According to questionnaire findings, there was a discrepancy between the principal and teacher reports on the provision of extra support for new teachers across the waves, with a large majority of principals but less than half of the teachers reporting on new teachers' having received additional support. A total of 48% of teachers in Wave 1, 43% in Wave 2, and 44% in Wave 3 responded that there had been extra support available for new teachers at their KGs or from their school sponsoring bodies (Figure 11). A considerable proportion (Wave 1: 36%, Wave 2: 38%, Wave 3: 38%) of teachers was unsure about the availability of extra support. This contrasted with around 82% of the principals in Wave 1, 77% of the principals in Wave

2, 74% of the principals in Wave 3 reporting the availability of support; and none of the principals reporting a "Not sure" option in all three waves (Figure 13).

A similar contrast is shown when teachers and principals were asked about the existence of a mentoring programme, with more than half of the teachers (Wave 1 = 54%, Wave 2 = 56%, Wave 3 = 60%) providing a "Yes" response, compared with around 95% of the principals across the waves. There was a slight increase in teachers reporting the presence of a mentoring programme in their KGs from Wave 1 to Wave 3.

Figure 12. Extra support for new teachers from teacher's perspective (Teacher questionnaire; Wave 1 n=1522; Wave 2 n=1446; Wave 3 n=1313)

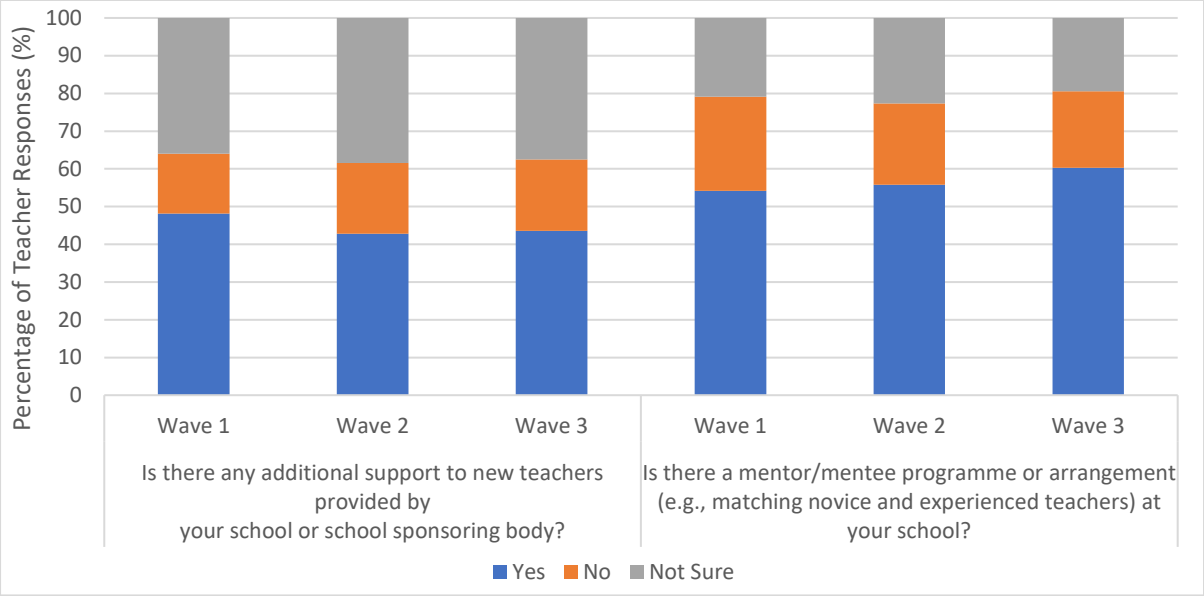
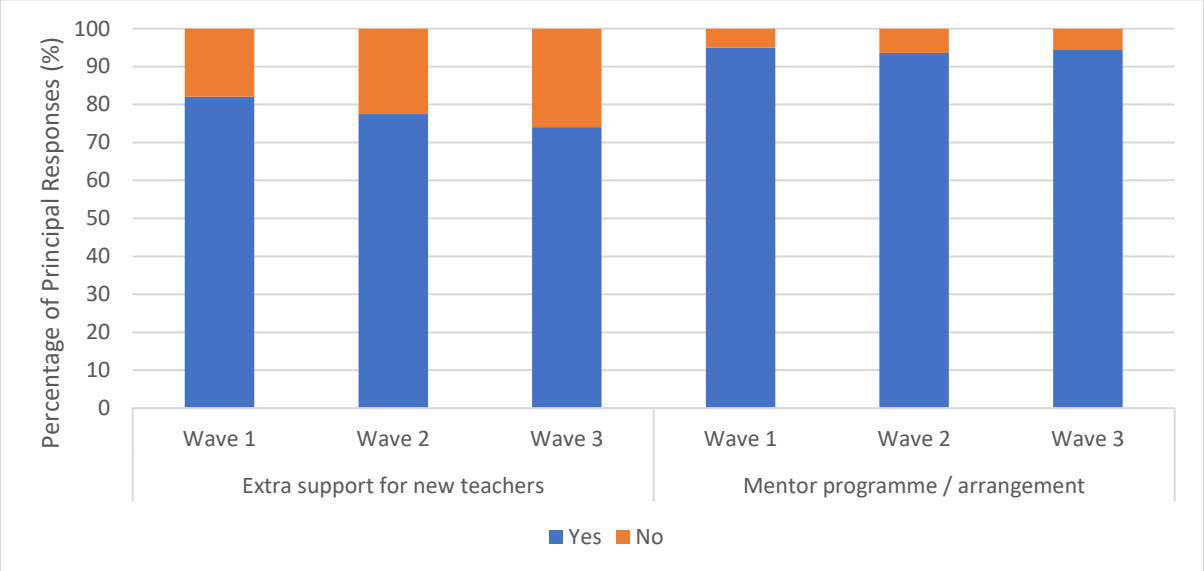


Figure 13. Extra support for new teachers from principal's perspective (Principal questionnaire; Wave 1 n=121; Wave 2 n=114; Wave 3 n=106)



The discrepancy between the responses from principal and teacher interviews appeared to be smaller in Wave 2 and Wave 3. Most principals (Wave 1: 24 KGs, Wave 2: 25 KGs, Wave 3:

24 KGs) and teachers (Wave 1: 41 teachers; Wave 2: 44 teachers; Wave 3: 44 teachers) reported that their KGs had provided extra support for new teachers in the interviews. At the same time, there were some discrepancies among teachers from the same KG. For example, in Wave 2, we interviewed 1 K1 teacher and 1 K3 teacher from each of the 25 KGs. For the 6 teachers who reported not having support for new teachers in their KGs, the other teachers we interviewed from the same KGs reported having such support. It shows that some teachers were unaware of the support for new teachers in their KGs. Besides, it should be noted that not all KGs had new teachers joining the KG each year, and some teachers mentioned they were unsure of the support because of the absence of new teachers in their KGs.

The types of additional support for new teachers mentioned in all three waves were mostly similar. In Wave 1 and Wave 3, around a quarter of the interviewed teachers and 24 principals reported the presence of a mentoring programme, and more teachers (35 out of 50) and principals (18 out of 25) reported a mentoring programme in Wave 2. In mentoring programmes, new teachers (mentees) had been matched with experienced teachers (mentors), who gave advice and support to the mentees regarding teaching and school operations. Some KGs and/or their school sponsoring bodies had organised induction or orientation sessions for new teachers before they started working, so that new teachers would understand more about the missions and activities of the KG and/or the school sponsoring bodies according to principals and teachers interviewed (Wave 1: 16 out of 50 teachers, Wave 2: 7 out of 50 teachers, Wave 3: 15 out of 50 teachers). Some teachers and principals mentioned their KGs would arrange for new teachers to attend seminars or courses (Wave 1: 4 teachers and 2 principals; Wave 2: 3 teachers and 1 principal; Wave 3: 8 teachers and 4 principals), for example, a 15-hour course on facilitating the assessment of students' Cantonese pronunciation in Wave 1 and a seminar on curriculum design in Wave 3. A few principals mentioned encouraging new teachers to join induction seminars. (Wave 1: 3 principals; Wave 2: 1 principal; Wave 3: 2 principals).

Principals (Wave 1: 14 principals, Wave 2: 10 principals, Wave 3: 11 principals) and teachers (Wave 1: 13 teachers; Wave 2: 4 teachers; Wave 3: 11 teachers) reported in the interviews that the KGs had made personnel arrangements to partner new teachers with experienced teachers in the same class and/or let new teachers be the class teachers for the afternoon session so that experienced teachers could guide and support new teachers as a demonstration in the morning session. A few principals (Wave 1: 1 principal; Wave 2: 2 principals; Wave 3: 2 principals) and teachers (Wave 1: 2 teachers; Wave 2: 2 teachers; Wave 3: 0 teachers) reported having class observations as additional support for new teachers. In Wave 2 and Wave 3, some principals also mentioned they had follow-up discussions or appraisal meetings after a new teacher had joined the KGs (Wave 2: 2 principals, Wave 3: 10 principals).

On the support for new teachers, most teachers agreed that it was important. In particular, the reasons mentioned were allowing new teachers to discuss their difficulties with senior staff (e.g. principals, vice-principals and senior teachers) and supporting new teachers to work in the KGs.

3. 6. Schools' practical support to encourage teachers' participation in professional development activities

More than 90% of teacher questionnaire respondents agreed that their KGs had made administrative arrangements to allow them to participate in professional development activities (Figure 11 above). This finding is consistent with the principal and teacher interviews. In addition to verbal encouragement and the circulation of information to encourage teachers' participation in professional development activities, across the 3 years, more teachers reported in the interviews that the KGs had been able to make personnel arrangements to allow them to attend professional development activities during work hours (including Saturdays) or leave early from schools (Wave 1: 19 teachers; Wave 2: 13 teachers; Wave 3: 16 teachers). According to the principals interviewed, 2 KGs in Wave 2 and 1 KG in Wave 3 had provided financial support for principals and teachers' participation in professional development activities. A new theme stemming from the principal interviews in Wave 2 was the availability of funding from outside organisations to allow KGs to hire supply teachers. This included funding from external projects providing professional development activities in which the KGs participated (Wave 2: 3 KGs, Wave 3: 1 KG). This was to enable teachers to have the capacity to participate in professional development activities.

According to the interviews, in Wave 1, 4 teachers reported that they could either participate in professional development activities only during personal time, or that they had difficulties participating because they did not have enough time or money. These difficulties were not reported in the subsequent waves. In Wave 2, 3 principals reported that the staffing was tight and therefore they did not have capacity to free teachers for professional development. This was not reported in Wave 3. On the other hand, 3 principals mentioned that they had the capacity to arrange for teachers to participate in professional development activities within school hours.

3. 7. Summary and discussion

Responses to the teacher questionnaires suggested that teachers' confidence varied across aspects. More than 80% of the teachers were confident in the pedagogical aspects of teaching, including designing the curriculum, catering for learning diversity, and on assessments, and fewer teachers (50-80%) were confident in school leadership, school self-evaluation, and school policies and administration, across the waves.

In terms of the expected number of hours to be spent on professional development activities in the school year, a higher percentage of teachers and principals reported having spent 20 hours more in Wave 2 than in Wave 1 and Wave 3 in questionnaires. Lower participation in Wave 3 was likely to be due to the social distancing measures in place because of the COVID-19 pandemic. Most principals gave priority to the aspect of learning and teaching in the arrangement of professional development activities for teachers in all three waves. The topics covered in professional development activities were similar across waves. Learning through play and supporting students with special needs continued being the most frequently mentioned topics.

Comparison of classroom observation data with principal questionnaire data provided evidence that teachers' participation in professional development activities is related to observed classroom quality. In Wave 1, principals' expectations of professional development activities for their teachers were significantly associated with the scores of Factor 1 (Supporting

socioemotional and cognitive development) and score of Factor 3 (Nature and living) but the associations were not significant in Wave 2 and Wave 3. This showed that, based on the Wave 1 data, participating in more hours of professional development activities might be associated with higher classroom observation scores in terms of interactional quality that support children's socioemotional and cognitive development, as well as qualities that promote children's learning in aspects of nature and living.

We also found that teachers' perceptions of the schools' administrative arrangements and encouragement, as well as their perceptions of whether professional development activities suited their needs, benefitted their teaching, and whether they felt they had enough training in Wave 3 correlated with their KGs' overall classroom quality over three waves. Although teachers' perceptions did not predict change in quality across the waves, this finding suggested that the above-mentioned factors might be related to classroom quality and might therefore be promoted to enhance quality.

The majority of teachers reported that participation in professional development activities was beneficial to their teaching. Principals shared how they saw teachers apply their learning from professional development activities when teachers shared about their learning or their experience of applying their learning in classrooms in whole-school meetings, or during class observations by principals. Teachers shared how they had applied their learning by trying out instructional strategies as well as making changes to the curriculum, classroom environment and learning corners. These findings provided evidence that teachers were able to apply what they had learnt from professional development activities to enhance teaching and learning.

Regarding the provision of additional support for new teachers, a high proportion of KGs reported providing support in the Pre-policy questionnaires (75% provided additional support and 96% had a mentoring programme in place). However, we observed a discrepancy between the principal and teacher reports in the interviews and questionnaires in the three waves (Wave 1 to Wave 3), although the gap between the 2 groups were slightly smaller across the waves. One reason for the discrepancy may be because the teachers who were interviewed were not novice teachers themselves and were therefore unaware of support available for novice or newly recruited teachers. Another source of discrepancy might have stemmed from the fact that some KGs did not have new teachers in the particular school year, so the teachers might not be aware of the support taking place. In addition, not all teachers were involved in the support for new teachers, for example, in the case of teachers not being a mentor or mentee in the mentoring programme. As reflected in the questionnaires and interviews, besides explicit support such as induction sessions and formal mentoring programmes, principals also make special arrangements by pairing up new teachers with experienced teachers. The types of support were similar from the Pre-policy phase to the three waves. Such administrative decision made by the management team could be considered as a form of implicit support, and hence other teachers might not have been aware of the arrangement.

According to the questionnaire findings, a large majority of teachers agreed that their KGs were able to make administrative arrangements for them to participate in professional development activities across the waves. When principals and teachers elaborated in the interviews, we found that most KGs had provided verbal encouragement, circulated information and provided advice to teachers. On the other hand, in Wave 2 and Wave 3, some KGs received extra funding to hire supply teachers for teachers' participation in professional development programmes. It can be seen that most KGs had made administrative arrangements or given encouragement to support teachers' participation in professional development activities to some extent.

Theme 4: Revised guide to the pre-primary curriculum

The Kindergarten Education Curriculum Guide (KECG) was issued in 2017 as a revision to the Guide to the Pre-primary Curriculum. In Wave 1, teachers and parents had generally displayed positive attitudes towards the benefits of learning through play, and based on the teacher and principal reports, some changes had taken place in KGs to promote play in the 2017/18 school year. We compared the principal interview responses of Wave 1 and Wave 3 qualitatively and found that 17 out of 25 KGs had implemented learning through play to a greater extent. Hence, in this section, we focus on the findings on attitudes and practices regarding the implementation of learning through play in KGs.

4. 1. Principals' and teachers' perceptions towards the KECG

The proportion of principals reporting in questionnaires a high level of knowledge of the KECG was 18% in Wave 1, 25% in Wave 2, and 23% in Wave 3; these changes were not statistically significant. The majority of principals in all three waves reported a moderate level of knowledge, and no principal reported having no knowledge at all. Principals' level of knowledge of the KECG was not associated with changes in overall classroom quality across the waves.

From the teacher questionnaires, there was a small increase in the proportion of teachers reporting that the KECG had made a "high impact" on their teaching, from 20% in Wave 1 to 23% in Wave 2 and 26% in Wave 3. Amongst the teachers completing all three waves (n=510), a multilevel repeated measures model showed a significant increase in teacher perceptions of the impact of the KECG across waves ($b=.09$, $p<.001$). Further, younger rather than older teachers were more likely to report that the KECG had made a high impact on their teaching ($p<.01$).

Figure B2 (see Appendix B) shows the types of changes that have been made to school curricula, as reported by principals. While strengthening the elements of free exploration in play and promoting learning through play were the most frequent (around 90%) and consistent change reported by principals in all three waves, we observed that there were more principals reporting in other aspects across the waves, including reinforcing catering for learner diversity, strengthening the promotion of moral education, and enhancing the interface between KG and primary education. Multilevel repeated measures models were used to examine changes over time in responses of principals participating in all three waves to a question on changes to the curriculum following the introduction of the KECG (n=85, after excluding 1 non-response to this question). The percentage of principals reporting the adoption of 2 specific measures increased significantly across the waves and they were: (i) re-enforcing catering for learner diversity; and (ii) promoting an inclusive culture ($ps<.05$).

4. 2. Teachers' and parents' attitudes towards learning through play

Questionnaire findings show nearly all teachers agreed or strongly agreed that "Learning through play is beneficial to children's development", "Rich playful learning environment is beneficial for students' learning" and "Learning experience should be real-life sensory and interesting" (see Figure 14). Around half of the teachers strongly agreed with these statements and the patterns were similar across the waves.

From the parent questionnaires, around 70% of the parents in all three waves agreed that students should have more free play time in school, although around 15% disagreed (the rest were not sure; see Figure 15). Longitudinal analysis of the parents with repeated measures showed no significant differences across the waves (excluding "don't know", $p>.05$). A high majority (Wave 1 = 97.66%, Wave 2 = 96.68%, Wave 3 = 95.54%) of parents agreed or strongly agreed that a rich and playful learning environment was beneficial to students' learning across waves. At the same time, most parents agreed or strongly agreed that repeated reading and writing was beneficial for students' literacy development (Wave 1 = 82.33%, Wave 2 = 85.37%, Wave 3 = 89.46%), and that it was important for students to learn to read and write before entering primary school (Wave 1 = 87.21%, Wave 2 = 86.00%, Wave 3 = 92.27%).

Teachers interviewed were asked whether they thought the parents at their KGs understood the importance of play to child development. In Wave 3, two-thirds of the teachers reported that most parents at their KGs generally understood the importance of play, around a quarter of the teachers reported that half or some of the parents understood the importance of play and a few teachers reported that their parents did not understand. A few teachers mentioned that although parents generally understood the importance of play, putting into practice might be challenging for the parents especially when they were concerned about transition to primary school. This reflected that the parents in many KGs seemed to agree with the importance of play, but this belief was not held among some other parents.

Figure 14. Teachers' beliefs towards children's learning (Teacher questionnaire; Wave 1 n=1522; Wave 2 n=1446; Wave 3 n=1313)

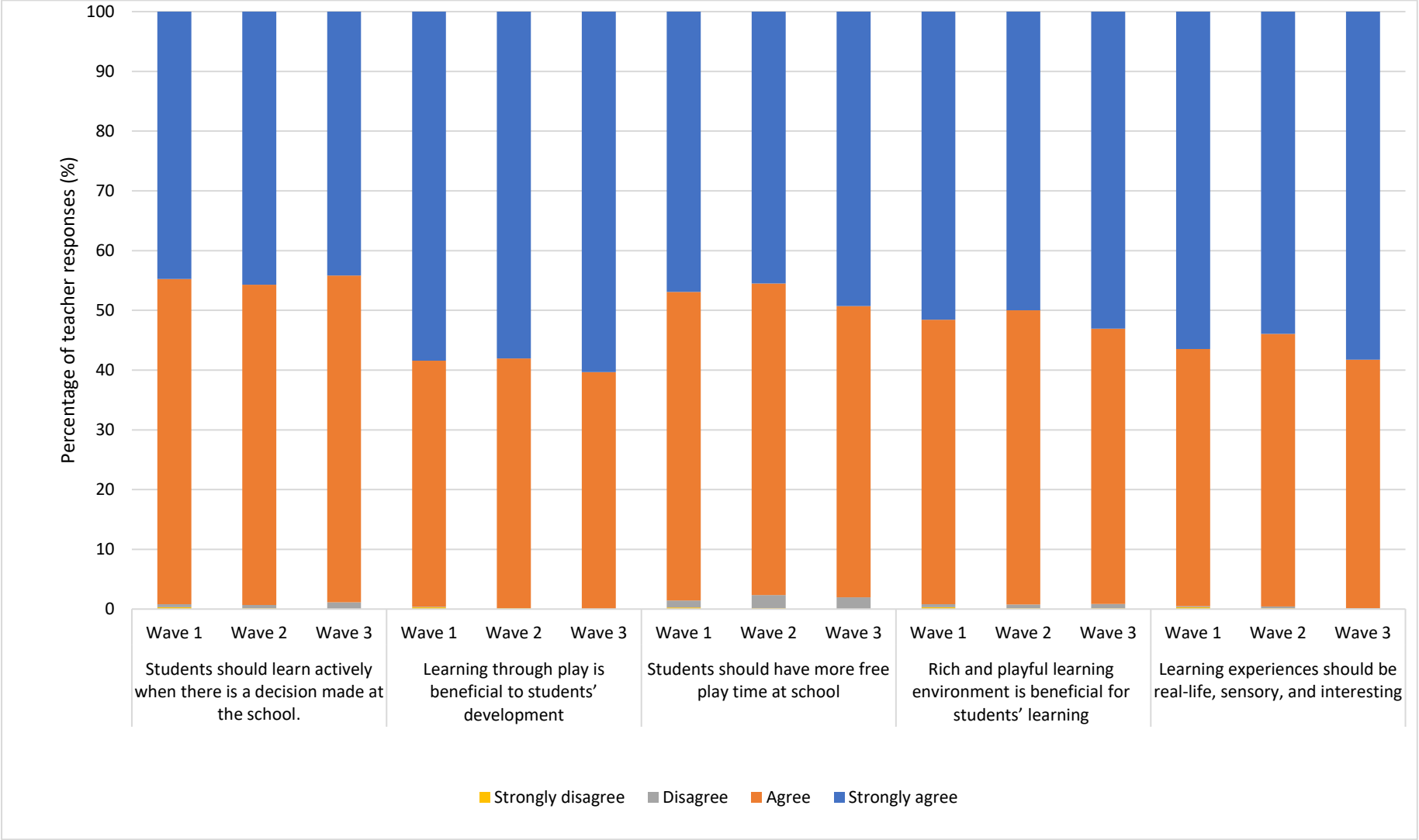
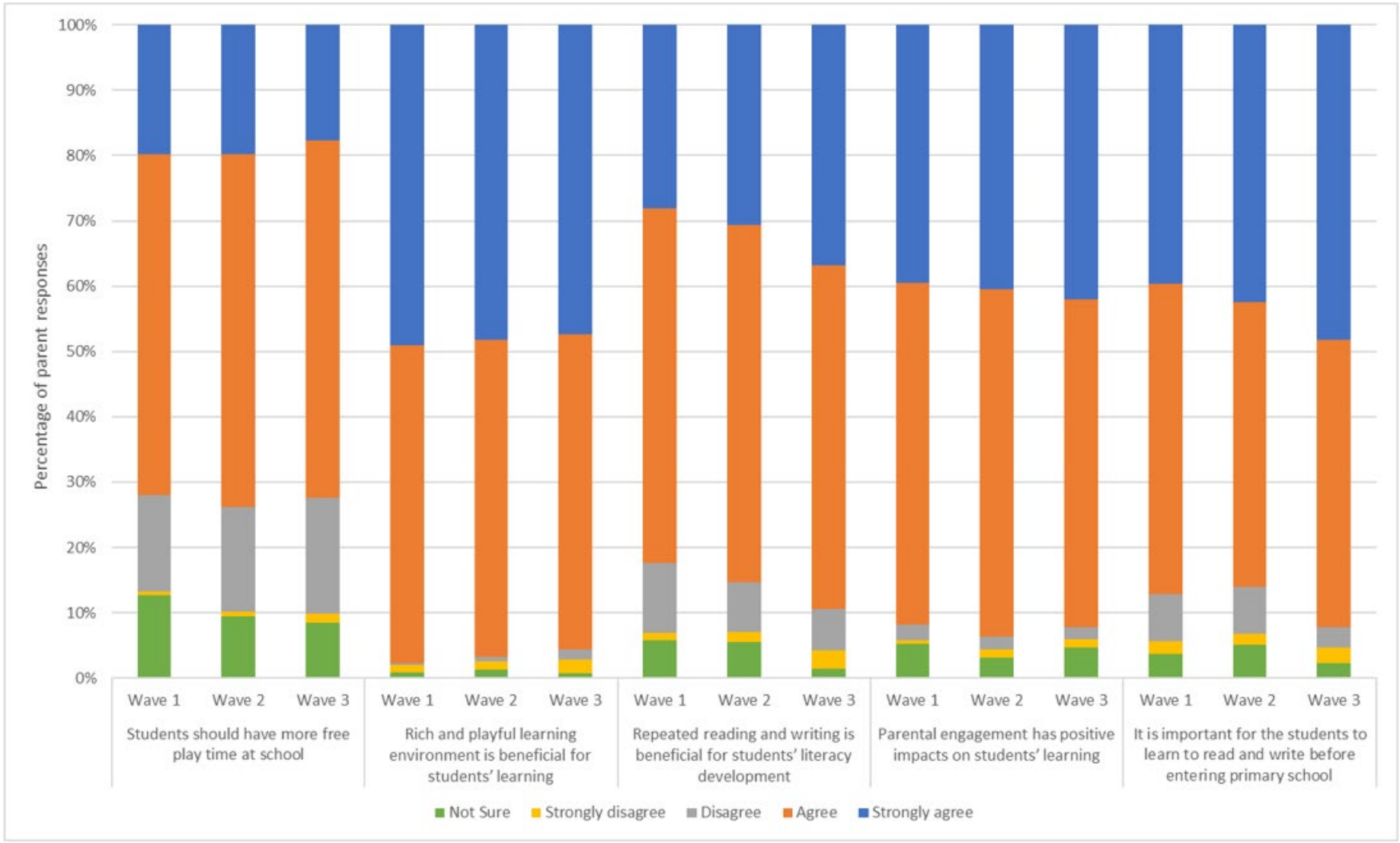


Figure 15. Parents' beliefs towards play and learning (Parent questionnaire; Wave 1 n=879; Wave 2 n=798; Wave 3 n=431)



4. 3. Schools' policy and practice on learning through play

Analysis of the principals completing questionnaires in each wave revealed that 57% of principals in both Wave 1 and Wave 2 strongly agreed that students learnt through play. In Wave 3 the proportion was 60% (See Figure B4 in Appendix B). A repeated measures model showed that this difference across waves was not statistically significant. In addition, teachers' report on whether they agreed that students learnt through play in their school in Wave 3 correlated positively with their KG's overall classroom quality across all waves (Rho = .22, $p < .05$).

From the interview data obtained in Wave 1, a substantial portion of principals reported uncertainties and the need for time to explore how play could be implemented with reference to the KECG. A total of 8 principals described uncertainties or difficulties in the implementation, including that they had needed time to explore what was expected of free play, with difficulties in implementing in the limited time, manpower, and training available, and some principals and teachers had got difficulties in understanding the EDB guidelines regarding the implementation of free play. In Wave 1, 4 principals and 8 teachers reported that there had not been any change to their pedagogy because their KGs had already been promoting learning through play before the release of the KECG. Another 4 principals and 6 teachers reported in Wave 1 that they had not yet started implementing learning through play but had been learning about the concept and preparing to make changes in the following school year. The preparation work included attending EDB seminars on learning through play and other related training activities, plans for reducing the amount of homework, incorporating more elements of learning through play, and employing additional staff to support group games. Fewer principals raised concerns and challenges in Wave 2 and Wave 3 as compared to Wave 1 (Wave 1: 8 principals, Wave 2: 2 principals, Wave 3: 5 principals). Uncertainties were reported in Wave 2 and Wave 3, including the need to figure out what the teachers' role was in play, to explore how to implement learning through play, for teachers to develop the skills and confidence, and the challenge of implementing free play within the limited space of the KG premises.

Most principals and teachers interviewed described some practices currently adopted at school, especially in Wave 2 and Wave 3. A substantial proportion of principals and teachers mentioned an emphasis on learning through play, or reported that they had been "using a play curriculum" or "incorporating the elements of play" to their school-based curriculum (Wave 1: 4 principals and 12 teachers, Wave 2: 4 principals and 13 teachers, Wave 3: 5 principals and 17 teachers). More principals and teachers also mentioned having included more "play-based activities" and strategies in their teaching across the waves (Wave 1: 10 principals and 26 teachers, Wave 2: 7 principals and 21 teachers, Wave 3: 16 principals and 30 teachers). These activities and strategies included storytelling, reading of picture books, role play, card games, and "free play week"/ "free play day", which facilitated the shift from teacher-led to child-led learning modes and provided opportunities for free exploration and extended learning. They also mentioned having used different questioning skills. A newly mentioned topic starting from Wave 2 was the inclusion of "Plan-Do-Review" or debriefing sessions at the end of free play (Wave 2: 4 principals and 3 teachers, Wave 3: 3 principals and 1 teacher).

Across the waves, more KGs reported that they had made changes to the daily schedule of children's activities in the interviews. Principals (Wave 1: 10 principals, Wave 2: 17 principals, Wave 3: 20 principals) and teachers (Wave 1: 11 teachers, Wave 2: 17 teachers, Wave 3: 31

teachers) said their KGs had allocated more time for free play, exploration, physical activities, music, and free choice time with reference to the requirements stipulated in the KECG.

There were more reports of making changes to the physical space set aside for children's use in Wave 2 and Wave 3 than Wave 1. Some principals and teachers reported that they had reorganised the physical space for play (e.g. by allocating more physical space and opening up classrooms so that children of different groups could use different rooms) and increased the number of learning corners for children to choose from (Wave 2: 4 principals and 5 teachers, Wave 3: 7 principals and 6 teachers). For example, children could enter different classrooms during playtime. There was also more shared space being reorganised/ opened up on campus or more shared community space for physical activities. There were also more principals (Wave 1: 5 principals, Wave 2: 9 principals, Wave 3: 7 principals) and teachers (Wave 1: 9 teachers, Wave 2: 9 teachers, Wave 3: 10 teachers) describing the new materials they had added to the learning environment, enhancing the elements of play and authenticity in learning corners. A few teachers also stressed that resources in learning corners had been changed regularly in Wave 2 (4 teachers). Particularly among the principals, the examples of toys and materials reported had been more concrete and varied in Wave 2 and Wave 3 than in Wave 1. These included big toys, building toys, special types of blocks, big wheels, block building walls, mirrors, recyclable materials, paper rolls, and books.

Several principals and teachers reported having reduced homework and writing tasks for children or having modified the format of homework (Wave 1: 1 principal and 3 teachers, Wave 2: 2 principals and 6 teachers, Wave 3: 0 principals and 4 teachers). In the parent interviews in Wave 2, 3 parents noted that writing had been reduced and more play had been going on in KGs. This reflected that the children had probably been having less writing. With no specific questions on the KECG or play, 3 parents interviewed in Wave 2 mentioned that they knew EDB had provided some guidelines for KGs such that too much writing was not allowed. In line with this, 2 principals mentioned that they had told parents about the KECG issued by EDB at the parent meetings in the same wave.

Some KGs had made reference to their experience in school-based support programmes or other professional development activities when implementing learning through play. Principals and teachers (Wave 1: 2 principals and 5 teachers, Wave 2: 4 principals and 1 teacher, Wave 3: 4 principals and 1 teacher) mentioned how they had been able to apply their learning from the projects organised by universities. In both Wave 2 and Wave 3, 4 teachers mentioned that they had reviewed and evaluated their implementation of play with other colleagues, again this had not been present in Wave 1.

We further examined the classroom observation scores related to learning through play under the theme "Revised guide to the pre-primary curriculum" (see Table 10). While no significant differences were found between Wave 1 and Wave 2 for MELE domain Teaching/Learning: Free-choice Indoor Activities and SSTEW Supporting Learning and Critical Thinking domain ($ps>.05$), scores were significantly lower in Wave 3 when compared with Wave 1 of the same domains. While this may suggest a decrease in quality on these aspects over the three-year course of the implementation of KG policy, we believe that the lower scores in Wave 3 may be due to the restrictions in place because of the COVID-19 pandemic.

Table 10. Classroom observation scores on domains and items related to learning through play in Pre-policy phase, Wave 1, Wave 2, and Wave 3

Domain/item	Pre-policy mean (n=15)	W1 mean (n=50)	W2 mean (n=50)	W3 mean (n=44)	p value of W1-W2 differences from t-test	p value of W1-W3 differences from t-test
MELE (4-point scale)						
Domain: Teaching/Learning: Free-choice Indoor Activities	2.53	2.91	3.01	2.17	$p = .30$	$p < .001$
Item 17: The daily routine, seen today, has a mix of activities and not only teacher-led instruction	1.53	2.32	2.68	2.43	$p = .03$	$p = .57$
Item 35: Children are given time for indoor free-choice activities	3.73	3.82	3.92	2.70	$p = .38$	$p < .001$
Item 36: Children have access to different interest centers during indoor play	2.93	3.44	3.30	2.41	$p = .29$	$p < .001$
Item 37: Dramatic or imaginative play materials for different themes are accessible	1.33	2.56	2.40	1.39	$p = .44$	$p < .001$
Item 38: Blocks or block-like objects of different shapes and sizes, for construction, are accessible	1.80	1.92	2.48	2.11	$p = .02$	$p = .45$
Item 39: Children have access to and show interest in 5 or more different books during free-choice time	2.67	2.42	2.64	2.05	$p = .29$	$p = .12$
Item 40: Adult supervision and adult-child verbal interactions during free play	2.73	3.32	3.34	2.39	$p = .91$	$p < .001$
SSTEW (7-point scale)						
Domain: Supporting Learning and Critical Thinking	2.15	2.62	2.83	2.21	$p = .30$	$p = .04$
Item 2: Encouraging choices and independent play	3.00	3.26	3.82	2.61	$p = .07$	$p = .04$
Item 9: Supporting curiosity and problem-solving	2.93	3.48	3.62	2.45	$p = .63$	$p < .01$
Item 10: Encourage sustained and shared thinking through storytelling, sharing books, singing, and rhymes	1.33	2.00	2.54	2.16	$p = .02$	$p = .49$
Item 11: Encouraging sustained shared thinking in investigation and exploration	1.80	2.34	2.20	1.34	$p = .61$	$p < .001$

4. 4. Support for teachers on the implementation of the KECG

In Wave 3, we asked principals in the interviews whether the schools had provided support for teachers to facilitate the implementation of the KECG or not. Most of the principals (16 KGs) reported that opportunities had been provided for teachers to attend relevant professional development activities, including workshops on learning through play, exchange visits outside Hong Kong, and participation in projects organised by external bodies. A few principals also (4 KGs) reported that they had had meetings with teachers, where they had discussed the KECG or evaluated their school curriculum based on the KECG. A couple of principals (2 KGs) also mentioned purchasing constructive toys or teaching materials as a means of support for teachers to implement the KECG.

4. 5. Summary and discussion

In the questionnaires, principals and teachers were asked to report on how much they had known about the KECG, whether they had no knowledge at all or a low/ moderate/ high level of knowledge of it. Based on the self-reports, the principals generally claimed they had got a moderate or high level of understanding of the KECG but there were no changes across the waves, and the level of understanding was not associated with changes in the overall classroom quality. There was a small increase in the percentage of teachers reporting having a high level of understanding of the KECG from Wave 1 to Wave 3. According to the longitudinal analyses of the teacher questionnaire data, we observed an increase in teacher perceptions of the impact of the KECG across the waves. According to these self-reported findings, principals and teachers generally had some understanding of the KECG, and across the waves, teachers perceived greater impact of the KECG on their practice.

Both the questionnaire and interview data showed how KGs' practice on learning through play had changed to some extent after the KECG had been introduced. The principals and teachers interviewed reported that their KGs had made considerably more changes to the policies and practices with reference to the KECG on learning through play. Questionnaire responses continued to suggest that the majority of the teachers had acknowledged the benefits of learning through play, with around half of the teachers strongly agreeing that learning through play had been beneficial and that a playful learning environment had promoted children's learning in the questionnaires in all three waves. It was also found that teachers' report on whether or not children had learnt through play in their school positively correlated with overall class observation scores in Wave 1. This provides evidence that KGs that practice learning through play to a greater extent may have higher classroom quality.

There was some evidence from interviews indicating that the respondents had reported changes taking place in KGs in promoting learning through play. The principals described their implementation of learning through play more extensively, with an enhancement that covered a wider range of aspects in the environment and teaching, and these were triangulated with teachers' responses. Policies and practices included adopting a "play curriculum", including more play-based strategies in class, engaging children with child-led activities and allowing children to participate with a higher degree of choice through planning and reviewing, extending the time allocated for non-teacher directed activities, and broadening the physical space and learning corners for children's play. Changes were not observed in relevant classroom observation domains (MELE Free-choice Indoor Activities and SSTEW Supporting

Learning and Critical Thinking), which were not significantly different between Wave 1 and Wave 2, and significantly lower in Wave 3 than Wave 1.

On the whole, questionnaire and interview findings of teachers' beliefs and KGs' practices on learning through play showed that KGs had promoted learning through play to a greater extent across the waves. At the same time, as reflected by the relevant domain scores, there were no changes in the classroom quality relating to free choice and play – suggesting that these changes might not have been captured by the measures we used in this study.

Theme 5: Increased monitoring and quality assurance

5. 1. Involving teachers in decision-making

Teachers and principals reported in questionnaires on whether teachers were involved in discussion or could give suggestion when decisions were made at school. As presented in Figure B3 (in Appendix B), around 25% of the teachers reported that they strongly agreed, around 60% reported that they agreed, and within 10% reported they disagreed or strongly disagreed with the statement in all three waves. The corresponding figures reported by principals in all three waves are presented in Figure B4 (in Appendix B): Around 50 to 60% of the principals reported that they strongly agreed, around 30 to 40% agreed, and within 10% strongly disagreed with the statement in all three waves. The findings reflected that a majority of teachers had been engaged in decision-making, and a higher percentage of principals than teachers agreed with the statement in the questionnaire.

Longitudinal analyses showed some significant differences in teacher responses across the waves, for those teachers with repeated measures. Responses were scored 1 (strongly disagree) to 4 (strongly agree), mean scores were calculated across the waves, and multilevel repeated measures models were used to test for statistical significance. When asked about their involvement in discussion and suggestions when a decision is made, teachers were less likely to agree in Wave 2 compared to Wave 1, but more likely to agree in Wave 3 compared to Wave 2 ($ps < .05$). We also explored whether or not teachers' perceptions on their participation in schools' decision-making was related to overall classroom quality, but we did not find any significant correlations with overall class observation scores or with changes in class observation scores across the waves.

Over 90% of the principals reported in the questionnaires across the waves that teachers could be involved in discussion or give suggestions when a decision was made at school. In line with this, most principals said in the interviews that they had involved teachers in the decision-making process to some extent (Wave 1: 23 KGs, Wave 2: 22 KGs, Wave 3: 25 KGs). Most of these principals mentioned having involved teachers in decision-making by seeking teachers' comments during whole-school meetings (Wave 1: 22 KGs, Wave 2: 21 KGs, Wave 3: 25 KGs). Among them, some principals had first made decisions with the management team (with Vice Principals/ senior teachers/ heads of different class levels), then asked teachers for comments to refine their plans (Wave 1: 5 KGs, Wave 2: 4 principals, Wave 3: 5 KGs). Some principals would engage teachers to make decisions on arrangements related to teaching and learning, such as choosing picture books for thematic teaching and learning (Wave 1: 3 KGs, Wave 2: 2 KGs, Wave 3: 2 KGs), together. In Wave 2 and Wave 3, 1 principal reported that she would obtain the consensus of all teachers in the meeting before finalising decisions. On the other hand, 1 principal in Wave 2 had not involved teachers in decision-making, but only included senior teachers in the process. They made the decisions and then informed and explained to teachers. Also in Wave 2, 1 principal explained that involving teachers in decision-making was not effective because teachers only had limited perspectives based on their class teaching experience, thus not being able to advise from a holistic view. The interview findings showed that the teachers of most of the KGs were involved in decision making to some extent, but the degree of involvement might vary.

5. 2. Staff morale and stability of the teaching team

In Wave 3, principals were asked in the interviews whether there had been any change in the stability of the teaching team and staff morale after their KGs had received the subsidies under the Scheme. The principals of 8 KGs reported that their teaching team had generally been stable and the principals of 6 other KGs reported that their teaching team had become more stable as compared to the time before the implementation of the KG policy. The principals of 3 KGs said that there had not been any change, and the principal of 1 KG said that it was less stable. The principals of 6 KGs thought that the staff morale had improved, 3 thought it had not changed, and 3 other principals described their staff morale had generally been good. The principals of 2 KGs thought there were generally more pressure and worries among the teachers because schools' funding for hiring teachers was dependent on student enrolment each year, and there were higher expectations on teachers' administration duties and professional development under the KG policy.

Likewise, teachers who had been in the same KGs before the implementation of the KG policy (i.e. before the 2017/18 school year) were also asked in the interviews on whether there had been any change in their salaries and their views on whether there had been changes in the stability of the teaching team and school morale in the Wave 3 interviews. Among the 36 teachers who responded, around two-thirds reported that there had been changes in their salaries (21 teachers), and another one-third reported that their salaries had not changed (12 teachers). Amongst those reported changes, 5 of them mentioned that the change had been a result of annual increment.

Nearly half of these teachers described that their teaching team was stable without commenting on the change (16 out of 36 teachers), some teachers said it had become more stable than previously (before the implementation of the KG policy; 9 teachers), some said the stability had been similar (9 teachers), and a couple reported that it had become less stable (2 teachers). In terms of morale, nearly 40% of the teachers believed that the staff morale at their KGs was good or strong without commenting it as a change (14 teachers), around 30% teachers said there had been no change as compared to the time before the implementation of the KG policy (10 teachers), and around 20% of the teachers reported that the morale had improved after the implementation of the KG policy (7 teachers). In general, there were mixed views regarding whether teachers perceived changes in salary, stability and morale of the teaching team after the implementation of KG policy over the three-year period.

5. 3. Summary and discussion

Across waves, principal and teacher questionnaires reflected that most teachers engaged in decision-making at school, with higher percentage of principals reporting positively than the teachers. This aligned with the principal and teacher interview data that showed that KGs had provided chances for teachers to be involved in making decisions at school, though the extent of involvement had varied. Most principals involved teachers in decision-making by seeking their comments during meetings. Teachers' perceptions on their participation in decision-making did not relate to the overall classroom quality. Mixed views, including changing positively, no change and changing negatively as compared to the situation before the implementation of the KG policy, were held among principals and teachers on the impact of receiving funding under the KG policy on the stability of the teaching team and staff morale.

Theme 6: Strengthened support for students with diverse needs

6. 1. Catering for students with diverse needs in classrooms

In Wave 3, teachers were asked in the interviews what they thought "student diversity" should include. Of the 50 teachers, 21 teachers referred to students with special needs, students joining the Integrated Programme (IP) in Kindergarten-cum-Child Care Centre[23], or different types of special needs (e.g. autism as well as early signs of attention-deficit/hyperactivity disorder and dyslexia) including deficits or disabilities (e.g. cognitive impairment, emotional problems, physical disabilities); and of those teachers, 2 teachers mentioned gifted students. A total of 18 teachers made reference to NCS students or students of different ethnic and/or linguistic backgrounds. There were 8 teachers mentioning both students with special needs and NCS students in their responses. On the other hand, 14 teachers described it as children's holistic development or developmental domains, including cognitive, social, language, self-care skills and moral development, that the environment or curriculum should provide diverse learning experiences or should be child-centred or based on child's interests. There were 11 teachers describing student diversity as children's individual needs, rather than inadequacies, and 10 mentioned students' different backgrounds, such as family backgrounds (9 teachers; e.g. parents' attitudes, home education). From the interview responses, teachers' understanding of student diversity was varied, which included students with special needs and NCS students, and also students' individual needs and backgrounds.

Table 11 presents the comparisons of the classroom observation scores on domains related to inclusiveness and diversity across the waves. The classroom observation score on the MELE Inclusiveness domain (including items 10 to 15) was significantly higher in Wave 2 and Wave 3 when compared to that in Wave 1. The scores of the ECERS-E Diversity domain were also significantly higher in Wave 2 and Wave 3 than in Wave 1 ($p<.001$). These findings reflected that the classrooms were better at promoting gender equality, and planning for individual learning needs across the waves.

Regarding the support provided for teachers, according to the teacher questionnaire findings, similar proportion of teachers had participated in professional development activities on the topic of catering for students' diverse needs, which included supporting students with special needs, students at risk of developmental delays and NCS students (Wave 1 = 67%, Wave 2 = 68%, Wave 3 = 72%). In the interviews, principals were asked whether the KGs had provided support for teachers of students with diverse needs or not. Regarding students with special needs or students at risk of developmental delays, most principals reported having recommended relevant professional development seminars to teachers, or having arranged relevant seminars for teachers to attend so as to enrich their knowledge on supporting students with special needs. A few principals had also provided relevant information (e.g. referral procedures or purchased books) for the teachers (4 KGs) while a few had arranged meetings for teachers to discuss issues on supporting students with special needs in the classrooms (3 KGs). Among the 16 KGs that had admitted NCS students, 5 principals reported having sent teachers to professional development seminars/ workshops on the support for NCS students, 3 principals reported that the schools had participated in school-based support programmes that provided coaching support for the teachers. A couple of principals also reported having used

[23] Integrated Programme in Kindergarten-cum-Child Care Centre by the Social Welfare Department provides training and care to children with mild disabilities in an ordinary kindergarten-cum-child care centre with a view to facilitating their future integration into the mainstream education as well as in the society.

the teaching materials developed by external bodies (2 KGs), having held regular meetings with social workers on the support for NCS students (1 KG), and having arranged principal/ senior teachers to observe the students and classes (1 KG).

Table 11. Classroom observation scores on domains and items related to catering for students with diverse needs in Pre-policy phase, Wave 1, Wave 2, and Wave 3

Domain/item	Pre-policy mean (n=15)	W1 mean (n=50)	W2 mean (n=50)	W3 mean (n=44)	p value of W1-W2 differences from t-test	p value of W1-W3 differences from t-test
MELE (4-point scale)						
Domain: Inclusiveness	2.85	3.11	3.30	3.31	$p < .01$	*p = .01*
Item 10: Program shows evidence of encouraging enrolment and participation of all ethnic, religious, linguistic and gender groups	3.33	3.40	3.36	3.11	$p = .78$	*p = .07*
Item 11: Program shows evidence of encouraging enrolment and participation of disabled children, including sensory, motor, and behavioral disabilities	2.83	2.84	3.22	3.56	$p = .11$	*p < .01*
Item 12: Children of different learning needs and levels are catered to.	2.60	3.60	3.68	3.66	$p = .46$	*p = .65*
Item 13: Gender equality in class participation	3.27	3.30	3.52	3.77	$p < .05$	*p < .001*
Item 14: Gender equality in indoor and outdoor activities	3.92	3.50	3.62	3.73	$p = .33$	*p = .06*
Item 15: Activities and materials raise awareness of ethnic, linguistic and religious diversity, in a respectful way	1.40	2.02	2.34	2.07	$p = .11$	*p = .82*
ECERS-E (7-point scale)						
Domain: Diversity	1.42	1.67	2.13	2.18	$p < .001$	*p < .001*
Item 13: Planning for individual learning needs	2.00	1.48	2.62	2.57	$p < .001$	*p < .001*
Item 15: Race equality and awareness	1.07	1.44	1.58	1.64	$p = .39$	*p = .24*

6. 2. Supporting students with special needs or at risk of developmental delay

KGs provided different kinds of support to students with special needs or were at risk of developmental delay. In the Pre-policy phase, principals were asked an open-ended question on the kinds of support provided for children with special needs. Their responses included professional training and support by the OPRS teams, referrals for assessments and services, IP, continuous observations, home-school communication, discussions with social workers, and strategies and adjustments in classrooms.

In the three waves, principals and teachers were asked whether they had provided specific types of support for students with special needs in the questionnaires, including introducing and providing professional help, communicating with parents, and enhancing teacher's training to cater for students' diverse needs. Among the different forms of support, contacting parents to understand students' needs, introducing external support, providing appropriate support and creating inclusive environment were the most common ones provided by KGs (see Figure 16 and Figure 17). The percentage of principals' reports of support provided for students (Figure 17) was higher than that of teacher reports (Figure 16) for some items, notably delegating specific teachers to support those students, adapting the curriculum, and creating an inclusive school environment. There were higher percentages of principals and teachers reporting introduction of external support in Wave 2 and Wave 3 compared to Wave 1.

Multilevel repeated measures models were used to examine changes over time in the responses of teachers participating in all three waves (Wave 1: n=500; Wave 2: n=504; Wave 3: n=504), excluding those who responded that their school did not have students with special needs). There was a significant increase across waves (ps<.05) in the percentage of teachers reporting the provision of: (i) contacting parents to understand students' needs; (ii) arranging specialised teachers; (iii) introducing external support for training; and (iv) introducing external support for parents. For the principals who had participated in all three waves (n=86), there was a significance increase in the percentage of principals reporting provision of (i) introducing external support for training; and (ii) introducing external support for parents across the waves (p<.01).

Figure 16. Support for students with special needs or at risk of developmental delay as reported by teachers (Teacher questionnaire; Wave 1 n=1522; Wave 2 n=1446; Wave 3 n=1313)

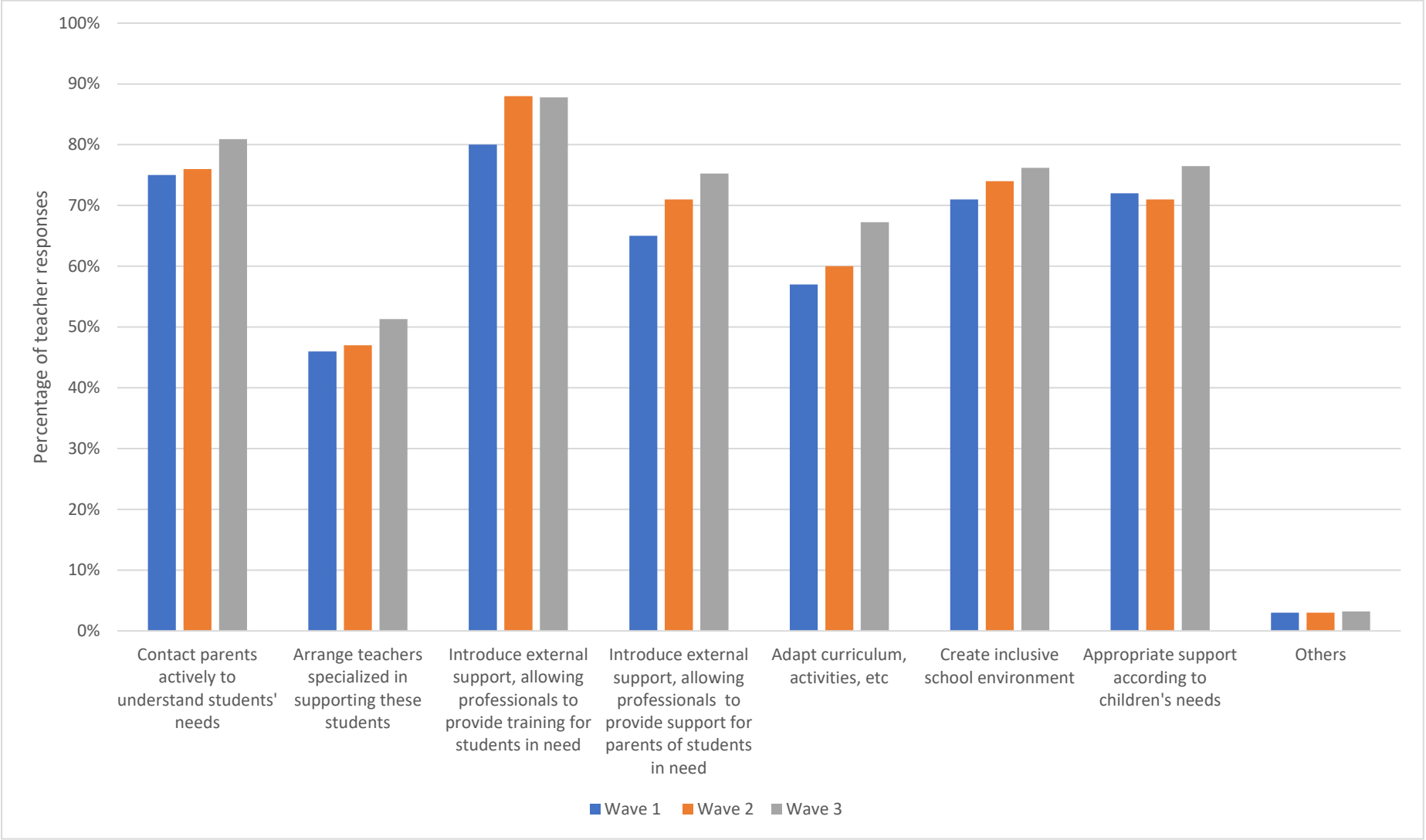
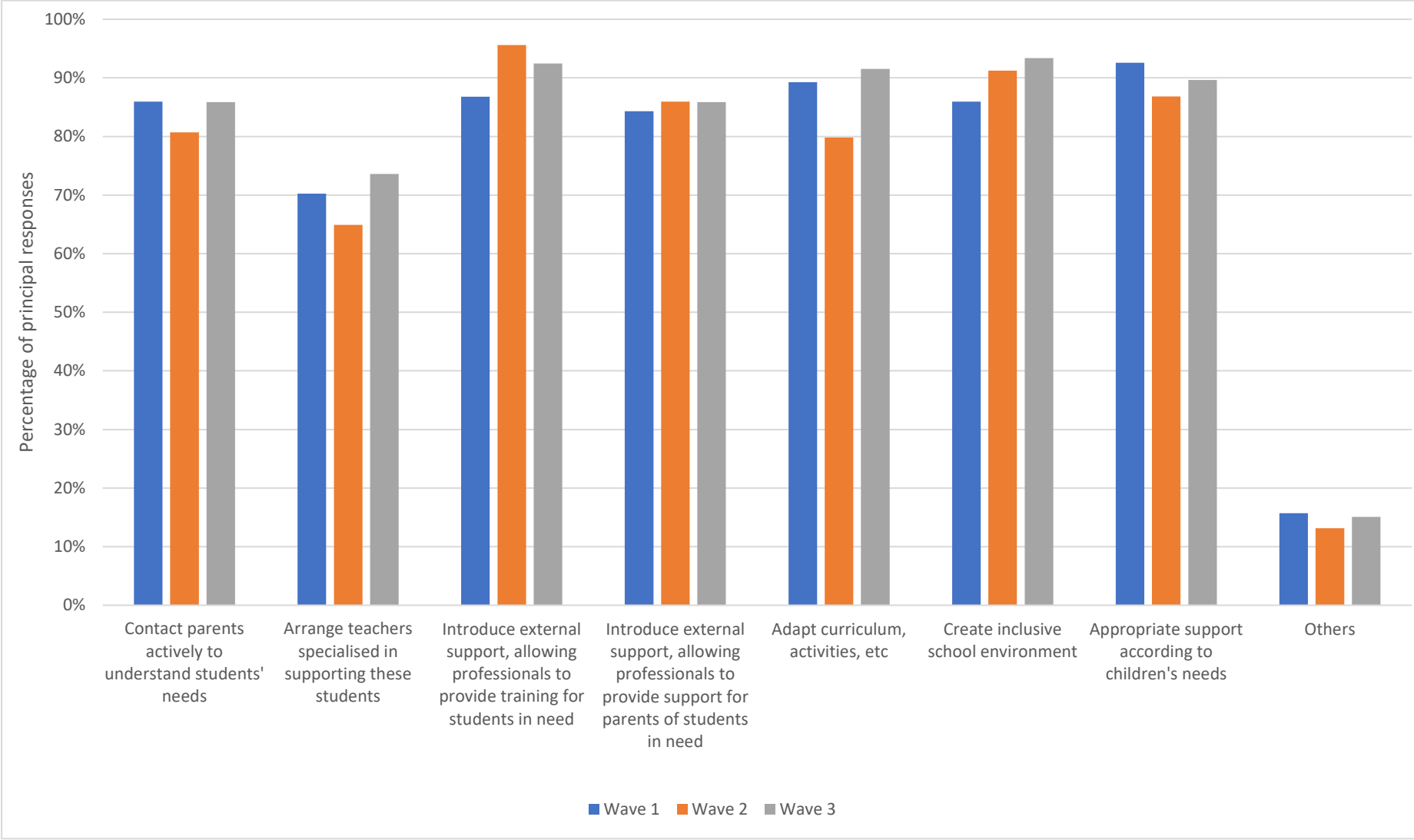
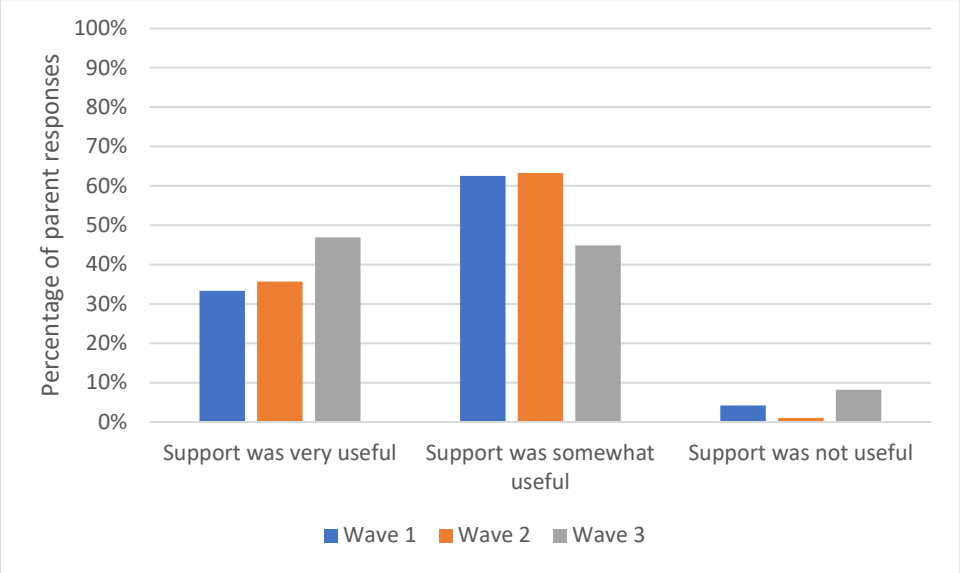


Figure 17. Support for students with special needs or at risk of developmental delay as reported by principals (Principal questionnaire; Wave 1 n=121; Wave 2 n=114; Wave 3 n=106)



Parents also reported in their questionnaires that their children with special needs had received support from the KGs. In Wave 1, Wave 2, and Wave 3, 127(14%), 143(19%), 74(18%) of the parents reported that their child had special needs, respectively. Among these parents, a greater percentage of parents reported that they had received support through the KGs over time (Wave 1: 64%, Wave 2: 78%, Wave 3: 80%). As presented in Figure 18, over 90% of the parents receiving support reported in all three waves that the support was very useful or somewhat useful.

Figure 18. Parents' perception on the usefulness of the support for children with special needs (Parent questionnaire)



Note: In Wave 1, Wave 2, and Wave 3, there were 127 (14%), 143 (19%), 74 (18%) students with special needs, respectively. Perceived usefulness was only reported among parents who reported having received support. Missing responses were excluded.

Compared with Wave 1, more principals and teachers reported having on-site support services and parent communication as support for children with special needs in the interviews in Wave 2 and Wave 3. In Wave 1, 21 principals and 26 teachers mentioned that OPRS were provided for children with special needs at their KGs. In Wave 2 and Wave 3, nearly all principals (Wave 2: 23 principals, Wave 3: 22 principals) and more than half of the teachers (Wave 2: 27 teachers, Wave 3: 45 teachers) mentioned having OPRS in their KGs. The support provided by OPRS involved external professionals, including speech therapists, occupational therapists, social workers, and educational psychologists, coming to the KGs to conduct individualised or group training for their students with special needs. The training sessions were conducted regularly, on average 2 to 3 times per week.

In Wave 1 and Wave 2, a higher proportion of principals than teachers reported that teachers had cooperated with OPRS professionals: some teachers would discuss with professionals the ways to support children with special needs and seek advice on in-class strategies. However, this was reported more frequently among principals (Wave 1: 7 principals, Wave 2: 5 principals) than teachers (Wave 1: 6 teachers, Wave 2: 5 teachers). Instead, most teachers who reported having OPRS in their KGs did not mention working with OPRS professionals. Meanwhile, OPRS was appreciated by a couple of principals for providing services on-site (2 principals in Wave 2), so that children did not have to miss classes or the opportunities to learn with their peers because of attend training during school hours, and it had been more convenient for the

parents. The professionals had also directly communicated with parents, including providing training (held trainings for parents alone or invited parents to attend training with children) and advice to parents on how to support children at home (Wave 1: 9 principals and 4 teachers, Wave 2: 7 principals and 10 teachers, Wave 3: 8 principals and 25 teachers). Some principals deemed that it was more convincing for professionals (rather than KGs) to communicate matters related to children's special needs with parents.

Some principals described the presence of a school social worker as a kind of support for students with special needs or students at risk of developmental delay in Wave 2 and Wave 3. According to the principal interviews, 11 KGs in Wave 2 and 12 KGs[24] in Wave 3 had a social worker to support students with special needs in addition to the support from OPRS; and most of these principals specified that these were school social workers. Such an arrangement was supported by the Social Welfare Department's pilot programme, or supported solely or partially by school sponsoring bodies, or by the KG's own budget. The principals described that the social workers mainly provided parent counselling and parent education while some also conducted training for children. "Social worker" was mentioned by 7 out of 50 interviewed teachers in Wave 2 and 16 out of 50 interviewed teachers in Wave 3 when they were asked to describe the support for children with special needs and children at risk of developmental delays in their KGs. However, most of these teachers did not mention whether the social worker was a school-based social worker or not, and some described the social worker as staff from OPRS. They mentioned that the social worker had communicated with parents, observed children in class, and provided training for children. According to the teacher interviews in Wave 2, most of these tasks were described as not directly connected to their teaching duties, with only 2 teachers mentioned working with the social worker: 1 teacher would seek advice from the social worker, and 1 teacher indicated that the social worker would come to class to support the class teacher.

To understand more about the cooperation between teachers with external professionals from OPRS or social workers, we included an additional question in the Wave 3 interviews with principals and teachers of KGs that had participated in OPRS or had school social workers. These principals and teachers were asked explicitly whether they had worked with the external professionals from OPRS or school social workers. Among the 25 KGs, principals of 23 KGs reported that the professionals or social workers discussed with the teachers on their observations students' progress in trainings, and how to better support students with special needs in class. The principal of 1 KG also noted that the professionals had provided teachers with teaching materials. Among the 50 teachers interviewed, 44 teachers reported that they had some cooperation with the external professionals from OPRS or social workers. Most of these teachers (38 teachers) reported having discussions or meetings with the professionals, especially with social workers. These discussions were related to children's progress, advice for teachers to support specific students, or teachers providing additional information about students' family backgrounds and behaviours in class. Sometimes teachers might not communicate with the professionals directly, but a supporting teacher or teacher designated for students with special needs would relay the messages to and from the professionals, as reported by 2 teachers.

[24] It should be noted that in Wave 3, principals were asked explicitly on the work of a school social worker, whereas Wave 2 we had not asked whether the KGs had a school social worker. This means that in Wave 1 and 2, the numbers may have been underestimated and may not be directly comparable with Wave 3.

According to the interviews, some principals mentioned that teachers of IP had supported students with special needs by conducting individual training, parent groups, and supporting the students in-class (Wave 1: 7 KGs, Wave 2: 6 KGs, Wave 3: 8 KGs). Besides, several principals (Wave 1: 4 KGs, Wave 2: 5 KGs, Wave 3: 1 KG) also mentioned designating teachers or senior teachers to be in charge of following up with the arrangements for the training for children with special needs or providing training for children with developmental needs. For example, in 1 KG in Wave 2, a senior teacher was responsible for arranging the training sessions for students with special needs and following up with the class teachers on children's performance in training sessions and in class.

Apart from utilising the support from OPRS or social workers or teachers of IP, some principals mentioned the teachers had made adaptations in order to cater for the needs of students with special needs or at risk of developmental delay (Wave 1: 6 KGs, Wave 2: 8 KGs, Wave 3: 10 KGs). These included making adaptations in the curriculum, adopting special group arrangement during small group activities, using sensory toys or special teaching materials for children, arranging designated teachers with training on students with special needs, and adjusting (lowering) learning objectives and/or homework or writing demands. Out of the 50 interviewed teachers, some teachers (Wave 1: 19 teachers, Wave 2: 13 teachers, Wave 3: 32 teachers) mentioned providing some kind of support to these students in class. These included lowering the difficulty level of homework or learning objectives (Wave 1: 7 teachers, Wave 2: 6 teachers, Wave 3: 13 teachers), adjusting curriculum or teaching materials (Wave 1: 8 teachers, Wave 2: 9 teachers, Wave 3: 12 teachers), and using strategies (e.g. gestures, repeating instructions, group or seating arrangement) in class (Wave 1: 7 teachers, Wave 2: 5 teachers Wave 3: 16 teachers).

In Wave 3, principals were asked in the interviews about the support provided to students with diverse needs, including students with special needs and students at risk of developmental delays during suspension of face-to-face classes under the COVID-19 pandemic. Of the 25 KGs, principals interviewed reported having OPRS training for the students, at the KGs (6 KGs), at OPRS centres (6 KGs), via online platforms (7 KGs), or on-site trainings at homes (1 KGs). Some principals also reported that OPRS professionals had provided suggestions or training materials for families so that children could undergo training at home (6 KGs), or provided training video clips (3 KGs). The principals also mentioned that the OPRS professionals, social workers, or class teachers had maintained communication with the parents (10 KGs), children (3 KGs), or children and parents simultaneously (3 KGs) via phone calls or online platforms.

6. 3. Supporting Non-Chinese speaking (NCS) students

6.3.1. Support for NCS students

In the 2017/18 and 2018/19 school years, NCS Grant was provided to KGs that had admitted 8 or more NCS students under the KG policy. KGs received the same amount of NCS Grant regardless of the total number of NCS students admitted. In the 2019/20 school year, the NCS Grant was enhanced to a five-tiered grant (from $50,000 to about $800,000) with the amount of grant provided based on the number of NCS students admitted in a KG. In line with the change, among the KGs that had admitted NCS students, the number of KGs that had received the NCS Grant in the 2017/18 (Wave 1) and 2018/19 (Wave 2) school years was 5 and 6 respectively. These were KGs that had 8 or more NCS students. In Wave 3, the 16 KGs that had admitted NCS students had all received the NCS Grant in the 2019/20 school year.

In the Pre-policy phase, 15 out of 25 KGs (60%) reported that they had admitted NCS students, among which 6 of these KGs had admitted more than 8 NCS students. Only 2 KGs reported having NCS teaching assistants to help support in class and communicate with NCS parents. A total of 3 KGs reported providing English translated circulars for the NCS parents.

Across the waves, KGs had provided different kinds of support for students whose spoken language at home was not Chinese. These included creating a rich Chinese language learning environment, encouraging interactions between NCS and Chinese-speaking students, and contacting parents to understand children's needs. Figure 19 and Figure 20 show the proportion of questionnaire respondents reporting having offered particular types of support, out of the total who reported they had at least 1 NCS student in their KGs (Principal questionnaires Wave 1: 48 KGs, Wave 2: 50 KGs; Wave 3: 61 KGs; Teacher questionnaires Wave 1: 528 teachers, Wave 2: 538 teachers, Wave 3: 397 teachers). Teacher responses showed a slight increase across the waves in the proportion of teachers implementing most types of support, especially from Wave 2 to Wave 3 (Figure 19). Among the types of support provided for NCS students as reported by teachers (Wave 1: n=312; Wave 2: n=312; Wave 3: n=333), a significant increase across the waves was identified in the following aspects: contacting parents to understand children's needs; employing NCS teachers; assigning specialised teachers; developing school-based materials; adapting curriculum activities; creating a rich Chinese language environment; and encouraging interactions between NCS students and their Chinese-speaking counterparts (ps<.05).

Principal responses on the types of support offered to NCS students also showed increases in general from Wave 1 to Wave 3, especially from Wave 2 to Wave 3, by contacting parents to understand students' needs, employing non-native Chinese-speaking teachers, arranging specialised teacher, developing school-based materials, adapting curriculum activities, creating rich Chinese language environment and providing appropriate support according to children's needs (Figure 20). Of the principals reporting NCS students in their school (Wave 1 n=43, Wave 2 n=43, Wave 3 n=52), there was a significant increase across waves in the proportion of principals reporting developing school-based materials, adapting curriculum activities, and creating a rich Chinese language environment (ps<.05).

Figure 19. Types of support for NCS students provided by kindergartens as reported by teachers (Teacher questionnaire; Wave 1 n=528; Wave 2 n=538; Wave 3 n=397)

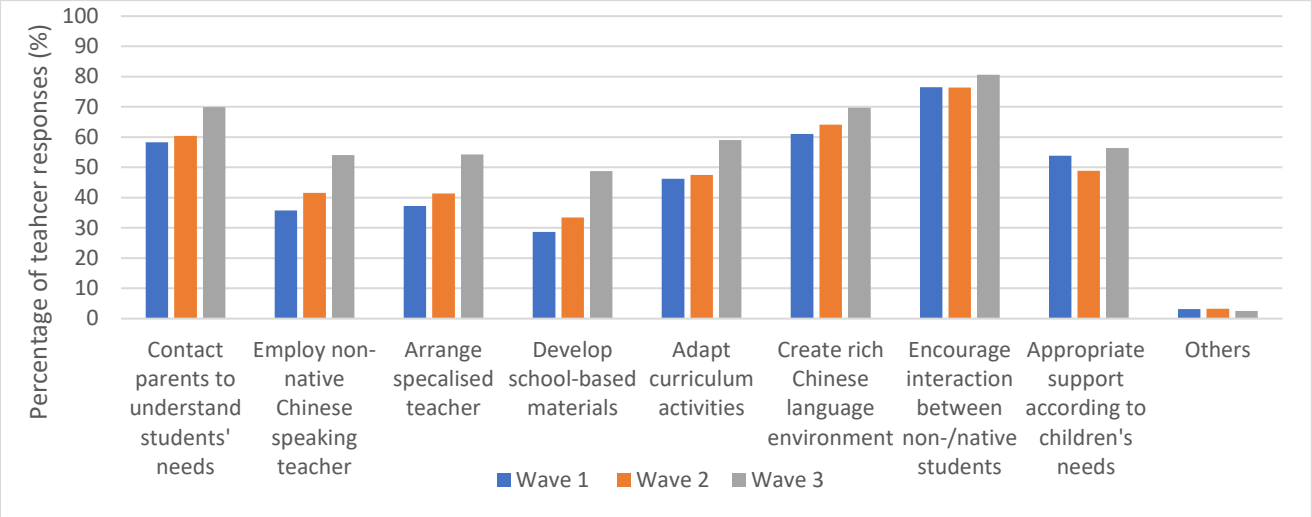
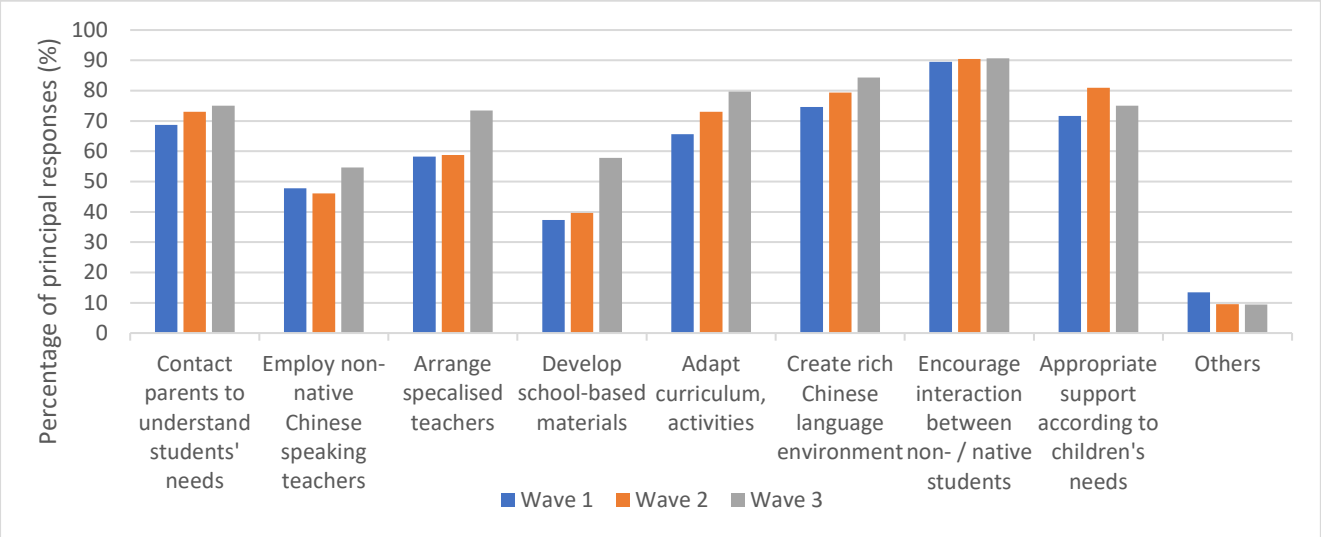
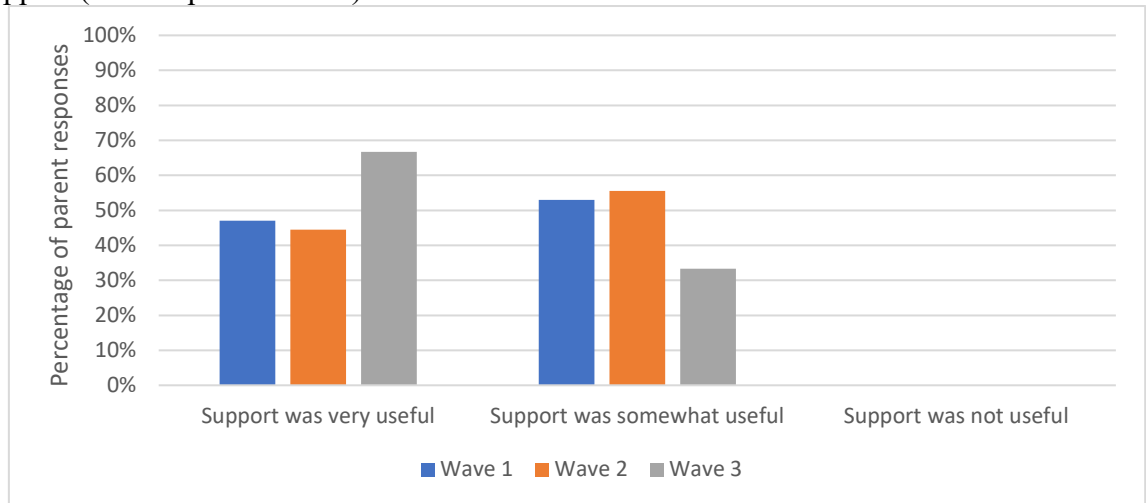


Figure 20. Types of support for NCS students provided by kindergartens as reported by principals (Principal questionnaire; Wave 1 n=48; Wave 2 n=50; Wave 3 n=61)



Parents gave their views on the provision of NCS support as part of their questionnaire responses. Among the parent respondents in the questionnaires, there were 47 (5%), 39 (5%) and 23 (5%) of the parents reporting that their children were NCS children in Wave 1, Wave 2, and Wave 3 respectively. Among the NCS parents who reported that their children had received support at their KG (Wave 1: 24 parents, Wave 2: 20 parents, Wave 3: 19 parents), most of them reported that the support was somewhat useful or very useful (see Figure 21).

Figure 21. Parents' perception on the usefulness of the support among NCS children receiving support (Parent questionnaire)



Note: In Wave 1 there were 47 (5%) parents of NCS students; in Wave 2 there were 39 (5%) parents of NCS students; and in Wave 3 there were 23 (5%) parents of NCS students. Perceived usefulness was only reported among parents who reported receiving support. Missing responses were excluded.

Principals, teachers, and parents of KGs with NCS students elaborated on the type of support provided in the interviews in Study 2. In Wave 1, 14 out of 25 KGs having admitted NCS students. In Wave 2 and Wave 3, there were slightly more KGs admitting NCS students. In Wave 2 and Wave 3, the total number of KGs that had admitted NCS students was 16 out of

25 KGs (number of NCS students ranging from 1 to 49 in Wave 2 and from 1 to 46 in Wave 3), and 14 KGs had admitted NCS students in both Wave 2 and Wave 3.

Multilevel repeated measures models were used to examine changes over time in the responses of teachers participating in all three waves (n=510): The proportion of principals (50% in Wave 1, 49% in Wave 2, and 40% in Wave 3; $p<.05$) and teachers (38% in Wave 1 and Wave 2, 34% in Wave 3; $p<.01$) reporting no NCS students in their KGs and classes respectively, decreased across waves.

In the three waves, we found that there had mainly been 2 kinds of support deployed to meet the learning needs of NCS students. These included designating teachers to support NCS students as well as employing different teaching strategies to support NCS students. Some KGs with a very small number of NCS students reported that they had provided support to NCS students through immersion in Chinese learning environment. Details of these support measures and comparison across the waves are as follows:

(a) Teachers designated to support NCS students – Some principals and teachers mentioned their KGs employed teachers or teaching assistants designated to support NCS students. There was an increase in the number of KGs employing designated teachers using the NCS Grant across the waves (Wave 1: 4 principals and 5 teachers; Wave 2: 6 principals and 3 teachers; Wave 3: 7 principals and 7 teachers). These teachers included Chinese-speaking teachers designated to support NCS students' Chinese learning, and teachers who speak English or other languages, such as Urdu. The teachers or teaching assistants sometimes provided in-class support for NCS students, prepared teaching materials, conducted pull-out classes for NCS students, and coordinated with external organisations to line up support for NCS students. The teachers/ teaching assistants who could speak other languages also helped communicate with NCS parents and translate instructions in class.

(b) Teachers' strategies in supporting NCS students – Similar kinds of supporting strategies were mentioned by principals and teachers in the interviews across waves. Strategies common across waves included having pull-out classes or small-group activities, using differentiated materials, using picture books, making adaptations to the curriculum, lowering the amount and/or level of difficulty of Chinese writing for NCS students, and including Chinese peers to the small-group activities for NCS students. In Wave 3 in particular, the principals of 3 KGs mentioned providing picture books for NCS students to read as one of the measures to support NCS students' learning, these included English books (2 principals) and bilingual books (1 principal). In addition, a greater variety of in-class strategies was mentioned in Wave 3. Some teachers reported using alternative means of communication with NCS students, such as gestures and pictures (2 teachers), and included discussions of diverse cultural topics for the whole class (2 teachers). Across three waves, some principals and teachers (2 KGs in Wave 1 and Wave 2, 1 KG in Wave 3) reported that they received school-based support on the teaching and learning of Chinese for NCS students. They made use of differentiated storybooks on different themes, and external facilitators supported their lesson planning and class observation. In Wave 3, the principals and teachers of 2 KGs mentioned that they had purchased services provided by external bodies to support NCS students' learning. The external body provided extra learning activities, pull-out classes, or training for the NCS students in particular.

(c) Immersion in Chinese learning environment – In Wave 1, principals of 6 out of 14 KGs reported that Chinese language were taught on the same way for both NCS and Chinese-speaking students to provide immersion in Chinese language environment for NCS students.

In Wave 2, principals of 10 out of 16 KGs reported that Chinese language were taught on the same way for both NCS and Chinese speaking students. These KGs all had less than 8 NCS students, very often with only 1 or 2 NCS students admitted, and had not received the NCS Grant. Reasons that the KGs did not provide additional support may include, the belief that inclusive education should include NCS and Chinese-speaking children in the same way, parents wanted their children to have the opportunities to use the language, or that the children had sufficient Chinese proficiency to participate in class activities such that they did not have additional needs for language learning. In Wave 3, 2 KGs mentioned immersion in Chinese language environment as the main approach, but they had paid attention to individual students' progress and provided support in some way reported in the themes above; 1 KG did not mention any support directly related to NCS students' learning but had provided translation for parents to understand NCS students' learning progress.

We interviewed 2 NCS parents in Wave 1 and Wave 2, and we interviewed 3 NCS parents (from 2 KGs) in Wave 3. All 7 NCS parents did not speak Cantonese, except for 1 parent who understood some simple phrases in Cantonese. Most of these parents said that their children were interested in learning Chinese. Some parents reported that they had difficulties in supporting their children with their homework (Wave 1: 1 parent, Wave 3: 1 parent). A NCS parent in Wave 3 reported that the books available for borrowing were all in Chinese and suggested that the book types could be more varied and to include English books. A parent in Wave 3 reported that her child had less exposure to Chinese due to the suspension of face-to-face classes during COVID-19 pandemic.

In Wave 3, principals were also asked of their support for NCS students during suspension of face-to-face classes under the COVID-19 pandemic. Of the 16 KGs that had admitted NCS students, 3 KGs reported that they had communicated with NCS parents to follow up on NCS students' progress on their homework and to understand their needs via phone calls or instant messaging applications, 2 KGs also reported providing videos or resources to NCS students specifically. Out of the 3 NCS parents interviewed in Wave 3, 1 parent reported that the KG sent videos and homework to them daily, but she had difficulty in using them because they were in Chinese; another parent found that her child showed difficulty in learning through online mode. Amongst these 3 NCS parents, 2 parents reported that the KG would communicate with them or sent them videos for the children to learn through instant messaging applications.

6.3.2. Schools' communication with NCS parents

In Wave 1 and Wave 2, some teachers had experienced difficulties in communicating with NCS parents particularly when the NCS parents did not speak English very well or did not speak any English (Wave 1: 5 teachers, Wave 2: 4 teachers). In Wave 3, the teachers interviewed did not report difficulties in communicating with NCS parents, who mostly used English, communicated with the parents/caregivers who spoke Cantonese, or had received support from the NCS teachers or teaching assistants at school (Wave 3: 5 teachers). Other than using English to communicate with NCS parents, some teachers reported some strategies to communicate with NCS parents who did not speak English. For example, when a NCS parent was able to speak Cantonese, the teachers would mainly communicate with that particular parent (Wave 1: 2 teachers, Wave 2: 2 teachers, Wave 3: 1 teacher) who would then help to disseminate the messages to other NCS parents. Another method reported by 3 teachers in Wave 2 was communicating through an elder sibling of the NCS student.

When discussing the support for NCS students, there were more reports of communicating with NCS parents in Wave 2 and Wave 3 than in Wave 1 (Wave 1: 2 teachers, Wave 2: 4 KGs, Wave 3: 5 teachers) so that parents could support their children's Chinese learning at home. According to the interviews, at least 1 KG reported holding regular NCS parent groups that taught parents basic Cantonese across three waves. According to Wave 2 interviews, the social worker at 1 KG provided support to address the needs of the NCS students and their parents. Among the KGs which had admitted NCS students, similar to Wave 1, some of them had provided English translations of documents for NCS parents. According to the principals interviewed, these include written translations of notices (Wave 1: 3 KGs, Wave 2: 4 KGs, Wave 3: 9 KGs) and oral translations by explaining to NCS parents (Wave 1: 3 KGs, Wave 2: 6 KGs, Wave 3: 7 KGs). There were 2 principals mentioning that NCS teaching assistant had been provided by the project organised by an external body to support parent communication. Altogether, a few principals (Wave 2: 2 principals, Wave 3: 1 principal) noted that their teachers had had simple English conversations with the NCS parents rather than providing written translations because their parents were not proficient in English. In terms of communication, some of the principals interviewed reported that a NCS teacher at their KG could communicate with the NCS parents (Wave 2: KGs, Wave 3: 5 KGs), encouraging these parents to participate in school activities, and providing interpretation during the school activities, including seminars, outings, and class observations.

Generally speaking, regarding the access to KGs, parents of NCS children had no problem in contacting the KGs and getting the KGs to respond but language barriers precluded smooth communication.

The NCS parents interviewed in all three waves could easily reach the schools when needed, and the schools had maintained regular communication with them. This was done by communicating directly with the class teachers or communicating through an NCS teacher or school staff. On the quality of communication, some parents experienced difficulties. For example, a parents interviewed in Wave 2 reported difficulties in the communication with the school as all school notices were in Chinese and in the communicating with school staff members verbally because of language barrier. The KG staff would make some notes and explain when needed, but she believed that it would be much better if the school could provide English notices. Another parent reported in Wave 3 that she would find a Chinese-speaking neighbour to help her translate the circulars verbally.

Across the waves, the interviewed NCS parents reported low participation in parent engagement activities at school. At least 1 NCS parent from each wave reported that they had not participated in any school activities because of the language barrier. They shared that all of the school activities or PTA meetings were conducted in Cantonese. In Wave 3, an NCS parent said NCS parents could not take part because of the language barrier.

6. 4. Summary and discussion

From the classroom observation scores, the higher scores in "MELE (Interaction)" and "ECERS-E (Diversity)" in Wave 2 and Wave 3 than Wave 1 provided evidence that the classrooms in Wave 2 and Wave 3 had shown higher quality in the interaction and diversity aspects (especially on planning for individual learning needs, and encouraging enrolment and participation of children with disabilities) to a certain extent.

From the longitudinal analyses of teachers and principals who had completed questionnaires in all three waves, we found that a greater percentage of teachers and principals have reported on providing certain support for students with special needs. Across waves, more teachers reported having contacted parents to understand students' needs and having designated teachers and teacher assistants to provide additional support. More teachers and principals reported introducing external support for training and parents. These findings reflected that the KGs re-enforced catering for learner diversity and promoting inclusive culture following the introduction of the KECG across waves.

In all three waves, KGs reported providing support for children with special needs and students at risk of developmental delay, and more than 90% of the parents found the support useful or somewhat useful. In Wave 2 and Wave 3, principals and teachers reported more support for students with special needs. This was done through the more extensive coverage of OPRS as reflected by a rise in the number of principals and teachers reporting having OPRS at their KGs, with professionals including social workers, speech therapists, occupational therapists, and psychologists coming to the schools regularly to provide training for students with special needs. According to the principals interviewed, these professionals had also worked in cooperation with class teachers by providing support to students in need and advice to class teachers. The professionals had also communicated with parents regularly. Across the waves, more principals reported having a school social worker who provided parent counselling, parent education, and some training. Some teachers mentioned having social workers to provide trainings for students.

More KGs had admitted NCS students from the Pre-policy phase to Wave 3. From the questionnaires and interviews, different KGs had provided a more extensive range of support for NCS students across waves as compared with the Pre-Policy phase. A greater proportion of teachers and principals reported that they had provided support for NCS students, including developing school-based materials, adapting curriculum activities, and creating a rich Chinese language environment. Among the NCS parents who had reported in the surveys that their KGs had provided extra support, most of them had rated the support as somewhat or very useful in each wave. Meanwhile, these parents could generally contact KGs when needed, but participation in school-based activities was low because it was challenging when activities and notices had been primarily in Chinese. That stated, fewer teachers reported in Wave 3 that they had encountered difficulties in communicating with NCS parents as compared to Wave 1 and Wave 2.

These findings from classroom observation scores, questionnaires, and interviews with stakeholders provided multiple sources of data to evaluate the impacts of the KG policy on catering for students' diverse needs in different waves of the study (research question 2). They showed that more extensive support had been provided to both students with special needs and NCS students, especially with the increased provision of NCS Grant, over the 3 years of implementation of the KG policy starting from the 2017/18 school year.

Theme 7: Strengthened parent engagement and education

7. 1. Home-school communication

KGs used many different ways to communicate with parents about their children's development and learning, and among all of them, parent-teacher conferences, newsletters, phone call/ written notes, student portfolios, informal conversations and student handbooks were used as reported by more than 60% of the respondents in both principal questionnaires and teacher questionnaires in each of the three waves (see Figure 22). Teacher and principal responses were fairly similar in terms of the types and distribution, although principals were more likely to report the use of certain means of communication than teachers (for example student handbooks). Responses in the three waves were similar in terms of types with the Pre-policy phase, and they were also similar across waves, with a greater number of principals and teachers reporting the use of the Intranet, emails, instant messaging applications, phone calls/ written notes in Wave 3 than in previous waves. Principals and teachers also reported in questionnaires under the "Others" category that they had used school mobile apps, school e-platforms, school websites and social media websites, Google Classroom, electronic notices and photo albums, displays at school, and home visits to communicate with parents.

Parents also reported in the questionnaires having used the same communication channels with their child's school as reported by principals and teachers, although the reported prevalence was lower for several categories (Figure 23). In particular, parents' reporting of newsletters (around 30%), and phone calls or written notes (around 40% to 60%) was lower than those of principals and teachers (65% to 90%). In Wave 3, there were considerably more parents reporting the use of instant messaging applications, phone calls/ written notes, and fewer parents reported on communicating via parent-teacher conferences and student handbook. This is not surprising because of suspension of face-to-face classes.

Figure 22. Methods of contacting parents about children's learning and development (Teacher questionnaire: Wave 1 n=1522; Wave 2 n=1446; Wave 3 n=1313 and Principal questionnaire: Wave 1 n=121; Wave 2 n=114; Wave 3 n=106)

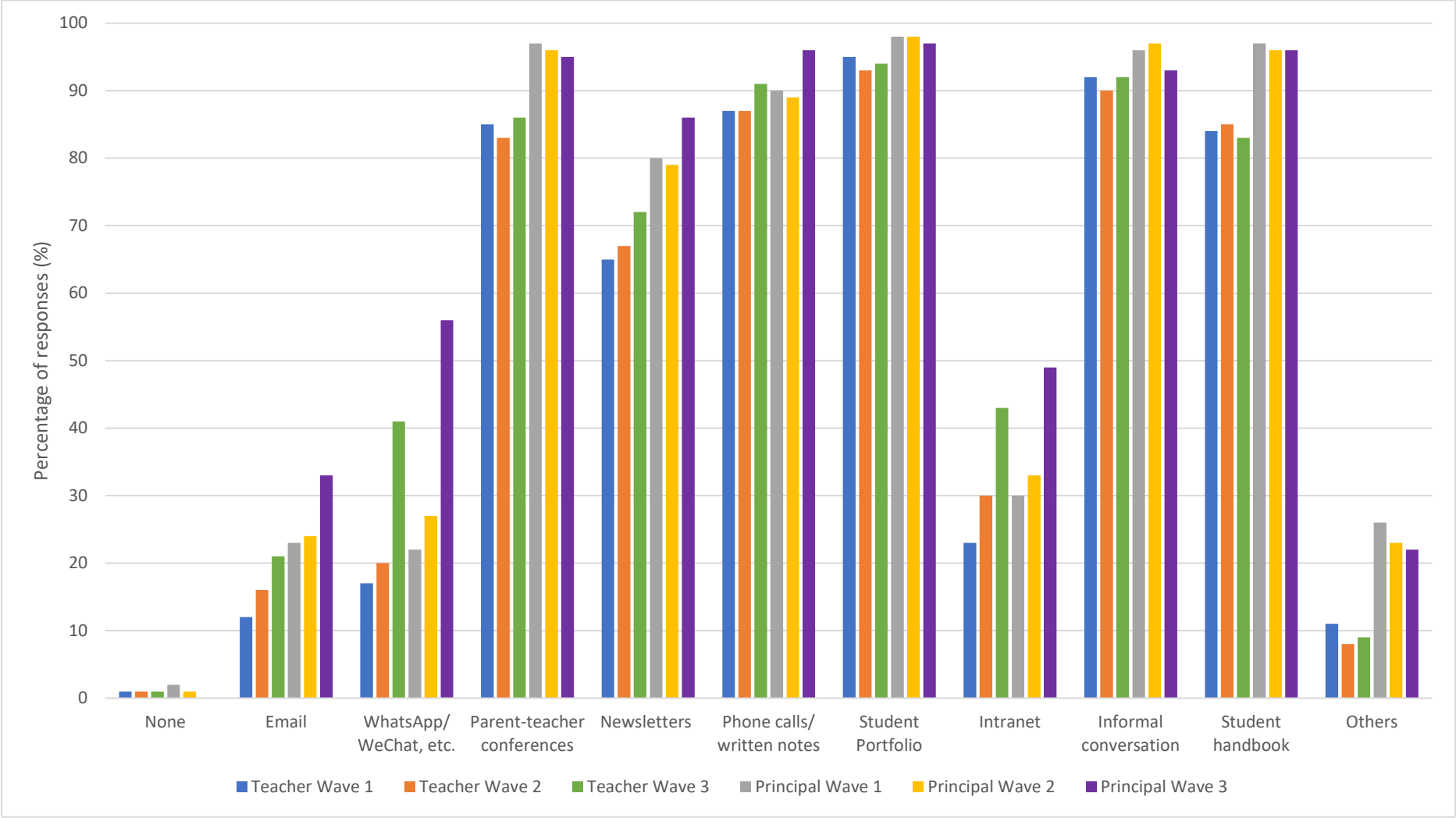
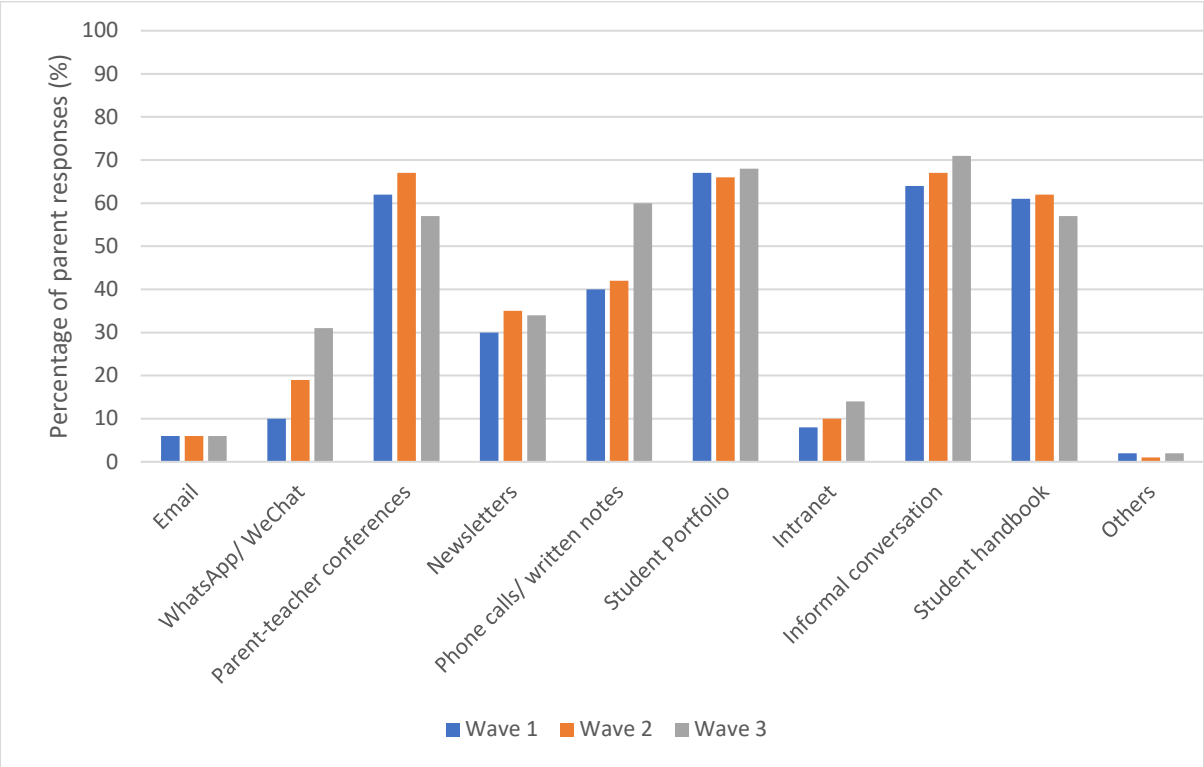


Figure 23. Home-school partnership for parents: methods of contact with their child's school (Parent questionnaire; Wave 1 n=879; Wave 2 n=798; Wave 3 n=431).



Most of the parents interviewed mentioned examples of KGs reaching out to them on school activities and matters related to their children specifically, including following up on children's behaviours, performance, and injuries at school, and these were similar across the waves. In all three waves, no parent had reported any difficulties reaching teachers or principals when they wanted to, this was often done through face-to-face meetings before or after school, during school activities, telephone calls, and conversations on instant messaging applications.

According to questionnaire responses across the waves, most of the teachers and principals reported positively on their communication with parents, that they had had good communication with the parents, taken the initiatives to talk to parents, discussed with parents on children's problems and progress, valued parents' opinions, and that parents had been willing to talk to them (see Figure 24 and Figure 25). More than 95% of the teachers in all three waves agreed that "teachers, parents, and the principal have consistent communication and collaboration" (see Figure B3 in Appendix B), and teachers' response on this item in Wave 3 correlated positively with overall class observation scores across three waves (Rho = .18, $p<.05$), but not with changes in quality over time. This reflects positive associations between teacher reports of communication and collaboration among teachers, parents, and the principals and overall classroom quality.

In all three waves, most of the parents interviewed had not given any comment to the KGs (Wave 1: 31 parents, Wave 2: 32 parents, Wave 3: 30 parents), as many of them were satisfied. Some parents had given comments to the KGs regarding issues faced by their children individually (Wave 1: 5 parents, Wave 2: 6 parents, Wave 3: 3 parents); most teachers had followed up by providing additional support in class and suggestions for parents to support at home, and following up personally with the parents. Some other parents (Wave 1: 7 parents,

Wave 2: 6 parents, Wave 3: 4 parents) had provided comments on activities and tasks so the KGs could improve on certain aspects, such as arranging outings, means of distributing information, providing part of the teaching materials to parents, including certain teaching activities. Some of these comments had been followed up on or taken into consideration by the KGs. In Wave 2 particularly, 5 parents had raised comments to schools on teaching, among them, 3 parents thought their children had been doing too little writing and playing too much, whereas 1 parent thought the KG was too academic-oriented and would like the KG to be more play-based, and another parent believed the format of homework could have been varied and more playful. In Wave 3, some parents (4 parents) raised issues on learning during suspension of face-to-face classes under COVID-19 pandemic, e.g. children having difficulties completing homework.

When the 50 parents interviewed were asked to share what they liked most about the KGs, most of them mentioned positive attributes of teachers, including being loving, caring, friendly, cheerful, and responsible in all three waves. In particular, more parents in Wave 2 appreciated how teachers had taken good care of their children (8 parents) and followed up on their children's needs actively (8 parents) than Wave 1. Several parents were also appreciative of the environment and hygiene of the schools (6 parents) and mentioned that their child had liked going to schools (5 parents). In Wave 3, more parents mentioned that they liked the teaching aspect of the schools, including the school curriculum or philosophy (3 parents), teaching activities/strategies (9 parents), qualified and experienced teachers (2 parents). Some parents also appreciated that the KGs were not too difficult in terms of academic and focused on holistic development.

In Wave 3 interviews, in response to the COVID-19 pandemic, we asked about the communication between parents and the schools during the suspension of face-to-face classes. Most teachers and parents mentioned that the KGs would make phone or video calls (39 teachers, 30 parents), communicate with parents via instant messaging mobile applications (8 teachers, 15 parents), the school websites (4 teachers, 1 parent), or school apps (3 teachers, 10 parents). These teachers would also seek information about children's learning and wellbeing (18 teachers, 17 parents) and situation faced by the family (4 teachers, 7 parents). Some KGs also had provided teaching videos (26 teachers, 21 parents), homework (14 teachers, 19 parents), learning and art materials (9 teachers, 3 parents), talked to the children (8 teachers, 2 parents), and provided online classes (3 teachers, 8 parents).

Figure 24. Teachers' communication with parents (Teacher questionnaire: Wave 1 n=1522; Wave 2 n=1446; Wave 3 n=1313)

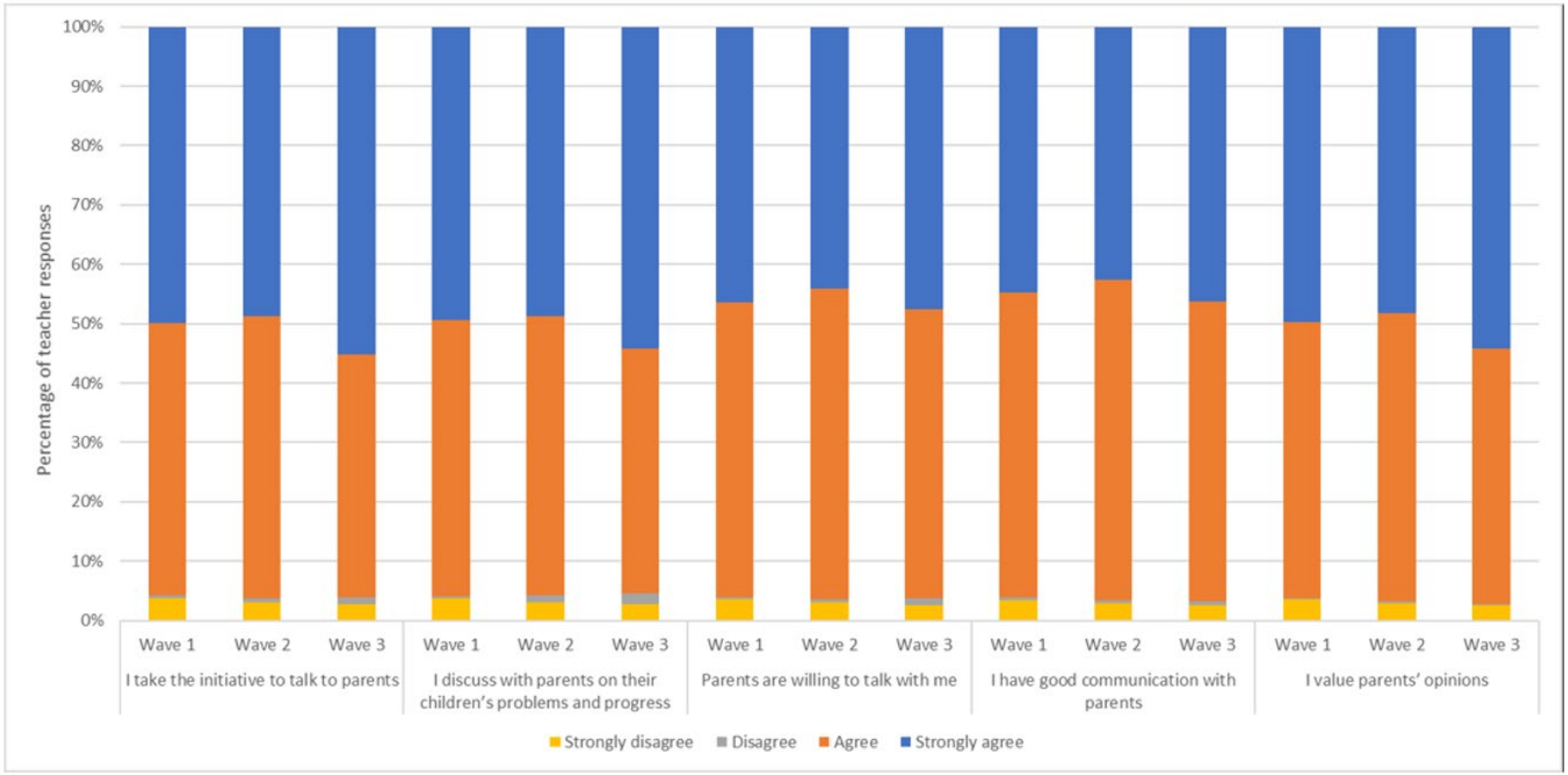
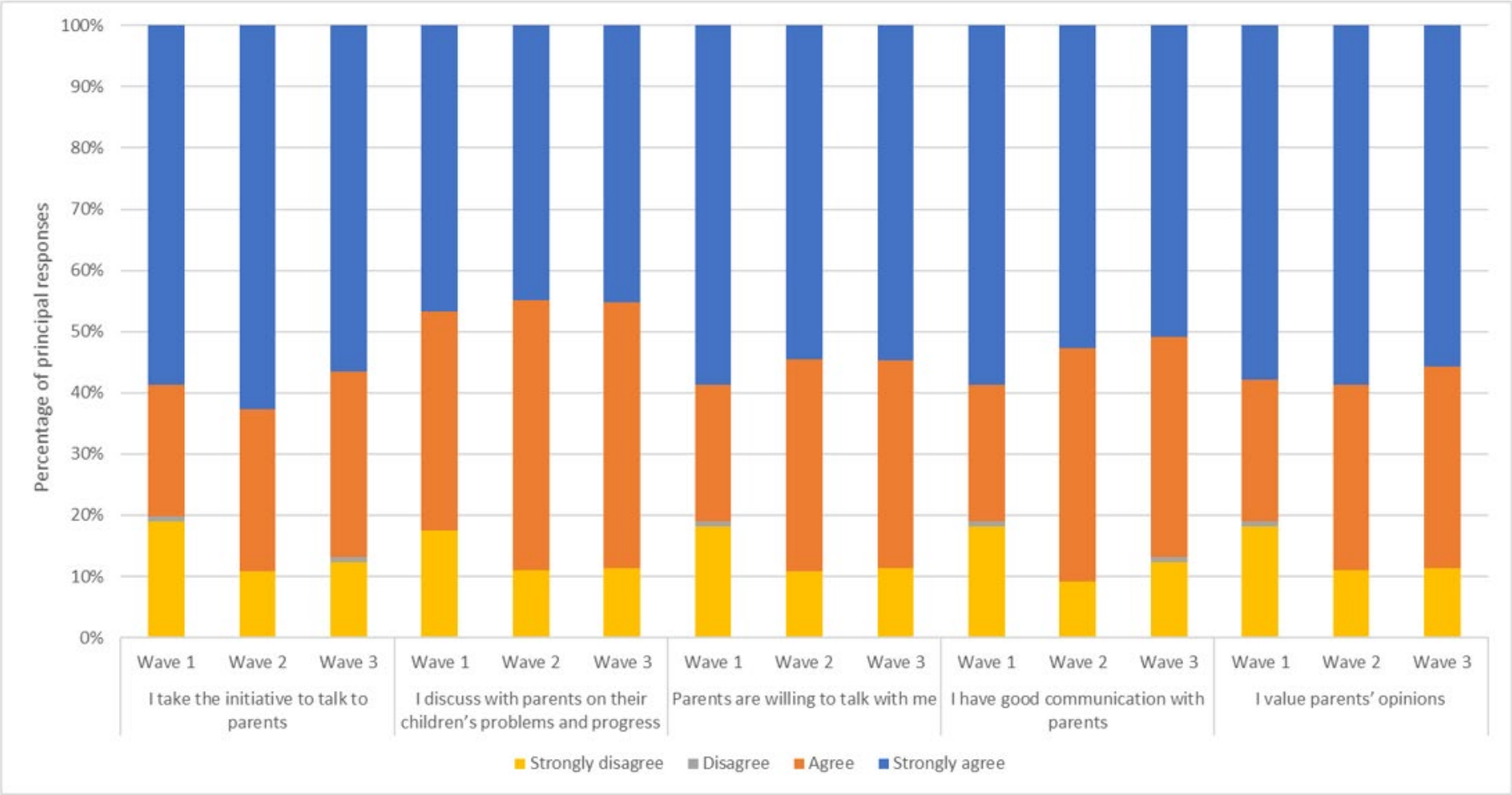


Figure 25. Principals' communication with parents (Principal questionnaire; Wave 1 n=121; Wave 2 n=114; Wave 3 n=106)

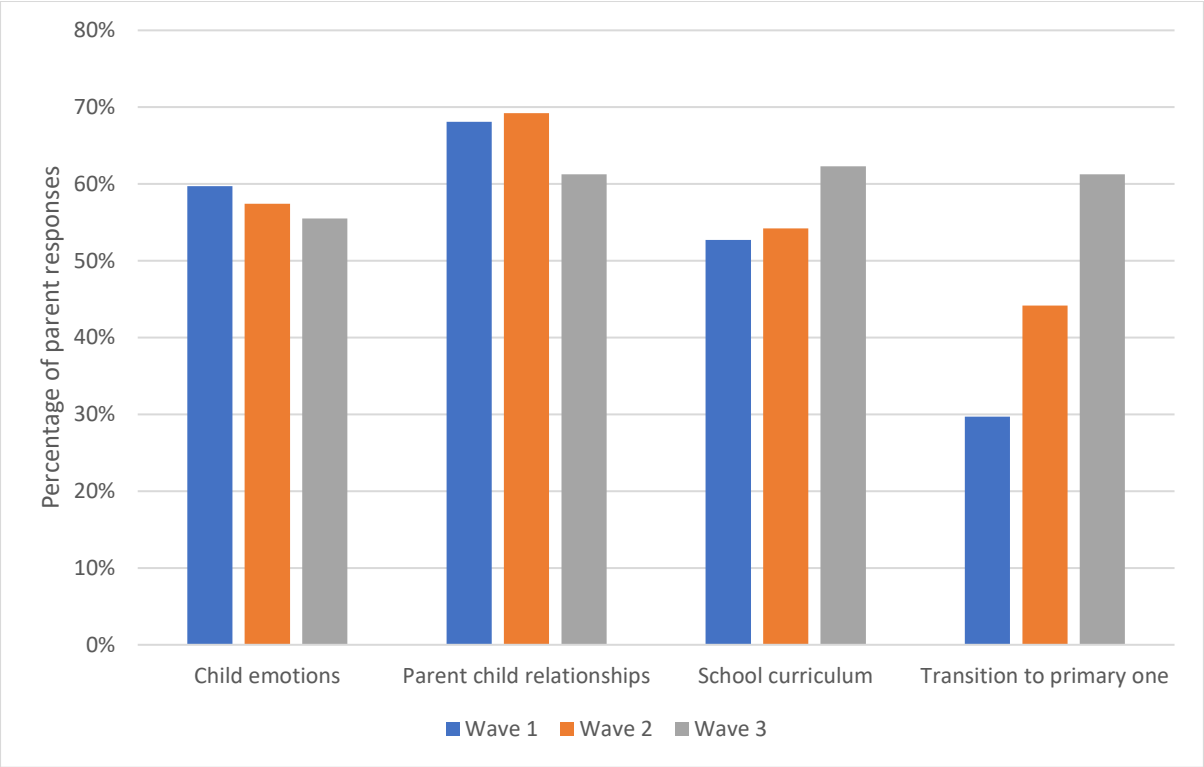


7. 2. School-based parent education and involvement

Around 90% of the teachers agreed that parents had been actively involved in school activities across the three waves (see Figure B3, Appendix B). Teachers' response on this questionnaire item in Wave 3 positively correlated with overall class observation scores across three waves (Rho = .24, $p<.05$). This means that the more strongly teachers agreed their parents had active involvement in school activities, the better the overall classroom quality.

KGs organised seminars and workshops for parents. Activities covered many different themes, such as managing children's emotions, parent-child relationships, school curriculum, and the transition to primary school. Figure 26 shows the topics covered in these workshops as reported by parents who have participated at least once. The largest increase across waves is found in the topic "transition to primary one". It should also be noted that the class levels that participated each wave are different, and older class levels (i.e. K2 and K3 classes) may have a stronger focus on certain topics including transition to primary school. As compared with Wave 1 and Wave 2, more parents in Wave 3 reported on participating in workshops on school curriculum, and fewer parents reported on participating in workshops on parent-child relationships. It is likely that the lower participation may be related to the restricted arrangement during the COVID-19 pandemic.

Figure 26. Topics covered at workshops for parents (Parent questionnaire; Wave 1 n=879; Wave 2 n=798; Wave 3 n=431)



During the interviews with 50 parents, most parents were aware of the parent education topics arranged by the KGs. Across the waves, topics on emotions of children or parents (Wave 1: 11 parents, Wave 2: 14 parents, Wave 3: 13 parents) were frequently mentioned among parents. Transition to primary school, including preparing for a child's transition and applications (Wave 1: 2 parents, Wave 2: 7 parents, Wave 3: 3 parents), was also mentioned among K3

parents, especially in Wave 2. More parents reported on topics related to parent-child reading (Wave 1: 1 parent, Wave 2: 6 parents, Wave 3: 3 parents), parent-child relationships (Wave 1: 2 parents, Wave 2: 4 parents, Wave 3: 3 parents), parent-child activities (Wave 1: 20 parents, Wave 2: 24 parents, Wave 3: 3 parents), and child rearing (Wave 1: 5 parents, Wave 2: 7 parents, Wave 3: 5 parents). Other topics mentioned by the parents included parent-child communication, writing, early childhood mathematics, language, music, dyslexia, home safety, family relationships and play.

The types of parent activities reported across the waves were similar. Participation in parent activities was reported more frequently especially among parents interviewed in Wave 1 and Wave 2. Participation in Wave 3 might have been affected due to restrictions and arrangement under the COVID-19 pandemic. Many parents had attended parent education workshops (Wave 1: 33 parents, Wave 2: 32 parents, Wave 3: 15 parents), and school outings (Wave 1: 22 parents, Wave 2: 19 parents, Wave 3: 9 parents). Some parents had been involved in volunteering at school, including story reading, joining class outings and preparing learning materials (Wave 1: 9 parents, Wave 2: 9 parents, Wave 3: 12 parents). Also, a few parents reported having participated in class observation (Wave 1: 2 parents, Wave 2: 4 parents, Wave 3: 1 parent), and several having attended home-school activities, including school carnivals, sports day, Christmas parties, handicraft workshops, community service, and social gatherings (Wave 1: 8 parents, Wave 2: 5 parents, Wave 3: 10 parents).

Across the waves, parents were generally positive when they were asked in the interviews to share about the perception on the benefits of participating in parent activities and parent education on children's development. A proportion of parents deemed that they had learnt more about parenting skills and child-rearing (Wave 1: 10 parents, Wave 2: 10 parents, Wave 3: 19 parents), while most of these parents had attended parent education seminars or workshops. Some parents also appreciated the opportunity to understand their children more, sometimes from a different perspective, seeing how children behaved at school which was often different from what they saw at home (Wave 1: 7 parents, Wave 2: 8 parents, Wave 3: 10 parents). Another 9 parents saw the immediate benefit of parent-child activities on children's development, for example, the activity had allowed children to learn something new, or encouraged children to be more engaged in the activities (Wave 1: 4 parents, Wave 2: 9 parents, Wave 3: 6 parents). Other parents had also had the opportunity to connect with other parents and teachers.

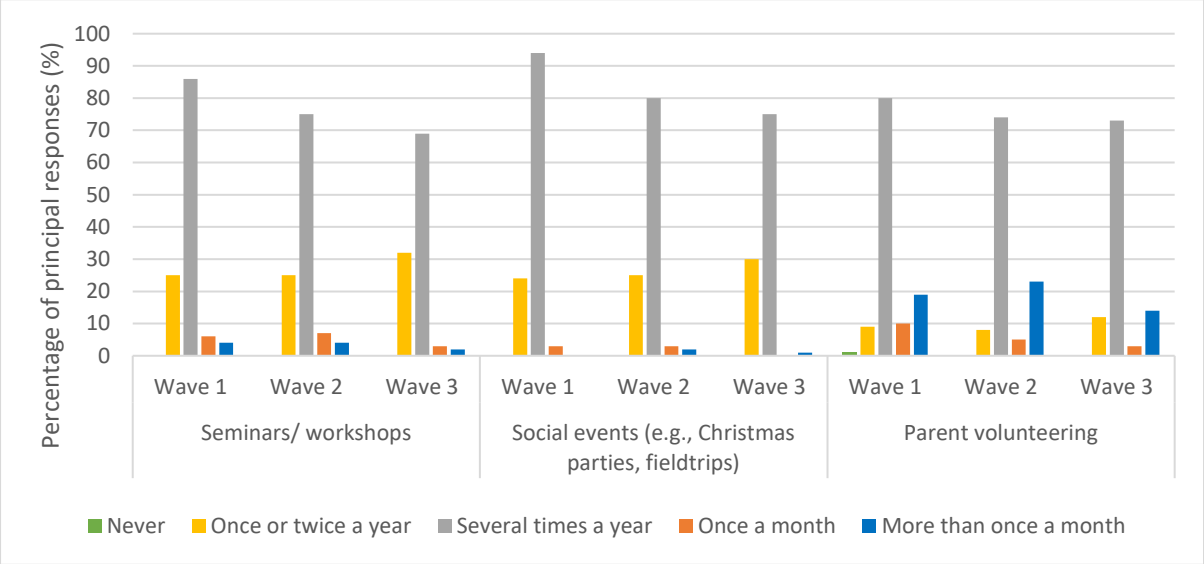
Around a quarter of the 50 parents interviewed had not participated in any parent education or involvement activity because of lack of time, family responsibilities and work (Wave 1: 12 parents, Wave 2: 13 parents, Wave 3: 18 parents). Some of these parents had not been aware of the parent education or involvement activities organised by the school. The primary obstacle to participating in school-based activities as reported by the parents was lack of time as they had had other family commitments and work duties, or they might have already arranged activities for their children at weekends. Some parents in Wave 3 also mentioned not participating in any parent activities that school year because of the COVID-19 pandemic.

For the K2 and K3 parents interviewed, we asked them to comment on the differences in the activities provided for parents between the current and previous school year. In Wave 2, most K3 parents found them to be similar, with only a difference in the topics provided. In particular, applying for and preparing for Primary One was a topic introduced in K3 and not in the previous school year (6 parents), this was also mentioned by 2 parents in Wave 3. Graduation activities were also present for this year (K3) but not previously (K2). They did not mention

any overlap in topics or outing venues across the 3 years. Altogether 4 parents felt like there were more parent activities in Wave 2 than previously. In Wave 3, the interviewed parents were K2 and K3 parents. A total of 18 parents reported that parent activities had been either cancelled, not arranged, or reduced – most of which were attributed to the COVID-19 pandemic, another 15 parents reported that the parent activities were similar to the previous year(s). 2 parents reported that there were no differences, and 4 parents reported that the activities were more diverse, or that they had more activities, or more outings this year.

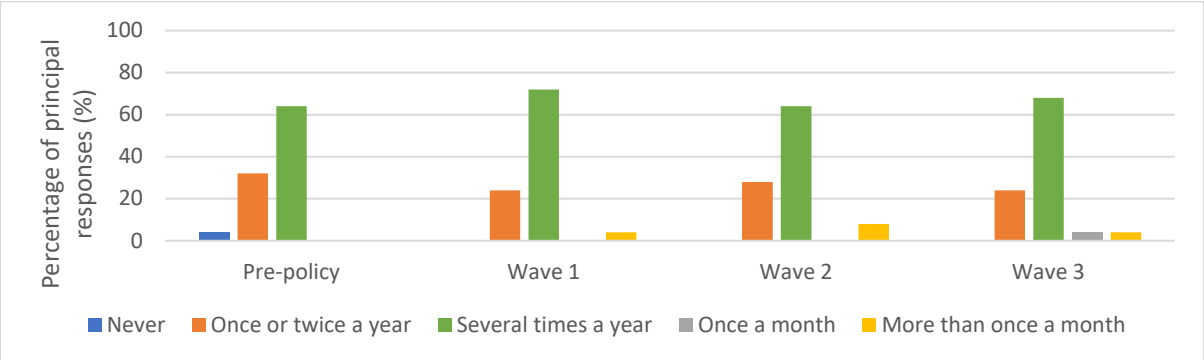
Figure 27 presents the frequency of schools' provision of parent involvement activities in the three waves according to principal questionnaires. Most KGs provided seminars/ workshops, social services, and volunteering services several times a year in all three waves.

Figure 27. Schools' provision of parent involvement activities (Principal questionnaire; Wave 1 n=121; Wave 2 n=114; Wave 3 n=106)



In addition, we compared the questionnaire report of the principals of 25 KGs participating in Study 2 from Pre-policy to Wave 3. As presented in Figure 27, while most of the 25 KGs held parent workshops/ seminars several times a year (64 to 72%) or once or twice a year (24% to 32%) across waves from Pre-policy to Wave 3, we found that there were slightly more KGs that held parent workshops/ seminars once a month or more (Pre-policy: 0%, Wave 1: 4%, Wave 2: 8%, Wave 3: 8%) over time.

Figure 28. Frequency of parent workshops/ seminar (reported in questionnaires by principals of 25 KGs participating in Study 2)



7. 3. Home-based involvement

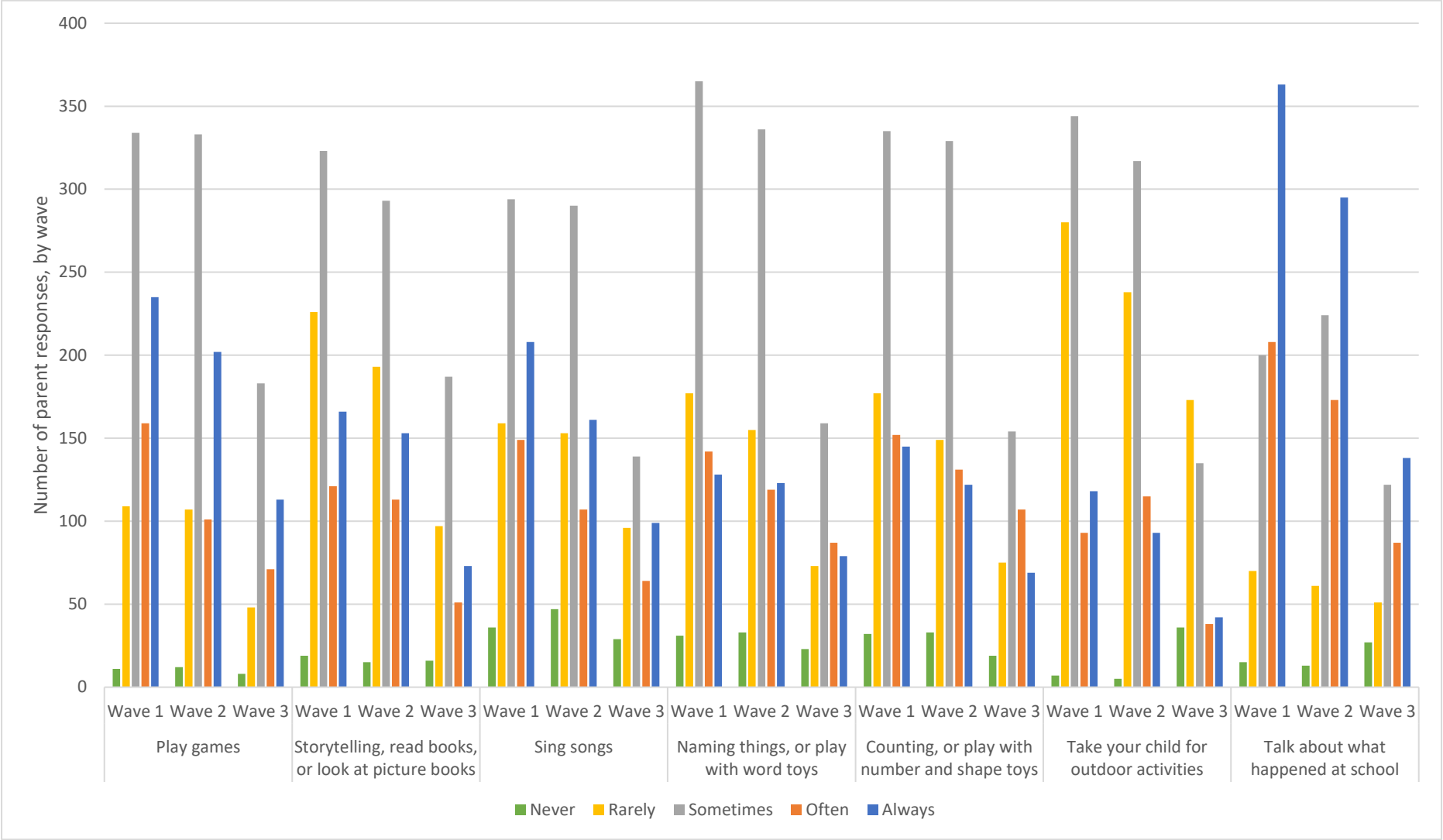
Parents reported in their questionnaires the types of parent-child activities conducted at home including playing games, storytelling or reading books, singing songs, naming things, counting or playing with numbers, outdoor activities, and talking about what happened at schools. Parents were asked to rate the frequency at which they conducted each activity. The most common activity carried out daily was talking about what happened at school (around 40% of parents did this daily in Wave 1 and Wave 2; see Figure 29).

The analysis of the interview data was also informative. Across waves, the types of home-based activities parents had taken part in with their children were similar. Some parents reported storybook reading or storytelling (Wave 1: 25 parents, Wave 2: 13 parents, Wave 3: 19 parents), playing toys or games (Wave 1: 19 parents, Wave 2: 11 parents, Wave 3: 17 parents), or drawing or engaging in handicraft activities (Wave 1: 11 parent, Wave 2: 9 parents, Wave 3: 11 parents). There were considerably more parents mentioning doing homework with their children across waves (Wave 1: 9 parents, Wave 2: 17 parents, Wave 3: 21 parents), revising what had been taught in school (Wave 1: 6 parents, Wave 2: 10 parents, Wave 3: 17 parents), or participating in e-learning activities (Wave 1: 2 parents, Wave 2: 0 parents, Wave 3: 6 parents). Some parents had bought additional workbook for their children to complete (Wave 1: 4 parents, Wave 2: 5 parents, Wave 3: 0 parents). More parents mentioned doing outdoor activities with their children, including visiting the park and hiking (Wave 1: 5 parents, Wave 2: 10 parents, Wave 3: 19 parents). Some parents used everyday activities to introduce words or extend oral language skills through chatting, reading from signs, object naming and counting (Wave 1: 8 parents, Wave 2: 6 parents, Wave 3: 1 parent).

7. 4. Parent-teacher associations/ Parent groups

Principals reported on whether they had PTAs, or parent groups, as part of their questionnaire. In Wave 1, 46% of principals reported having these groups, in Wave 2 this had risen to 51%, and to 52% in Wave 3. The PTA/ parent-group activities described by principals, teachers, and parents in the interviews were similar to Wave 1. These included parent-child activities (e.g. outings and activity days), parent education workshops (e.g. parent-child communications, emotions), and parent volunteer work (e.g. storytelling, preparing lesson materials and assisting daily class routine).

Figure 29. Home-based activities (Parent questionnaire; Wave 1 n=879; Wave 2 n=798; Wave 3 n=431)



According to the principal interviews, most KGs had a PTA or parent groups (including parent volunteer groups) (Wave 1: 17 KGs, Wave 2: 23 KGs, Wave 3: 19 KGs). Some principals also shared about the benefits of having parent groups or PTA, including bridging between parents and schools, and developing a sense of belonging among parents. Most principals whose KGs did not have a PTA were uncertain about establishing a PTA in their KGs. In Wave 1 and Wave 2, some principals (Wave 1: 3 principals, Wave 2: 4 principals) had raised concern about requiring teachers' participation in PTAs, which was considered to be a demanding role and taking up teachers' time for meetings and coordination or that it might cause troubles. Also, in Wave 2, 2 principals indicated that they did not have a PTA because they did not have rooms to hold meetings. A couple of principals in Wave 2 (2 principals) and Wave 3 (2 principals) deemed that they still had high parent participation in their KGs despite not having PTA. In addition, some principals reported challenges in involving teachers in parent groups or PTA. For example, some teachers did not like to involve parents in school activities, and sometimes parents had disputes when they held different opinions.

7. 5. Summary and discussion

Findings under this theme specifically addressed the impact of the KG policy on parents' engagement, including parent communication and parent involvement in parent education and school activities.

Across the waves, the questionnaire and interview reports of principals, teachers, and parents showed that KGs had provided various activities and parent education of different topics for parents. Most KGs had provided regular seminars/workshops, social events, and volunteering several times a year. Among the subset of 25 KGs that completed questionnaires from Pre-policy phase to Wave 3, we observed that there was a small rise in the number of KGs that held parent workshops/ seminars once a month or more, indicating slight increases in the provision of parent workshops/ seminars after the implementation of the KG policy. In each wave, parents tended to report that fewer topics had been covered in parent seminars than the parent seminar topics reported by teachers and principals. One speculated reason might be that parents tended to focus on activities they had participated in before. Among the parents interviewed, a substantial portion of parents had not had time to participate in any school activity or parent education activity. It should also be noted that some activities were cancelled due to the COVID-19 pandemic in the 2019/20 school year (Wave 3). Parent-child activities, such as outings and workshops had been more popular and preferable among parents.

Findings on home-based involvement also showed that parents were concerned about children's academic learning, as many of them would do homework together with the children and purchase additional workbooks for their children. It should be worth noting that the parent participants for Wave 1 were from K1 and K2 classes and parents' participants for Wave 2 and Wave 3 included K3 parents. K3 parents might be more concerned with preparing children for the transition to primary school than parents from younger groups.

On the whole, the majority of teachers agreed that there were parents' active involvement in school activities and good communication and collaboration among teachers, parents, and the principal across the three waves. Their responses on these 2 aspects in Wave 1 were found to associate positively with overall classroom quality.

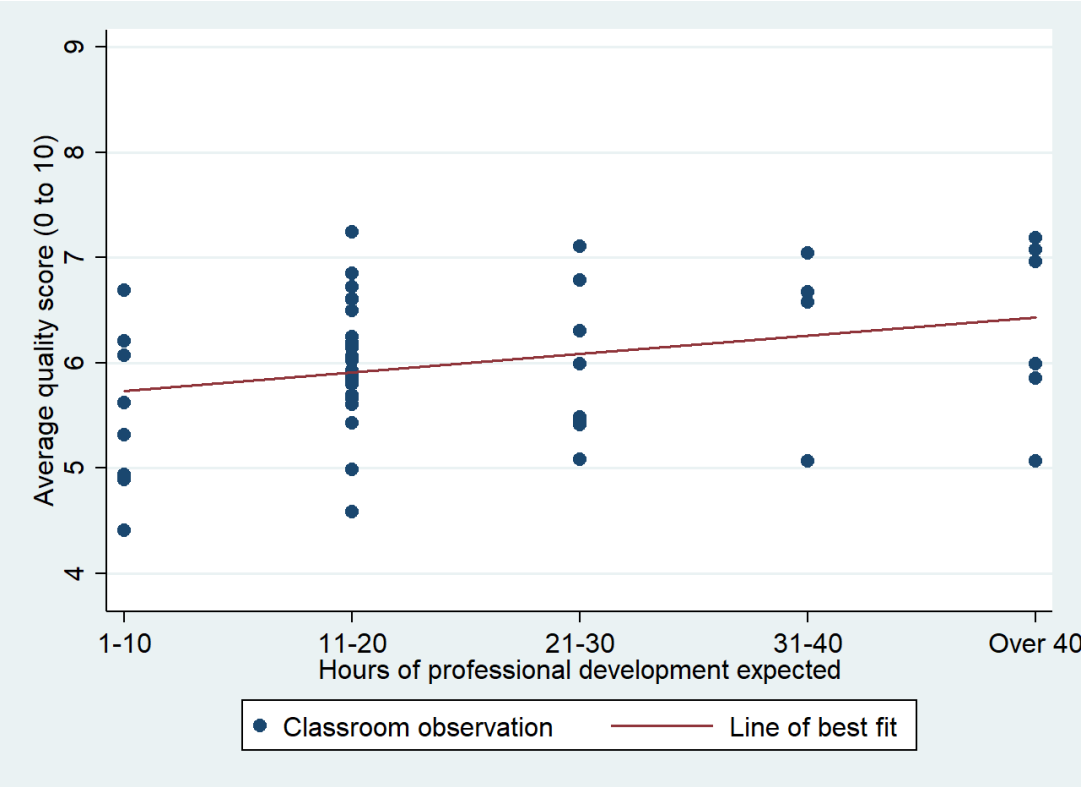
School factors conducive to the quality of KG education

Continuous professional development policy of schools

Principals reported on the number of hours of professional development – including seminars, conferences, and training workshops – teachers in their school were expected to participate in during the school year. The number of hours reported by principals at Wave 1 was positively and significantly correlated with overall observed classroom quality, as illustrated by Figure 30. Further, as illustrated in Table 8 above, hours reported by principals at Wave 1 were also correlated with 2 of the factors of quality: Factor 1 (Supporting socioemotional and cognitive development); and Factor 3 (Nature and living).

However, there was no evidence of significant differences in changes over time, as changes in reported hours across waves were not significantly correlated with changes in quality across waves. The principal's report of how many hours they personally expected to spend on professional development over the school year was also not significantly correlated with quality, and neither was the school average of the teachers' report of expected hours of professional development.

Figure 30. Correlations between average classroom quality and hours of professional development expected reported by principals



Teacher engagement, participation, and experiences

Teachers' report of their participation in professional development was significantly correlated with overall observed quality scores. Quality scores were higher where teachers were more likely to agree that their school could make administrative arrangements so that they could attend professional development activities, where the activities suited their needs, where

participation benefitted their teaching, where their school encouraged teachers to participate, and if they agree they already had sufficient training.

Teachers were also asked about whether they agreed with different statements regarding their teaching experience in their school. Overall observed classroom quality was correlated with several teacher statements about their school experience during Wave 3. More than 95% of the teachers in all three waves agreed that "teachers, parents, and the principal have consistent communication and collaboration" (see Figure B3 in Appendix B), and teachers' response on this item in Wave 3 correlated positively with overall class observation scores across three waves (Rho = .18, $p<.05$), but not with changes in quality over time. This suggests that the more teachers agreed that there was communication and collaboration among teachers, parents, and the principal, the better the overall classroom quality.

Further, schools with teachers who were more likely to agree that students learnt through play, and that students enjoyed going to school, also had significantly higher overall observed classroom quality scores. However, changes in teacher responses across waves were again not significantly correlated with changes in classroom quality across waves.

Parent involvement

Around 90% of teachers agreed that parents were actively involved in school activities across the three waves (see Figure B3, Appendix B). Schools with teachers who were more likely to agree that parents were actively involved in school activities had significantly higher overall quality scores. This means that the more strongly teachers agreed their parents had active involvement in school activities, the better the overall classroom quality.

General discussion and conclusions

In this section, we address the 6 research questions, as set out on P.8 of this report.

Q1. What are the impacts on the learning and teaching of the students (e.g. in curriculum planning, teaching methods, students' engagement in learning activities, etc.)?

- **Improvements were found in certain aspects of classroom quality across waves.** Scores on Factor 1 (Supporting socioemotional and cognitive development), Factor 2 (Learning environment, catering for learner diversity and free-choice indoor activities), and Factor 4 (Inclusiveness, group activities and teacher-child interaction) increased progressively between Pre-policy and Wave 2, and then decreased slightly in Wave 3. Across time, scores on Factor 3 (Nature and living) were the highest in Wave 1, before decreasing slightly in Wave 2 and then more substantially in Wave 3. This suggests that, up to Wave 2, classroom quality improved in terms of most aspects, including interactional quality that supported children's socioemotional and cognitive development, the physical environment and catering for learner diversity and inclusiveness. The decline in Wave 3 may be related to the COVID-19 pandemic measures that restricted activities and interactions.

- **Changes were identified on school curricula following the introduction of KECG.** Strengthening the element of free exploration in play and promoting learning through play were the most frequent (around 90%) and consistent changes reported by principals. Other changes on school curricula such as reinforcing catering for learner diversity, strengthening the promotion of moral education and promoting an inclusive culture were also identified.

- **Teachers reported that the impact of the KECG on their teaching increased across waves.** Analyses of the responses of the 510 teachers who completed the questionnaire in all three waves indicated that they felt the impact of the KECG was greater in later waves. The majority of the teachers acknowledged the benefits of learning through play and stated that a playful learning environment had promoted children's learning.

- **The increased importance of learning through play was evident from questionnaires and interviews.** An analysis of responses to the questionnaires indicated that the majority of principals and teachers endorsed the importance of play across waves. A large proportion of principals and teachers interviewed reported that they had made changes in accordance with the KECG. Changes to the timetable were made in order to allocate more time for free play, exploration, physical activities, music, and free choice time. More activities including storytelling, picture book reading, role-playing, card games, and "free play day/week" were adopted to facilitate shifting from teacher-led to child-led learning modes and to provide more opportunities for free exploration and learning through play. Some KGs also reorganised physical space for play on campus and increased the number of learning corners for children to choose. Some also added new materials and resources, such as big toys, building toys, special types of blocks, big wheels, recyclable materials, to the learning environment to promote learning through play. The KGs had added new materials to the learning environment to enhance the elements of play and authenticity in learning corners. Some

principals and teachers reported having reduced homework and writing tasks for children or having modified the format of homework. As revealed in interviews some parents noted that writing had been reduced and more play time was given to children. While learning through play is now much more commonly seen in KGs, some principals and teachers were not sure how the play-based pedagogy could be implemented in the classrooms.

Q2. What are the impacts on catering for students' diverse needs (e.g. teachers' understanding of their specific needs, support to their learning, collaboration with relevant experts/ external organisations, teachers' training in this regard, etc.)?

- **More KGs provided additional support to NCS students across waves**. Additional support was provided to NCS students, which include assigning designated teachers or teaching assistants to support NCS students, participating in school-based support programmes, teachers using in-class strategies, and purchasing services by external bodies. The additional support was reported mostly among KGs that received the NCS Grant. Across the waves, a greater proportion of teachers and principals reported in the questionnaires that they had provided support for NCS students, including developing school-based materials, adapting curriculum activities, creating a rich Chinese language environment, encouraging interaction between NCS and Chinese speaking students, and contacting parents to understand children's needs. KGs had provided a more extensive range of support for NCS students across waves as compared with the Pre-policy phase. Among the NCS parents who reported that their children had received support at their KGs, most of them reflected that the support was somewhat useful or very useful.

- **On the whole, more support was provided for students with special needs.** From the longitudinal analyses of teachers and principals who completed questionnaires in all three waves, we found that a greater percentage of teachers and principals reported providing certain support for students with special needs across waves. Among the different forms of support, contacting parents to understand students' needs, introducing external support, providing appropriate support and creating inclusive environment are the most frequent ones. Across the waves, more principals reported receiving support from OPRS and acquiring services from school social worker, during interviews. Principals and teachers interviewed reported working with external professionals in supporting students with special needs. This suggests that KGs had greater opportunities to work with external professionals to support the development and learning of students with special needs. Among the parents who reported that their children had special needs in questionnaires, a greater percentage of them reported that they received support through the KGs over time. Most of them found the support very useful or somewhat useful. In Wave 2 and Wave 3, there was also evidence of higher quality on inclusiveness and diversity from classroom observations in certain aspects. This outcome may be a result of interactions among multiple factors put forward in the Theory of Change.

- **Teachers reported being more confident in supporting children with diverse needs across waves.** Items on the questionnaire for teachers and questions posed in the teacher interviews were aligned to the objectives of the KG policy and/or related to factors undergirding teacher effectiveness. Analyses of the responses from the 510

teachers who completed questionnaires in all three waves of the study enable us to determine changes in their perceptions and reported experiences. The majority of teachers reported being fairly or very confident in terms of supporting students with diverse needs (e.g. at risk of developmental delays, special needs, and NCS students) and teachers' levels of confidence in supporting students with diverse needs increased across the waves.

Q3. What are the impacts on school management and organisation (e.g. transparency, holistic planning in resource deployment, school culture and atmosphere, etc.)?

- **Principals reported using the grants in different ways to enhance the quality of teaching and learning during interviews.** These included hiring extra staff, supporting the daily operation of the KGs, upgrading equipment and facilities, purchasing toys and teaching materials, organising activities for students and teacher professional development. Revisiting the implementation of the Scheme 3 years after it started in the 2017/18 school year, some principals reported that they were able to hire additional teachers and staff and teachers received higher salaries, and that they had capacity to allow teachers to prepare for teaching, participate in professional development activities, and communicate with parents.

- **Principals, teachers, and parents were positive about the school culture and atmosphere**. Principals and teachers reported that the KGs had involved teachers in decision making to some extent. In general, parents appreciated that the teachers were caring and loving, took good care of their children and followed up with parents on children's needs. Some parents were also appreciative of the environment and hygiene practices in the schools and mentioned that their child had liked going to schools. In Wave 3, more parents mentioned that they liked the teaching aspect of the schools, including the school curriculum or philosophy, teaching activities/strategies, and qualified and experienced teachers.

Q4. What are the impacts on teachers' professional development including school policy relating to teachers' development (e.g. staffing structure/hierarchy)?

- **More teachers were willing to spend more time to attend professional development activities.** We observed an increase in the proportion of principals surveyed who expected teachers at their KGs would spend more than 20 hours in the respective school year on professional development activities up to Wave 2 (Wave 1 = 62%, Wave 2 = 67%, Wave 3 = 49%). Similarly, teachers who reported that they would spend more than 20 hours on professional development activities increased from Wave 1 (45% teachers) to Wave 2 (53% teachers), and decreased from Wave 2 to Wave 3 (46% teachers). In line with these findings, according to reports in teacher questionnaires of the 510 teachers who completed all three waves, the average expectations for professional development activities increased between Wave 1 and Wave 2, then decreased between Wave 2 and Wave 3. There might have been fewer professional development activities during the COVID-19 pandemic than previous years and there may have been less variability in expectations towards professional development that school year. More than 90% of the teachers in all three waves agreed that professional development activities had suited their needs, benefitted their teaching, and that their schools had been encouraged their participation in these activities.

- **Most KGs permitted teachers to attend professional development activities during working hours.** Some principals mentioned in interviews that with more staff employed after the implementation of the KG policy allowed them to have the capacity for teachers to participate in professional development activities. More than 90% of teacher questionnaire respondents agreed that their KGs made administrative arrangements to allow them to participate in professional development activities. This finding is consistent with principal and teacher reports during interviews.

- **KGs adopted certain measures to support new teachers.** There were mentoring programmes, induction sessions, class observations, follow-up discussions or appraisal meetings with the new teachers. Some KGs had made personnel arrangements to support new teachers such as partnering the novices with more experienced teachers in the same class. It should be noted that support for new teachers was more frequently reported by principals than teachers, this may be because not all teachers were involved in the support.

- **Teachers were able to apply their learning from professional development activities to teaching and curriculum development.** Principals interviewed reported that teachers were able to apply what they had learnt from the professional development activities in class teaching. Teachers at some KGs had been asked to share in meetings what they had learnt in the professional development activities, and some also had been requested to share how they put learning into practice. Teachers at some KGs had also been required to produce written reports on their learning. Some principals or senior teachers discussed with the teachers and provided advice to encourage teachers' application of their learning from professional development activities. Some teachers who had received professional development in a particular aspect (e.g., supporting students with special needs) were assigned to be in charge of relevant programmes in schools. Evidence from the teacher interviews also showed that teachers were able to apply what they had learnt from professional development activities in the classrooms. The areas of application included supporting children with special needs, play, music, language and storytelling and areas involving science and maths. The teachers applied strategies learnt to lesson planning like enhancing child-led elements in teaching, improving the classroom environment or incorporating elements of play into different learning domains.

- **KGs with higher expectations for professional development activities had higher classroom quality in Wave 1 and Wave 2**. Principals' expectations of the number of hours for their teachers' professional development activities were significantly associated with both ECERS-E and SSTEW in Wave 1, with SSTEW only in Wave 2, and not associated with any measures in Wave 3. This showed that participating in more hours of professional development activities may be associated with higher quality of classroom observation in terms of interactions.

Q5. What are the impacts on parents' engagement (e.g. more diverse communication channels, promotion of parent education)?

- **A positive home-school cooperation culture was generally displayed among KGs across waves.** Most teachers and principals reported positively on their communication with parents in the questionnaires across waves. While parents noted, in the interviews, that they appreciated the positive attributes of teachers, including kindness and being loving and responsible, more parents showed greater appreciation on the teaching aspect of the schools (e.g. teaching activities, school curriculum) in Wave 3.

- **KGs maintained diverse communication channels with parents.** Besides using conventional ways like parent-teacher conferences, newsletters, phone call/written notes, student portfolios, informal conversation and student handbook to communicate with parents about their children's development and learning, a greater number of principals and teachers reported the use of electronic means such as Intranet, emails, instant messaging applications in Wave 3 than in previous waves. This is not surprising given suspension of face-to-face classes because of the COVID-19 pandemic.

- **KGs continued to provide a range of topics on parent education and parental involvement activities**. Most KGs had provided regular seminars/workshops, social events, and volunteering several times a year. Common topics for parent education included child and parent emotions, parent-child relationships, transition to primary school, and promoting specific learning areas. Activities included school outings, volunteering, and parent-child events at school. Some parents interviewed reported that through participation in these education and involvement in children activities, they had learnt more about parenting skills or child-rearing, or had a better knowledge of their children's characteristics. This suggests that these activities were able to promote parents' understanding of their children and parenting. Among the 25 KGs that completed questionnaires from Pre-policy phase to Wave 3, there was a small rise in the number of KGs that held parent workshops/ seminars once a month or more, indicating slight increases in the provision of parent workshops/ seminars after the implementation of the KG policy.

- **KGs continued to improve communication with NCS parents.** Fewer teachers reported having difficulties communicating with NCS parents in Wave 3 as compared to Wave 1 and Wave 2 as they adopted different strategies in daily communication with the NCS parents. Some KGs provided English translation of documents for the parents. The NCS parents interviewed in all three waves reported that they could easily reach the schools when needed, and the schools maintained regular communication with them through class teachers, NCS teachers or school staff. Yet, language barriers still exist which preclude smooth communication between the KGs and the NCS parents, as reflected by certain responses in interviews that the NCS parents needed help in understanding the school circulars and they refrained from participating in parent engagement activities at schools due to language barriers.

- **Parents' participation in school activities was affected due to different reasons.** Around a quarter of the parents interviewed in Wave 1 and Wave 2 and 36% of the parents interviewed in Wave 3 had not participated in any parent activities. This was mainly because of their lack of time, or for other reasons such as the arrangements under

the COVID-19 pandemic in Wave 3. According to NCS parents who were interviewed, participation in school-based activities may be challenging when activities and notices are primarily in Chinese. As noted above, most NCS parents interviewed reported that they had not participated in any parent activities because of language barriers.

Q6. What are the school factors that are conducive to the development of quality KG education?

- **The number of hours that teachers participated in professional development activities, as reported by principals at Wave 1, was positively associated with overall classroom quality**. Engagement in professional development activities was also associated with specific aspects of classroom quality including supporting children's socioemotional and cognitive development, and their learning of nature and living.

- **Teachers' perceptions on professional development arrangement in Wave 3 were positively associated with classroom quality**. These perceptions encompassed teachers' views about whether the activities suited their needs, benefited their teaching, and whether they felt that they had enough training. Teachers' perceptions were also influenced by whether they believed that their schools encouraged them to attend or were able to make administrative arrangement for them to participate in professional development activities.

- **Parents' involvement and communication with schools in Wave 3 were positively associated with overall classroom quality across waves**. We found that KGs who had teachers who were more likely to agree that parents were actively involved in school activities and that "teachers, parents, and the principal have consistent communication and collaboration" in Wave 3 had higher classroom quality across three waves.

Limitations

Our observations reflect the activities that took place on the day we visited the KGs and we may not be able to capture all aspects of the programmes. The teaching on a particular day may depend on the current theme or the activities scheduled as part of the ongoing curriculum. For example, some themes on the community may be more related to the learning areas of Language or Self and Society while other themes on nature may be more relevant to the learning area of Nature and Living. Hence, there may be discrepancies between our measure of classroom quality and the actual teaching and learning taking place in the KGs.

There may be a disconnection between what was reported in the interviews and the questionnaires and what was observed. Principals and teachers stated that learning through play had become more important across the waves, but this was not captured in classroom observations. This may be because the observational scales used in this study focused on the global and domain-specific measures of quality and were not sensitive enough to capture all changes related to the KG policy.

The time of the year we collected the data in each wave should be noted when interpreting the findings. Principals, teachers, and parents may have had more experience to share about the school year when they completed surveys or interviews near the end of the school year (e.g. June to August) than at an earlier time. Similarly, classroom quality may depend on the nature of activities and relationships between teachers and the children, which may be affected by whether it is the beginning or the end of the school year. Near the end of the school year, K3 teachers may focus on preparing children for the primary one transition; in these cases, the teaching may deviate from a typical school day.

We are also mindful that activities may be limited due to the restrictions in place because of the COVID-19 pandemic. These activities include classroom teaching, teacher professional development, and parent activities.

Key Findings and Recommendations

The following recommendations stem directly from the study findings.

	KEY FINDINGS	RECOMMENDATIONS
I.	Classroom observations indicate an increase in the scores of 3 factors involving most aspects from Pre-policy phase to Wave 2. The scores of Factor 3 (Nature and living) in classrooms, however, decreased across waves.	Further investigate pedagogy related to the learning area "Nature and Living" in KGs.
II.	There was a positive impact of the KECG on learning and teaching. Learning through play, as emphasised in the KECG, was reflected in teaching and learning as reported by principals, teachers and parents. Some challenges remain in the implementation of free play by teachers and parents.	Provide further professional development programmes and support to KGs on free play; identify good practices and encourage sharing amongst KGs.
III.	KGs were responsive to the characteristics of their students. More support was provided in KGs for NCS students and students with special needs. Classroom observations demonstrated higher quality in aspects of teacher-child interactions and catering for diverse needs. Teachers also reported increased confidence in supporting children with diverse needs across waves.	Continue to allocate grants to support KGs in catering for diversity. Further support can be placed on reducing the language barriers between NCS parents and KGs to support smooth communication and home-school cooperation.
IV.	KGs benefited from the utilisation of different grants which supported the teaching and learning environment and experiences for teachers and students.	Continue to assess schools' needs across the sector and provide various grants to support the quality of teaching and learning in KGs.
V.	KGs placed emphasis on professional development. More teachers attended professional development activities across the waves and KGs made administrative arrangements to support teachers' participation. Teachers benefitted from professional development activities, which contributed to their confidence in teaching and curriculum development. At the same time, teachers wished to have more opportunities for professional development.	Maintain support for teachers through the provision of professional development activities in diversified modes and, when necessary, review the continuous professional development policy to suit the sector's needs.
VI.	KGs offered a variety of communication channels and activities to promote home-school cooperation as well as parent education and involvement. Some challenges remain as there is a relatively low rate of parents' participation in activities arranged by schools.	Promote parent education and involvement across KGs so as to reach parents of all backgrounds, including working parents and NCS parents.

Appendix A: Item lists of observation measures and questionnaires

Appendix A1: Early Childhood Environment Rating Scale-Revised (ECERS-R) Item List

	Space and Furnishings
1	Indoor space
2	Furniture for care, play, & learning
3	Furnishings for relaxation
4	Room arrangement for play
5	Space for privacy
6	Child-related
7	Space for gross motor
8	Gross motor equipment

	Personal Care Routines
9	Greetings/departing
10	Meals/snacks
11	~~Nap/rest~~[25]
12	Toileting/diapering
13	Health practices
14	Safety practices

	Language Reasoning
15	Books and pictures
16	Encouraging children to communicate
17	Using language to develop reasoning skills
18	Informal use of language

	Activities
19	Fine motor
20	Art
21	Music/movement
22	Blocks
23	Sand/water
24	Dramatic/play
25	Nature/science
26	Math/number
27	Use of TV, video, and/or computers
28	Promoting acceptance of diversity

	Interaction
29	Supervision of gross motor activities
30	General supervision of children
31	Discipline
32	Staff-child interactions
33	Interactions among children

[25] To better fit the Hong Kong KG context, we dropped Item 11: Nap/rest. As there will be half-day and whole-day Scheme-KGs participating in the Study, to be consistent across all classroom observations, we also omitted this item for the whole-day classroom.

Program Structure

34 Schedule
35 Free play
36 Group time
37 Provisions for children with disabilities

Parents and Staff

38 Provisions for parents
39 Provisions for personal needs of staff
40 Provisions for professional needs of staff
41 Staff interaction and cooperation
42 Supervision and evaluation of staff
43 Opportunities for professional growth

Appendix A2: Early Childhood Environmental Rating Scales – Extension (ECERS-E) Item List

Literacy

1 Print in the environment
2 Book and Literacy Areas
3 Adult Reading with the Children
~~4 Sounds in Words~~[26]
5 Emergent writing/Mark-Making
6 Talking and Listening

Mathematics

7 Counting and Application of Counting
8 Reading and Representing Simple Numbers
9 Mathematical Activities (Select Either 9a or 9b)
  9a. Shape
  9b. Sorting, Matching, and Comparing

Science and the Environment

10 Natural materials
11 Areas Featuring Science/Science Materials
12 Science Activities (Select 12a, 12b or 12c)
  12a. Non-living
  12b. Living Processes
  12c. Food Preparation

Diversity

13 Planning for Individual Learning Needs
14 Gender Equality and Awareness
15 Race Equality and Awareness

[26] To go in line with the medium of instruction of Hong Kong KGs, we dropped Item 4: Sounds in Words.

Appendix A3: Measure of Early Learning Environmental (MELE) Item List

I. Physical environment	
1	Presence of child work
2	Presence of print displays
II. Interaction	
3	Adults are verbally responsive to child-initiated questions or comments
4	Teacher encourages children with open-ended questions to express new thoughts
5	Scaffolding by teacher to help children work through the steps to solve problems or errors
6	Discipline supports behavior for full and appropriate participation
7	Behavioral indications of positive praise of children
8	Behavioral indications of teacher encouraging a positive environment among children
9	There are behavioral indications of a negative environment between teacher and children
III. Inclusiveness	
10	Program shows evidence of encouraging enrolment and participation of all ethnic, religious, linguistic, and gender groups
11	Program shows evidence of encouraging enrolment and participation of disabled children, including sensory, motor, and behavioral disabilities
12	Children of different learning needs and levels are catered to
13	Gender equality in class participation
14	Gender equality in indoor and outdoor activities
15	Activities and materials raise awareness of ethnic, linguistic, and religious diversity, in a respectful way
IV. Teaching/Learning: Overview	
16	A curriculum has been developed outlining competencies and lesson plans
17	The daily routine, seen today, has a mix of activities and not only teacher-led instruction
18	Teacher arranges learning in small groups (of 2 – 10 children) and facilitates full involvement of all children within groups, rather than always whole-group activities
V. Teaching/Learning: Language and Literacy	
19	Children are introduced to reading and/or writing letters
20	Adult has available, reads and discusses an age-appropriate illustrated Storybook with text
21	Adult introduces children to new vocabulary for everyday use (not special math vocab)
22	Children's new language/literacy learning is connected to past learning and to its everyday application
VI. Teaching/Learning: Numbers and Numeracy	
23	Counting and Enumeration
24	Children read and/or write simple numbers
25	Children engage in activities that teach about shapes
26	Children are encouraged to use objects for math concepts and patterns, and not simply for enumerating.

27	Operations on numbers by adding or subtracting
28	Children's new numeracy learning is connected to past learning and to its everyday application

VII. Teaching/Learning: Nature and Science

29	Material from the natural or technological world is accessible and included in an activity
30	Teacher weekly encourages learning and exploration of natural or technological world

VIII. Teaching/Learning: Group Activities

31	Age-appropriate gross motor games are supervised and led by an adult usually outside
32	Singing and gross motor movement
33	Rhymes, including rhyming songs and poems
34	Art work encourages individual expression through drawing, colouring, clay, paint, or other

XI. Teaching/Learning: Free-choice Indoor Activities

35	Children are given time for indoor free-choice activities
36	Children have access to different interest centers during indoor play
37	Dramatic or imaginative play materials for different themes are accessible
38	Blocks or block-like objects of different shapes and sizes, for construction, are accessible
39	Children have access to and show interest in 5 or more different books during free-choice time
40	Adult supervision and adult-child verbal interactions during free play

Note:
We removed 10 items from the original 50-item scale that were unlikely to vary in the context of Hong Kong. These items include clean/hygienic area, handwashing before a meal, drinking water available on site, children sitting on material, such as cement, mat, chair and not on bare ground, adequate child-sized latrine/toilet facilities, protection from hazardous conditions outside classroom, protection from hazardous conditions within classroom, adequate covered classroom space, use of writing implements, and children's waiting time.

Appendix A4: Sustained Shared Thinking and Emotional Well-being Scale (SSTEW) Item List

Building Trust, confidence and independence	
1	Self-regulation and social development
2	Encouraging choices and independent play
3	Planning for small group and individual interactions/adult deployment
Social and emotional well-being	
4	Supporting socio-emotional well-being
Supporting and extending language and communication	
5	Encouraging children to talk with others
6	Staff actively listen to children and encourage children to listen
7	Staff support children's language use
8	Sensitive responsiveness
Supporting learning and critical thinking	
9	Supporting curiosity and problem-solving
10	Encouraging sustained and shared thinking through storytelling, sharing books, singing, and rhymes
11	Encouraging sustained shared thinking in investigation and exploration
12	Supporting concept development and higher-order thinking
Assessing learning and language	
13	Using assessment to support and extend learning and critical thinking
14	Assessing language development

Appendix A5: Principal Questionnaire Item List

Part 1: School information

1 Types of programmes offered
2 Numbers of students enrolled in school
   (a) Non-Chinese speaking students
   (b) Cross border students
   (c) Students from low-income families
   (d) Students diagnosed with special needs
3 Numbers of staff employed
   (a) Principal and teaching staff
   (b) Non-teaching staff (Administrative staff)
   (c) Others (e.g. janitors or cook)
4 Grant received by the school

Part 2: Principal's and Teachers' Professional Development

5 Whether professional development activity participation is a duty for teachers
6 Expectant hours of professional development participation (Teachers)
7 Types of professional development activities teachers participated
8 School's priority in arranging professional development activities for teachers
9 Topics covered in the professional development activities for teachers who got involved in the administrative work
10 Follow up action with teachers after their participation in professional development activities
11 Mentor/mentee programme
12 Additional support to new teachers
13 Expectant hours on professional development activities
14 Types of the professional development activities participated in
15 Professional development activities participation and application

Part 3: Home-School Partnership

16 Home-school communication means (on children's development and learning)
17 Frequency of activities provided for parents/guardians
18 Topics covered in seminars/workshops provided for parents
19 Existence of Parent-Teacher Association
20 Relationship with parents

Part 4: Catering for Diverse Needs

21 Support provided by schools for students with special needs or students at risk of developmental delay
22 Support provided by schools for Non-Chinese speaking students
23 NCS Grant (2017/18 school year)

Part 5: School Curriculum

24 Involvement in school's curriculum planning
25 Knowledge of the "Kindergarten Education Curriculum Guide" (2017)
26 Adoption of the focuses in the school's curriculum (after Kindergarten Education Curriculum Guide 2017)

Part 6: Principals' Beliefs and School Perceptions

27 Beliefs about teaching and learning
28 Beliefs about the school management and atmosphere

Part 7: Principal Background Information

29 Principal background information
30 Principal's engagement in the school tasks
31 Other comments

Appendix A6: Teacher Questionnaire Item List

Part 1: Teaching Duties and Practices

1	Teacher's engagement in the school tasks
2	Teachers' instructional strategies
3	Teachers' support for student students at risk of developmental delay (Teacher)
4	School support provided for students with special needs or students at risk of developmental delay
5	Support provided for non-Chinese speaking students
6	Teacher's involvement in school's curriculum planning
7	Impact of the Kindergarten Education Curriculum Guide (2017) on teaching

Part 2: Home-School Partnership

8	Home-school communication means
9	Parent-Teacher Association and participation
10	Provision of school-based involvement activities for parents
11	Topics covered in the parent seminars/workshops
12	Relationship with parents

Part 3: Teachers' Professional Development

13	Teachers' perceived confidence
14	Professional development activities requirement
15	Expected hours spent on professional development activities
16	Provision of professional development activities
17	Topics covered and application of professional development activities
18	Professional development participation relating to catering for students with special needs or students at risk of developmental delay
19	Professional development participation relating to teaching non-Chinese speaking students
20	Beliefs towards professional development activities
21	Dissemination of professional development experience
22	Support for new teachers
23	Mentor/mentee programme

Part 4: Teachers' Beliefs and School Perceptions

24	Teacher self-efficacy
25	Teaching and learning beliefs
26	Perceived school culture

Part 5: Background Information

27	Teacher and class background information
28	Other comments

Appendix A7: Parent Questionnaire Item List

Part 1: Home-School Partnership

1	Home-school communication means (child learning)
2	Home-school communication means (child behaviour)
3	Scheduling meeting with teachers
4	Parent-Teacher Association
5	School-based involvement activities provided for parents and participation
6	Effectiveness of the activities in helping parents understand their children's developmental needs
7	(A) Topics covered in parent seminars/workshops (B) Preference of topics to be covered in upcoming seminars/workshops

Part 2: Parent-child activities

8	Home-based parent-child activities
9	Perceived child performance

Part 3: View towards your Child's School

10	School satisfaction
11	Parents' ratings of the school quality
12	Parents' ratings of the teacher quality
13	Support for students with special needs
14	Support for students at the risk of developmental delay
15	Support for non-Chinese speaking student
16	Beliefs about children's learning

Part 4: Student Background Information

17	Relationship with the student
18	Student background information
19	Information about the student's family (Household size, parental occupation and education)
20	Support from the following schemes (a) Comprehensive Social Security Assistance Scheme (CSSA) (b) Kindergarten and Child Care Centre Fee Remission Scheme
21	Other comments

Appendix B: Additional tables and figures

Table B1. Factor analysis (principal component factors) of 18 ECERS-E, SSTEW, and MELE domains (n=159)

	Eigenvalue	Difference	Proportion	Cumulative
Factor1	5.38	3.57	0.30	0.30
Factor2	1.81	0.14	0.10	0.40
Factor3	1.67	0.25	0.09	0.49
Factor4	1.42	0.39	0.08	0.57
Factor5	1.03	0.12	0.06	0.63
Factor6	0.91	0.14	0.05	0.68
Factor7	0.77	0.05	0.04	0.72
Factor8	0.72	0.05	0.04	0.76
Factor9	0.67	0.08	0.04	0.80
Factor10	0.60	0.02	0.03	0.83
Factor11	0.57	0.10	0.03	0.86
Factor12	0.47	0.04	0.03	0.89
Factor13	0.43	0.04	0.02	0.91
Factor14	0.39	0.04	0.02	0.94
Factor15	0.35	0.02	0.02	0.95
Factor16	0.32	0.04	0.02	0.97
Factor17	0.29	0.08	0.02	0.99
Factor18	0.21	.	0.01	1.00

Table B2 shows the rotated 5-factor solution with quartimax rotation. Loadings of greater than .45 are highlighted for ease of interpretation (Tabachnick & Fidell, 2007[27]). Composite variables were created for each factor by taking the mean of each domain with high loadings (>.45) on that factor, based on the standardised mean score of each domain. Each composite variable was rescaled 0 to 10. Cronbach's alpha scores were calculated for each composite factor variable.

[27] Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics (5th edition)*. Allyn & Bacon.

Table B2. Rotated 5-factor solution (quartimax rotation; n=159; loadings > .45 are highlighted for ease of interpretation)

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Uniqueness
ECERS-E						
Literacy	0.29	0.49	0.34	0.08	0.37	0.41
Mathematics	0.38	0.55	0.24	-0.02	0.16	0.47
Science and Environment	0.16	0.03	0.82	0.00	0.25	0.24
Diversity	0.28	0.55	-0.04	0.15	0.47	0.37
SSTEW						
Building trust, confidence and independence	0.82	0.25	0.17	-0.01	-0.05	0.23
Social and emotional well-being	0.80	0.08	-0.01	-0.01	0.05	0.35
Supporting and extending language and communication	0.73	-0.11	-0.15	0.26	0.32	0.26
Supporting learning and critical thinking	0.77	0.10	0.30	0.02	-0.17	0.27
Assessing learning and language	0.46	-0.33	0.15	-0.02	0.16	0.62
MELE						
Physical environment	0.18	0.74	-0.03	0.14	-0.07	0.39
Interaction	0.49	-0.05	0.01	0.59	0.18	0.37
Inclusiveness	0.16	0.21	-0.07	0.69	0.07	0.44
Teaching and Learning: Overview	0.58	0.30	-0.03	0.41	-0.02	0.41
Teaching/Learning: Language and Literacy	-0.02	0.33	0.22	0.53	0.23	0.51
Teaching/Learning: Numbers and Numeracy	0.05	0.02	0.06	0.04	0.84	0.28
Teaching/Learning: Nature and Science	0.15	0.07	0.79	0.03	-0.18	0.32
Teaching/Learning: Group Activities	0.37	0.02	0.09	0.60	-0.26	0.43
Teaching/Learning: Free-choice Indoor Activities	0.32	0.53	0.43	0.06	-0.36	0.30

Table B3. Classroom observation scores by domain

	ALL					PRE-POLICY				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
ECERS-E (7-point scale)										
Literacy	159	3.39	0.87	1.60	5.80	15	3.59	1.06	1.6	5.2
Mathematics	159	2.37	1.04	1.00	5.33	15	2.11	0.86	1	4.67
Science and Environment	159	1.60	0.74	1.00	5.00	15	1.67	0.47	1	2.67
Diversity	159	1.93	0.69	1.00	4.33	15	1.42	0.27	1	2
SSTEW (7-point scale)										
Building trust, confidence and independence	159	3.83	1.18	1.33	7.00	15	3.33	1.09	2	6
Social and emotional well-being	159	3.30	1.70	1.00	7.00	15	2.67	1.5	1	6
Supporting and extending language and communication	159	4.72	1.19	1.25	7.00	15	4.17	1.14	2	6.75
Supporting learning and critical thinking	159	2.53	0.97	1.00	5.25	15	2.15	0.69	1.25	3.75
Assessing learning and language	159	2.81	0.99	1.00	6.50	15	2.7	0.75	1.5	4
MELE (4-point scale)										
Physical environment	159	3.12	0.60	1.00	4.00	15	2.77	0.42	2	3.5
Interaction	159	3.59	0.42	2.00	4.00	15	3.14	0.45	2	3.71
Inclusiveness	159	3.20	0.40	1.75	4.00	15	2.85	0.42	1.75	3.5
Teaching and Learning: Overview	159	3.01	0.68	1.00	4.00	15	2.36	0.76	1	3.33
Teaching/Learning: Language and Literacy	159	2.98	0.66	1.25	4.00	15	2.5	0.61	1.5	3.75
Teaching/Learning: Numbers and Numeracy	159	2.42	0.81	1.00	4.00	15	2.7	0.52	1.6	3.67
Teaching/Learning: Nature and Science	159	1.97	0.87	1.00	4.00	15	1.63	0.88	1	3.5
Teaching/Learning: Group Activities	159	3.46	0.56	1.75	4.00	15	3.18	0.81	1.75	4
Teaching/Learning: Free-choice Indoor Activities	159	2.70	0.65	1.00	4.00	15	2.53	0.42	1.83	3.33

Table B3. Classroom observation scores by domain (Cont'd)

	WAVE 1 K1					WAVE 1 K2				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
ECERS-E (7-point scale)										
Literacy	25	3.12	0.76	2.20	5.20	25	3.38	0.77	2.40	5.20
Mathematics	25	2.55	1.01	1.00	4.67	25	2.31	0.91	1.00	5.00
Science and Environment	25	1.51	0.55	1.00	2.67	25	1.77	0.90	1.00	5.00
Diversity	25	1.67	0.59	1.00	3.33	25	1.67	0.37	1.00	2.33
SSTEW (7-point scale)										
Building trust, confidence and independence	25	3.73	1.10	1.67	6.00	25	3.91	1.03	1.33	6.00
Social and emotional well-being	25	2.92	1.66	1.00	6.00	25	2.92	1.41	1.00	6.00
Supporting and extending language and communication	25	4.09	1.29	1.25	6.50	25	4.40	1.15	2.25	6.50
Supporting learning and critical thinking	25	2.55	1.07	1.00	5.00	25	2.69	1.15	1.00	5.25
Assessing learning and language	25	2.88	0.95	1.00	5.00	25	2.80	0.74	1.00	5.00
MELE (4-point scale)										
Physical environment	25	3.10	0.50	2.00	4.00	25	3.12	0.46	2.50	4.00
Interaction	25	3.49	0.47	2.43	4.00	25	3.64	0.39	2.29	4.00
Inclusiveness	25	3.13	0.41	2.33	3.67	25	3.10	0.32	2.50	3.67
Teaching and Learning: Overview	25	2.83	0.75	1.33	4.00	25	2.79	0.64	1.00	3.67
Teaching/Learning: Language and Literacy	25	2.80	0.69	1.25	4.00	25	3.09	0.62	1.50	4.00
Teaching/Learning: Numbers and Numeracy	25	1.76	0.49	1.00	2.50	25	1.79	0.44	1.17	2.83
Teaching/Learning: Nature and Science	25	2.36	0.88	1.00	3.50	25	2.30	0.79	1.00	3.50
Teaching/Learning: Group Activities	25	3.30	0.54	2.25	4.00	25	3.67	0.37	2.50	4.00
Teaching/Learning: Free-choice Indoor Activities	25	2.99	0.45	2.17	3.83	25	2.84	0.57	1.50	3.67

Table B3. Classroom observation scores by domain (Cont'd)

	WAVE 2 K1					WAVE 2 K3				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
ECERS-E (7-point scale)										
Literacy	25	3.14	0.80	2.00	4.80	25	3.94	0.86	2.00	5.80
Mathematics	25	2.85	1.24	1.00	5.33	25	2.44	1.20	1.00	4.67
Science and Environment	25	1.63	0.79	1.00	3.33	25	1.97	1.04	1.00	4.67
Diversity	25	2.12	0.73	1.33	4.33	25	2.15	0.67	1.33	3.33
SSTEW (7-point scale)										
Building trust, confidence and independence	25	4.21	1.11	1.33	6.00	25	4.23	1.24	2.67	7.00
Social and emotional well-being	25	3.80	1.55	2.00	6.00	25	3.76	1.76	2.00	7.00
Supporting and extending language and communication	25	4.65	0.93	3.00	7.00	25	4.78	0.99	3.25	6.75
Supporting learning and critical thinking	25	2.81	0.80	1.50	4.25	25	2.85	1.03	1.50	5.25
Assessing learning and language	25	2.82	0.71	1.00	4.50	25	2.64	0.80	1.50	4.50
MELE (4-point scale)										
Physical environment	25	3.20	0.41	3.00	4.00	25	3.20	0.43	2.50	4.00
Interaction	25	3.62	0.33	2.71	4.00	25	3.63	0.31	2.86	4.00
Inclusiveness	25	3.37	0.28	2.67	3.83	25	3.23	0.36	2.17	3.80
Teaching and Learning: Overview	25	3.20	0.41	2.33	4.00	25	3.44	0.32	3.00	4.00
Teaching/Learning: Language and Literacy	25	2.96	0.61	1.50	4.00	25	3.34	0.58	2.25	4.00
Teaching/Learning: Numbers and Numeracy	25	2.25	0.84	1.00	3.60	25	3.12	0.65	1.33	4.00
Teaching/Learning: Nature and Science	25	1.86	0.87	1.00	4.00	25	2.36	0.88	1.00	4.00
Teaching/Learning: Group Activities	25	3.55	0.46	2.50	4.00	25	3.59	0.48	2.50	4.00
Teaching/Learning: Free-choice Indoor Activities	25	3.03	0.44	1.67	3.83	25	2.99	0.47	2.33	4.00

Table B3. Classroom observation scores by domain (Cont'd)

	WAVE 3 K2					WAVE 3 K3				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
ECERS-E (7-point scale)										
Literacy	25	3.82	0.65	2.80	5.20	19	2.66	0.62	1.60	3.60
Mathematics	25	2.47	0.84	1.33	4.00	19	1.56	0.65	1.00	3.00
Science and Environment	25	1.43	0.46	1.00	2.33	19	1.18	0.34	1.00	2.33
Diversity	25	2.44	0.72	1.33	4.00	19	1.84	0.75	1.00	3.33
SSTEW (7-point scale)										
Building trust, confidence and independence	25	4.19	1.19	2.00	6.67	19	2.72	0.71	1.67	4.33
Social and emotional well-being	25	4.12	1.76	2.00	7.00	19	2.42	1.61	1.00	6.00
Supporting and extending language and communication	25	5.60	1.08	2.50	6.75	19	5.22	1.05	1.75	6.75
Supporting learning and critical thinking	25	2.65	0.78	1.25	3.75	19	1.63	0.42	1.00	2.25
Assessing learning and language	25	2.90	1.65	1.00	6.50	19	2.92	1.06	1.00	4.50
MELE (4-point scale)										
Physical environment	25	3.62	0.60	2.00	4.00	19	2.53	0.79	1.00	4.00
Interaction	25	3.76	0.37	2.57	4.00	19	3.71	0.44	2.14	4.00
Inclusiveness	25	3.47	0.25	3.00	4.00	19	3.10	0.49	2.17	4.00
Teaching and Learning: Overview	25	3.52	0.47	2.33	4.00	19	2.58	0.61	1.00	3.33
Teaching/Learning: Language and Literacy	25	3.09	0.72	1.50	4.00	19	2.86	0.59	2.00	3.75
Teaching/Learning: Numbers and Numeracy	25	2.47	0.73	1.17	3.67	19	3.13	0.50	2.00	4.00
Teaching/Learning: Nature and Science	25	1.78	0.65	1.00	3.00	19	1.13	0.33	1.00	2.00
Teaching/Learning: Group Activities	25	3.64	0.50	2.00	4.00	19	3.11	0.58	2.50	4.00
Teaching/Learning: Free-choice Indoor Activities	25	2.49	0.70	1.00	3.67	19	1.76	0.54	1.00	3.00

Table B4. ECERS-R scores by domain for Pre-policy and Wave 3 (K3 only)

	PRE-POLICY					WAVE 3				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
Space and Furnishings	15	3.91	0.59	2.88	4.63	19	2.95	0.72	1.75	4.00
Personal Care Routines	15	4.41	0.63	3.20	5.20	19	3.49	1.44	1.80	6.40
Language Reasoning	15	3.78	1.36	1.75	6.00	0	N/A	N/A	N/A	N/A
Activities	15	2.61	0.72	1.40	3.60	19	1.64	0.47	1.00	2.70
Interaction	15	5.59	1.06	2.40	6.60	0	N/A	N/A	N/A	N/A
Programme Structure	15	3.32	0.80	2.00	4.75	19	2.26	0.97	1.00	4.00
Parents and Staffs	15	4.71	0.66	3.50	5.67	0	N/A	N/A	N/A	N/A

Table B5. Overall mean classroom observation scores (ECERS-E, SSTEW, MELE) by wave

	Obs	Mean	Std. Dev.	Min	Max
ALL					
ECERS-E	159	2.43	0.62	1.29	4.57
SSTEW	159	3.53	0.87	1.71	5.71
MELE	159	3.00	0.31	1.95	3.74
PRE-POLICY K3					
ECERS-E	15	2.40	0.56	1.50	3.50
SSTEW	15	3.10	0.86	1.71	4.79
MELE	15	2.73	0.30	1.95	3.23
WAVE 1 K1					
ECERS-E	25	2.19	0.48	1.47	3.20
SSTEW	25	3.32	0.97	1.86	5.71
MELE	25	2.89	0.28	2.28	3.40
WAVE 1 K2					
ECERS-E	25	2.30	0.46	1.64	3.73
SSTEW	25	3.47	0.91	1.71	5.64
MELE	25	2.96	0.27	2.33	3.53
WAVE 2 K1					
ECERS-E	25	2.54	0.68	1.79	4.50
SSTEW	25	3.71	0.66	2.29	4.93
MELE	25	3.08	0.25	2.65	3.60
WAVE 2 K3					
ECERS-E	25	2.81	0.74	1.64	4.57
SSTEW	25	3.73	0.85	2.43	5.57
MELE	25	3.27	0.24	2.92	3.74
WAVE 3 K2					
ECERS-E	25	2.72	0.49	1.93	3.64
SSTEW	25	3.97	0.90	1.86	5.46
MELE	25	3.13	0.27	2.33	3.56
WAVE 3 K3					
ECERS-E	19	1.93	0.44	1.29	2.79
SSTEW	19	3.13	0.54	1.86	4.07
MELE	19	2.81	0.28	2.10	3.26

Note: ECERS-E and SSTEW were rated on a 7-point scale and MELE was rated on a 4-point scale.

Figure B1. Grants received by KGs (Principal questionnaires; Wave 1 n=121; Wave 2 n=114; Wave 3 n=106)

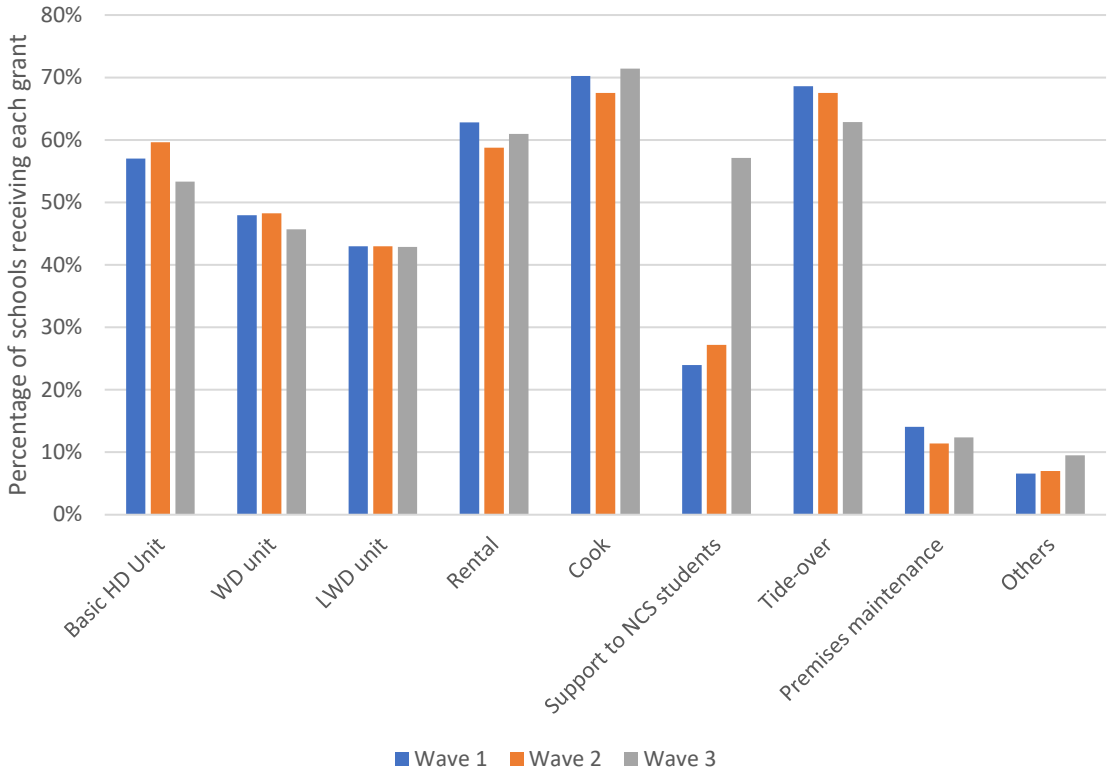


Figure B2. Changes reported by principals following the introduction of the KECG (Principal questionnaire; Wave 1 n=121; Wave 2 n=114; Wave 3 n=106)

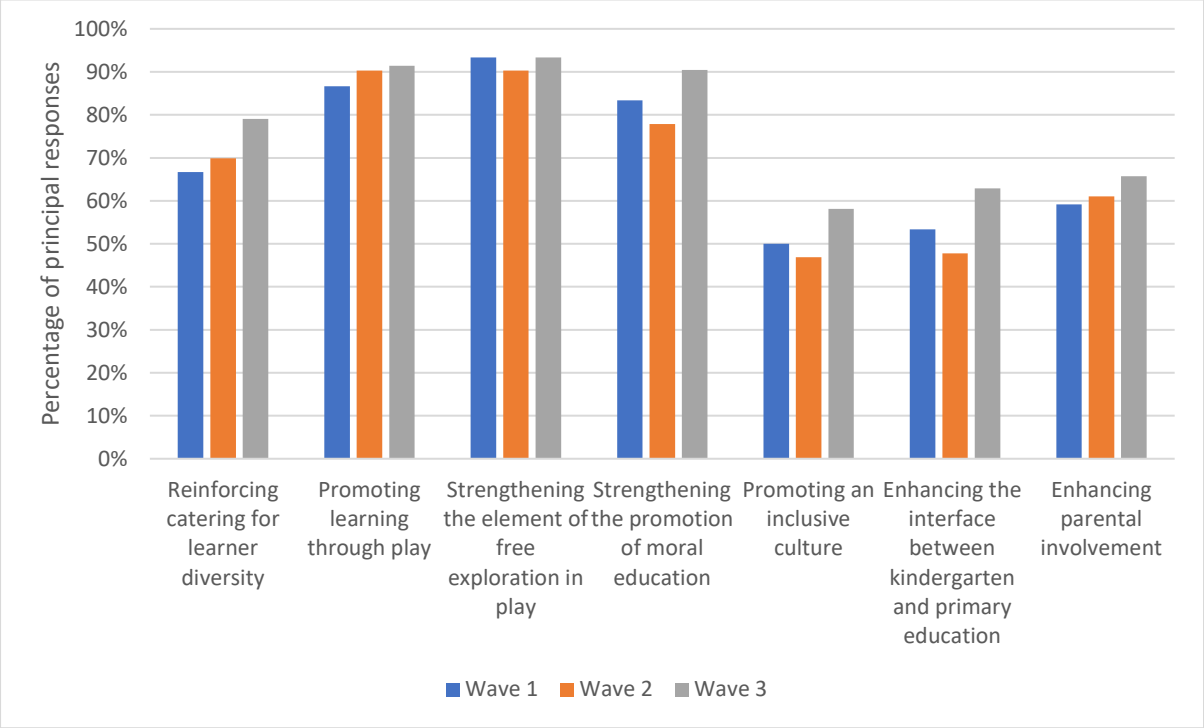


Figure B3. Teachers' perceptions of their teaching experience in school (Teacher questionnaire; Wave 1 n=1522; Wave 2 n=1446; Wave 3 n=1313)

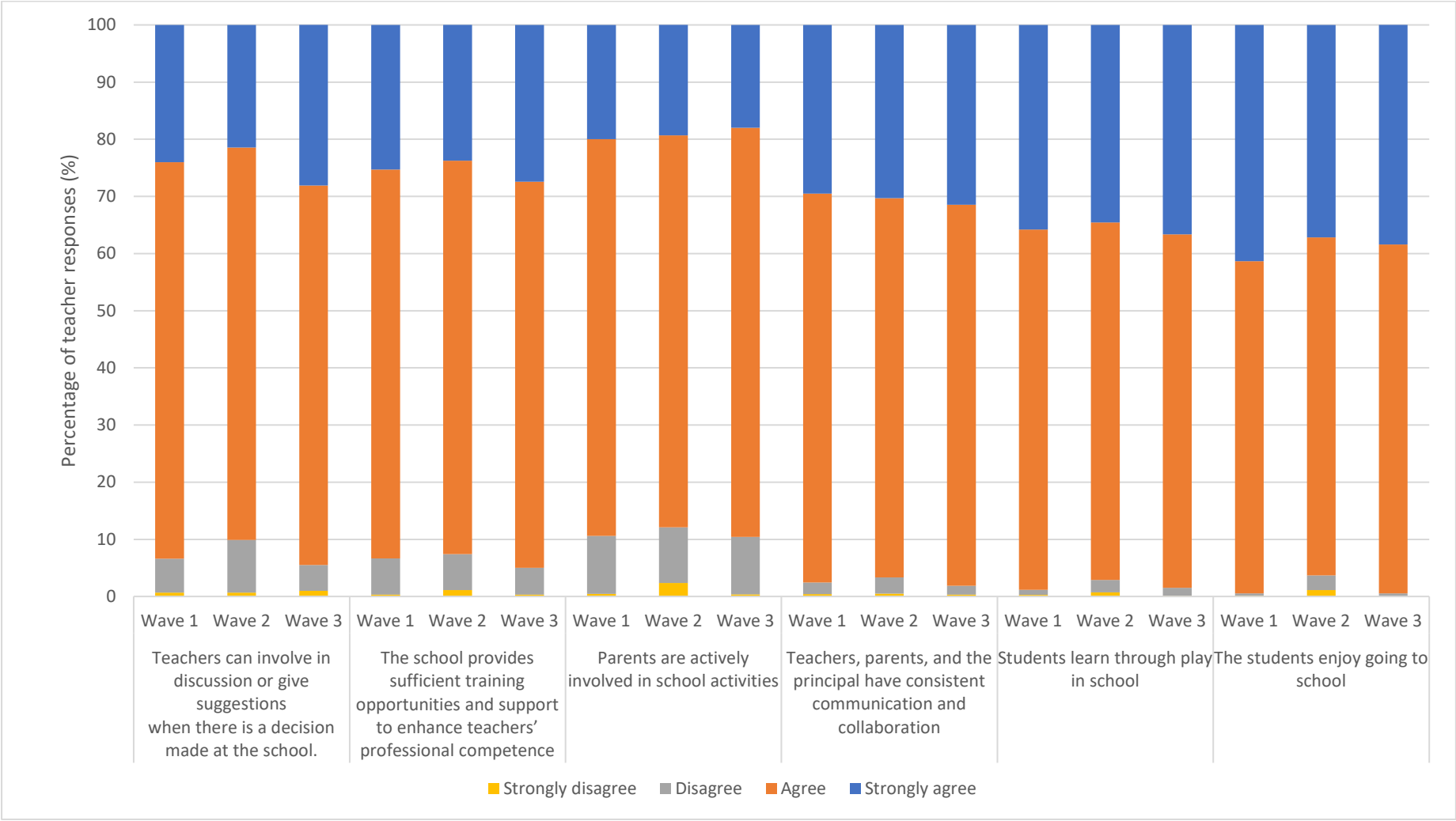


Figure B4. Principals' perceptions on their teaching experience in school (Principal questionnaire; Wave 1 n=121; Wave 2 n=114; Wave 3 n=106)