https://doi.org/10.1016/j.ridd.2019.103433

Effectiveness of the Whole Inclusive School Empowerment (WISE) project in supporting preschool children with diverse learning needs

Cynthia Leung, Ph.D.; Janet Leung, PhD; Shirley Leung, MBBS, MPH;

Wally Karnilowicz, PhD

Cynthia Leung

The Hong Kong Polytechnic University

Janet Leung

The Hong Kong Polytechnic University

Shirley Leung

The University of Hong Kong

Wally Karnilowicz

Victoria University

This work was supported by the Simon K Y Lee Foundation

Abstract

Aim: The aim of the study was to evaluate the effectiveness of the Whole Inclusive School Empowerment (WISE) project in supporting preschool children with diverse learning needs.

Methods: This study adopted a mixed method design. The quantitative section was a quasi-experiment comprising eight intervention preschools (378 students, 68 teachers) with a support team of an educational psychologist and a teacher coordinator, compared with eight control preschools (281 students, 61 teachers) without the support team. Teachers completed questionnaires on students' school readiness and behavior as well as their own teaching efficacy at pre-intervention, mid-intervention, and post-intervention. The qualitative part consisted of preschool principals and teachers participating in focus group discussions. **Results:** The quantitative results indicated a significant interaction effect (group X time) for students' school readiness, behavior problem and prosocial behavior, as well as teachers' efficacy. Qualitative findings from principals and teachers also showed that the WISE brought benefits to the preschools, teachers, students and parents. **Conclusions:** The results provided promising evidence on the effectiveness of the WISE project in supporting preschool children with diverse learning needs.

Keywords: preschool; diverse learning needs.

What this paper adds:

This study is one of the pioneer attempts to evaluate the effectiveness of a whole-school approach in supporting children with diverse learning needs, including those with developmental disabilities. The results provide promising evidence that this approach can bring benefits to both students and teachers.

1. Introduction

The importance of early identification and intervention of learning and behavior problems in early childhood is well recognized. In the absence of early identification and effective intervention, such problems might lead to academic and mental health problems in later life. In a longitudinal study, it is found that preschool children at risk of learning disabilities are further behind their age peers by the third grade (Morgan, Farkas, & Gibel, 2008). In a meta-analysis investigating the trajectories of children with early onset conduct problems, these children are found to show higher risk of adverse psychosocial outcomes (e.g., depression, substance abuse, criminal behavior) at adolescence/adulthood than their peers without conduct problems (Bevilacqua, Hale, Barker, & Viner, 2018). In another meta-analysis, childhood conduct disorder and problem behavior are associated with later mental illness (Fryers & Brugha, 2013). Social-emotional profile at preschool is also predictive of academic achievement. In an Australian longitudinal study, preschool children with high levels of anxious and aggressive behavior are found to have poorer literacy and numeracy achievement in grade 3, compared with their peers with lower levels of anxiety and aggression (Collie, Martin, Nassar, & Roberts, 2018). Webster-Stratton and Taylor (2001) argue for early intervention of these problems in order to "nip problems in the bud" (p.167).

The World Health Organization and UNICEF (2012) argue for the importance of early identification and intervention of children with developmental disabilities. They also emphasize the importance of inclusive early childhood education. Marmot (2010) advocates quality early years education to support children at risk of developmental problems. From a public health perspective, a population strategy of providing quality education for all facilitates the development of children with a diverse range of learning abilities, including those with developmental disabilities. The preschool is a setting where children with developmental

disabilities can be readily identified. It is important that preschools are given sufficient resources and teachers are empowered to provide quality education, early identification and intervention. This paper evaluates the effectiveness of a project to support preschools in providing quality education, early identification and intervention.

1.1 The Whole Inclusive School Empowerment (WISE) Project

In Hong Kong, children with developmental disabilities are referred to rehabilitation services after assessment by the Child Assessment Service (CAS). However, there is a long queue for assessment. In 2017, only 55% of new cases could have their assessment completed within six months (Department of Health, 2018). This means that 45% of the children have to wait for more than six months for the assessment to be completed. This situation has adverse implications on the developmental outcomes for these children. An Onsite Preschool Rehabilitation Service (OPRS) has been in place since 2015 to support children with developmental disabilities in their preschools (Social Welfare Department, 2017). The multi-disciplinary OPRS team comprises clinical/educational psychologist, social worker, occupational therapist, physiotherapist, speech therapist, and special childcare worker. However, children with marginal disabilities, those at risk of developmental disabilities, or children from disadvantaged backgrounds may also need varying degrees of support, but do not qualify for this service. Furthermore, some parents are reluctant to let their children attend outside organizations such as CAS for assessment.

The WISE project is designed to fill the above service gap. On top of the OPRS, the project provides 0.125 of an educational psychologist (the same psychologist serves both OPRS and WISE) and 0.7 of a teacher coordinator. The project adopts a whole-school approach in improving the quality of teaching to support children with diverse learning needs. Following the

recommendations of Hagans-Murillo (2005) and The Australian Psychological Society (2016), it is prevention-oriented and adopts a response to intervention approach. At the system level, educational psychologists work with preschools to develop an inclusive preschool policy and enhance related measures. At the teacher level, training and consultation are provided to support them in catering for diverse learning needs in the classroom. Besides, parent consultation and parent training, as well as student assessment and intervention are provided as appropriate. It is anticipated that parents might be less reluctant to allow their children to be assessed at their preschools.

The project commenced in January 2017 and ended in July 2018. The interim results of the first 6 months indicated positive effects on school readiness and prosocial behavior in the preschools participating in the WISE project (Leung, Leung, Leung, & Karnilowicz, 2019).

1.2 The Present Study

This study aimed to evaluate the effectiveness of the WISE project. The hypotheses were:

i. There would be greater improvement in students' school readiness and behavior in intervention preschools compared with control preschools.

ii. There would be greater improvement in teachers' sense of efficacy in supporting students with diverse learning needs in intervention preschools compared with control preschools.

iii. Parents in intervention preschools would be more ready to give consent for their children to be assessed compared with those in control preschools.

2. Method

2.1 Design and Setting

This study adopted a mixed method approach. The quantitative approach involved a quasi-experimental design where the allocation of preschools to intervention or control was

based on the preschools' decision. Outcomes were measured pre-intervention, mid-intervention and post-intervention. There were eight intervention preschools with OPRS operated by five non-governmental organizations (NGOs) which also provided the WISE service. The eight control preschools received OPRS operated by the same NGOs, but without the WISE service. The mean number of students with neuro-developmental disabilities (e.g., global developmental delay, autism spectrum disorder, etc.) diagnosed by health professionals in each of the 16 preschools was 17.74. The majority were delayed in two or more developmental areas by ≥1.5 standard deviations.

The qualitative part consisted of focus group interview conducted with principals and teachers of the intervention preschools to understand their perceived changes and the change processes. Focus group interview effectively taps the perceptions, experiences and opinions of the participants involved in a program (Krueger, 1994), and is frequently used in program evaluation (Shek, 2017).

2.2 Participants

The participants in the quantitative study consisted of students and teachers in the intervention and control preschools. Teachers were requested to complete questionnaires on students' learning and behavior. As the funding body was interested in children from low income families, teachers were requested to complete questionnaire for all students who were on fee remission (a government scheme to support children from low income families), and a random sample of 50% of the other students. However, three preschools (intervention = 1; control = 2) decided to ask their teachers to complete questionnaires for all students, irrespective of their fee remission status. Only students and teachers who were studying/teaching in the preschools from January 2017 to July 2018 were included. There were 659 students (intervention = 378; control =

281) and 129 teachers (intervention = 68; control = 61) with complete data over the three time points. The flow of participants is shown in Figure 1.

At pre-intervention, there was no significant difference between intervention and control preschools in terms of the percentage of students on fee remission, $\chi^2(1) = 0.02$, $p = .889$, and the percentage of teachers consenting to participation, $\chi^2(1) = 1.89$, $p = .169$. There was, however, a significant difference between intervention and control preschools in the percentage of parents who gave consent for teachers to rate their children' school readiness and behavior, $\chi^2(1) = 50.30$, $p < .001$. The consent rate was higher in intervention preschools than control preschools.

To account for the cluster (preschool) factor and design effect, the sample size required for teachers' rating of students' learning is 1,260, (medium effect size, 41.2 students per school), assuming an intracluster correlation of .22 (Malti, Ribeaud, & Eisner, 2011). Using the same intracluster correlation, the sample size required for teachers' rating of teaching efficacy is 327 (medium effect size, 8.06 teachers per school).

In the qualitative study, principals and teacher coordinators in the intervention preschools were invited to participate in the focus group. Finally, three principals and seven teacher coordinators participated in the focus group interview. The participants were all females, with rich experience in preschool teaching and administration.

2.3 Measures

Teacher Sense of Efficacy Scale (TSES; Tschannen-Moran & Woolfolk-Hoy, 1998) – This scale consists of 12 items. For each item, teachers rate their perceived efficacy in teaching preschool students with diverse learning needs on a 9-point scale. The Chinese version of the TSES was validated by Kennedy and Hui (2006) for use with Hong Kong Chinese teachers. All teachers who were involved in face-to-face teaching of students in both intervention and control

preschools were requested to complete this questionnaire. In addition, teachers had to provide some brief information on their teaching qualifications and experience.

Gumpel School Readiness Scale (GSRS; Gumpel, 1999) – This scale consists of six items. Teachers rate their students' classroom behavior and preschool concepts on a 4-point scale. In this study, a Chinese version of the GSRS developed and validated by Ho, Leung, and Lo (2013) was used.

Strength and Difficulty Questionnaire (SDQ; Goodman & Scott, 1999) – The SDQ is a brief behavioral screening questionnaire for children and adolescents aged 4 to 16 years, with five sub-scales, Emotional Symptoms, Conduct Symptoms, Hyperactivity Symptoms, Peer Problems and Prosocial Behavior. Teachers rate each item on a 3-point rating scale, with higher scores indicating higher endorsement of the behavior domain. The raw scores from the Emotional Symptoms, Conduct Symptoms, Hyperactivity Symptoms and Peer Problems sub-scales can be summed to form a measure of total problem behavior. A Chinese version of the scale was validated for use with children aged 6 years to 12 years (Lai et al., 2010). In the Chinese version, the clinical cut-off for total problem behavior is ≥15.

Demographic information – Parents were requested to complete a questionnaire on demographic details of the students. The data included child age; child's length of residence in Hong Kong; gender; fee remission status; parent educational achievement level and employment; welfare benefit status; family income; family type; parents' marital status; parent's age in years; and, length of residence in Hong Kong.

Time for parent consent for referral for assessment and waiting time for assessment – Intervention and control preschools were requested to record the time interval between preschool decision for referral for assessment and parent consent for their children to be assessed by

educational psychologists, as well as the interval between parent consent for referral for assessment and the date of assessment by educational psychologists.

2.4 Procedures

The parents were requested to complete a questionnaire on the demographic characteristics of their children and their families. Teachers completed the GSRS and SDQ for students in their class at pre-intervention (January 2017), mid-intervention (June/July 2017) and post-intervention (June/July 2018). The teachers also completed the TSES at these three time points.

A focus group interview was conducted in July 2018. We obtained the informed consent from the participants. The second author performed the role of the moderator and the discussion was based on an interview guide. Three areas were discussed in the interviews: (1) the changes in preschools, teachers, students and parents after implementation of the WISE project; (2) the processes through which the changes occurred; and (3) recommendations on helping preschool children with diverse needs. The participants were encouraged to share their views, experiences and observations freely in the focus group. The interview lasted for two hours. The whole process was audio-recorded with the participants' consent, and was transcribed verbatim by the project research assistant.

This study was approved by the Human Subjects Ethics Sub-committee of The Hong Kong Polytechnic University.

2.5 Data Analysis

For the quantitative outcomes, due to the cluster (preschool) nature of the data, linear mixed model was used to analyze the data. The fixed factors were group status (intervention versus control) and time (pre-intervention, mid-intervention and post-intervention), with

preschool as the random factor. The dependent variables were students' school readiness, student s' behavior and teachers' efficacy. To investigate the differences in patterns of change over time between intervention and control preschools, the interaction effect (group X time) was examined. Logistic regression random effect model was used to examine group differences in parent consent (for assessment by educational psychologist) and proportion of students with problem behavior above the clinical cut-off point at post-intervention. Mixed method regression was used to examine group differences in time interval between school decision for referral for assessment and parent consent. In the logistic regression random effect model and mixed method regression, the independent variable was group (intervention versus control) and the random factor was preschool.

For the analysis of qualitative data, thematic analysis was used to identify, analyse and interpret the patterns and meanings from the qualitative data (Braun & Clarke, 2006). We followed the steps suggested by Braun and Clarke (2006). First, we transcribed and read the data several times (i.e., familiarization with data). Then, we coded the features that addressed the areas of focus (i.e., initial coding) and collated the codes into potential themes (i.e., searching for themes). Furthermore, we checked whether the themes were related to each other to generate a thematic "map" of the analyses (i.e., reviewing the themes). Subsequently, we defined the themes and made clear understanding of what each theme tells (i.e., naming and defining themes).

2.6 The Intervention

To support the team in project implementation, meetings were held with the educational psychologists, preschool principals and teacher coordinators to discuss ongoing issues. A training session on referral mechanism to medical services was conducted by the third author for

educational psychologists. Another training session on concept of classroom accommodation and strategies in teacher consultation was delivered by an experienced educational psychologist to the teacher coordinators.

The educational psychologists visited the intervention preschools either weekly or fortnightly. The system level services included consultation with preschool principals on the development of inclusive school policy and/or enhancement of measures such as setting up a system for identification of children with developmental disabilities. At the teacher level, the educational psychologists provided 10 hours of teacher training per academic year in each preschool. In the 2016/17 academic year, the teacher training was mainly in a didactic format and included topics such as classroom management; differentiated instruction; social-emotional competence; literacy, reading and language. The training content was developed by the educational psychologists themselves. In the 2017/18 academic year, the focus was on practical application of the concepts covered previously. The training was in the form of practical workshops. In addition, the educational psychologists and the teacher coordinators jointly provided a consultation service to teachers at two levels. At the individual level, in response to the challenges brought about by students with diverse learning needs, such as non-compliant behavior, below average learning performance and socio-emotional difficulties, the educational psychologist would conduct classroom observation and provide advice on the modification of classroom seating arrangement, instructional strategies, prompting strategies and activities design, as appropriate. The teacher coordinator would follow up the progress. At the class level, the educational psychologists and teacher coordinators would coach teachers in using differentiated instruction in lesson planning and design of worksheets with various levels of difficulties, classroom management, small group learning in classroom and design of materials

and toys in learning corners. The educational psychologists would also participate in the curriculum meetings to help teachers develop/modify the curriculum to cater for diverse learning needs. Over the 18 months of the project, the educational psychologists provided 593 consultation sessions (mean duration = 1.14 hours). The teacher coordinators provided 2,606 consultation sessions (mean duration = 1.12 hours). The consultation activities included individual or small group student needs (32%), classroom learning (27%), class observation (24%), others (11%), and follow-up of teacher training (6%). The consultation content included classroom management (29%), cognitive and language development (26%), social emotional development (20%), physical development (12%), moral development (7%) and aesthetic development (6%). They also consulted with parents on individual children's behavior and learning.

A parent training program on behavior management (e.g., strategies to increase positive behavior and manage undesirable behavior), parent-child relationship (e.g., spending quality time with the child) and paired reading was attended by 130 parents in the intervention preschools. The program was delivered in group format and consisted of eight weekly sessions.

Educational psychologists also conducted individual assessment (formal and informal) for students as needed.

Teacher coordinators worked together with the educational psychologists in providing student intervention in individual, group and class formats. The content included reading and writing (e.g., enhancement of radical awareness, morpheme, character/word and related meaning, use of multisensory strategies in reading and writing) and social emotional training (e.g., understanding and expression of emotions, problem solving and conflict resolution).

In the full academic year 2017/18, approximately 20% of all intervention preschool students were identified with various degrees of learning and behavior difficulties and received interventions. These consisted of direct services such as group and/or individual intervention, and indirect services such as teacher consultation (on their behavior and/or learning) and parent consultation. About 20% (3.9% of the total intervention preschool sample) of these also required individual assessment by educational psychologists. Of these, 68% (2.7% of the total intervention preschool sample) were subsequently referred for rehabilitation services and/or medical evaluation/management.

3. Results

3.1 Quantitative Results

There were significant baseline differences in family background characteristics and pre-intervention child outcome measures between the intervention and control group students in terms of parents' length of residence in Hong Kong, number of children in family and pre-intervention school readiness. In comparison to the control group, the intervention group fathers and mothers lived in Hong Kong longer and they had fewer children. The teachers' rating on pre-intervention school readiness was lower for the intervention group. The demographic characteristics of the students are illustrated in Table 1. The mean pre-intervention, mid-intervention and post-intervention scores are shown in Table 2. There was a non-significant difference at baseline between intervention and control preschool teachers in terms of background of teachers and their pre-intervention TSES scores (see Table 3).

The quantitative analysis incorporated a test of two fixed factors, group status (intervention; control) and time (pre-intervention, mid-intervention and post-intervention). Preschool was included as the random factor. For student outcomes, the covariates were parents'

length of residence in Hong Kong; number of children at home; and pre-intervention measure of school readiness. The dependent variables were school readiness, total problem behavior and prosocial behavior. There was a significant interaction effect (group [intervention vs control] X time [pre-intervention, mid-intervention and post-intervention]) among students for total problem behavior (F (2, 1656.93) = 5.47, p = .004, η_p^2 = 0.007, d = 0.17); prosocial behavior (F (2, 1658.86) = 4.25, p = .014, η_p^2 = 0.005, d = 0.11); and, school readiness (F (2, 1658.27) = 5.95, p= .003, η_p^2 = 0.007, d = 0.07). In the case of school readiness, based on Ho et al (2013), child's age at pre-intervention was included as an additional covariate. In summary, students in the intervention group, in contrast to students in the control group, experienced a greater level of positive outcomes over time.

A logistic regression random effect model was used to test for the difference between the intervention and control groups in proportion of students who were above the published cut-off defining total problem behavior at post-intervention. The fixed factor was group status (intervention versus control) and the covariates were the cut-off point for total problem behavior at pre-intervention, parents' length of residence in Hong Kong, number of children in family and pre-intervention school readiness, with preschool as the random factor. There was a significant smaller percentage of students above the clinical cut-off point in the intervention group at post-intervention (15.1%, n = 57) in contrast to the control group (21.4%, n = 60), (z = 2.11, p = .035, OR = 0.29, 95% CI [0.09, 0.91]). However, these results need to be considered in light of the larger percentage of intervention group students (26.5%, n = 100) in contrast to control group students (18.5%, n = 52) who were measured above the clinical cut-off point for total problem behaviors at pre-intervention. There was no published cut-off point for prosocial behavior and school readiness for Chinese children.

Mixed method regression (group status [intervention; control] as the independent variable with preschool as random factor) tested for differences in interval between preschool decision for referral for assessment and parent consent. Based on available data (intervention = 88, control = 7), there was a significant difference between the intervention and control preschools in terms of interval between the preschool decision for referral and parent consent (F (1, 9.71) = 20.22, p = .001, d = 2.44). The average interval for intervention preschools was 2.42 days (sd = 4.90, range: 0 - 20). In contrast the average for control preschools was 20 days (sd = 21.44, range: 0 - 56). However, logistic regression random effect model indicated a non-significant difference between intervention and control preschools in terms of percentage of parent consent for assessment (z = 1.42, p = .157, OR = 6.29, 95% CI [0.49, 80.10]). The consent rate in intervention preschools was 97.8% and that in control preschools was 87.5%.

The mean interval between parent consent and assessment by educational psychologists in intervention preschools (based on available data from 81 cases) was 27.22 days (sd = 37.27, range: 0 - 189). The median interval was 14 days. The CAS pledges to arrange for a first intake session three weeks upon receiving referral and case completion (assessment by specialists) six months upon referral. The interval between parent consent and assessment by educational psychologists in WISE intervention preschools was comparable to CAS first assessment and considerably shorter than CAS case completion. There were only two cases in the control preschools having information on subsequent referral for assessment. However, the information on the date of assessment was incomplete.

A further test of the intervention effect on teacher sense of efficacy (dependent variable) was conducted with group (intervention; control) and time (pre-intervention, mid-intervention, and post-intervention) as fixed factors, and, preschool as the random factor. There was a significant

interaction effect (group [intervention vs control] X time [pre-intervention, mid-intervention and post-intervention]), (F (2, 367.04) = 3.65, p = .027, η_p^2 = 0.019, d = 0.30). Preschool teachers in the intervention condition demonstrated a steady increase in their sense of teacher efficacy.

3.2 Qualitative Results

3.2.1. Perceived changes from the participants

At preschool level, the participants suggested that the preschools were readier to include children with diverse needs, and assist them in their adaptation to the school environment. Different strategies were designed and implemented to meet the students' diverse needs, including modification of school curriculum, changing the school physical environment and restructuring of daily operations. Here are some quotes:

> "The hardware of the school was improved… Now we made use of the library corner and purchased some materials for moral education and emotional management. EP (educational psychologist) taught us how to use the materials to help the students" (Participant F, Teacher Coordinator, Paragraph 58).
>
> "We modified the curriculum so that the curriculum was more suitable for students with different capabilities. Before WISE, we found it difficult to modify the curriculum … We did not know how much we should modify. But now, the EP discussed with us how to modify the curriculum in response to the specific needs of the students. We used the strategies and work in other classes…I found that the whole school improved much (Participant E, Principal, Paragraph 59).

At teacher level, participants found that they achieved professional growth in both teaching and helping the students with diverse needs. They became more confident in classroom management and student assistance. Besides, teachers showed greater acceptance to the students

with diverse needs and were readier to provide school-based support to them. They used different strategies (e.g., classroom activities, small group intervention) to facilitate student learning, especially those with diverse learning needs. Moreover, teachers reported that they were more sensitive to the needs and behavior of the students and could make better assessment on their needs, particularly the K1 students. Their sensitivity and professional rigor facilitated early identification of the students with diverse needs and provided necessary assistance to improve their learning and adjustment. There are some quotes:

> "The largest benefit was the professional development of the teachers…I was responsible to scan those students with special needs… As I was the one who kept close contact with the EP, she guided my work directly…The teachers also received many down-to-earth suggestions from the EP. We had meetings together and discussed some strategies…I became more confident … In the past, I was not sensitive to students with SEN (special educational needs) … I was hesitant to help … Now I could manage efficiently" (Participant J, Teacher Coordinator, Paragraphs 54 and 56).
>
> "Our students had problems in reading. EP gave us concrete advice on how to help them. We developed the materials to facilitate our teaching ... In the past, we were constrained by the curriculum…Now, we used small groups to help students learn and read. Some students were found to be helpless in large class learning. Then we used small groups…We modified the curriculum. We were so satisfied! We found that the students improved a lot. … Our confidence was gained. This experience was particularly important to new teachers…The successful cases brought much satisfaction to us (Participant I, Teacher Coordinator, Paragraph 61).

Apart from the modifications of preschool environment and improved quality of teaching which benefited the students as a whole and those having specific needs, the procedure on students' referral for formal assessment was also smoothened and speeded up. In the WISE project, as the formal assessment was conducted by the educational psychologist designated to the preschool (same educational psychologist of WISE project and OPRS team), parents were less defensive to give consent for formal assessment of their children. The school-based assessment, support and follow-up also enhanced the trustful relationship among parents, teachers and educational psychologist. Parents also appreciated the assistance and follow-up of the teachers. Here are some quotes:

> "One of the best arrangements was that the EP would come to school to do assessment. After referring to the EP, the EP would do the formal assessment and the report would be sent to her agency for further service. We now could easily track the progress and discuss with the parents on the follow-up…As you know, some of our students came from poor families. Parents would reject us if they needed to escort their children from place to place. Now the parents were more willing to listen to our advice, and were more motivated to help their children" (Participant F, Teacher Coordinator, Paragraph 35).
>
> "We received a letter of appreciation from a parent. The parent mentioned that her child was weak in language expression. However, our teacher invited him to participate as a background narrator of a drama. … Actually, the EP suggested us to enhance the child's confidence. The teachers paid effort on enhancing the student's ability to express, as well we his confidence…The parents observed the changes of the child and became more confident to assist her child…We witnessed his positive change" (Participant A, Principal, Paragraph 75).

3.2.2. Processes through which the changes occurred

The participants shared the importance of educational psychologist in enhancing the teachers' competencies. As the educational psychologists were more familiar with the preschool situation and students' needs, tailor-made assistance and support to preschool were available. Educational psychologists provided useful advice and concrete support to teachers during class observations and meetings, especially on the skills in classroom management and strategies in assisting individual students with diverse needs. They also participated in curriculum modifications, restructuring of preschool environment and daily operations to build up a supportive learning environment for the students. There are some quotes:

> "There were some training workshops for the teachers, which nurtured our [teaching] skills … Our EP conducted observations in class. As there were some students with special needs in the class, the EP gave comments on the specific skills that the teachers were using, and gave them suggestions on how to improve the skills…The WISE project helped a lot…As the EP and teacher coordinator discussed frequently, the EP was very familiar with the school needs and provided more concrete and tailor-made suggestions for the school" (Participant E, Principal, Paragraph 19).
>
> "There were some students with SEN (special educational needs) in each class. However, their needs might be hidden, especially in K1 students…We always had queries on whether the students had some adjustment problems to the new environment, or they possessed some disabilities …The EP gave us many down-to-earth suggestions … Our teachers found that their classes were running smoothly this year" (Participant J, Teacher Coordinator, Paragraph 34).

> "I felt that we were 'backed up' by different professionals… The EP sometimes participated in our meetings…She sometimes would lead the discussion…I always asked our teacher coordinator to consult the EP. She [the EP] was our "floating boat" (Participant A, Principal, Paragraph 68).

Moreover, the participants shared their changes in perceiving teacher's roles on assisting the students with diverse needs. The changes were two-fold. First, before the implementation of the WISE project, teachers commonly employed a unified standard to evaluate student's performance, which created stress and barriers for teachers to accept the specific needs of the students. After implementing the WISE project, teachers were aware of the importance to use different standards in assessing the performance of students with diverse needs, which increased the teachers' acceptance of the students. Here is a quote from a participant:

> "Teachers tried their best to teach their students. However, we used one standard to evaluate students. Hence, we were frustrated that even we paid so much effort, some students did not learn well. We were annoyed…WISE project brought an important message to us: The students could not acquire the knowledge because they had different learning capabilities, which required different strategies and allowed more time for them to learn…. But we should be aware that some students learnt slowly, we should walk at their pace and let them learn step by step…The tension between teachers and students then decreased…I showed more acceptance to the students and allowed them to learn at their pace…I became more relaxed in my teaching" (Participant C, Teacher Coordinator, Paragraph 62).

Second, teachers were more aware of their roles in assisting the students with special needs in school. Rather than relying on formal assessment and follow-up by different professionals,

they were more confident and readier to provide school-based support to the students with special needs. Here is a quote from a participant:

> "The teachers helped the students through small groups and individual training. Though ST (speech therapist) and other professionals from OPRS would provide training for the students, the sessions were not as frequent as what we could do for the students. They could only have training once a week or even biweekly. However, we could offer more practice to the students. We acquired some skills from the EP, and we gave the students more opportunities to practice. The experience was positive for both teachers and the children" (Participant F, Teacher Coordinator, Paragraph 35).

Last but not the least, the importance of collaborations among teachers, parents, educational psychologists and other professionals was highlighted. The participants suggested that rather than working separately to handle the problems of the students with special needs, it was more important for teachers, parents, educational psychologists and other professionals to work together in providing a supportive learning environment for the students. Here is a quote from a principal:

> "Parents, school, EP, teachers, we worked together… Before WISE, the parents were frightened when teacher told them that your children have problems. The teachers were sacred to tell the parents on children's problems... All parties did their own job [without communication]. Who would build a net, a safety net to support our children? … WISE in this sense was very helpful… It transformed the school into a strong net that could support our children" (Participant G, Principal, Paragraph 82).

3.2.3 Recommendations in helping preschool children with diverse needs

All participants agreed that it was preferable to have the whole-school approach in helping the students with diverse needs, together with the specific intervention strategies to assist individual students having special educational needs and/or sustaining developmental disabilities under formal assessment. Here is a quote from a participant:

> "I think there were three layers in WISE project. The first layer was to apply teaching strategies and skills to the whole class. The second layer was teaching in groups, and the third layer was assisting individual children who needed more care. The different layers of intervention would benefit those students with special needs and all students as a whole" (Participant F, Teacher Coordinator, Paragraph 70).

4. Discussion

Hypothesis 1 was supported. There was greater improvement in school readiness and child behavior in the intervention preschools than control preschools, as indicated by the significant interaction effect, as well as the analysis on the percentages of students above the clinical cut-off for total problem behavior at post-intervention. The results were similar to that reported in the interim report (Leung et al., 2018) but the improvement over the three time points provided clearer evidence on the effectiveness of the intervention. With the support provided by the educational psychologists and teacher coordinators, the teachers were able to provide timely support to children with developmental disabilities in the mainstream classroom. Additional pull-out individual and group intervention could provide support to children in need of more intensive support.

Hypothesis 2 was supported. There was a greater improvement in teachers' sense of efficacy in the intervention preschools. The results were different from that in the interim report (Leung et al., 2018) where there was no significant interaction effect. It could be argued that it

takes time for teachers' efficacy to build up. With an extra year of professional support and accumulation of experiences, the teachers were more confident in identifying and catering for children's diverse learning needs. This is consistent with the qualitative findings.

Hypothesis 3 was also supported. In the intervention preschools, the time taken for parents to give consent for their children to be assessed by educational psychologists was shorter than that in the control preschools. This was also supported by the qualitative findings. The mean and median interval of waiting for assessment was shorter than that pledged by the CAS.

Warren, Martinez, and Sortino (2016) point out that ongoing professional development and the selection of an experienced and committed teacher are some of the important qualities for successful inclusion program in preschools. Lee, Yeung, Tracey and Barker (2015) maintain that teachers with professional training in special education are more positive about inclusion. In the WISE project, the teacher coordinator is an experienced teacher and there is ongoing professional training from educational psychologists. These elements are likely to be important factors in supporting preschools to cater for learning diversity.

Apart from early identification and intervention for children with developmental disabilities, there is some promising evidence to show that the WISE project can bring benefits to the whole school population, in terms of child learning and behavior.

Though the study was conducted in Hong Kong, it could have implications for the international audience. There are very few studies on the effectiveness of educational psychology services in preschool settings for children with developmental disabilities (Douglas-Osborn, 2017). This study is one of the pioneer attempts to systematically evaluate the effectiveness of preschool-based educational psychology service.

4.1 Limitations

First, this study adopted a quasi-experimental design rather than a randomized controlled trial design, as there were difficulties in persuading preschool principals to accept random assignment. Nevertheless, the preschools in both arms were similar in the number of students on fee remission (an indicator of family socioeconomic status) and number of students with developmental disabilities. Baseline differences in student demographic characteristics and pre-intervention measures were adjusted statistically in data analysis. Second, the outcome measures on teachers and students were based on teachers' report and the teachers were aware of the group status of themselves and their students. We could not rule out the possibility of information bias. Rating of students by independent assessors blind to intervention status might cause much disruption to the preschool routine and affect preschools' decision to participate. Future research could consider including classroom observation of children's learning and behavior as well as teaching behavior by blinded independent observers. Third, the sample size was insufficient for a cluster design where the sample size has to be adjusted by the design effect. Fourth, as the needs of individual preschools were different, flexibility in the frequency and type of consultation, training and intervention had to be allowed. It was therefore difficult to standardize the intervention. Fifth, the clinical cut-off for total problem behavior is based on the norm of primary school children in Hong Kong. Sixth, the effect sizes of the outcomes were small. However, these were comparable to those reported in early intervention programs where the effect sizes (Cohen's *d*) for cognitive gains and social outcomes were 0.32 and 0.05 (Blok, Fukkink, Gebhardt, & Lesemanm, 2005) respectively. Finally, due to the interest of the funding body, all students with fee remission but only 50% of those not on fee remission were included in the quantitative outcome analysis. As separate analyses by fee remission status yielded the same pattern, the results presented in this paper was based on the total sample.

4.2 Conclusions

The WISE project provides a model to support preschools in catering for diverse learning needs, with ongoing onsite support from educational psychologists. There is some early evidence to support its effectiveness in bringing benefits to students with developmental disabilities and students with typical development. It could also support preschools to provide early identification and intervention to children with developmental disabilities.

Preschools and teachers would need continued professional support to sustain these positive outcomes. However, to benefit all students with quality education and effectively address students with diverse learning needs, scaling up the program to cover all preschools in the territory by the government should be considered.

Funding: This work was supported by the Simon K Y Lee Foundation.

References

Bevilacqua, L., Hale, D., Barker, E.D. & Viner, R. (2018). Conduct problems trajectories and psychosocial outcomes: a systematic review and meta-analysis. *European Child and Adolescent Psychiatry, 27*, 1239–1260.

Blok, H., Fukkink, R.G., Gebhardt, C., & Leseman, P.P.M. (2005). The relevance of delivery mode and other programme characteristics for the effectiveness of early childhood intervention. *International Journal of Behavioural Development, 29*, 35-47.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.

Collie, R. J., Martin, A. J., Nassar, N., & Roberts, C. L. (2019). Social and emotional behavioral profiles in kindergarten: A population-based latent profile analysis of Links to socio-

educational characteristics and later achievement. *Journal of Educational Psychology*, *111*, 170-187.

Department of Health (2018). Replies in written questions raised by Finance Committee Members in examining the Estimates of Expenditure 2017-18. Retrieved from https://www.dh.gov.hk/english/budget/files/2018-19_eng.pdf

Douglas-Osborn, E. (2017). Early investment: The use of action research in developing the role of an educational psychologist in an early years setting. *Educational Psychology in Practice, 33*(4), 406-417.

Fryers, T. & Brugha, T. (2013). Childhood determinants of adult psychiatric disorder. *Clinical Practice and Epidemiology in Mental Health, 9*, 1-50.

Goodman, R., & Scott, S. (1999). Comparing the strengths and difficulties questionnaire and the child behaviour checklist: Is small beautiful? *Journal of Abnormal Child Psychology, 27*(1), 17-24.

Gumpel, T. (1999). The use of item response theory to develop a measure of first grade readiness. *Psychology in the Schools, 36*, 285-293.

Hagans-Murillo, K. (2005). Using a response-to-intervention approach in preschool to promote literacy. *The California School Psychologist, 10*(1), 45-54.

Ho, D., Leung, C. & Lo, S.K. (2013). Validation of the Gumpel Readiness Inventory for preschool children in Hong Kong. *Research in Developmental Disabilities, 34*(10), 3066-3076.

Kennedy, K. J., & Hui, S. K.F. (2006). Developing teacher leaders to facilitate Hong Kong curriculum reforms: Self efficacy as a measure of teacher growth. *International Journal of Education Reform, 15*(1), 137-151.

Krueger R.A. (1994). *Focus groups: A practical guide for applied research* (2nd ed.). Newbury Park, CA: Sage.

Lai, K. Y. C., Luk, E. S. L., Leung, P. W. L., Wong, A. S. Y., Law, L., & Ho, K. (2010). Validation of the Chinese version of the strengths and difficulties questionnaire in Hong Kong. *Social Psychiatry and Psychiatric Epidemiology, 45*, 1179-1186.

Lee, F.L.M., Yeung, A.S., Tracey, D., & Barker, K. (2015). Inclusion of children with s special needs in early childhood education: What teacher characteristics matter. *Topics in Early Childhood Special Education, 35*, 79-88.

Leung, C., Leung, J., Leung, S. & Karnilowicz, W. (2018). Pilot evaluation of the Whole Inclusive School Empowerment (WISE) project in kindergartens in Hong Kong: A mixed method approach. *Psychology in the Schools.* DOI: 10.1002/pits.22204

Malti, T., Ribeaud, D., & Eisner, M. (2011). The effects of two universal preventive interventions to reduce children's externalizing behavior: A cluster randomized controlled trial. *Journal of Clinical Child and Adolescent Psychology, 40*(5), 677–692.

Marmot, M. (2010). *Fair society, healthy lives: Strategic Review of Health Inequalities in England post-2010.* Retrieved from http://www.instituteofhealthequity.org/projects/fair-society-healthy-lives-the-marmot-review/fair-society-healthy-lives-executive-summary.pdf

Morgan, P.L., Farkas, G. & Gibel, J. (2008). Matthew effect for whom. *Learning Disability Quarterly, 31*(4), 187-198.

Shek, D. T. (2017). The Use of Focus Groups in Programme Evaluation: Experience Based on the Project PATHS in a Chinese Context. In A New Era in Focus Group Research (pp. 129-153). Palgrave Macmillan, London.

Social Welfare Department (2017b). *Pilot scheme on on-site pre-school rehabilitation services*. Retrieved from https://www.swd.gov.hk/oprs/index_en.htm

The Australian Psychological Society (2016). *The framework for effective delivery of school psychology services: A practice guide for psychologists and school leaders*. Victoria, Australia: The Australian Psychological Society Limited.

Tschannen-Moran, M., Wolforlk Hoy, A., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68*(2), 202-248.

Warren, S.R., Martinez, R.S. & Sortino, L.A. (2016). Exploring the quality indicators of a successful full-inclusion preschool program. *Journal of Research in Childhood Education, 30*, 540-553.

Webster-Stratton, C. & Taylor, T. (2001). Nipping early risk factors in the bud: preventing substance abuse, delinquency, and violence in adolescence through interventions targeted at young children (0-8 years). *Prevention Science, 2*, 165-192.

World Health Organization and UNICEF (2012). *Early childhood development and disability: a discussion paper*. Retrieved from http://apps.who.int/iris/bitstream/handle/10665/75355/9789241504065_eng.pdf;jsessionid=5AC56702F6E35955794D11B599BD15DE?sequence=1

Table 1:

Demographic Characteristics of Student Participants

	Intervention (n = 378)		Control (n = 281)		Significance
	Number	%	Number	%	
Child sex - boy	203	53.7%	154	54.8%	$\chi^2(1) = 0.08$, $p = .779$
Child born in HK	330	91.4%	244	88.4%	$\chi^2(1) = 1.59$, $p = .208$
On fee remission	272	76.4%	210	77.5%	$\chi^2(1) = 0.10$, $p = .749$
On OPRS	26	6.9%	13	4.6%	$\chi^2(1) = 1.47$, $p = .226$
Relationship with child – mother	302	83.2%	233	83.8%	$\chi^2(2) = 3.17$, $p = .205$
Family - nuclear	177	49.2%	138	50.2%	$\chi^2(2) = 4.94$, $p = .084$
Family - extended	161	44.7%	108	39.3%	
Family - others	22	6.1%	29	10.5%	
Marital status – married/de facto	339	93.6%	256	92.8%	$\chi^2(1) = 0.20$, $p = .656$
Marital status – separated/divorced /widowed/single	23	6.4%	20	7.2%	
Mother education – ≤ 9 years	125	34.8%	107	38.5%	$\chi^2(1) = 0.91$, $p = .340$
Father education – ≤ 9 years	110	31.5%	98	36.3%	$\chi^2(1) = 1.56$, $p = .212$

Mother employed[a]	111	31.8%	73	27.9%	$\chi^2(2) = 1.22$, $p = .542$
Father employed[a]	253	73.3%	198	73.6%	$\chi^2(2) = 0.60$, $p = .741$
Family income – < HK$20,000	210	59.0%	165	60.7%	$\chi^2(1) = 0.18$, $p = .672$
On social welfare benefit	16	4.5%	14	5.3%	$\chi^2(1) = 0.18$, $p = .669$
	Mean	*sd*	Mean	*sd*	
Child age	3.82	0.62	3.82	0.66	t (657) = 0.13, $p = .895$
Child's length of residence in HK	3.60	0.89	3.53	0.92	t (602) = 0.94, $p = .350$
Mother's length of residence in HK[b]	18.58	13.71	15.16	13.06	t (603) = 3.11, $p = .002$
Father's length of residence in HK[b]	29.05	13.52	26.42	14.23	t (568) = 2.25, p=.025
Number of children in family	1.82	0.72	2.00	0.83	t (640) = 2.90, p=.004

[a] Some parents (19.2% of fathers and 7.9% of mothers) chose the category "others" under parent occupation and it was not possible to classify them as employed or not employed

[b] Some parents just indicated they were born in Hong Kong or were permanent residents, without specifying years of residence in Hong Kong

Table 2

Pre-Intervention, Mid-intervention and Post-intervention Scores of Student Participants

	Intervention (n = 378)		Control (n = 281)		Pre-intervention significance	α
Pre-intervention SDQ total problem behavior	10.76	6.06	10.02	6.13	t (657) = 1.53, p=.126	.85
Intervention SDQ total problem behavior	9.78	6.05	9.36	5.76		.84
Post-Intervention SDQ total problem behavior	8.86	5.82	9.85	6.00		.85
Pre-intervention SDQ prosocial behavior	5.72	2.48	5.70	2.37	t (657) = 0.08, p = .934	.85
Intervention SDQ prosocial behavior	6.80	2.42	6.00	2.43		.85
Post-intervention SDQ prosocial behavior	7.05	2.53	6.77	2.49		.86
Pre-intervention school readiness	11.48	4.18	12.37	3.60	t (642.82) = 2.94, p = .003	.88

Intervention school readiness	13.15	3.78	13.51	3.35	.86
Post-intervention school readiness	14.35	3.25	14.14	3.05	.87

Table 3

Demographic Characteristics and Pre-intervention, Mid-intervention and Post-Intervention Scores of Teacher Participants

	Intervention (n = 68)		Control (n = 61)		Pre-intervention significance	α
	Number	%	Number	%		
Sex - female	68	100.0%	61	100.0%		
Special education experience	10	14.7%	4	6.6%	$\chi^2(1) = 2.21$, $p = .137$	
Qualifications – degree or above	30	44.1%	28	45.9%	$\chi^2(1) = 0.04$, $p = .839$	
Teaching experience – ≤ 1 year	9	13.2%	8	13.1%	$\chi^2(4) = 0.73$, $p = .948$	
Teaching experience – 2 to 3 years	13	19.1%	14	23.0%		
Teaching experience – 4 to 10 years	19	27.9%	16	26.2%		
Teaching experience – 11 to 15 years	6	8.8%	7	11.5%		
Teaching experience – ≥ 16 years	21	30.9%	16	26.2%		
Experience in present school – ≤ 1 year	17	25.0%	16	26.2%	$\chi^2(4) = 1.61$, $p = .807$	

Experience in present school – 2 to 3 years	15	22.1%	18	29.5%		
Experience in present school – 4 to 10 years	24	35.3%	20	32.8%		
Experience in present school – 11 to 15 years	7	10.3%	4	6.6%		
Experience in present school – ≥ 16 years	5	7.4%	3	4.9%		
	Mean	*sd*	Mean	*sd*		
Pre-intervention teacher sense of efficacy	73.88	10.52	76.74	9.47	$t\,(127) = 1.61, p = .109$	.91
Mid-intervention teacher sense of efficacy	76.87	11.35	79.26	8.05		.92
Post-intervention teacher sense of efficacy	81.15	10.01	78.02	11.03		.93

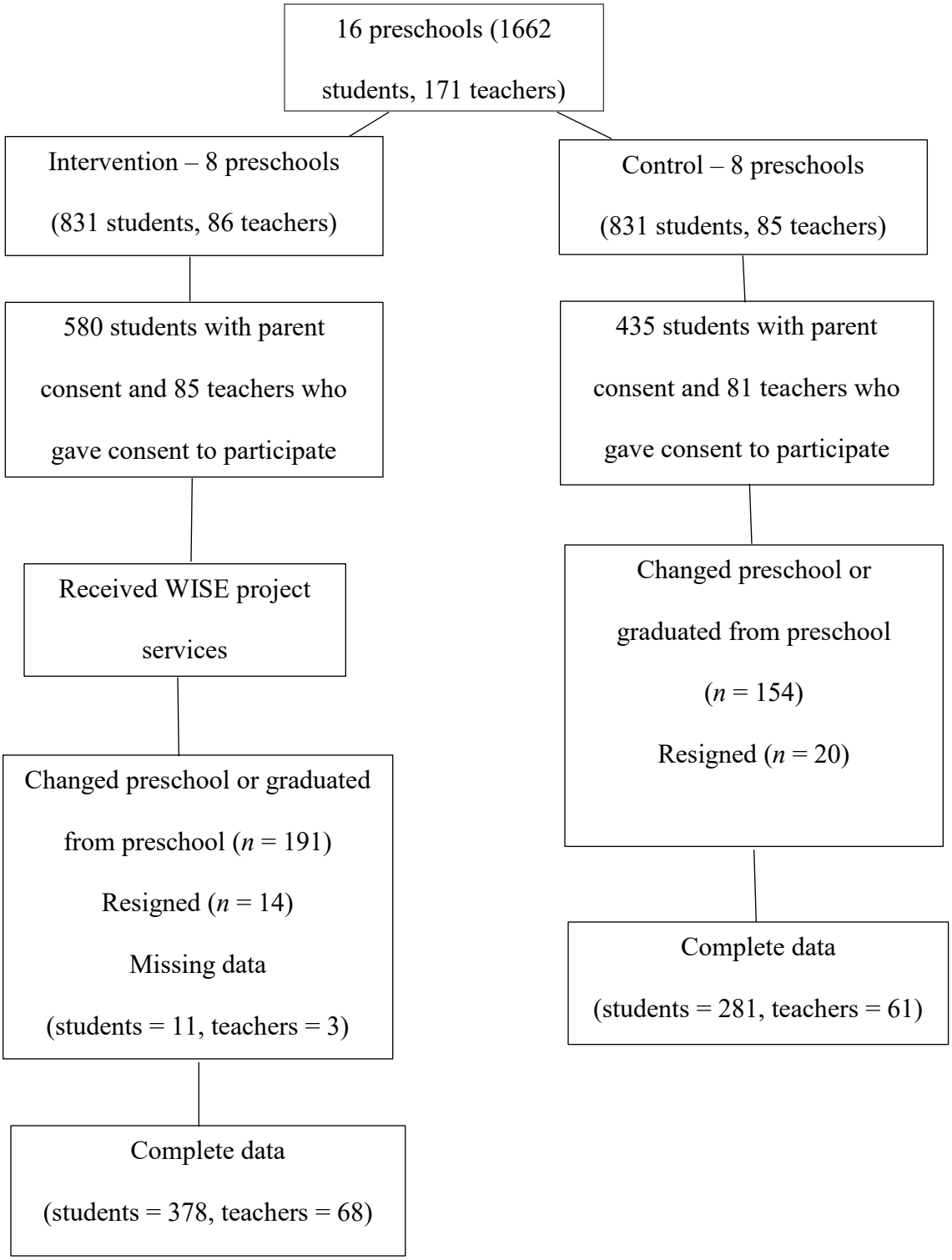

Figure 1: Flow of Participants