

DOCTORAL THESIS

Exploring Strategies for Enhancing Children's Executive Functions in Hong Kong Kindergartens

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**Exploring Strategies for Enhancing
Children's Executive Functions in Hong Kong Kindergartens**

TONG Lok Yi

**A thesis submitted in partial fulfilment of the requirements
for the degree of
Doctor of Education**

Principal Supervisor:

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December 2023

DECLARATION

I hereby declare that this thesis represents my own work which has been done after registration for the degree of EDD at Hong Kong Baptist University, and has not been previously included in a thesis or dissertation submitted to this university or any other institution for a degree, diploma or other qualifications.

I have read the University's current research ethics guidelines, and accept responsibility for the conduct of the procedures in accordance with the University's Research Ethics Committee (REC). I have attempted to identify all the risks related to this research that may arise in conducting this research, obtained the relevant ethical and/or safety approval (where applicable), and acknowledged my obligations and the rights of the participants.

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ABSTRACT

This qualitative research study aims to explore the strategies employed by early childhood educators in Hong Kong kindergartens for enhancing children's executive functions. Executive functions are crucial for children's school readiness and future success, yet there is not much research on how teachers promote executive functions in Hong Kong. Fourteen early childhood educators were interviewed, and three kindergartens were visited for class observation to examine teachers' concepts and experiences in promoting children's executive functions.

The results show that teachers adopt various strategies to promote children's executive functions in their daily practice, particularly in inhibitory control. However, teachers' teaching priorities are affected by parental expectations and the academic-focused environment in Hong Kong, resulting in a discrepancy between teachers' beliefs and practices. The results also indicate some teachers were not familiar with the concept of executive functions.

The study suggests that professional training for teachers is needed in this area to ensure that children's executive functions are effectively promoted in early childhood education and to minimise the discrepancy between teachers' beliefs and practices. This research provides insights for educators and kindergarten teacher training programmes in Hong Kong on promoting children's executive functions by facilitating teachers' professional development.

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Chapter 1 Introduction

This study focuses on exploring how to enhance children’s executive functions in Hong Kong kindergartens and how teacher training programmes can further support Hong Kong early childhood educators’ professional development and their knowledge on executive functions. In this chapter, I will first present the research background by describing the importance of executive functions as well as the contextual background of early childhood education in Hong Kong. Then the problem statement of this study is proposed, to be followed by a sharing on how the study was anchored on my professional experiences in early childhood education. Finally, this chapter ends with a presentation on the significance of this study.

1.1 Research Background

1.1.1 The Importance of Executive Functions in Early Years

Executive function (EF) includes a set of higher-level cognitive abilities and strategies for overseeing life tasks, such as controlling one’s attention; suppressing impulses and inhibiting inappropriate responses by inhibitory control; combining information in working memory; and planning, organising, monitoring and flexibly redirecting thought and behaviour

in mental flexibility (Berk & Meyers, 2013). It is considered to be the conductor or the management system of one's brain (Barker & Morton, 2018). Though EF skills are related to higher-level cognitive abilities, yet they are distinct from our common understanding of "intelligence", which is based on facts and knowledge such as vocabularies or numbers. Indeed, EF skills are the attention-regulation skills that make an individual possible to sustain attention, keep goals and information in mind, delay immediate responses, resist distraction and plan for the future (Zelazo et al., 2016).

Young children have short attention spans and they get easily distracted by visual or auditory stimuli. Children's attention span-persistence is related to executive function and self-regulation (McClelland et al., 2013) especially in the aspects of inhibitory control. Inhibitory control is the suppression of goal-irrelevant stimuli and behavioral responses, it includes two components: response inhibition – the ability to inhibit a prepotent motor response; and attentional inhibition – the ability to resist interference from distracting stimuli, including visual or auditory stimuli (Tiego et al., 2018).

Children's early executive function and self-regulation, in particular the attention aspect, have emerged as an important predictor of school readiness and later achievement (Duncan et al., 2007; McClelland et al., 2013). Executive function skills are necessary for young children as they once enter kindergarten. For example, they have to resist distraction and pay attention to what teachers say and remember teachers' instructions; work with other

young children; finish their task; and learn to take turns when playing in kindergarten (Thorell et al., 2009; Volckaert & Noel, 2015). All the above abilities of controlling one's behaviour, resisting distraction, regulating emotion, and demonstrating flexibility are related to executive functions (EFs). Thus, EFs are critical in determining young children's self-regulation, school readiness and achievement in the future (Diamond, 2016; Slot et al., 2017).

Research found that most kindergarten teachers agreed that self-discipline and attentional control are more important than literacy or arithmetic skills for school readiness (Diamond et al., 2007). The study by Diamond et al. in 2007 further illustrated that EF skills are strongly related with school readiness and future school success. Young children need different EF skills when they first enter schools, but those skills are seldom formally taught in kindergartens.

1.1.2 Curriculum Framework for Kindergarten Education in Hong Kong

The study by Diamond et al. in 2007 revealed that EF skills are important for young children while seldom formally included in curriculum and taught in kindergartens. In this section, the kindergarten curriculum framework of Hong Kong would be introduced. In 2017, the Education Bureau of Hong Kong (EDB) published a new Curriculum Guide for Kindergarten Education with the title *Joyful learning through play • Balance development all the way*. From the title of the curriculum guide, play and balance development are the two key

emphases of the new kindergarten curriculum framework. The curriculum guide suggests that kindergarten teachers should facilitate young children to engage in free play and free exploration and encourage them to make their own choices and set rules with peers so that “children can have their alone time to arrange activities on their own, or they can chat, co-create or play with peers” (CDC, 2017, p.64).

Play in early childhood education is not a new emphasis. Starting from 20th Century, many scholars such as Piaget, Vygotsky and Freud have stressed the value of play and asserted that play foster young children’s development in cognitive, social, emotional, and physical domains (Heidemann & Hewitt, 2010; Johnson et al., 2005; Shipley, 2013).

Awareness of the importance of play in Hong Kong early childhood setting has been raised over the past 20 years. Many local kindergartens highlight that their curriculum embraces the element of play and promotes young children’s learning through play. However, the emphasis on academic achievement and traditional Chinese thoughts such as “reward lies ahead of diligence, but nothing is gained by play” are still rooted deeply in the minds of many Chinese parents (Chao, 2001). Early childhood education in Hong Kong seems to be faced with the difficulty of balancing the value of play and academic skills training. Therefore, EDB reiterated the importance of play in the new kindergarten curriculum framework.

The second key emphasis of the Curriculum Guide is to uphold balanced development in children by covering five developmental objectives, namely Moral Development, Cognitive

and Language Development, Physical Development, Affective and Social Development, and Aesthetic Development. In order to achieve the above five developmental objectives, six learning areas including Physical Fitness and Health, Language, Early Childhood Mathematics, Nature and Living, Self and Society and Arts and Creativity were introduced. Based on the principles of enhancing comprehensive and balanced development, Hong Kong early childhood educators design varieties of learning activities or experiences for young children under these six learning areas. The content of learning activities is usually based on real-life learning themes which are closely related to children's daily life experiences, cognitive abilities and interests. Kindergarten curriculum is also coherent with the primary and secondary curricula, covering three interconnected components, namely Values and Attitudes, Skills and Knowledge, which aims to be "fostering children's interest in learning, cultivating positive values and attitudes, as well as strengthening self-confidence and self-care abilities" (CDC, 2017, p.21).

Though EF skills have received little explicit attention in the kindergarten's curriculum in Hong Kong, enhancing children's EFs would not deviate from the two key emphases of the new kindergarten curriculum framework, i.e., learning through play and balance development. Over the past few years, research has demonstrated that play is a powerful means for improving learning and brain development (Gibb et al., 2021). Additionally, it has been established that children can boost their executive function

capabilities through play. Furthermore, studies have revealed that well-developed EF in preschoolers is a crucial predictor of academic and life achievement in the future (Gibb et al., 2021). Therefore, it is worthwhile to develop children's EFs in the early childhood stage.

1.2 Statement of the Problem

The Hong Kong government had relatively neglected early childhood education until 2000, when they began reforming the school education system. Since then, the importance of child-centredness, learning through play, and holistic development as the core values of early childhood education curriculum frameworks have been widely promoted. However, the pressure of high academic achievement often drives parents and teachers in Hong Kong to focus on teaching young children literacy and arithmetic skills. According to Wong and Rao (2015) Hong Kong parents are highly influenced by Confucian values which emphasis academic achievement and diligence in academic pursuits has made the ECE pedagogical reform difficult to effect. In Hong Kong, many parents view education as a highly didactic business, focused on instilling as much knowledge and as many skills as possible within a limited time frame (Llewellyn, 1982).

The phrase "to win at the starting line," frequently used in recent years, has resulted in parents demanding an academic-focused curriculum with as many components as possible, starting from an early age (Pearson & Rao 2006). Yuen and Grieshaber (2009) surveyed Hong

Kong parents to assess their thoughts and attitudes towards early childhood education. They discovered that parents at all income and education levels expressed a desire for their children to enjoy learning. However, they also found that parents struggled to accept a curriculum that was less academically oriented or demanding. Learning through play and holistic development seems only a slogan in early childhood education. Parents and teachers still focused on academic performance of the children and paid less attention to balanced development.

As mentioned, EFs are critical for school readiness and achievement. It is integral for teachers and parents to support the development of children's EF skills in kindergarten. It is understandable that parents are concerned about young children's academic performance. However, executive functions affect children's readiness for primary school and future success (Bierman et al., 2008), so they are as important as literacy or arithmetic skills. Therefore, it is essential for educators to think about how to enhance young children's EF skills in kindergarten setting and enhance children's transition to primary school.

Various studies confirmed the relationship between school readiness and EF (Berk & Meyers, 2013; Diamond et al., 2007) as well as the effectiveness of EF interventions in school settings (Diamond et al., 2007; Volckaert & Noel, 2015). Some recent research also showed that early intervention or training, such as computerised and non-computerised games, aerobic

exercise and sports, martial arts and mindfulness practices, are able to assist executive-function development (Diamond & Lee, 2011; Traverso et al., 2015).

Research has suggested the important role for EFs in learning and the development of EFs is critical in the first five years of life (Garon et al., 2008). However, there is currently limited research regarding teacher's experiences, perceptions, knowledge and understanding about EFs (Morgan-Borkowsky, 2012; Keenan et al., 2021). There is also limited research in Hong Kong regarding teachers' experiences of enhancing children's EFs in the kindergarten setting. If teachers lack a clear understanding of EFs and their significance, they will not be able to effectively support the development of children's EFs.

Therefore, this qualitative research inquired about: (1) the educators' conceptions on EFs; (2) what did teachers do in the classroom that fostered EF development; and (3) the challenges they face when promoting EFs in kindergartens. This study can provide an insight to early childhood educators on how to promote young children's EFs.

1.3 Personal Experiences on Early Childhood Education and Executive Functions

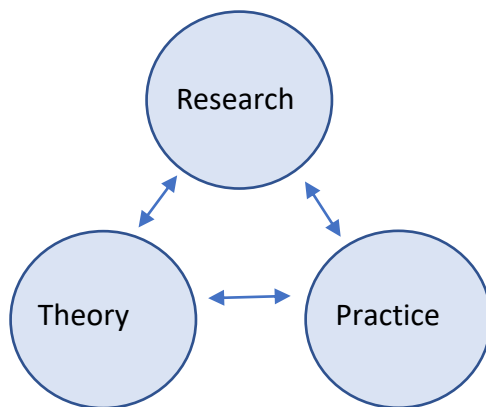
As a former early childhood educator who was trained and taught in Hong Kong, I am familiar with the local context and curriculum. Throughout these last two decades, I witnessed the education reform and how teaching approaches in Hong Kong kindergartens changed

from traditional, teacher-centred to child-centred and play-oriented. After working at a kindergarten for several years, I started my journey to pursue postgraduate studies in education and then became a lecturer in Hong Kong to provide pre- and in-service kindergarten teacher training.

Most of my students are young adults who aspiring kindergarten teachers. In addition to these pre-service teachers, my students also include in-service kindergarten teachers. Having been a kindergarten teacher trainer for over ten years, I have observed that both pre-service and in-service kindergarten teachers in Hong Kong are eager to learn, particularly when it comes to acquiring practical skills that can enhance their teaching abilities. This emphasis on practical skills may stem from the historical perception of kindergarten teacher training in Hong Kong as primarily vocational in nature. While teaching skills are undoubtedly crucial, it is equally important not to overlook the interconnectedness of theory and practice (Kessels & Korthagen, 1996). Teachers should have a solid understanding of the underlying theories and embrace evidence-based practices. It is worth noting that practice can also contribute to the development of new theories, establishing a reciprocal relationship between theory, research, and practice. This study aims to provide some insights on the significance of the theory-research-practice relationship in the early childhood education sector in Hong Kong (see Figure 1.1).

Figure 1.1

The relationship of theory, research and practice



Besides, I have been teaching at different tertiary institutions. Basically, the teacher training curricula contents are quite similar as the framework is structured and framed tightly by the government. It covers learning theories and child development topics or issues in early childhood but seldom mentions EFs. The situation was the same as when I was studying early childhood education as a student teacher. I did not learn much on this topic. I first came across the term Executive Functions when pursuing postgraduate studies and found these abilities are very important for young children or even young adults.

After two decades of education reform, young children born during or after the reform period have now reached tertiary education level. However, based on my experience, many tertiary students still have room for improvement when it comes to skills related to executive functioning such as planning, goal setting, and execution to meet their goals. As the importance of executive functioning skills for school readiness and future success has been

highlighted before, it is worth discussing how to equip students with these skills from a young age, during their time in kindergarten, instead of waiting until they commence university.

1.4 Significance of the Study

The significance of the study lies in its potential to fill the research gaps and provide valuable insights into teachers' experience and understanding of executive functions in early childhood education. The study focuses on how teachers promote children's executive functions in kindergartens and the strategies they employ. The findings of this study will have several important implications for different stakeholders in the field of education.

Firstly, the study will benefit teachers by providing them with an opportunity to reflect on their teaching practices and review any discrepancies between their teaching practices and beliefs. By understanding how teachers promote children's EFs, teachers can incorporate effective strategies to support children's development. This will enhance their teaching skills and improve their ability to support children's development on EFs.

Secondly, the study will benefit the early childhood education field by providing insights to schools on how to support children's EFs development. This is important because EFs are vital for children's academic success, social-emotional development, and overall well-being. By understanding the strategies that teachers use to promote executive functions in

kindergartens, schools can develop policies and programs to support children's development in this area.

Thirdly, the study provides insight to kindergarten teacher training programmes. The results inform teacher training programmes about frontline teachers' conceptions of EFs and any discrepancies between their beliefs and practices. Teacher training programmes can then equip teachers with solid knowledge based on evidence, helping to align their beliefs and practices with the latest research. This is important for teachers' professional development, as it enables them to enhance their pedagogy and improve their ability to support children's executive functions development. With professional knowledge, teachers can minimise the impact of external factors such as parents' expectations or the academic-focused environment on their teaching practices.

Fourthly, the study provides insight to parents about the importance of executive functions. Parents often focus on academic performance and overlook the importance of executive functions in their children's development. The study's findings can help parents understand that executive functions are crucial for school readiness, academic success and future success. By understanding the importance of executive functions, parents can support their children's development in this area and help them achieve their full potential.

In summary, the study's findings have significant implications for different stakeholders in the field of education, including teachers, schools, teacher training programs, and parents. By providing insights into teachers' experience and conception of executive functions and the strategies they use to promote them in kindergartens, the study can enhance teaching practices, support children's development of EFs, and improve academic outcomes. The study's findings can also inform policy development in early childhood education and provide a foundation for future research in this area.

Chapter 2 Review of the Literature

Early childhood educators in Hong Kong are under pressure from parents and the academic-focused environment to constantly improve children's academic performance. Therefore, advances in research about cognitive development are being explored to provide insight on teaching practices. The term executive function (EF) was first developed in the medical field (Burgess, 1997; Goldstein et al., 2014) and is now gradually becoming a trending research topic in the education field (Dawson & Guare, 2009; Cooper-Kahn & Foster, 2013). Recent research also focused on executive function as predictors of academic outcomes (Huizinga et al., 2018).

EF encompasses a diversity of cognitive processes, abilities and actions including planning, working memory, regulation of attention, inhibition of inappropriate actions, flexibility to shift between tasks etc., which are carried out by the prefrontal areas of the frontal lobes (Kloo et al., 2010). The term EF is a new focal point in the education field developed, but actually the components inside it are some well-known higher order cognition abilities such as working memory and flexibility. This chapter begins with the definitions and theoretical framework of executive function proposed by different researchers, then followed by an overview of kindergarten education in Hong Kong and finally the relationship between teachers' belief and their teaching practice would be provided.

2.1 Definition of Executive Functions

Executive functions are a set of cognitive skills that help individuals to manage daily lives, govern goal-directed action and adaptive responses (Hughes, 2011). According to Dawson and Guare (2018), there are eleven EF skills that help an individual to organise behaviour over time, override immediate demands for achieving longer-term goals. Dawson and Guare categorized the eleven EF skills into two groups (see Table 2.1). The first group consists of thinking skills that are involved in selecting and achieving goals or solving problems. The second group focuses on assisting individuals in remembering their goals and providing guidance to help them behave in ways that enable them to reach those goals.

Table 2.1

Two groups of executive function skills

Group 1 Thinking skills that are involved in selecting and achieving goals or solving problems	Group 2 Skills for assisting in remembering goals and providing guidance to behave and reach the goals
1. Planning	6. Response inhibition, also known as inhibitory control
2. Organisation	7. Emotional control
3. Time management	8. Attention
4. Working memory	9. Task initiation
5. Metacognition	10. Flexibility
	11. Goal-directed persistence

These skills are not innate but born with the ability (Dawson & Guare, 2018) to develop throughout childhood to adulthood (Best & Miller, 2010). Dawson and Guare (2018) listed developmental tasks or behaviours for children in different age groups. As this research

specifically focuses on the development of EF skills in kindergarteners, only the age ranges of preschool and kindergarten to Grade 2 are presented (see Table 2.2).

Table 2.2

Developmental task requiring executive skills (Dawson & Guare, 2018, p.9)

Age range	Developmental task requiring EF skills
Preschool	Run simple errands (e.g., “Get your shoes from the bedroom”). Tidy bedroom or playroom with assistance. Perform simple chores and self-help tasks with reminders (e.g., clear dishes from table, brush teeth, get dressed). Inhibit behaviors: don’t touch a hot stove, run into the street, grab a toy from another child, hit, push, etc.
Kindergarten to Grade 2	Run simple errands (2- to 3-step directions). Tidy bedroom or playroom. Perform simple chores and self-help tasks may need reminders (e.g., make bed). Bring papers to and from school. Complete homework (20 minutes maximum). Decide how to spend money (allowance). Inhibit behaviors: follow safety rules, raise hand before speaking in class, keep hands to self.

Based on the information presented in the table above, the key EF skills required for kindergarteners to accomplish their developmental tasks primarily include:

Attention: Kindergarteners need attention skills to resist distractions and complete their homework effectively.

Working Memory: The ability to remember and execute simple tasks is crucial for kindergarteners, such as remembering and carrying out basic errands.

Inhibitory Control: Kindergarteners should develop inhibitory control skills to regulate their behavior and make appropriate choices.

Organization: Developing organizational skills allows kindergarteners to tidy up their belongings and maintain order in their environment.

Planning and Flexibility: Kindergarteners benefit from developing planning skills, especially when it comes to managing and budgeting money. In cases where they don't have enough money, they need to be able to adapt their plans accordingly.

Therefore, in this study, the researcher narrowed down the initial eleven EF skills into six, including attention, working memory, inhibitory control, planning, organization, and cognitive flexibility for a more specific investigation. Below are the definitions of these six EF skills.

Attention refers to the capacity to concentrate on tasks while blocking out external stimuli or daydreaming. It is a fundamental prerequisite for selecting incoming information and for focal processing (Posner & Petersen, 1990). Executive attention can be used to effectively block potential distractions and keep information active and in focus in short-term memory. This allows the brain to manage and prioritise sensory input, improving task efficiency and performance (Kumar & Singh, 2020).

Working memory is the capacity for temporarily storing and manipulating information in order for it to be used later (Reynolds & Romano, 2016). It supports problem solving activities by remembering instructions or recalling facts from long-term memories. Working memory model was introduced by Baddeley and Hitch (1974), it is a multicomponent system that manipulates information storage for greater and more complex cognitive utility. Working memory is also known as short term memory, important for incorporating new information, reasoning and problem-solving (Hui-Chun & Gray, 2017).

Inhibitory control or response inhibition means the ability to suppress an impulse consciously and behave in an appropriate way (Hui-Chun & Gray, 2017; Diamond & Ling, 2016). Inhibitory control enables individuals to resist impulses when there are conflicts among goals. It helps people stay focused despite distractions or strong temptations that may lead them away from their intended goals. It is commonly linked to self-regulation, self-control and impulse suppression (Willis & Dinehart, 2014).

Planning involves setting goals and deciding how best to achieve them while also taking into account any potential obstacles along the way. The processes of planning involve several components, to identify the initial goal, develop sub-goal representation, anticipate consequences, and finally determine the requirements for achieving the sub-goal (Sternberg & Ben-Zeev, 2001).

Organisational skills include a set of techniques to help an individual for future-oriented learning, problem-solving, and task completion (Hartford & Hooper, 2013).

Organisation requires the integration of several elements to reach a planned goal. Dawson and Guare (2018) define organisation skills as the ability to design and maintain information or materials in systems, allowing individuals to structure their environment so that finding things becomes easier when needed in future situations.

Cognitive flexibility means being able to think creatively, change focus from one task to another and review things in another perspective. It builds on working memory and inhibitory control and thus, comes later in development (Davidson et al., 2006). It refers to the ability to adjust thinking patterns quickly depending on changing circumstances which could involve switching between different perspectives on an issue or transferring knowledge gained in one situation over another in a similar yet slightly different context (Diamond, 2013). Both of these processes require quick reasoning abilities combined with experience-based learning strategies which can then inform decision making processes accordingly. This ability is important for facing new challenges (Diamond & Ling, 2016).

Humans are not born with the skills but have potential to develop executive function capacities. EFs develop through practice and are strengthened by the experiences applied (Best & Miller, 2010; Dawson & Guare, 2018). EFs develop rapidly in preschool years (Moriguchi, 2014) and continue to develop during the adolescent and early adult years (Garon

& Smith, 2008). It takes time and practice for children to develop EF skills. Adults can allow children to practise more on EFs and manage their emotions and monitor their thoughts in order to work more efficiently and effectively (Dawson & Guare, 2018).

2.2 Social Constructivism and EFs

In terms of the contribution of experience, learning shares an important part in EF skills development. A common theoretical framework mentioned in the research of EFs is the social constructivist theory proposed by Lev Vygotsky. Vygotsky was a Russian psychologist and his socio constructivist theory asserts that individuals are active participants in the construction of their own knowledge (Schreiber & Valle, 2013). He proposes the importance of social interaction between learners and more capable people plays an important role in cognitive development (Vygotsky,1978). According to Vygotsky, cognitive development is intricately linked to social interaction and continuous throughout one's lifetime, implying that shared learning experiences with adults or peers facilitate all learning tasks.

Vygotsky emphasises the value of make-believe play, and posits that in make-believe play, children create certain rules that help them to gain control over their behaviours (Johnson et al., 2005; Shipley, 2013). According to Vygotsky, children have to think before acting during dramatic play. They can plan and compromise play scenarios together before acting out while they need to remember the chosen scenario and inhibit behaviours

inconsistent with their roles. Children may use their private speech or write down and describe their plans.

Vygotsky further points out that private speech, i.e., thinking as they are talking is crucial for young children internalising rules and developing self-regulation. Self-regulation defined as goal-directed behaviour (Hofmann et al., 2012) is more than self-control and inhibition. In make-believe play, children have to constrain behaviour, act out and finish plans, so it involves a goal-directed process and needs self-regulation. Therefore, in Vygotsky's perspective, make-believe play and private speech are able to foster children's self-regulation and executive functions (Berk & Meyers, 2013).

Prior research has supported Vygotsky's perspective, indicating that social interaction can enhance the development of EF and that the quality of scaffolding may serve as a significant predictor of the growth of EF skills. Moreover, human interaction, as well as interaction with a non-human agent, is paramount for children's EF skill advancement. Conversely, the development of social interaction skills in children may also benefit from the improvement of their EF abilities (Moriguchi, 2014).

2.3 Research of EFs: From Special Education to Early Childhood Education

2.3.1 Research of EFs in Special Education

Since EF is responsible for controlling an individual to complete a task or goal, and the skills of those cognitive abilities, such as planning, organisation and self-regulation are related to academic performance (Huizinga et al., 2018), EFs were first explored in the medical field and was then widely discussed in education and education psychology fields (Burgess, 1997; Goldstein et al., 2014). Students who show a deficit of EFs may exhibit difficulties in social development and academic performance (Dawson & Guare, 2009).

Barkley is one of the most famous researchers in EF and attention deficit hyperactivity disorder (ADHD) since the 1980s (Denckla, 2007). Barkley (1997, 2012) asserted the connection between ADHD and EFs affected the research about EF and special education needs decades later. Like ADHD, people with autism spectrum disorder (ASD) also show executive impairments (South et al., 2007). Therefore, the research interest on EF in education first began with a focus on children with special needs.

Research on EF gradually became more popular in the education field and many scholars suggested that EFs are trainable and could be improved with practice. Guides/tools for teachers or success of EF interventions in schools were developed (Dawson & Guare, 2009; Diamond, 2013). A Practical Guide namely *Executive skills in children and*

adolescents: A practical guide to assessment and intervention is widely used and provides useful guidelines for teachers to support children.

2.3.2 Research of EFs in Early Childhood Education

EFs involved a bunch of higher order cognition abilities (Henry & Bettenay, 2010), it was believed that EF continued to develop until early adolescence. Together with the challenges that kindergarteners seem to not have enough attention, inhibitory control, and communication skills for assessing EFs (Diamond et al., 2007), thus, the importance of supporting young children's executive functions through empirical evidence is equivalent to supporting children with special needs.

There were few researchers trying to investigate executive processes in young children in the past. Recently, it was then found that EFs develop rapidly during the early childhood period and EFs emerge much earlier than what was assumed before (Anderson & Reidy 2012). As more research showed that EFs can be trained at age 3-6 (Henry & Bettenay, 2010; Volckaert & Noel, 2015; Gibb et al.,2021), it is important for early childhood educators to be familiar with the concept of executive function and provide training to children and minimise the risk of academic or behavioural problems in primary school.

Berk and Meyers (2013) conducted a review of research on play from a Vygotsky's perspective, emphasising the importance of make-believe play. They also discussed how

private speech can play a mediating role in the association between pretend play and the development of executive functions (EFs) in young children, as well as the significant impact of adult support in facilitating make-believe play to enhance EFs. In addition, their findings demonstrated that there is a positive association between pretend play and inhibitory control, which is one of the key EF skills.

In a naturalistic play setting in preschool, a study by Slot et al. (2017) found a correlation between executive functions (EFs) and the quality of pretend play in 3-year-old children. The study showed that children at this age are capable of both cognitive and emotional self-regulation and there is a significant association between the quality of their make-believe play and their cognitive self-regulation abilities. Volckaert and Noel (2015) conducted a study on preschoolers using a series of games and exercises designed to enhance their inhibition functions. The study spanned over 8 weeks, with two 45-minute intervention sessions every week. Their findings indicated that 16 intervention sessions were sufficient to demonstrate a noticeable improvement in the preschoolers' EFs.

The aforementioned studies suggest that young children's EFs can be enhanced through play, whether it be structured intervention or naturalistic play. In Hong Kong, there have been several research studies conducted on EFs in early childhood settings as well. A study conducted by Chung et al. (2018) revealed the relationships between EF and word reading. Additionally, a research study conducted by Fung et al. (2020) further found that

among the three EF skills, namely inhibitory control, attention shifting, and working memory, working memory was identified as the strongest correlate of children's concurrent word reading. Another study by Cheung and Chan (2021) involved testing two hundred and twenty-five Chinese kindergarteners with assessments for general cognitive, executive functioning, and mathematics skills. The results of this study indicated that verbal working memory, spatial working memory, and cognitive flexibility were significant correlates of applied mathematical problem-solving.

Despite the existing findings on executive functions (EFs) and their relationship with reading and mathematics skills, limited research has been conducted on the experiences, perceptions, knowledge, and understanding of teachers regarding EFs (Morgan-Borkowsky, 2012; Keenan et al., 2021). In Hong Kong, there is also a dearth of research in this area. While several studies have focused on the relationship between EFs and academic abilities such as reading and mathematics skills of young children in Hong Kong, there is a lack of emphasis on how to promote EFs in kindergarteners and the extent to which teachers are familiar with the concept of EF. Consequently, this study aims to address this research gap by exploring teachers' conceptions of EFs and strategies to enhance EFs in Hong Kong kindergartens. The following section will provide an overview of kindergarten education in Hong Kong.

2.4 Kindergarten Education in Hong Kong

Kindergartens in Hong Kong are privately run and divided into non-profit-making kindergartens (NPM KGs) and private independent kindergartens (PI KGs). In 2021-22, there are about 1,042 kindergartens in Hong Kong, around 80% of them are run by non-profit making organisations and 20% are private independent organisations. Kindergarten education in Hong Kong is not mandatory but according to Wong and Nao (2015), almost all 3- to 6-year-olds attend preschool programmes in Hong Kong. In the 2021-22 school year, the number of local children aged three to five enrolled in kindergartens is 155,956. While the Hong Kong Government follows the market system, all kindergartens need to register with EDB and are under its close supervision.

Starting from the 2017-18 school year, the Government has modified and implemented the Free Quality Kindergarten Education Scheme (Formerly known as Pre-primary Education Voucher Scheme). Only local non-profit-making kindergartens are eligible to participate in the scheme. Around 790 kindergartens are eligible and 762 of them have joined the scheme. All the kindergartens that joined the scheme have to follow the Hong Kong Kindergarten Curriculum Guide and are required to conduct ongoing School Self-evaluation and undergo Quality Review for quality assurance and sustainable development.

2.4.1 Popular Teaching Approaches in Hong Kong

As mentioned, all the kindergartens in Hong Kong joining the Free Quality Kindergarten Scheme followed EDB's curriculum guide and adopted an integrated curriculum. The Hong Kong Government has promoted learning through play and curriculum integration since the 1980s. Integrated learning implies all the learning experiences are designed or synthesised across traditional subject areas. It is believed that children can acquire various subject knowledge or skills, such as language, mathematics, social-emotional skills integratively under a topic. In the following subsections, three popular pre-primary curricula in Hong Kong will be introduced. These curriculum approaches are well aligned with EDB's curriculum guide and demonstrate the orientation of child-centeredness.

2.4.1.1 Thematic Approach

The thematic teaching approach is a popular and effective method for kindergarten children. Thematic approach is an integrated curriculum which aligns with the curriculum guidelines of Hong Kong. Under this approach, the content of each lesson is related to a chosen theme so that children can link the learned knowledge across different subjects. By connecting subjects and topics to a central theme, students are able to see the relationships between different subjects, and to make connections between what they learn in the classroom

and the world around them. The real-life learning experiences together with the connections among different subjects help children to deepen and consolidate the learning content.

The thematic approach begins by selecting a central theme, such as animals, seasons, or communities, that is relevant and engaging for young children. This theme is then used as a starting point for exploring various subjects and topics, such as science, self and society, mathematics, language and creative arts. Teachers pre-plan the learning contents by connecting subjects and topics to a central theme. Students are then able to see the connections between different subjects and to develop a more comprehensive understanding of the world around them (Lipson et al., 1993).

In sum, the thematic teaching approach is an effective and engaging educational method for kindergarten students. By connecting subjects and topics to a central theme, this approach helps to foster a sense of excitement and engagement among young students, to integrate different subjects and topics, and to promote a holistic and interdisciplinary approach to learning, so it is one of the common preschool curricula in Hong Kong.

2.4.2.2 Project Approach

Project approach is another popular approach in Hong Kong. Project approach is a child-directed approach which encourages children to engage in hands-on, inquiry-based learning experiences. This inquiry-based learning method is grounded in a constructivist

approach, especially on Vygotsky's (1978) social-cultural theories which presumes children construct their own knowledge through in-depth investigation. It is an effective method for teaching young children because it allows them to explore topics that interest them, build critical thinking skills, and develop a love of learning. Unlike the thematic approach, teachers do not pre-plan the activities in project approach. On the contrary, the teacher acts as a facilitator, guiding children to investigate the topic they choose and discuss with them what activities could be designed to deepen their understanding.

In the context of kindergarten children, a project approach can be a highly effective way to engage young children in learning, as it appeals to their natural curiosity and sense of wonder. A key aspect of the project approach is that it allows children to take an active role in their own learning. The project approach divides the learning process into three phases (Helm & Katz, 2011). In phase one, it is a motivation stage, teachers brainstorm with children what they would like to explore and learn under the selected topic. Children can raise questions related to the topic or share their prior experiences and knowledge with others in this stage. Teachers act as facilitators and help children to outline the sub-topics they will further explore in phase two.

Phase two is a developing stage. First-hand experiences are emphasised in this stage. Children explore and investigate the questions or subtopics based on their interest. Rather than passively receiving information from a teacher, they are able to explore topics in a

hands-on, interactive way, which helps to build their critical thinking skills and fosters a love of learning. Teachers do not answer children's questions directly; on the other hand, they provide scaffolding and assist children to solve their problems or acquire new knowledge by themselves. Additionally, children are able to work at their own pace and on topics that interest them, which helps to keep them engaged and motivated.

Phase three is a display stage. Teachers help children to consolidate and display their learning outcomes. Children are given the opportunity to present their work or learning outcome to their classmates, which can help to build confidence and public speaking skills. Another key aspect of a project approach is the emphasis on collaboration and teamwork throughout the three phases, children are encouraged to work together, sharing their ideas and learning from each other. This helps to build social and emotional skills, as well as promoting the development of a sense of community among children.

The project approach is an effective teaching style that is well-suited to kindergarten children (Katz & Chard, 1989) and aligns with Hong Kong preschool curriculum. Learning activities in project approach are not pre-planned by the teachers as in the thematic approach but initiated by children. Teachers are only facilitators in project approach, by providing children with a variety of materials and support to help them learn more about the topic. Teachers have to motivate children to engage in hands-on, inquiry-based learning experiences. Teachers have to develop children's critical thinking skills, without pre planning,

so there is relatively high demand on teachers' teaching skills. Therefore, some kindergartens in Hong Kong mainly adopted the thematic approach and carried out project approaches once or twice a year.

2.4.2.3 High-Scope Approach

The High-Scope approach is popular in Hong Kong preschool settings as well. This comprehensive educational approach is based on Piaget's theory and stresses on cognitive development (Schweinhart et al., 2005). Similar to thematic approach and project approach, this approach is also based on active learning, and hands-on experiences. However, the High-Scope approach also offers a child-friendly environment to facilitate learning. The goal of High-Scope is to help children develop the skills and knowledge they need to succeed in school and in life, by providing them with a supportive and engaging learning environment.

The key elements of the High-Scope approach echo the Hong Kong kindergarten curriculum. Active learning involves children taking an active role in their own learning, rather than simply being passive receivers of information. In a High-Scope classroom, children are encouraged to explore, experiment, and discover new things through hands-on experiences and play in three steps: (1) Plan: Children can first plan what items they want to interact with, how they will interact with them, and who will join them in these interactions. (2) Do: As mentioned, the High-Scope approach is focused on active learning and hands-on

experiences. When their decisions are made, children are free to carry out their activities. (3)

Review: At the end of their experience, they discuss ways in which the actual activity was different from the planned activity.

This approach recognizes that children learn best through direct experience and exploration, and it provides them with opportunities to engage with their environment and learn in a meaningful way. By providing children with hands-on experiences and opportunities to explore and learn through play, the High-Scope approach helps to build their confidence and independence, and to develop their critical thinking and problem-solving skills (Schweinhart et al., 1993).

In Hong Kong, some kindergartens partially adopted the Plan-Do-Review concept from the High-Scope teaching approach. Those kindergartens' curriculum frameworks are still based on thematic approach, and in addition, children are provided with opportunities to explore, experiment, and discover new things in various learning corners inside the classroom during free play periods. Teachers have to design a meaningful classroom environment and support children from active learning so that children can plan and carry out their learning experience themselves in free play sessions.

In summary, the three popular teaching approaches are child-centred and aligned with the Hong Kong kindergarten curriculum framework. However, the project approach and the

High-Scope approach place more emphasis on child-initiated learning, giving children the chance to plan and design their own activities. Both of these approaches are based on cognitive theories by Vygotsky and Piaget, which are beneficial to children's cognitive development, including these EF skills such as organisation, planning and problem-solving skills.

2.5 The Theoretical Frameworks on Teachers' Knowledge, Teaching Practices and Beliefs

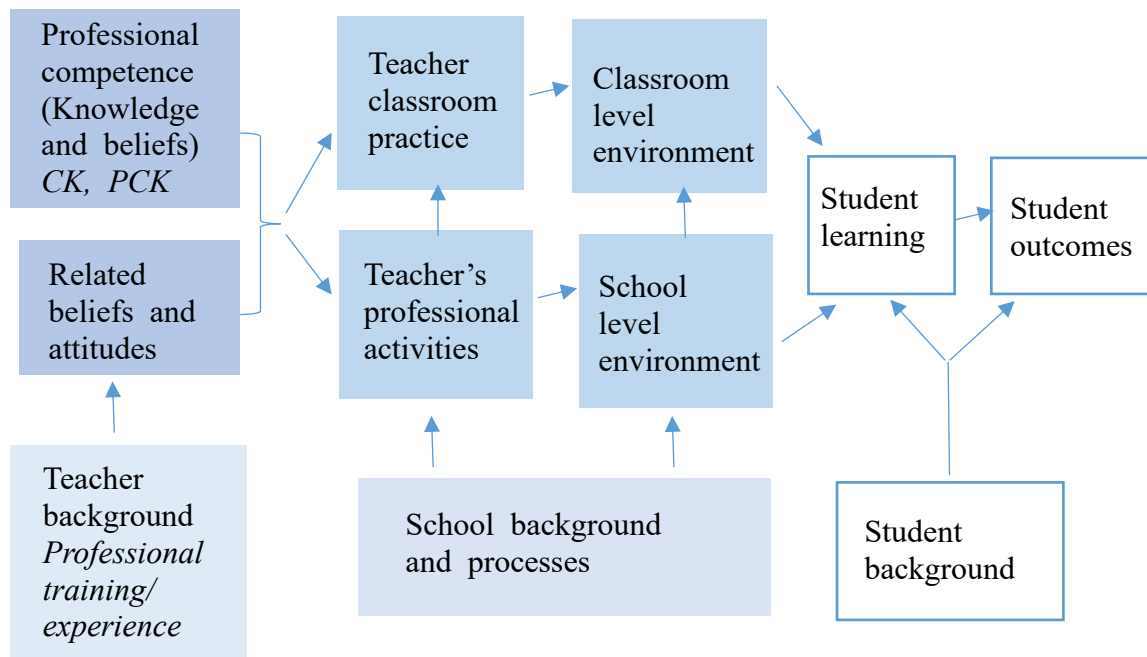
As this study aims to explore how to enhance children's executive functions in kindergartens, teachers play an integral role in facilitating children's development on EFs. Teachers hold different beliefs on children's development, teaching and learning and shape by various factors, such as their professional training, age, experience and cultural background (Stohlmann et al., 2014). In this section, teachers' knowledge, teaching practices and beliefs are discussed.

In 2009, The Teaching and Learning International Survey (TALIS) examined teachers' beliefs, attitudes and practices (OECD, 2009). This study illustrates significant relations between teachers' beliefs, attitudes and practices and provides a framework for analysing teachers' knowledge, teaching practices and beliefs.

According to TALIS (OECD, 2009), teachers' background including professional training and experience affects teachers' professional competence and their beliefs and attitudes related to teaching. These two components further affect teachers' classroom practice and teachers' professional activities. Then teachers' classroom practice and teachers' professional activities influence students' learning. As this study mainly focuses on teachers' knowledge, teaching practices and beliefs and does not address on student's background, learning and outcomes, so the constructs which related to students from TALIS' model are not highlighted in blue (see Figure 2.1 below).

Figure 2.1

Framework for the analysis of teaching practices and beliefs (OECD, 2009, p.91)



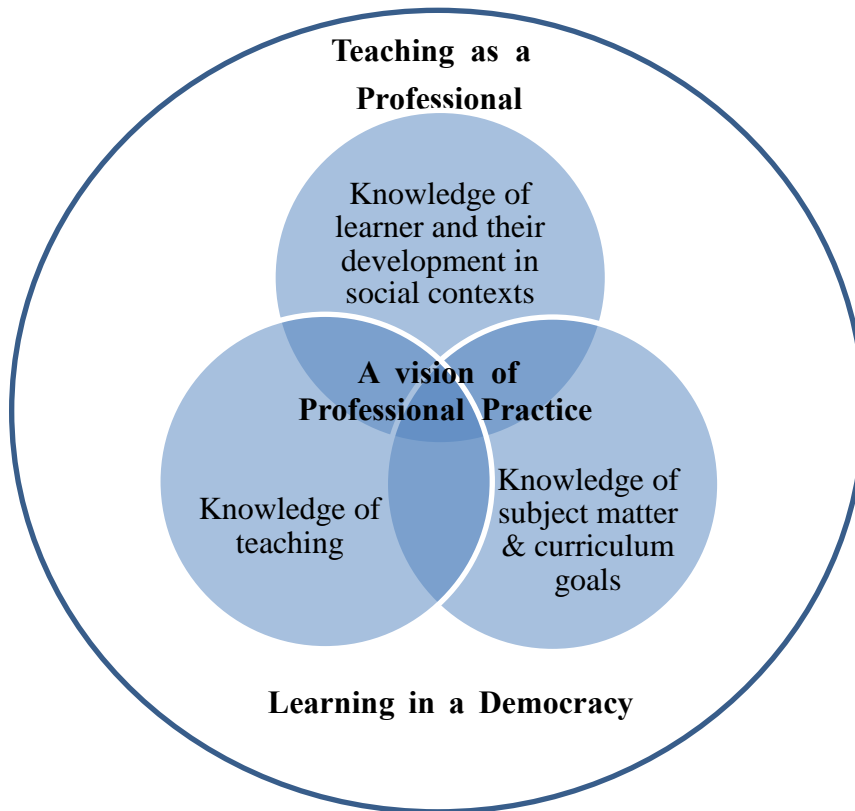
TALIS's study indicate teachers' professional competence consists content knowledge and pedagogical content knowledge, other research also suggest teachers need not only subject-specific knowledge, such as content knowledge (CK) but also pedagogical content

knowledge (PCK) in order to teach effectively (Shulman, 1986; Ball et al., 2008). However, teachers do not only need CK and PCK, they also need an ability to apply this knowledge in teaching practices for teaching effectiveness. Therefore, teachers require teacher education to know what enables them to apply knowledge in the classroom (Jeschke et al., 2021).

As teaching is a professional practice, to equip entering teachers, Darling-Hammond (2006) suggests teacher training programmes should encompass three areas of knowledge. First, teachers should have knowledge of learners and their development in social and cultural context such as knowing and understanding young children's characteristics and needs; and the multiple influences on early development and learning. Second, teachers should have knowledge of subject matters and curriculum goals, such as developing and evaluating developmentally appropriate curricula for all children; and developing curriculum for facilitating all children. Finally, teachers should have knowledge of teaching, such as understanding content knowledge, and content pedagogy, assessment, and classroom management (see Figure 2.2 below).

Figure 2.2

Framework for understanding teaching and learning (Darling-Hammond, 2006, p. 304)



In short, teachers must be able to apply this knowledge to promote children’s learning and development successfully. Moreover, teachers behave according to their beliefs.

“Teachers’ beliefs and attitudes are believed to be major factors that determine teachers’ practice and pedagogy” (Pajares, 1992). Teacher professional knowledge, teaching beliefs and teaching practices are three interrelated components of a successful classroom (Khan, 2021).

Teacher knowledge and beliefs shape the way they approach instruction, while teaching practices help to bring those beliefs into action. Together, these three elements create an effective learning environment for students.

2.6 Research Questions

Despite a number of studies examining the importance of EFs for young children and various effective interventions on promoting children's EFs (Diamond & Ling, 2016), there is limited local study on how teachers enhance children's EFs in kindergartens and rare research on teacher's experiences, perceptions, knowledge and understanding about EFs (Morgan-Borkowsky, 2012; Keenan et al., 2021). In this regard, this study aims to explore the experiences of Hong Kong kindergarten teachers on promoting children's EFs and further examine the teacher's conception on EFs in order to support Hong Kong early childhood educators' professional development and their knowledge on executive functions.

The research questions for this study are:

RQ 1: What are Hong Kong early childhood educators' conceptions of executive functions?

RQ2: How do Hong Kong early childhood educators support the development of executive functions in their classroom practice? Specifically, what are the practices of Hong Kong early childhood educators when integrating EF training in classroom teaching and learning?

RQ3: What are the factors affecting early childhood educators' practices on promoting children's EF in their classroom?

Among the three research questions mentioned, the first and third questions pertain to “what”, while the second question focuses on “how”. This study aims to explore the strategies adopted in Hong Kong kindergartens for enhancing children's executive functions through interviewing participants and class observation. The intention of the researcher is not to evaluate children's performance or conduct pre- and post-tests for asserting that children’s executive functions were improved as a result of the teachers’ intervention. Instead, this study explores how early childhood educators in Hong Kong provide support for children's executive functions through three exploratory and interpretive questions.

Chapter 3 Methodology

This study is proposed to explore early childhood educators' view and experience on enhancing children's EF in classroom settings, and hopes to provide insights for teacher training programmes on supporting Hong Kong early childhood educators' professional development and their knowledge on executive functions. In order to address the above research objectives, a qualitative research approach was adopted for this study so that it provides an in-depth investigation of Hong Kong early childhood educators' experiences and challenges on promoting children's EFs. Semi-structured interviews and class observation provided an understanding on specific activities or teachers used in improving children's EF skills.

3.1 Research Design

The purpose of educational qualitative research is to gain a deep understanding of complex and nuanced educational phenomena, and to develop new insights and perspectives on these phenomena (Coolican, 2013). It can use a variety of sources to collect data, such as interviews, observation, and document analysis, allowing researchers to gain a rich and comprehensive understanding on the individual and subjective experiences of students,

teachers, and other stakeholders. It can provide valuable insights into the ways in which education is experienced and perceived, and can help to identify the challenges and opportunities that these individuals face.

Qualitative research in education could be used to explore a range of topics, including teaching and learning practices, student experiences, and the impact of educational policies and programmes (Creswell, 2014). It could help the researcher to understand the perspectives, experiences, and beliefs of key stakeholders in the educational system, such as students, teachers, parents, administrators, and policy makers. This type of research can provide valuable insights into the lived experiences of those who are directly involved in the educational system, and can help to identify the challenges and opportunities that they face.

For this study, qualitative research was used to explore the conceptions and experiences of teachers on promoting children's EF in classroom settings. Through the qualitative data collected by semi-opened questions, participants described their views and concepts in their own words and supplementary information obtained by follow-up questions. Through the class observation, the researcher gained a deeper understanding of the teaching and learning process from authentic interactions between teachers and children. Through the use of qualitative methods, researchers identify new and unexpected insights on enhancing children's EFs.

A generic qualitative approach was chosen for this study. Generic qualitative study is also called basic qualitative or interpretive approach (Merriam, 2009; Kahlke, 2014). It is not guided by explicit philosophical assumptions in the particular form of established qualitative methods, such as the three most common methods: phenomenology, grounded theory, and ethnography (Percy et al., 2015). This approach tries to understand how individuals interpret, construct or make meaning from their environment and their experiences. It is a descriptive methodology commonly used in educational research aimed at understanding how individuals make meaning of a phenomenon or a situation, suitable for obtaining an in-depth understanding of education process (Creswell, 2014) such as strategies and practices of teachers and administrators. That matches with the purpose of this research, which aims to explore Hong Kong kindergarten teachers' conception and experience on EFs in the classroom setting and the challenges they face.

This qualitative study follows the research paradigm of interpretivism. This paradigm acknowledges there is no single reality and reality is unique and subjectively to the observer. Moreover, it suggests that facts and values cannot be separated, and knowledge is based on the individual and the event (Ponterotto, 2005). This research aims to find out the perception of kindergarten teachers towards EF and how they encountered difficulties in integrating the concept into daily teaching. All participants, including the researcher, have their own professional experiences and their own views of the world to the research. Therefore,

researchers should be open-minded and try to understand the attitudes and values of the participants and not to have prior assumptions. This study also adopted the constructivism paradigm as knowledge is created by individuals when interacting with the environment; in this study, knowledge is co-constructed among researchers and participants (Ponterotto, 2005), after collecting the descriptive information from educators through in-depth semi-structured interviews towards their conceptions in EFs.

3.1.1 The Sample

Purposeful sampling (Suri, 2011) was employed in this study for exploring Hong Kong early childhood educators' conception of EFs and the experiences of promoting EFs in their schools. Purposive sampling means non-probability sampling techniques in which the participants are selected based on their characteristics. It ensures the selected participants (early childhood educators) and the sites (kindergartens) are rich in information (Patton, 1990). The researcher currently works at a tertiary institution providing pre-service and in-service kindergarten teachers training and maintains good relationships with early childhood educators. To recruit potential participants, the researcher contacted teachers and principals of target kindergartens and explained the purpose of this study.

All the participants joined on a voluntary basis and all participants' identities were being protected with pseudonyms. The researcher had informed them of the research purpose

and collected their consent form before the interviews. Those chosen participants demonstrated a keen interest in the research with diversified backgrounds. Different types of kindergartens with various characteristics were selected in order to collect more diversified and information-rich data. The background of the three observed kindergartens was first introduced and followed by the profiles of the fourteen interviewees.

3.1.1.1 The Information of the Observed Kindergartens

To obtain a diversified information, three different types of kindergartens were invited for class observation. The basic background information of the kindergartens in this study is provided below accompanied by a table for summary (see Table 3.1).

Kindergarten A (KGA)

KGA is a private independent kindergarten (PI KG), it is a bilingual kindergarten where most of the children come from middle-class families. Each class of KGA has one native English teacher and one local Chinese teacher. For the teaching pedagogies, the English-stream adopts project approach while the Chinese-stream adopts thematic approach and follows the Hong Kong curriculum framework. The school management arranged one K1 class (age 3-4) with the class size 15 children for class visit. The head teacher (Irene) and the Chinese class teacher (Dolly) were invited for interviews after class visits.

Kindergarten B (KGB)

KGB is a local non-profit-making kindergarten (NPM KG) which does not join the Free Quality Kindergarten Scheme. The school sponsoring body is a local Christian church and valued on nurturing children's ethics, intellect, physique, social skills, aesthetics and spirituality. Most of the children also come from middle-class families. For the teaching pedagogies, the school mainly adopts thematic approach and sometimes conducts project approach. It also follows the Hong Kong curriculum framework. The school management arranged one K2 class (age 4-5) and one K3 class (age 5-6) for class visits. The class size of this kindergarten is 40 children per class. The kindergarten principal (Jenny); the K2 class teacher (Kate) and the K3 class teacher (Linda) were invited for interviews after class visits.

Kindergarten C (KGC)

KGC is a local non-profit-making kindergarten (NPM KG) under the Free Quality Kindergarten Scheme. The school sponsoring body is also a local Christian church and valued on nurturing children's ethics, intellect, physique, social skills, aesthetics and spirituality. The children come from both working-class and middle-class families. For the teaching pedagogies, the school mainly adopts thematic approach and sometimes conducts project approach. It also partially adopts the High-Scope approach in free play sessions. It follows the

Hong Kong curriculum framework as well. The school management arranged one K1 class (age 3-4); one K2 class (age 4-5); and one K3 class (age 5-6) for class visits. The class size of this kindergarten is 30 children per class. The kindergarten principal (Mavis); the K1 class teacher (Olivia) and the K3 class teacher (Noelle) were invited for interviews after class visits.

Table 3.1

Background information of the kindergartens

	KGA	KGB	KGC
Type of kindergarten	Bilingual private independent kindergarten (PI KG)	Local non-profit-making kindergarten (NPM KG) Does not join the Free Quality Kindergarten Scheme	Local non-profit-making kindergarten (NPM KG) Under the Free Quality Kindergarten Scheme
Socioeconomic status of the families	Mainly middle-class families	Mainly middle-class families	Both working-class and middle-class families
Class observed	One K1 class (age 3-4) with the class size 15 children	One K2 class (age 4-5); and one K3 class (age 5-6) The class size of this kindergarten is 40 children per class	One K1 class (age 3-4); one K2 class (age 4-5); and one K3 class (age 5-6) The class size of this kindergarten is 30 children per class

3.1.1.2 The Profile of the Participants

Besides having class observation in three different kindergartens, and interviewed the mentioned eight teachers, the researcher also interviewed other six teachers. The interviewees

also have diversified backgrounds and work at various types of kindergartens. The profiles of the participants are listed as below followed by a table for summary (see Table 3.2).

Teacher Bella

Teacher Bella works at a local NPM KG under the Free Quality Kindergarten with 10-year teaching experience. Her KG mainly adopts thematic approach and sometimes conducts project approach. She has a Bachelor of Education in Early Childhood Education and the Bachelor degree has included special child care worker training.

Teacher Cath

Teacher Cath works at an international PI KG with 5-year teaching experience. Her KG adopts the International Baccalaureate (IB) programme. She has been working at a local NPM KG as well which adopts the High-Scope approach before. She has a bachelor degree in non-education discipline and then studied a Postgraduate Diploma in Early Childhood Education and the Postgraduate Diploma does not include special child care worker training.

Teacher Dolly

Teacher Dolly works at KGA, a bilingual PI KG with 5-year teaching experience. Her KG adopts thematic approach for local-stream and project approach for English-stream. She has a bachelor degree in non-education discipline and then studied a Postgraduate Diploma in

Early Childhood Education and the Postgraduate Diploma does not include special child care worker training.

Teacher Elsa

Teacher Elsa works at a local NPM KG under the Free Quality Kindergarten with 10-year teaching experience. Her KG mainly adopts thematic approach and sometimes conducts project approach. She has a Bachelor of Education in Early Childhood Education and the Bachelor degree has included special child care worker training. She is now a special education teacher.

Teacher Fanny

Teacher Fanny works at a local NPM KG under the Free Quality Kindergarten with 10-year teaching experience. Her KG mainly adopts thematic approach and sometimes conducts project approach. She has a Bachelor of Education in Early Childhood Education and the Bachelor degree has included special child care worker training. She is now a special education teacher and studying for a Master in Counseling.

Head Teacher Gloria

Head Teacher Gloria works at an international PI KG with 7-year teaching experience. Her KG offers a Cantonese-led local curriculum and an English-led international curriculum. The English stream adopts a Nordic approach. She has been working at a local NPM KG as

well, where the kindergarten adopts the thematic and project approach. She has a bachelor degree in non-education related discipline and then studied a Postgraduate Diploma in Early Childhood Education and Postgraduate Diploma does not include special child care worker training.

Teacher Heidi

Teacher Heidi works at a local NPM KG under the Free Quality Kindergarten with 10-year teaching experience. Her KG mainly adopts thematic approach and sometimes conducts project approach. She has a Bachelor of Education in Early Childhood Education and the Bachelor degree has included special child care worker training.

Head Teacher Irene

Teacher Irene works at KGA, a bilingual PI KG with 7-year teaching experience. Her KG adopts thematic approach for local-stream and project approach for English-stream. She has a bachelor degree in non-education discipline and then studied a Postgraduate Diploma in Early Childhood Education and the Postgraduate Diploma does not include special child care worker training.

Principal Jenny

Principal Jenny works at KGB, a local NPM KG not under the Free Quality Kindergarten with over 30 years teaching experience. She has been working at the Education

Bureau. Her KG adopts thematic approach and project approach. She has a Master degree in Education and does not have special child care worker training.

Teacher Kate

Teacher Kate works at KGB, a local NPM KG not under the Free Quality Kindergarten with 5-year teaching experience. Her KG adopts thematic approach and project approach. She has a Bachelor of Education in Early Childhood Education and the Bachelor degree does not include special child care worker training.

Teacher Linda

Teacher Linda works at KGB, a local NPM KG not under the Free Quality Kindergarten with 7-year teaching experience. Her KG adopts thematic approach and project approach. She has a Certificate of Education in Early Childhood Education and a Higher Diploma in Psychology. She is now studying a degree programme.

Principal Mavis

Principal Mavis works at KGC, a local NPM KG under the Free Quality Kindergarten with 36-year teaching experience. Her KG adopts thematic approach; project approach and partially adopts the High-Scope approach. She has a Bachelor of Education in Early Childhood Education and the Bachelor degree has included special child care worker training.

Teacher Noelle

Teacher Noelle works at KGC, a local NPM KG under the Free Quality Kindergarten with 11-year teaching experience. Her KG adopts thematic approach; project approach and partially adopts the High-Scope approach. She has a Bachelor of Education in Early Childhood Education and the Bachelor degree has included special child care worker training.

Teacher Olivia

Teacher Olivia works at KGC, a local NPM KG under the Free Quality Kindergarten with 11-year teaching experience. Her KG adopts thematic approach; project approach and partially adopts the High-Scope approach. She has a Certificate in Early Childhood Education and has special child care worker training.

Table 3.2

Summary of the participants' profiles

	Interviewee (pseudonyms)	Types of kindergartens	Academic background	Years of working experience
1	Teacher Bella	Kindergarten 1 NPM KG	BEd in ECE	10 years
2	Teacher Cath	Kindergarten 2 PI KG	PGDE in ECE	5 years
3	Teacher Dolly	Kindergarten 3 (KGA) PI KG	PGDE in ECE	5 years
4	Teacher Elsa	Kindergarten 4 NPM KG	BEd in ECE	10 years
5	Teacher Fanny	Kindergarten 5 NPM KG	BEd in ECE (Studying Master in Counseling)	10 years
6	Head Teacher Gloria	Kindergarten 6 PI KG	PGDE in ECE	7 years

7	Teacher Heidi	Kindergarten 4 NPM KG	BEd in ECE	10 years
8	Head Teacher Irene	Kindergarten 3 (KGA) PI KG	PGDE in ECE	7 years
9	Principal Jenny	Kindergarten 7 (KGB) NPM KG (Not under Free Quality Kindergarten Scheme)	MEd	Over 30 years
10	Teacher Kate	Kindergarten 7 (KGB) NPM KG (Not under Free Quality Kindergarten Scheme)	BEd in ECE	5 years
11	Teacher Linda	Kindergarten 7 (KGB) NPM KG (Not under Free Quality Kindergarten Scheme)	CE in ECE HD in Psy Studying a Bachelor degree in Special Education	7 years
12	Principal Mavis	Kindergarten 8 (KGC) NPM KG	BEd in ECE	36 years
13	Teacher Noelle	Kindergarten 8 (KGC) NPM KG	BEd in ECE	11 years
14	Teacher Olivia	Kindergarten 8 (KGC) NPM KG	CE in ECE	28 years

3.1.2 Data Collection

This study adopted interviews and observation as the data collection methods. Semi-structured interview was used as it is an effective method for gaining qualitative and open-ended information; exploring interviewee's thoughts, feelings and beliefs on certain topics. In this case, apart from the preset questions, such as Do you think executive functions are important? Why or why not? Do you think EFs are well known in Hong Kong Kindergartens? What are your experiences on promoting executive functions in kindergarten settings? What

are the challenges when promoting executive functions? Any support from school? (See Appendix 5), the researcher raised follow-up questions in order to collect teachers' perspectives on teaching beliefs, conceptions of EFs and how they promote EFs in daily teaching practices in a more in-depth manner.

Observation can help to tell the whole story instead of just telling the frequency of an event. Observing children's behaviour in a real setting is an important part of the information. In this study, field notes were adopted. Field note is an observation record often used in a qualitative approach; it is a detailed narrative observation record. It is written observation recorded during or immediately following particular behaviour or interaction (Allen, 2017).

This study collected data from interviews of early childhood educators and class observation so that apart from the articulation from the interviewees, children's behaviour and teacher's teaching strategies in real kindergarten settings are also observed. It allowed the researcher to integrate both information from teachers' description of their memories and the authentic practices. The observation records and field notes were triangulated with the data collected from teacher's interviews.

Interviews were conducted in the period of January to December of 2021. Participants were contacted via email or telephone call; the interviews were scheduled with their convenience. The location of each interview was determined by the participants, usually in

their kindergartens or a cafe nearby, especially if the participants could only join the interviews after school hours. The language commonly spoken in Hong Kong is Cantonese, thus the researcher conducted the interviews in Cantonese. Each interview lasted for around 25-45 minutes. All the interviews were audio-recorded and transcribed by the researcher and the transcription were recorded in Chinese and kept the exact wording of the interviewees.

In addition to conducting interviews, three kindergartens were selected for class observation in order to understand the daily practices of the teachers. It allowed the researcher to collect detailed information on how teachers promote children's EFs in schools. As the study aims to explore the experiences that Hong Kong early childhood educators have on promoting children's EF in their classrooms, the researcher during class observation did not evaluate teachers' teaching effectiveness nor assess children's performance.

Observation for each class lasted for around one hour. Children's behaviours and teacher's teaching strategies in real kindergarten settings were observed and recorded. The observed activities were diversified, including English activities, Chinses (Cantonese) activities, Mandarin activities, art and craft activities, mathematic activities, physical fitness activities and free play sessions. The researcher typed the handwritten field notes after every visit for documentation. The field notes were triangulated with the data collected from teacher's interviews.

Due to the outbreak of COVID-19, all of the schools in Hong Kong were temporarily suspended in the first half of the year and hence the class visits of the three chosen kindergartens were scheduled in the second half of the period. For the class visits, during the learning and teaching activities, the researcher sat in the back and took field notes, making a conscious effort not to disrupt the children's learning. However, in the free play sessions, the researcher occasionally roamed around the classroom, observing the children closely and diligently documenting their activities. As videotape was not permitted, all the data was recorded in the form of field notes. All the data would be destroyed when the research is completed.

3.2 Data Analysis

Thematic analysis is adopted in this research, it is a commonly used qualitative research method. It is a method of helping researcher identifying, analyzing, reporting patterns or themes, and understanding the underlying themes within a set of data (Braun & Clarke, 2006). It is described as a descriptive method that reduces the data in a flexible and adaptable method (Castleberry & Nolen, 2018), and can be applied to a wide range of qualitative data. The data analysis in qualitative research is a continuous and spiral process. The researcher in this research engaged in four steps, which are: (1) Data Preparation; (2) Coding; (3) Theme Identification; and (4) Theme Interpretation.

The first stage of this study involved preparing the data for analysis. This involves transcribing the data, memoing, and organising it into a format that is easily accessible and manageable. The researcher first read and reread the transcripts and the field notes and then immersed in the data. Memos are informal notes for researcher to write down impressions and ideas as a way of “holding the thought” when the researcher working through the data. So, the choice of words and writing style is not necessary to cater to a wider audience (Rivas, 2012). Writing memos in this study also facilitated the development of categories. The researcher documented several ideas that were frequently mentioned by the interviewees in a memo. While reviewing and analyzing the first few transcripts, the researcher initially recorded these ideas in the first memo (see Table 3.3), and subsequently added more content in subsequent memos.

Table 3.3

Sample of a memo

Views frequently shared by the interviewees
Important things need to train young children in kindergarten: To follow the daily routine/ class routine, Remember the step-by-step procedures for tidy-up
Example of strategies used to train children’s EF: To draw attention: clapping hands, saying ding, ding, dong, To remember class routine: sing nursey rhymes or songs, picture cues
Teaching approaches mentioned which can help to promote children’s EF: Project approach, High-Scope approach
Challenges faced by the interviewees: Tight curriculum schedule, Expectations from parents, academic results, prepare children for the transition to primary school

The second stage of thematic analysis involves coding the data. Coding is the process of assigning labels or categories to specific sections of the data in order to identify recurring patterns or themes (Boyatzis, 1998). The researcher used open coding as coding techniques. Open coding is an inductive coding, it starts from scratch and the researcher created codes based on the qualitative data itself (Rivas, 2012). Unlike deductive coding, the researcher in this study did not have a predefined set of codebooks; all codes arose directly from the interviewees' responses. The memos prepared before helped the researcher in breaking down the data into smaller units and assigning labels or categories to each unit. The researcher based on the categories from the memos, underlined the text in different colours then grouped similar codes together, identified relationships between them and explored their relationships with other codes and themes.

The third stage of thematic analysis involves identifying the themes within the data (Braun & Clarke, 2006). This is typically done by reviewing the coded data and grouping similar codes together into themes. The researcher continued to use memo writing to compare the data collected from interviews and observation and identified themes and sub-themes for analysing early childhood educators' conceptions of EFs and how they support children's development in EF.

The final stage of thematic analysis involves interpreting the themes that have been identified (Braun & Clarke, 2006). This involves analysing the relationships between the

themes and exploring the significance of these relationships in relation to the research question. The researcher identified four themes, the first theme corresponding to Research Question 1, the second and third themes corresponding to Research Question 2 and the fourth theme corresponding to Research Question 4. The researcher then interpreted and analysed the themes. After comparing the data between the interviews and observation, the researcher identified new themes and patterns and refined the analysis. This flexibility helps the researcher employing analytic induction throughout the research process.

Analytic induction is a qualitative research method that is used to generate theory from empirical data. It involves a systematic and iterative process of analysing data and making inferences about the underlying patterns, relationships, and themes within the data (Katz, 2001). The process of analytic induction typically begins with the collection of qualitative data through interviews and observation. After transcribing the first few pieces of interviews, the researcher then began to read and code, and the researcher began to identify patterns and relationships in the data. Through a process of iterative analysis and refinement, the researcher develops a set of tentative explanations for these patterns and relationships.

3.3 Trustworthiness

Trustworthiness in qualitative research refers to the extent to which the findings of a study are credible, transferable, and confirmable. Below are some characteristics of trustworthy qualitative research (Allen, 2017).

To establish credibility, the researcher used triangulation to verify the findings.

Triangulation refers as a qualitative research strategy to test validity through multiple methods or data sources to develop a comprehensive understanding of phenomena (Patton, 1999). This can help to ensure that the findings are based on a range of perspectives and sources (Allen, 2017). In this study, the researcher used multiple sources of data (interviews and class observation) for triangulation, which involves comparing data from different sources to verify the findings.

Member checking is another strategy adopted to enhance credibility. The researcher shared the findings with some of the participants after translating the transcripts from Chinese into English to ensure that the meaning and interpretation is accurate. Member checking was voluntary based on if the participants have time. Peer debriefing is another technique used in this study, the researcher has shared the research process and findings with her university colleagues who have expertise in the related field, and seek their feedback and critique to ensure that the findings are credible.

However, there are also some limitations and challenges associated with peer debriefing. For example, the feedback provided by peers may not always be objective or unbiased, as they may have their own assumptions or perspectives that influence their opinions. Additionally, the feedback provided by peers may not always be consistent or coherent, especially if there are disagreements or differences in opinion among the peer group.

To enhance transferability, the researcher provides detailed descriptions of the study context, participants, and methods. This can help readers to understand the context in which the research was conducted and to determine whether the findings are applicable to their own context. Researchers also strived to include a diverse range of participants and settings to increase the transferability of the findings.

To enhance confirmability, the researcher was reflexive, which involves reflecting on her own biases and assumptions throughout the research process. This helps to ensure that the findings are not influenced by the researcher's biases. Researchers also maintained an open and transparent research process, including documenting any changes to the research design or methods. Using multiple analysts to review the data can also enhance confirmability, as it can help to ensure that the findings are supported by the data and not influenced by the researcher's interpretation.

3.4 Ethical Considerations

For the research ethics considerations, the researcher took precautions to protect the privacy and confidentiality of the participants throughout the process (Creswell & Guetterman, 2019). This involved using pseudonyms to maintain anonymity and obtaining consent from the participants prior to conducting interviews (see Appendices 1-4).

Additionally, the researcher made a commitment to only use the data for research purposes and assured the participants that all data would be securely stored and destroyed within three years upon completion of the research study.

During class observation, the researcher tried not to interfere with the children's learning or the interactions between teachers and the children. Moreover, the researcher obtained ethical approval from the University Research Ethics Committee in December 2020 before conducting the first interview in January 2021.

Chapter 4 Results

The purposes of this generic qualitative research study were to explore the experiences that Hong Kong early childhood educators have on promoting children's EF in their classrooms; and how to support Hong Kong early childhood educators' professional development and their knowledge on executive functions in the future. Interviews and classroom observation were conducted in order to answer following research questions:

RQ1: What are Hong Kong early childhood educators' conceptions of executive functions?

RQ2: How do Hong Kong early childhood educators support the development of executive functions in their classroom practice? Specifically, what are the practices of Hong Kong early childhood educators when integrating EF training in classroom teaching and learning?

RQ3: What are the factors affecting early childhood educators' practices on promoting children's EF in their classroom?

After analysing the interview transcripts and observation records, it found Hong Kong kindergarten teachers' conceptions of EF; what are their strategies for enhancing children's EFs; and what factors affect teachers for promoting children's EFs. Thus, following themes emerged:

Theme 1: Educators' knowledge, conceptions and views on EFs

Theme 2: Teachers' experiences on promoting children's EFs

Theme 3: Teacher's practices and children's behaviours on EFs in authentic kindergarten settings

Theme 4: Factors affecting the promotion of EFs in kindergartens

4.1 Theme 1: Educators' Knowledge, Conceptions and views on EF

In order to investigate how the Hong Kong early childhood educators promote children's EF development, early childhood educators' knowledge and conception of EF was first explored. In the interviews, eight out of fourteen educators claimed that they heard of or recognise the term EFs. Among them, five participants said they learned this term when studying in teacher education programmes (Teacher Bella, Teacher Elsa, Principal Mavis, Teacher Olivia, and Teacher Noelle). They could roughly remember the meaning and some specified that they learned this term in special education courses. One participant (Principal Jenny) learned this term through a parental education workshop given by an educational psychologist. Two participants (Teacher Fanny and Heidi) forgot they learned this term from where Heidi also forgot the meaning of this term.

It is found that the term EF is not popularly used in the ECE workplace and early childhood teacher training programmes do not necessarily cover or emphasise this topic. Teacher Noelle, said that she heard this term when she was studying early childhood education teacher training programme, but the term EF was not frequently used in the early childhood education field. Principal Mavis shared that many teachers, similar to her experience, learned the term EF when studying special education in early childhood education degree programmes. She therefore pointed out that some teachers may think that training EF is only related to SEN children. However, Mavis believed that promoting children's EF development is very important, and was not only for SEN children. She said:

Some teachers may forget or do not know what EF is, but EF is quite related to kindergarten's daily practice or daily training. When teachers train young children to follow class routines, it can also help children to develop some EF skills, but kindergarten teachers seldom use this term.

Other participants also agreed that promoting children's development of EF is very important. Teacher Fanny, who knew the term EF, expressed that: "I think (EF skills) are important! The stage of early childhood is a foundation stage of their life long journey. At this stage, providing opportunities for them to repeatedly practise these skills is very good and important."

Upon the researcher's brief explanation on the meaning of EF, all the other six participants understood the meaning of EF. Head Teacher Irene found that EF is very important as it is related to the development of school readiness:

These (EFs) are some soft skills, the atmosphere now in Hong Kong focused on training children's academic results, most importantly is articulation to primary school. However, focusing on good academic results may neglect some soft skills.

Actually, fostering their EF skills won't affect their academic results, but now, only focused on academics and these skills are neglected.

The other five participants who did not learn the term EF before also recognised the importance of EF. Teacher Kate expressed that these skills are very important to young children, though she did not know this term, her views are similar to Principal Mavis, believing that many kindergarten teachers have provided some similar training to young children.

Kindergarten teachers do not use this term, but actually, when they train children to remember class routines, follow instructions. For example, teachers gave five instructions, some children can only remember three instructions. Teachers may provide picture cards to help them (children). I think it can help children to develop some of the EF skills, such as working memory.

In sum, nearly half of the participants have not heard the term EF reflecting this term is not popular in the early childhood education field. Though some participants do not have much knowledge of the term EF, they can all understand that EFs include a bunch of skills such as attention, working memory, self-control, planning, organisation, and flexibility after researcher's explanation. They all understood the meaning of these terms and agreed EFs are important to children. Some participants reflect on their daily routines and they can help to develop children some of the EF skills.

4.2 Theme 2: Teachers' Experiences on Promoting Children's EFs

According to the interviews, teachers think that improving children's EFs can help children to follow instructions and develop their self-care ability is very important, they reported a variety of strategies that have been used in fostering children's EFs. Executive function skills are some mental processes that enable an individual to plan, focus attention, remember instructions, then execute the task or multiple tasks. During the process, children have to inhibit or control their behaviour so that they can complete the task successfully. When young children first go to kindergarten, they may feel challenged as they have to memorise teachers' instructions and classroom rules in order to complete the task or daily routines smoothly.

Therefore, children's attention and working memory are fundamental skills. After they remember the task/instructions, they have to control themselves to complete the task.

Planning and organisation involved higher order thinking ability. When children carry out their plan and find some problems, flexibility is needed for modification of their plan. In this regard, their methods are grouped in this order: (1) attention and working memory; (2) inhibitory control; (3) planning and organisation; and (4) cognitive flexibility. Excerpts of the sharing from those participants who heard EF before would be presented first.

4.2.1 Attention and Working Memory

Some participants mentioned that training children's attention is very important. First of all, they need to draw children's attention before teaching or giving important instructions so that children can complete the tasks step-by-step. Teacher Heidi shared that when children first start kindergarten, they have never been to school before and often struggle to maintain their attention. It is common for children to show improvement after weeks as a result of teachers' activities. She used the method of clapping hands to draw children's attention, especially when she taught K1 class.

I clap my hands in front of the children, and say: "clap, clap, clap, children", then children then look at me and say: "clap, clap, clap,". Apart from this clapping

instruction, sometimes, I may call them suddenly like "ding dong ding dong" and draw their attention back. It usually takes one or two weeks for them to get used to it.

After drawing children's attention, teachers also used demonstration, storytelling, nursery rhymes, visual aids (including picture clues, shapes and colours) and immediate feedback for helping children to remember step by step procedures or class routines. Teacher Elsa provided the various examples like demonstration, nursery rhymes, appreciation picture cards for promoting children's working memory to follow instructions:

I use demonstrations, or I may also use some stories to support. For example, I want to teach them how to sit properly, or how to line up nicely. I use nursery rhymes as a strategy, as the children read aloud the nursery rhymes with the movements every day, so they know how to sit properly, or how to line up nicely. In addition, I post some picture cards with appreciation words in the classroom. If anyone sits nicely, there is an immediate response of appreciation. For example, I point to the picture card and read out the words "you are doing well".

Teacher Dolly, who has not heard of the term EF before, also shared similar examples for helping children to remember the step-by-step procedures and complete tasks. Teacher Dolly said that:

I make up a story from the perspective of a child that may be easier for them to understand and carry out the task. For example, I make up a story that a child can wash his hand before tea, and then tidy up his utensils to the tray after tea. During tea time, I demonstrate how to line up and scoop the food into the bowl. They can choose the bowl they like, but they have to remember the procedures. When finished eating, they have to tidy up their eating utensils. They have to group the bowl together into a tray on the assigned round table. Most of the children can remember and recognise that this round table is for placing used eating utensils after training.

Teacher Cath, who teaches in an international school, shared another example for helping children to remember and complete the task by using a song:

I will use nursery rhymes or songs, for example a Cantonese song called “Red, Orange, Yellow, Green, Blue, Indigo and Purple”. This song can help children to identify different colours. In our school, each learning corner is presented in a different colour, such as red is for the toy corner while yellow is for the reading corner. After singing this song, those non-Chinese speaking children can remember and understand that they have to put the toys in the red place (toy corner). Using a song is less boring and can help them to remember.

4.2.2 Inhibitory Control

Apart from developing working memory, participants also shared that training young children to follow class rules or instructions are very important in this stage. Children have to inhibit impulsive behaviour in order to focus and complete the task or to protect themselves in dangerous situations. For training inhibitory control, Teacher Elsa shared that:

For example, when children are playing gross-motor activities, and because of the limited space in the kindergarten, or sometimes there is some large equipment near the side of the table, it may be dangerous if they run too close. So, I have to remind them to stop when they are near. Children have to know how to control their movements when they are in danger. Sometimes we place traffic cones as a signal and children know they have to stop when they see a traffic cone.

Teacher Fanny expressed that kindergarten teachers may promote children's inhibitory control through daily routine training. For example, during transition time, children have to tidy up their toys and prepare to join the next activity, though they may still want to continue playing with the toys. Apart from transition time, many simple games are used to help to train children's inhibitory control in music lessons, such as Stop and Go, children have to walk or stop walking by following the teacher's instructions or music.

Teacher Cath, though she did not hear EF before also shared some games in training children's inhibitory control. In the game Simon Says, children have to control themselves not to act out the instructions if the teacher's instruction did not start with Simon says. "I think we can train children by some 'follow instruction games', such as Simon Says. They have to follow my instructions and do the corresponding actions, and can help to train children's inhibitory control."

4.2.3 Planning and Organisation

Teacher Bella, Elsa, Fanny, Heidi, Kate, Nolle, Head Teacher Gloria, Irene, Principal Jenny and Mavis suggested that project approach can help to develop children's EFs in the area of planning and organisation. During the activities in project approach, children have to plan what they would like to investigate; then design their learning mind map; and record what they have to do. Teacher Bella shared that: "We seldom used (mind maps) in thematic approach, but we design mind maps together with children when implementing project approach. Children have to organise the learning topic and the subtopics in the mind maps."

Teacher Fanny articulated that both project approach and the High-Scope approach can help to train children's EFs. She pointed out that not many kindergartens in Hong Kong adopt the High-Scope approach but many kindergartens implement project approach once or twice per year, such as her kindergarten.

I think project approach can provide room for children to display their ability.

Teachers do not pre-plan everything but follow children's interest to develop (the curriculum) together. I remember that when I was teaching a K1 class, it was very impressive that children brought various noodles and pasta to school for observation and investigation. All the ideas were suggested by the children and the role of the teachers is assisting them to complete (their ideas or plans).

Besides Fanny mentioned High-Scope approach can promote children's EF, Teacher Bella, Elsa, Heidi, Linda also suggested that the Plan-Do-Review session in High-Scope approach can help children to reflect the planning and the implementation of their plan. However, as their kindergartens do not adopt the High-Scope approach, they did not provide explicit examples on this.

Teacher Cath used to work at a local kindergarten adopting the High-Scope approach. She recalled that her students had nearly 50 minutes for free play at that time. There were different learning corners in the classrooms. They could choose to play at Math Corner or Language Corner etc. Teachers only act as a facilitator during free play time. When the children enter the classroom, they plan and tick (on the record sheet) which corners they would like to choose for that day. They have to review and reflect on what they have done or learnt at the end. Cath shared a case on how children plan and reflect.

I was teaching K3 class at that time, and there were three different art and craft activities for them (children) to choose from the art corner. They could select what they like but I reminded them that if they had selected play with clay the previous day, then they have to choose paper folding or drawing this time. And as Mothers' Day was coming, they were asked to make a paper-fold flower for their mother that week.

During reflection time, one of the children showed me his two artworks, one handcraft and one wood colour drawing. He found that he missed one art and craft activity (paper-folding flower) and said: "Aiya, I repeated one activity (drawing) and missed one activity (paper-folding)." Then I asked him: "So, did you complete your planning?" He said no and felt regretful. I continued to ask: "What will you do next time?" He said: "I will complete the most important thing first. Mother's Day card (with a paper-fold flower on top) is very important as I have to present my card to my mother next week." "So, what will you do next time?" I asked. He replied: "I will fold the paper flower first next time."

Beside project approach and the High-Scope approach, Bella suggested role play can enhance children's EFs which echo Vygotsky's theory. Bella explained that children can develop the skills on planning and organisation during role play.

The role-play activities could be in the form of an extension activity from a story.

Teachers usually provide assistance depending on children's age group. Teachers may

provide more guidance to those younger children such as K1 children and help them to decide their roles. For those older children (K2, K3), teachers will discuss with them and let them decide which characters are suitable for them. It allows children to plan the storyline and organise their role.

4.2.4 Cognitive Flexibility

Cognitive flexibility is the capacity for shifting, changing, or switching one's thinking or task. Teacher Heidi suggested an example is about children's ability of adapting or adjusting their behaviour to changing situations. She said that when children are promoted from K1 to K2 class, as the K2 class routines are different from K1, K2 class teachers may use different signals to remind them how to behave or respond. Children have to adjust their thinking and behaviour. Though Heidi only indicated this case is for EFs and did not specify it is related to cognitive flexibility.

Teacher Bella shared that project approach provides children an opportunity to solve problems and exhibit flexibility. She said during the conclusion phase of the project, children have to round up and present their learning outcome. Sometimes if their plan does not work, children have to change their plan. Bella recalled an example:

One of the projects I have led before is about restaurants. Children want to display their artworks of dim sum to the children from another class. They planned to set up a

restaurant in the pretend play corner and invite the other class's children to pretend to be their customers, so that they could serve them with the self-made dim sum.

However, the children from the other class had other duties on that day and were unable to join their pretend play activity of dining in a restaurant. Children showed their flexibility and changed the plan as they split the class into two groups, some of them pretending to be cooks and waiters, while some of them pretending to be customers.

From the examples provided by the teachers, it was found that training inhibitory control is part of kindergarten routine. Some participants (Elsa, Dolly) who provided many examples on training children step by step procedures did not mention much on this area. Elsa was unable to immediately recall any examples related to cognitive flexibility and the need for thinking. Kindergarten teachers provide significant amount of time in training children to follow instructions and daily routines to foster the smooth progression of learning. As a result, they are well-positioned to provide ample examples of how they promote children's attention, working memory, inhibitory control, and planning and organisation. This is corroborated with the class observation records.

4.3 Theme 3: Teacher's practices and children's behaviour on EFs in authentic kindergarten settings

In order to study how teachers promote children's executive function development in authentic situations, three kindergartens (KGA, KGB, and KGC) were selected for observation. The observation results helped to triangulate with the interview results.

Triangulation in research refers to the utilisation of multiple approaches to investigate a specific question or topic (Patton, 1999; Carter et al., 2014). The objective of triangulation is to increase confidence in the research findings by confirming a proposition using two or more independent measures. In this study, the researcher is able to obtain a more comprehensive and holistic understanding on how teachers enhance children's EF in the real situation the by combining the results obtained from interviews. This comprehensive picture of the results obtained through triangulation lends greater credibility to the study's conclusions (Tashakkori & Teddle, 2003).

The results of the observation were organised into two categories: (1) teacher's lesson planning and delivery, and (2) the physical environment setting. They revealed children's behaviour in the real situation and verified the results from the interviews.

4.3.1 Teacher's Lesson Planning and Delivery

The three kindergartens that were observed involved a variety of teaching strategies in their classrooms. The records of these observation were triangulated with the interview records to ensure the credibility of the study. Some teaching practices observed during class visits were aligned with the interview results.

4.3.1.1 The Observation Results of KGA

At KGA, two whole-class activities were observed, the first activity was conducted in English and the second activity was conducted in Chinese. The fifteen K1 children were sitting in a big semi-circle and facing the whiteboard. In the English lesson (from 9:45 to 10:00 am), the teacher led a creative activity where the children had to draw a monster. The teacher first demonstrated and started by sketching the monster's outline on the whiteboard. Then she asked children to take turns drawing a different body part for it. The teacher emphasised that the children had complete freedom to draw any number of body parts that they wanted. The students' creativity shone through as they drew unique features such as six eyes, three hairs, and even nine legs for the monster. After the demonstration, the teacher allowed the children to draw their own monsters on a sheet of paper and then write down a name for their creation. This activity not only showcased the children's artistic abilities but also fostered their creative and imaginative skills.

The next lesson (from 10:00 to 10:45am) was led by the Chinese teacher, Teacher Dolly. She used an action song to capture the children's attention before beginning the Chinese lesson. Dolly also encouraged the children to follow her instructions to clap their hands as warm-up. In addition, transitioning from an English lesson to a Chinese lesson required children to change their mindset and switch their way of thinking in order to effectively move on to the next task. Dolly's approach was able to facilitate the transitions that can help children to shift tasks, reminding them that they are now shifting from English lesson to Chinese lesson.

During the lesson, Dolly utilised PowerPoint with pictures to teach the children about park rules and guided them to reflect on appropriate behaviours when visiting a park. Dolly expressed concern about overcrowding at the park facilities, and asked the children what they would do in that situation. The child responded by suggesting that they should not push others away, but take turns. The child also suggested asking others to take turns, so that they can also play and enjoy the facilities.

Dolly pointed to the picture of a roundabout: "What should we do on the roundabout?"

Child A: "Should not spin too fast, (It is) very dangerous, (we) may fall down." "Um, yes." Dolly next pointed to the picture of a slide: "Can you stop moving on the slide when climbing up?" Child B: "It will block other people (for playing), we should not

block the others.” Dolly: “Oh, yes. What if other people stop moving on the slide?”

Child B: “We cannot push others away, we can say 'excuse me'.”

Dolly's practice is not to give children direct answers but instead, encourage them to reflect on the questions and find their own solutions or alternatives, which can promote problem solving. During the lesson, a child was very eager to share his ideas and kept interrupting with "me, me, me" hoping to be selected by the teacher. Dolly reminded the child to raise his hand and be patient, which can help him learn to inhibit his impulses. The practices of Dolly are quite similar to other participant's sharing during the interviews, especially on enhancing children's attention and inhibitory control.

4.3.1.2 The Observation Results of KGB

When observing the K2 class (from 2:00 to 3:00 pm), three small group activities were being conducted. The students were separated into three small groups and three different teachers led parallel activities. The three activities were mathematics, storytelling, and free play. Each group had to rotate around every 20 minutes to complete three tasks within an hour.

During the mathematics activity, the teacher introduced measuring tapes to the children who had previously only used rulers for measurement. The teacher demonstrated the use of a ruler and a measuring tape and encouraged the children to observe and compare the

two. A question was posed about the need for a measuring tape when a ruler is already available, which initially left the children puzzled. To demonstrate the advantages of a measuring tape, the teacher placed a ruler on her head and asked the children: "*How could you measure the circumference of my head?*" After some hesitation, a child raised his hand and said: "*Oh! I know!*" He came forward and put a measuring tape around another child to measure his head circumference.

Another group of children, led by Teacher Kate were free playing in the first 20 minutes. After that, it was story listening time. As they made the switch, Teacher Kate reminded them to tidy up the toys with the phrase "Ding Dong Ding Dong, please tidy up the toys." All of the children were able to neatly tidy up their toys and place them back in the right place, keeping things organised by matching the label on the carbine. Other participants in the previous interviews or observation also shared similar practices. The children then lined up and walked to the other side of the classroom to sit in a semicircle, where they listened to the story and watched the story's illustrations from a PowerPoint slide-show.

The story is about emotion management. The story starts with a young boy who is upset because he cannot go outside due to rain. During the lesson, Teacher Kate asked a variety of imaginative questions and encouraged the children to freely express their ideas. She also asked the children how to solve the problem presented by the rain, allowing them to guess without stopping them, even if the answer was not the same as the story. Towards the

end of the storytelling time, Teacher Kate taught the children how to manage their emotions and relax by leading them in a breathing exercise. The exercise involved counting from one to three and taking a deep breath together. Overall, Kate helped children to learn how to control and manage their emotion control, which can help in inhibitory control.

When observing the K3 class (from 3:00 to 4:00 pm), large group activities were being conducted. On the observed day, the class teacher, Linda, led an art and craft session. She offered two different paper plate crafts for children to choose from a Christmas tree or an angel. Linda proceeded to demonstrate how to divide and cut the paper plate into four equal parts, like a triangle. Then children formed the triangle-shaped paper either into a Christmas tree or an angel. Following the demonstration, Linda projected step-by-step production diagrams onto the screen, i.e., displayed pictures cues for guiding the children, which helped the children to remember the right procedures and complete the task in the right track, despite the potential for confusion while selecting between the two crafts.

During an art and craft session, Linda's practice similar to Teacher Elsa's account during the interview, teachers usually demonstrate step-by-step procedures to help children remember and execute the tasks. Moreover, it was found that some classroom practices were quite similar in KGA and KGB, children were sitting in a semicircle, and watching the PowerPoint slide-show prepared by the teachers.

4.3.1.3 The Observation Results of KGC

The last observed kindergarten was KGC. During the observation at KGC's K2 class (from 9:10 to 9:50 am), the children were first engaged in free play. When the session drew to a close, the teacher used a similar strategy to draw the children's attention, pointing to the clock and said: "*Ding Ding Ding, when the long arm of the clock points to four, you have to tidy up.*" After tidying up, the teacher invited two children to share what they had planned and played during the free play session to help them recall and review their planning.

It was their daily practice that only two children were able to share, the teacher saw some children were disappointed and comforted them, reassuring them they would have a chance to share tomorrow. The children learned important self-control skills, they have to control themselves and not to shout "me, me, me" and know they have to wait, suppress impulses, and defer gratification.

After the review session of the free play, the children were instructed to proceed to the physical play area. The teacher provided four instructions simultaneously to the children, including clapping their hands, standing up, pushing their chairs under the table, and lining up behind the red tape. All of the children were able to remember all the four instructions and lined up behind a red floor marking tape. It showed the teacher training children's working Memory daily by giving more than one instruction each time.

In the K3 class (from 9:50 to 10:50 am), the children were first sitting in a semi-circle and having a Putonghua class. Followed by the Putonghua lessons, it was free play time. During this time, a boy in K3 class used small Legos to construct a thin box and referred to it as a wallet. His class teacher, Noelle, was curious if the box was meant to hold money. She pointed to the opening of the box and asked: "So you will put the money here?" The child confirmed and said: "Yes." Noelle showed her concern that the money may fall out, she turned the thin box upside down and asked: "But the money will fall down! What can we do?" The child responded by adding a Lego onto the edge of the box and covered the opening, allowing it to open and shut securely. Teacher Noelle was seen in this case providing scaffolding to help children improve their problem-solving abilities. Over time, this may enable children to experiment with various problem-solving approaches and foster greater flexibility when confronted with challenges.

Another case showed that K3 children were able to demonstrate problem-solving and flexibility without teacher's assistance. A girl in the art and craft corner created two paper folding boxes without lids. She put the tops of the boxes together, hoping to pretend that the box had a lid, but found that the two parts could not fit together to make a complete box. Undeterred, she took some paper from the art corner and cut out flower petals which she then attached along the edges of the box. While the petals only partially covered the box, the girl seemed satisfied with her creation and proudly declared to her nearby classmate, "It's a fa fa

(flower) box." The girl demonstrated her flexibility by exhibiting different ideas or concepts in her mind. She is able to switch or change her mind and adapt to the outcome due to the limitations of the environment.

In the K1 class (from 10:50 to 11:50 am), there is an exploration corner where children can engage in various activities. During the free play session, one child entered the corner and immediately turned the sand timer upside down to countdown and began his explorations. He then proceeded to play with a torch, projecting an animal's image on the wall. Teacher Olivia noticed that he only played with the animal picture cards, so she decided to introduce the cellophane sheet to the child. The child tried overlapping the red and yellow cellophane sheet in front of the torch and was delighted to find that the light turned orange. He exclaimed, "Oh! It's orange! It became orange!" Olivia encouraged him to try other colours again, and the child mixed blue and yellow to create a new colour - green.

Later, during the interview, Olivia elaborated on the rules in her classroom's learning corners, including limitations on the number of children and duration of play at each corner. To promote self-control, planning, and time management, Olivia provided a 5-minute sand timer at the exploration corner. With this tool, children learn to monitor when playtime is over and have to tidy up the materials accordingly. Outside the corner, other children can also observe the sand timer and roughly know the waiting time. They can plan their next activity

to avoid waiting too long and being engaged. This enables children to learn how to plan and organise their time effectively.

After the 30-mins free play session, children had to tidy up and start the next lesson. Again, similar to the previous observation, children were sitting in a semi-circle and having a language lesson. This was a whole-class activity and children have to recognise some words related to Christmas.

Classroom observation revealed consistent information gathered from the interviews and among the classes. The effective teaching practices employed to promote children's attention, working memory, self-control, planning and organisation were quite similar to the interview results. The observation showed that teachers employed various strategies in their classroom practices which some of them were mentioned in the interviews. Such as using picture cues nursery rhymes to help children remember class rules; provide instructions or demonstration to help children remember step-by-step procedures.

KGC partially adopted the High-Scope approach in the free play session, and the observation records showed that during free play, teachers can support children's flexibility, planning and problem solving. However, Teachers also mentioned teaching approaches like project approach could not be observed. The teachers did not use simple games such as stop and go, Simon says to train children's executive functions in between the lessons on that day.

On the other hand, sitting in a semicircle is a quite common practice observed in teaching and learning among the three kindergartens.

Historically, the construct of EF has lacked a clear definition, encompassing various processes related to self-regulation, such as sustained attention and planning (Zelazo et al., 1997; Zelazo et al., 2016). However, in the last two decades, the research on EF and its development in childhood has increased, resulting in a more precise definition (Zelazo et al., 2016). EF is generally described as a distinct set of attention-regulation skills that are utilised in conscious goal-directed problem-solving. These skills encompass cognitive flexibility, working memory, and inhibitory control (Blair & Diamond, 2008; Diamond, 2013; Zelazo et al., 2016).

Although some of the participants indicated that they did not learn the term EF before, they generally know the term self-regulation and self-control. From the classroom observation, it was evident that while the teachers may not explicitly understand the term EF and did not deliberately focus on developing the young children's EFs, they did provide numerous forms of support to help the children enhance their self-control and self-regulation skills. This was evident in their ability to remain seated in a semicircle and attentively engage with the lessons delivered by the teachers. Children performed well in following class routines and they also demonstrated planning and flexibility in free play periods. Teachers

provided many supports to children on developing their self-regulation especially in the area of inhibitory control.

4.3.2 The Physical Environment Setting

According to the Reggio Emilia Approach, the environment plays a crucial role in facilitating young children's learning as the "third teacher" (Strong-Wilson & Ellis, 2007). Moriguchi (2014) also asserted that both interaction with a human or a non-human agent can contribute to children's EF skill advancement. During the observation, children were able to demonstrate some EF skills without the teacher's direct verbal instructions.

In all three kindergartens, children were encouraged to keep the classroom tidy and organised with the help of picture cues. To help children easily identify their storage cabinets, teachers affixed photos of each child onto their respective cabinets. Additionally, the toy shelves were labelled with specific colours or shapes in categories in order to assist children in properly sorting and storing toys after use. By providing visual cues as reminders of classroom routines, behaviour expectations, and organisation strategies, the environment also helps to support children's EFs development in the area of working memory and organisation.

During the class visit conducted at KGA, it was observed that the K1 children were able to effectively follow the class routine. To assist in this process, the teachers had posted cue cards containing pictures illustrating various class rules such as staying in their seat,

sitting properly, sharing, taking turns, and listening carefully. In one instance during an English lesson, a child stood up and started walking around. The teacher promptly pointed to the cue card displaying the message "Stay in my seat". The child quickly understood what was required and was able to control her impulses, returning to her seat promptly, it helped in developing inhibitory control.

At KGB, it is noteworthy that the K2 children demonstrate their organisational skills by matching toy labels and returning the toys in an orderly manner. During the show and tell session of the K3 class, it was observed that five responsible children were able to take out their books or pictures from their respective cubbies and follow the floor marking tape to line up on the floor. Jenny, the principal of KGB, mentioned that although EFs are not included in the school's curriculum, children learn the importance of queuing up for the toilet through daily practices and environmental cues. Additionally, by following picture cards with step-by-step procedures, they are able to execute certain tasks, such as washing hands procedures.

Notably, KGC had also used floor marking tape to help children line up and adhere to the class routine. During the interview, Mavis, the Principal of KGC, shared that they used a variety of methods and tools, tailored by the age group of the children, to help them remember and comply with the class rules. During the observation, it was observed that Principal Mavis' sharing held true in the K3 classroom where teachers had simply placed a square-shaped floor marking tape on the ground to indicate the starting point for the queue. The K3 students were

observed to neatly line up, one by one, behind this square. However, in the K1 classroom, it was necessary for teachers to affix a long, straight line on the floor to guide young children in lining up straight. Moreover, to encourage fairness and consideration for others, children can take turns and allow those waiting to play at those popular corners. Teachers provide a timer to children and switch for every five minutes. K1 class used a sand timer while K3 class used digital timer as K1 children may not recognise all the numerals.

To remind children of the available learning activities for the free play session, KGC teachers display picture cards of each learning corner on the board, along with their corresponding representation signs. Record books for all children are placed in letter holders below the board, allowing them to track their participation in each learning corner. K2 and K3 students can draw or mark the corners they have joined, while K1 students may stamp a corresponding chop on the picture of the corner in their record book.

Teachers demonstrated many examples of training children's EFs. With the support of the stimulating environment - the "third teacher", a non-human agent, the observed children were able to pay attention to the teacher, memorise and complete their tasks and exhibited a degree of self-control and flexible way of thinking during lessons or free play sessions.

The observation results also confirmed the findings from the interviews, as many of the strategies mentioned by the interviewees for supporting children's development of

executive functions (EFs) were also identified in the class visits. Such triangulation enhances the validation of the findings from different data sources.

4.4 Theme 4: Factors Affecting the Promotion of EFs in Kindergartens

The objective of this study is to gain insight into the current practices and values of kindergarten teachers regarding EFs. The information gathered from this study is intended to guide appropriate actions, such as professional development and teacher training in the future. To achieve this goal, this section will examine teachers' difficulties and challenges they face when promoting EFs and sort out resolutions for supporting teachers on promoting children's EFs in kindergarten.

4.4.1: Academic Focusing Environment in Hong Kong

Due to the intense and competitive atmosphere in Hong Kong, parents are driven to prioritise academic achievement. This leads kindergartens to place a greater emphasis on developing children's cognitive and intellectual abilities in preparation for the transition to primary school and to meet parental expectations.

Teacher Heidi, Fanny, Linda and Head Teacher Irene mentioned that the curriculum design of numerous Hong Kong kindergartens tends to be focused on academic learning.

Gloria, the head teacher, explained that due to the pressure of transitioning to primary school, there is a heavy emphasis on improving children's memory and academic performance in kindergartens. She noted that training executive functioning may require more time and parents may not see immediate results, but the outcome can be easily observed by measuring what children learned, such as the number of words that children recognise.

Gloria shared that parents place high regard on the evaluation of their children's academic progress. Teacher Cath further asserted that teachers tend to focus on training the abilities based on the children's learning assessment items set by the kindergartens. In the event that children are unable to meet these objectives, parents may convey their concerns to teachers and schools, adding pressure on teachers. Since the curriculum and assessment structure is established by the school management, it would be beneficial if school administrators give priority to EFs and advocate their importance to teachers and parents. In doing so, this can allow teachers to allocate more time to train children's executive functions. Teacher Fanny also shared Teacher Cath's views, if the children's assessment form does not include a particular item, teachers may not prioritise teaching that area. Cath raised an issue that school management plays a crucial role in curriculum and assessment design and sometimes teachers are quite passive when facing parents' demands.

Another participant, Principal Jenny, also shared her views from the perspective of the curriculum leader. According to Jenny, some parents experience conflicting emotions

regarding educational goals. They desire for their children to have an enjoyable learning experience, while on the other hand, they are influenced by the atmosphere in Hong Kong and are concerned that the curriculum may not be difficult enough, ultimately causing their children to fall behind others.

Jenny further explained that areas of child development are interdependent, and it is necessary to focus initially on training children's self-care abilities and responsibility. Then their working memory and ability to follow instructions should be also developed. Once children have acquired basic skills, it will facilitate their learning ability and progress of cognitive development, from the sensorimotor stage to the preoperational stage. As children become capable of executing various tasks, their self-esteem will increase as well. Therefore, whole-person development is critical and should not only focus on their cognitive development or academic performance. She expressed that: "Our kindergarten is a happy school. I also try to balance both joyful learning and academic performance. While we prioritise holistic development, we are also pleased to report that our students' academic abilities are not bad."

Jenny continued to articulate that each year their school holds a parent's meeting, with a sharing session to discuss the curriculum and where parents can express their preferences on all aspects of their children's learning and development, including EFs. This allows the school

to explain their educational philosophy and for parents to clarify their preferences, ultimately fostering mutual respect between the parents and the school.

According to Jenny's views, there does not have to be a trade-off between cognitive development and executive functioning development. In fact, training children in skills such as attention, working memory, inhibitory control, planning, organisation, and flexibility can actually scaffold their academic performance. Thus, adopting a holistic learning approach can help both areas of development complement each other. Furthermore, like Principal Jenny's suggestion, it is crucial for schools to communicate this message to parents and ensure that they are well-informed.

4.4.2: The Tight Schedule and Limited Manpower at Kindergartens

In Hong Kong kindergartens, teachers have a tight schedule and often struggle to complete learning tasks within the allotted three hours of school time. Teacher Fanny shared one of the challenges in developing children's EFs is the tight curriculum schedule in most Hong Kong kindergartens. K2 and K3 students are burdened with numerous classwork, including worksheet, penmanship, leaving teachers with limited time to train their EF within the restricted 3-hour daily schedule.

Fanny expressed that due to the relatively large class sizes (around 30 students in one class) in Hong Kong kindergartens, teachers often focus on instilling children's obedience

rather than cultivating their autonomy and self-direction. Teaching children to follow instructions, self-control can be beneficial for classroom management. However, if children are only taught to follow instructions, it may limit their variation and hinder the development of cognitive flexibility.

Teacher Noelle believes that certain EF skills should be mastered by every child, while some children may require additional support due to individual differences. However, teachers do not have the time or manpower to provide this extra assistance or follow-up.

Despite these challenges, Noelle shared:

I want to encourage my students to reflect on their progress and identify areas for improvement every day. Unfortunately, due to limited time and manpower, this can often be challenging. Just like the scenario you (the researcher) found today, a child was creating a wallet out of the Legos block and we discussed how to prevent the money from falling out. I would love to engage in these sorts of activities with my students every day, but reality does not allow me to do so. It is because the children have to complete all the classwork before free play periods. Sometimes, if some children have not finished the classwork, we have to accompany them to finish the classwork and then I cannot play with the children.

Teacher Kate mentioned that the half-day kindergarten schedule leaves little room for additional activities. Despite the desire to provide more learning opportunities, teachers are bound to follow the assigned curriculum. The situation may be better in a full-day kindergarten programme. She further expressed that, in addition to academic lessons, teachers also need to nurture students' soft skills, such as fostering children's initiative, executive skills, and social skills. Kate noted that while her students are well-behaved and attentive, their flexibility is not too remarkable. She said:

During regular lessons, I didn't offer enough opportunities for children to express themselves creatively. However, during free play, many children showed their creative and imaginative ideas. This led me to wonder if it's possible to allocate two or three sessions per week to foster children's free expression and exploration, even if it cannot be offered every day. It's important to provide such opportunities for children to nurture their creativity and flexibility.

Head Teacher Gloria shared that it is preferable to have a small group discussion with the students to set the class rules. It can help the children to develop planning and self-control. However, when there are 30 children in a class and the teacher-to-child ratio of approximately one to eleven or twelve, it is more manageable for teachers to enforce predetermined rules by posting them on the wall. Gloria said:

I have tried to develop class rules by encouraging my students to brainstorm together in group discussion sessions. It can nurture the children to follow social rules better as these agreements (class rules) are suggested by them. I find it is more effective to conduct these discussions in small groups with around five to six children.

According to Teacher Elsa, the class time is a fixed constraint and cannot be changed by teachers. It is challenging for children to accomplish everything within the three-hour time allotted during school hours. Elsa believes that full-day classes might be a better solution. Additionally, she suggested that: “schools and teachers can play a more active role in educating parents on how to improve their children's executive functions at home.”

During the interviews, participants highlighted the crucial issues of time and manpower limitations at kindergarten. Recognising that this situation cannot be resolved in the short term, a potential solution was suggested by Elsa: “exploring home-school collaboration may be a way to address this problem.”

4.4.3 Educator’s Knowledge, Beliefs and Attitudes on Children Development and EFs

In order to teach effectively, teachers must possess specialised knowledge in their subject area, including both content knowledge and pedagogical content knowledge (Shulman, 1986; Ball et al., 2008). Thus, in this session, the participants’ knowledge or

conceptions on EFs as well as their attitudes and beliefs on education and child development were presented.

As mentioned in theme 1, some participants were not familiar with the concept of executive functions, which is not commonly used in Hong Kong early childhood education. However, all participants, including those who were unfamiliar with EFs, were able to share some strategies to enhance children's EFs in daily activities. Teacher Dolly, mentioned that she was not aware of this term previously, but she could recall examples related to the concept from her daily practices. She said:

I can provide you with some examples (strategies on promoting EFs) based on my daily practices, but I must admit that I may not be able to articulate them in a concise and systematic manner. I think this term (EFs) should be introduced to the early childhood education field so that we can do better.

Teacher Olivia, who knew this term, mentioned that although teachers may have never heard of the term EFs, they do possess many teaching strategies and skills for classroom management. They could use their experiences to assist children in following daily routines. However, since EF skills consist of various cognitive and behavioural processes that teachers may not be aware of, it is essential to introduce the concepts to teachers. She further added

that: “In this way, they can learn about the different facets of EFs and help children enhance these skills systematically.”

Principal Jenny explained that the term EFs is relatively new in Hong Kong's early childhood education context. As a result, many teachers may not have heard of it before, and even Jenny had only come across the term one or two times. However, Jenny said that recent research has shown the importance of executive functions such as inhibitory control, working memory, and flexibility. Therefore, she believed it was valuable to inform teachers about it and provide training in this area. Jenny suggested:

Given that many teachers might not be up-to-date with current research since they received their training ten or eight years ago (means many years ago), I suggested including the concept of executive functions in both pre-service and in-school training. In this way, new teachers can bring new ideas to kindergartens, and existing teachers can modify their curriculum to better support children's development.

In addition to teachers' knowledge of executive functions affecting their practices to promote these skills in children, their beliefs and attitudes on child development also play a critical role. During the interviews, none of the participants expressed that academic ability was the most important attribute in early childhood development. This result was similar to the research by Diamond et al., (2007). The research found that most kindergarten teachers

agreed that self-discipline and attentional control are more important than literacy or arithmetic skills for school readiness.

The participants were believed that academic ability was not the most important in early childhood education, instead, they emphasised the importance of self-care ability and independence (as mentioned by Teachers Bella, Dolly, Elsa, Kate, Linda, Noelle, and Head Teacher Gloria), attention and following instructions (as mentioned by Teachers Elsa, Heidi, and Olivia), character (as mentioned by Teacher Heidi, Kate, and Noelle), and problem-solving (as mentioned by Teacher Cath, Noelle, and Olivia) as the most important attributes for children at this stage. Head Teacher Gloria, Irene, Principal Jenny and Mavis further added that during the interviews, actually all developmental areas are important for young children, both academic and non-academic development.

4.4.4 How to overcome the challenges and help teachers in promoting children's EFs in the future?

Based on the information gathered from interviews and class observation, it can be inferred that teachers prioritise the development of diverse skills in children, with a particular emphasis on self-care (especially keeping toys or belonging organised), attention, and following instructions. During free play sessions or project approach time, teachers provide opportunities for children to plan, reflect, solve problems by themselves and demonstrate

flexibility. The scenarios from the class observation also provided similar results. The participants provided examples of how they train children in these areas, which aligns with their personal values. Despite the academically driven environment in Hong Kong, these teachers do not solely focus on academic performance and instead uphold the values that they treasure.

In theme 1, the research results highlighted that teachers recognize the importance of EFs and display a positive attitude towards enhancing them in children. However, there exists a challenge in early childhood education where training other areas of development may consume time that could otherwise be allocated to academic development. Teacher Fanny opines that this is not a conflict, she said: “Kindergarten children spend a lot of time on penmanship, but actually, training working memory and inhibitory control can aid them in completing their homework more effectively.” Therefore, it is crucial to educate parents and teachers’ awareness on the significance of EFs since it can enhance children's academic performance instead of being a hindrance to their studies.

Head Teacher Irene further expressed that her kindergarten's education direction does not prioritise EFs. Those examples on how to promote children's EFs she provided in the interview are only minor matters during lessons. During staff meetings, the school management only discusses how to teach English and Chinese more effectively. Irene pointed out that since schools may not focus on EFs training for children, it places greater

responsibility on teachers to have the necessary knowledge, ability and skills to observe and provide assistance to children when necessary. She emphasised that: “It is crucial to raise teachers' awareness and foster a positive attitude towards promoting EFs, as many schools may not place a strong emphasis on EF training.”

In sum, to support teachers in promoting EFs in kindergarten, it is crucial to recognise the significant impact of teachers' knowledge, belief, and attitude on their teaching and classroom practice. According to the participants, the first way to improve this is to enhance teachers' awareness of the importance of EF and provide them with systematic training to teach young children effectively. When the teachers possess a positive attitude toward holistic development and believe that it will not hinder academic performance. They can then convey this message to parents, raising parents' awareness of promoting children's EFs.

Chapter 5 Discussion

This study aims to explore the strategies for enhancing children's executive functions in Hong Kong kindergartens and how Hong Kong early childhood educators' professional development and their knowledge on executive functions can be promoted. In this chapter, key findings from the study focusing on the research questions will be discussed. An overview of Hong Kong early childhood educators' conceptions of executive functions will be reported first. Next, how Hong Kong early childhood educators support the development of executive functions in their classroom practice will be examined, followed by a discussion of the practices of integrated EF training in kindergarten. Finally, the factors affecting early childhood educators' implementation of training on EF in their classroom will be discussed. This chapter concludes with implications, limitations of the study and finally recommendations for further study.

5.1 Summary of the Findings

The intention of this study was to explore Hong Kong kindergarten teachers' concept and practice of training children's EFs in classrooms. Results from Chapter Four indicate that the participants have all adopted various strategies that improved children's EFs in classes,

even without knowing the concept of “executive functions”. Their descriptions in interviews echo the class observation results, that they provided many opportunities for children to practise EF skills through self-care and daily routines training.

It was found in this study that teachers spent quite a lot of time and effort on training daily routine tasks, involving the EF skills of attention, working memory, inhibitory control and organisation. As a result, children performed quite well in these areas from the classroom observation. However, due to the large class size and the academic-focused environment in Hong Kong, teachers tended to conduct teacher-directed and large-group activities. They also experienced pressure from parents in prioritising classroom activities to complete academic contents. Free play time and child-directed activities that potentially promote EFs entail relatively less time than teacher-directed and academic activities.

Hong Kong kindergarten teachers often face the dilemma between parents' expectations and their beliefs. However, training children in EFs could actually benefit their school readiness and the future school success (Diamond et al., 2007). Therefore, it is worthwhile to educate parents on the importance of EFs.

5.2 Discussion of Findings for Enhancing Children’s EFs Development in Hong Kong

Kindergartens

The findings of this study provide insights regarding Hong Kong early childhood educators’ conceptions and practices of promoting children’s development in EFs. Four themes emerged from the interview transcripts and observation records. They are: (1) Educators’ knowledge, conceptions and views on EFs; (2) Teachers’ experiences on promoting children’s EFs; (3) Teachers’ practices and children’s behaviours on EFs in authentic kindergarten settings; and (4) Factors affecting the promotion of EFs in kindergartens. These themes help to answer the research questions by presenting participants’ views on EFs, and how they promote children’s EFs in classroom practices. Meanwhile, the participants also mentioned the challenges in nurturing children’s development with the academics focused situation in Hong Kong.

In the following sections, key findings from Chapter Four will be discussed based on the three research questions:

RQ 1: What are Hong Kong early childhood educators’ conceptions of executive functions?

RQ2: How do Hong Kong early childhood educators support the development of executive functions in their classroom practice? Specifically, what are the practices of Hong Kong early childhood educators when integrating EF training in classroom teaching and learning?

RQ3: What are the factors affecting early childhood educators' practices on promoting children's EF in their classroom?

5.2.1 Research Question 1: What are Hong Kong early childhood educators' conceptions of executive functions?

Understanding Hong Kong early childhood educators' conceptions about EFs is important as their concept of EFs may influence teaching priorities and practices. According to the participants, EFs is not a commonly used term in early childhood education and is relatively new to some teachers. Some participants learned this concept during academic studies or professional training such as special education courses or workshops. Educators learned about EFs in special education courses because children with special education needs are often deficient in EFs, necessitating additional training in this area. Teachers with the knowledge of EFs work primarily with children with special needs and they may not apply the concept deliberately in training mainstream children's EF in regular curriculum.

According to Dawson and Guare (2009), EFs may be considered a hidden curriculum in schools. Teachers may recognize the importance of EFs for student success, while they may not be aware that these skills can be taught explicitly, leading to gaps in the explicit training of these skills.

Kindergarten teacher training programs in Hong Kong do not typically cover cognitive psychology. However, for special education teacher training, an interdisciplinary approach is commonly used that highlights collaboration with physiotherapists, occupational therapists, and educational psychologists in special child care centres. Consequently, teachers with special education training may have some knowledge of cognitive psychology and have heard of EFs.

While the term EFs is not commonly used in the local early childhood education field, all participants were able to comprehend the meaning of each of the EF skills including attention, working memory, inhibitory control, planning and organisation and cognitive flexibility. Although teachers may not refer to EFs explicitly, they asserted that the daily routines and practices help to enhance children's abilities related to EFs such as paying attention, remembering and following the instructions, and exerting self-control. In this sense, the participants acknowledged the importance of executive functions for children.

Recent research has shown that EFs are linked to numerous positive outcomes, such as improved social cognition, social understanding, prosocial behaviour, social-emotional learning, and academic proficiency (Rabhari & Vaillancourt, 2015). Developing young children's EFs is important and it is worthwhile to promote EFs as learning outcomes in the early childhood education sector.

To summarise, findings from the study suggested that some teachers are not familiar with the concept of EFs, and the term EFs is not commonly used among Hong Kong kindergartens. Though the educators do not have a full picture in terms of knowledge and understanding of EFs, they have enhanced these abilities to their children in daily practices and recognize the significance of EFs for children. The study revealed that the participants' knowledge of the full set of EFs was limited, and the implications of this gap in teachers' knowledge will be further discussed in this chapter.

5.2.2 Research Question 2: How do Hong Kong early childhood educators support the development of executive functions in their classroom practice? Subquestion: What are the practices of Hong Kong early childhood educators when integrating EF training in classroom teaching and learning?

This study aims to investigate how educators promote children's EFs in Hong Kong kindergartens, so the practices that Hong Kong early childhood educators demonstrate in the classrooms were examined. In the interviews, participants mentioned a variety of strategies in daily practices to support children's EF development. To gain a deeper understanding of the implementation in real classroom settings, three kindergartens were visited and classroom observation were conducted in addition to the interviews.

This study's findings show that kindergarten teachers spend quite a lot of time training two of the EF skills, namely attention and inhibitory control, though they may not be aware of it. Education systems in Asian countries are dominated by teacher-centred approaches wherein students are passive recipients, accepting and absorbing what the teacher teaches (Wong, 2004; Loh & Teo, 2017). Due to the Asian teaching and learning style and the relatively large student-to-teacher ratio, Hong Kong kindergarten teachers have to manage and engage their students in lessons effectively through fostering good classroom behaviour.

As a result, children showed impressive performance in attention, working memory, inhibitory control, and organisation during class observation. For attention and working memory, children demonstrated their capabilities to effectively recall and comply with teachers' instructions and class rules. For organisation, children could remember and complete self-care tasks such as how to tidy-up their belongings or toys in order. In the class observation, it was common to see children sitting still in a semicircle facing the screen and learning with the aid of PowerPoints in large group lessons in all three kindergartens. So for inhibitory control, children could maintain appropriate behaviour, stay in their seats and sit properly.

During the preschool years, inhibitory control is a vital aspect of executive functioning that develops dramatically (Diamond & Taylor, 1996). It aids in the suppression of unnecessary thoughts or actions that may hinder children from completing tasks. Strong

inhibitory control skills among students in a classroom environment have been shown to enhance their ability to concentrate on pertinent information and activities, even in disruptive circumstances, like in a noisy classroom, as well as to recall and obey rules, such as waiting their turn in group play (McClelland et al., 2007). The above abilities are essential in an Asian teaching style classroom, and as indicated by observation results, teachers did pay lots of effort and have demonstrated proficiency in enhancing children's inhibitory control.

Findings also revealed that employing the curriculum of project approach or High-Scope approach can enhance the planning and flexibility skills of children. This is attributed to the fact that these approaches do not have pre-planned activities set solely by the teachers, allowing children to have the freedom to decide what they wish to do or learn. The results also showed project approach promoted children to have flexibility when facing problems, they could change their plans and solve their problems.

In accordance with the recommendations of the Hong Kong Education Bureau, both full-day and half-day kindergartens should provide at least 50 minutes and 30 minutes of free play session respectively every day. During classroom observation, it was noticed that some kindergarten classrooms partially implemented the Plan-Do-Review concepts from the High-Scope approach during the free play period, which allowed children to plan and execute their activities. Some children exhibited flexibility while creating art works, and teachers interacted with children and provided scaffolding when necessary. However, such practices were

observed in a few instances only. Moreover, the observed kindergartens mainly adopt the thematic approach curriculum, which restricts the frequency of project approach to once or twice a year. As a result, the researcher could not witness any instances relevant to the project approach.

From the interviews, various strategies to improve children's various executive functions, including attention, working memory, inhibitory control, planning, organisation, and flexibility were suggested. However, based on observation results, teachers allocated a greater amount of time to teacher-initiated rather than child-initiated activities, leaving children with not much choices during teacher-directed or organised lessons except the 30 mins free play period. As the project approach curriculum is implemented only once or twice a year, there offers fewer opportunities for children to develop and demonstrate planning or flexibility skills compared to other executive function skills.

Research in recent years has emphasised the benefits of play for enhancing learning and promoting brain development. It is also proven that children improve their EF skills through play. According to the findings, some participants suggested some simple games, such as pretend play, Stop and Go, and Simon Says, which can improve children's EFs in kindergartens. Gibb et al. (2021) developed a play-based program called Building Brains and Futures (BBF) to promote EF development in 3 to 5-year-old children and was found to be effective. The programme consisted of ten different 5-min skill building games selected to

enhance children's working memory, cognitive flexibility and inhibition. The ten games included were: dimensional change card sort, lips and ears, block building, musical freeze, opposites, pretend play, red light/green light, shared project, Simon says, and wait for it.

The simple games suggested by the participants are quite similar to the 10 skill building games employed by Gibb et al. Though teachers were not specifically targeting EF training when they played these games with children at kindergartens, these simple games in daily practice were able to support children's EFs development. However, unlike the ten skill building games provided by BBF, the simple games suggested by the teachers like Simon Say and Stop and Go are mainly for training children's inhibitory control. Their insufficient understanding of all aspects of EFs hindered their ability to conduct systematic EF training.

In 2016, Diamond and Ling conducted a meta-analysis of 84 studies examining the effectiveness of various interventions, programmes, and approaches in improving executive functions (EFs). The results of their analysis indicated that training specific and narrow EFs, such as working memory, can improve that skill and transfer to similar skills like attention, but not to dissimilar skills such as self-control or flexibility. To have widespread benefits, diverse skills must be practised, and real-world activities such as certain school curricula that can train diverse executive-function abilities have shown more widespread cognitive benefits than targeted in only training one particular area. Therefore, apart from adopting some simple games, embedding children in real world classroom curricula, like project approach and High-

Scope approach, as well as the free play period for supporting children's EFs development is also important. It is important to enhance awareness among teachers about the significance of all EF skills as Diamond and Ling's (2016) findings indicate that these skills cannot be transferred across dissimilar tasks. Thus, it is not advisable to just focus on training inhibitory control, or any one area of EFs, as all of them are crucial.

From the earliest age, children begin to develop attention and behaviour in ways that form the foundation for executive function skills, which include abilities like planning, problem-solving, and self-regulation. These early building blocks are critical for children's future success in school and in later life. Children's ability to control attention, behaviour, and emotions emerges during infancy and toddlerhood and continues to develop throughout childhood and adolescence. As they grow, children learn to regulate their attention and impulses, plan and organise their thoughts, and flexibly adjust their behaviour as needed. By providing a supportive real-life environment and opportunities for practice, caregivers and educators can help children strengthen these important skills (Blair & Ursache, 2011).

Overall, the findings indicated that participants all had some experiences in promoting children's development of EFs. Teachers offered many opportunities for children to perform attention, working memory, inhibitory control, planning and organisation through daily routine training in the classroom. Later in this chapter, we will discuss the implications of the

gap in improving the practices of promoting children's EFs, as teachers place greater emphasis on inhibitory control.

5.2.3 Research Question 3: What are the factors affecting early childhood educators' practices on promoting children's EF in their classroom?

Apart from exploring the practices of promoting children's EFs in Hong Kong kindergartens, it is worthwhile to investigate the factors affecting Hong Kong early childhood educators' implementation of training on EF. All participants claimed that they faced certain extents of challenges or constraints when promoting children's EFs. The major challenges for educators when implementing training of EFs are the academic-focused atmosphere in Hong Kong schools; the kindergartens in Hong Kong lacking time and manpower; and the kindergarten teachers with insufficient knowledge on EFs.

The first two challenges mentioned above are closely connected. The academic-focused atmosphere in Hong Kong's education system causes parents to expect kindergartens to prepare their children solely for primary school admissions, which has led kindergarten curricula to prioritise academic results over other aspects of learning. This has resulted in tight and pre-planned teaching schedules, with some teachers feeling pressured to prioritise teacher-guided lessons to meet parents' expectations. Unfortunately, child-guided activities and free play time are given less importance, leaving children with limited opportunities for

creative expression and flexible planning. Consequently, teachers have less spare time for interaction with children and may miss valuable teachable moments with children during free play sessions.

In the previous section, it was observed and discussed that teachers tended to allocate more time to teacher-initiated activities than to free play or child-directed activities. In the interviews, teachers also revealed that they were facing challenges related to insufficient time and staff when promoting children's EFs. Teachers acknowledged that providing more opportunities for free play or free-choices could facilitate the development of children's EFs. However, they do not have enough time to complete the pre-planned curriculum while at the same time attending to ad hoc activities initiated by children.

Kindergartens are influenced by parental expectations, making it important that there is an alignment between parents and teachers' expectations. Parents generally expect teachers to help prepare their children for primary school (Chan, 2012). Kindergartens can strengthen their collaboration with parents by promoting the benefits of improving EFs. It is important to emphasise to parents that academic learning and EF training are not contradictory; instead, they complement each other. Research found that inhibitory control skills help children to concentrate on learning tasks and are related to cognitive abilities and academic achievement in Mathematics, vocabulary, phonemic awareness, and reading (Blair & Razza, 2007). A lack of inhibitory control skills is also associated with higher levels of aggression and negative

emotions, as well as decreased rates of prosocial behaviours and lower overall social competence (Rhoades, Greenberg, & Domitrovich, 2009).

The previous section discusses teachers' inadequate knowledge in EFs. That discussion reveals the last factor affecting teachers' implementation of enhancing children's EFs. In short, the term EFs is not widely known in the Hong Kong early childhood education sector. Teachers and principals should work persistently on professional development to keep abreast of educational trends, allowing them to effectively provide up-to-date information to parents. Parent education and actively communicating with parents can help to narrow the gap in expectations between parents and schools.

5.3 Implications

The purpose of this study is to explore the strategies used in Hong Kong kindergartens to encourage the development of children's EFs. In addition, the study aims to offer practical advices for teachers, kindergartens, and teacher training programme developers, and parents in supporting the cultivation of children's EF skills. In such way, this study hopes to provide valuable insights that can support the future professional development of early childhood educators in Hong Kong.

5.3.1 Theoretical Significance of the Findings

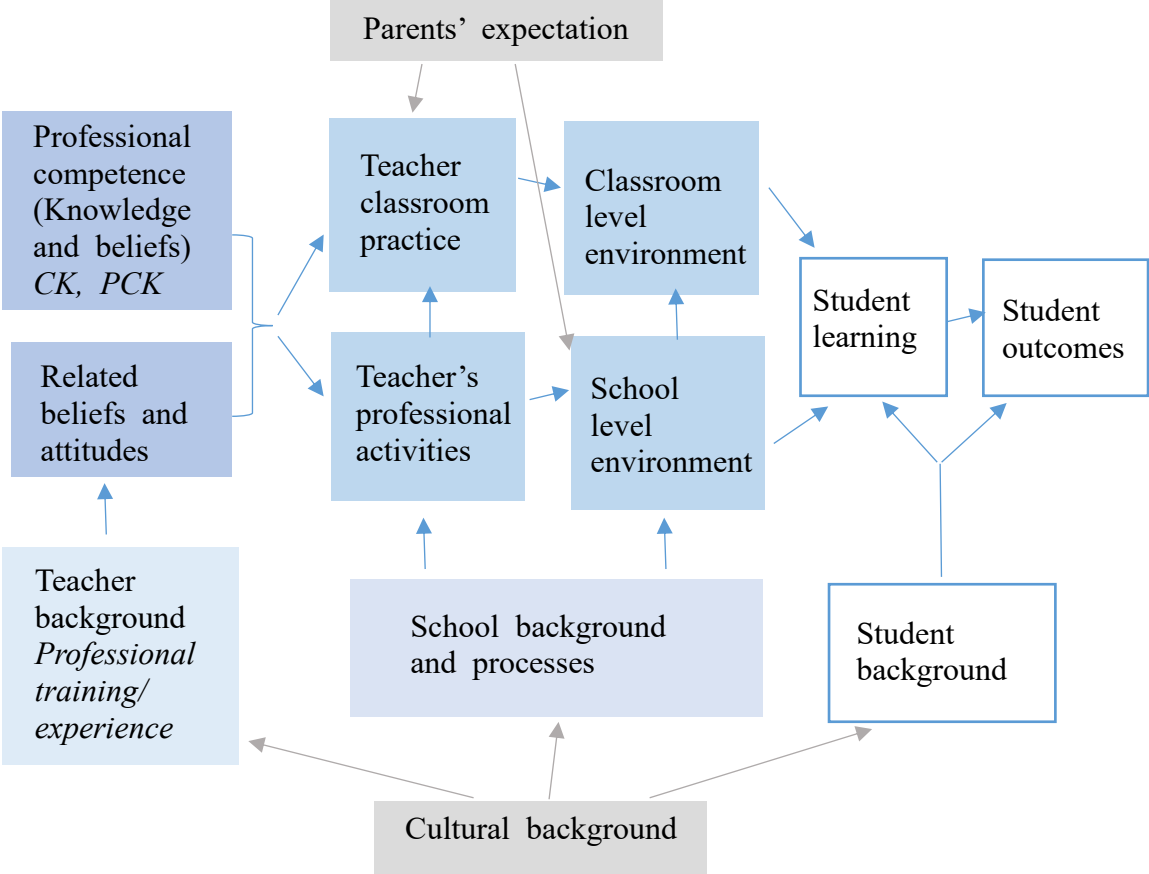
The findings revealed that early childhood educators in Hong Kong believed that academic ability was not most important during the early years. On the contrary, they prioritise qualities such as self-care ability, independence, attention, following instructions, character, and problem-solving skills over academic ability. However, the high expectations of parents concerning their children's academic performance occasionally influenced the teaching practices of kindergarten teachers. The emphasis on academic performance in Chinese culture contributes to an environment in Hong Kong that prioritises children's academic ability.

TALIS's framework mentioned in Chapter 2 illustrates that teachers' background including professional training and experience affects teachers' professional competence and their beliefs and attitudes related to teaching. These two components further affect teachers' classroom practice and teachers' professional activities (OECD, 2009).

Teachers' teaching practices can be influenced by a range of factors. In addition to their personal beliefs, professional training, and competence, other elements, including cultural background and the involvement of various stakeholders in the education system, such as parents, can also have an impact on teachers' practices. The following diagram bases on

TALIS’s framework but further illustrate with the factors of cultural background and parents’ expectation on influencing teachers’ teaching practices and beliefs.

Figure 5.1
Framework for analysing teaching practices and beliefs



The findings of this study also provided insights regarding Hong Kong early childhood educators’ conception of EFs and their practices and difficulties on enhancing children’s EF skills. As mentioned in Chapter One, the findings of this study have several implications to different stakeholders in the education field. First of all, it provides an opportunity to teachers for reflecting their teaching practices and beliefs. Next, it provides insights to schools on how to support children’s EFs development. Then, it provides insights to teacher training

programmes on how to equip teachers with knowledge and foster their professional development. Finally, it provides insights to parents on the importance of EFs. The following sections will present these four implications one by one.

5.3.2 Implications on Teaching and Learning for Frontline Kindergarten Teachers

The results of this study suggest a discrepancy between teachers' beliefs and practice. On one hand, educators believe that academic performance is not the most important outcome in early childhood. Self-care abilities, character development or holistic development are deemed most important in this stage. On the other hand, they face pressure from parents on enhancing children's academic performance. They also need to fulfil the assessment criteria on student performance laid down by the school and hence they tend to prioritise addressing academic contents specified on the assessment criteria. Teachers' practices are thus affected by the accountability for children's performance to both parents and schools.

Additionally, results found that educators were not familiar with the concept of EFs, which is not commonly adopted in early childhood education. Thus, teachers are unable to provide balanced and systematic training on EF. This highlights the need for professional training for educators in this area, who must keep themselves updated with new and advanced pedagogical knowledge. According to Wong and Rao (2015), before the 1980s, no qualifications or credentials required to work as a kindergarten teacher. From the 1980s to

1997, it was a transitional stage, academic qualifications of kindergarten teachers raised as they had to complete the Qualified Kindergarten Teacher programme. Kindergarten teacher training somehow was viewed as vocational training at that time, gearing towards teaching practical skills and hands-on strategies. The main providers were Hong Kong Institute of Vocational Education - Lee Wai Lee Campus, the Hong Kong Polytechnic University, and the Grantham College of Education.

By 2005 - 2006, 94.4% of kindergarten teachers had acquired the QKT qualification (Wong & Rao, 2015) and several Universities gradually offered bachelor degree programmes in early childhood education. As teacher qualifications have improved over time, continuing professional training has become essential to not only help teachers gaining subject knowledge on EFs, but also to strengthen their professional identity.

In short, continuing professional training on EF is essential for helping kindergarten teachers to gain the latest pedagogical knowledge; ground teachers' beliefs with solid theories; and improve kindergarten teachers' professional identity. Teachers uphold their beliefs without being easily affected by external factors such as parents' expectations or academic-focused environments that can minimise the discrepancy between teachers' beliefs and practices. Furthermore, if kindergarten teachers have access to current research-based knowledge such as EFs, they could employ better pedagogical approaches which could benefit children's learning outcomes significantly.

5.3.3 Implications on Curriculum Planning for Kindergartens

The findings show that teachers already employed simple games into their daily practice but those games usually focus on training inhibitory control which cannot fully develop all aspects of EFs. The findings also indicate that Hong Kong kindergartens place a strong emphasis on discipline for helping children focus on learning. As those simple games usually last for 5 to 10 minutes they can be easily integrated into the existing curriculum. Therefore, kindergartens can incorporate the simple games including the training of all areas of EFs systematically into their curriculum. Teachers can be introduced to incorporate different games into their daily practice, for example during transition between lessons to help children develop executive functions.

Another implication of these findings is that kindergartens should encourage use of free play and children-directed activities, which are both important for the development of executive functions. Findings suggest that these activities provide children with opportunities to develop their creativity, problem-solving skills, and self-regulation, all of which contribute to the development of executive functions. Additionally, real-world learning experiences, such as project-based learning and the High-Scope approach, can also be effective in developing children's executive functions.

Furthermore, kindergartens should consider providing teachers with more time and human resources to incorporate executive function training into their curriculum. Teachers are often very busy and prioritise teaching academic content to devote to non-academic activities. Therefore, kindergartens should consider re-allocating some resources to ensure that teachers have the time and materials necessary to effectively integrate executive function training into their daily practice.

In addition, kindergartens should consider adopting a holistic approach to education that includes the development of executive functions alongside academic learning. This can help ensure that children are well-rounded and prepared for success in all areas of life. Moreover, kindergartens should consider collaborating with parents and caregivers to reinforce executive function development at home. This can help ensure that children receive consistent support for their executive function development across different contexts.

Overall, the findings suggest that kindergartens should not only focus on academic learning, they should balance all aspects of development in their curriculum. By providing teachers with training on executive function development and encouraging the use of free play and real-world learning experiences, kindergartens can help ensure that children develop the skills necessary for success in all areas of life. Additionally, kindergartens should consider allocating more time and resources to EFs training and adopting a holistic approach to education that includes both academic and non-academic learning.

5.3.4 Implication for Development of Teacher Training Programmes

The findings indicate that Hong Kong kindergarten teachers are not familiar with the concept of executive functions and that have important implications for the development of teacher training programmes. Given that executive functions are crucial for school readiness and future success, it is imperative that teachers are equipped with the knowledge and skills to help children develop their executive functions in a balanced and systematic manner.

One implication of these findings is that teacher training programs should incorporate the topic of executive functions into their curriculum such as in cognitive development of young children. This can be done by providing teachers with an overview of what executive functions are and how they contribute to children's development. When teachers recognize the importance of executive functions in children's development, it can enhance their awareness of promoting children's executive functions in their daily practice.

Teachers should also be introduced to different activities and strategies that they can incorporate into their daily practice to help children develop their executive functions. This can be accomplished through pre-service teacher training courses or in-service teacher development workshops, which can include introducing activities that specifically target on improving attention, working memory, inhibitory control, planning, organisation and cognitive flexibility, all of which are key components of executive functions.

Another implication of these findings is that teacher training programmes should provide teachers with a deeper understanding of how executive functions develop over time and how they can be effectively trained. This can include providing teachers with information on the different stages of executive function development, as well as the different factors that can influence the development of executive functions. Teachers should also be provided with information on how to assess children's executive functions and how to implement strategies to address any deficits that may be identified.

It is also important to note that professional knowledge on executive functions should not be limited to special education. While traditionally, children with special needs are known to have executive function deficits, research has provided evidence that executive functions are important for all children, including those without special needs. Therefore, teacher training programs should incorporate executive function development into general early childhood education as well.

Overall, the findings suggest that there is a need for teacher training programs to address the topic of executive functions in a comprehensive and systematic manner. By doing so, teachers can gain the knowledge and skills necessary to help children develop their executive functions, which can have a positive impact on their school readiness and future success. Additionally, it is important that teacher training programs keep pace with current research and integrate new findings into their curriculum, as research on executive functions

is an evolving area of study. By prioritising the development of executive functions in early childhood education, we can help ensure that all children have the opportunity to reach their full potential.

5.3.5 Implication for Parents

The study indicates that Hong Kong parents are affected by Chinese culture, which places a strong emphasis on academic achievement and diligence. While parents are focused on academic performance, they may not be aware that EFs are very important for children's school readiness and future success. Therefore, it is crucial to educate parents on the importance of executive function training and provide them with the necessary resources to support their children's development.

One implication of these findings is that schools should provide parental education courses on executive function training. These courses can help parents understand what executive functions are and how they contribute to their children's development. Parents can also be introduced to different activities and strategies that they can use at home to help their children develop their executive functions. This can include activities that focus on improving working memory, inhibitory control, and cognitive flexibility, all of which are key components of executive functions.

Another implication of these findings is that parents may need to reflect on their child-bearing practices. Parents may have misconceptions that executive functions are innate abilities that children would automatically acquire. However, research has shown that executive functions can be trained and developed through appropriate activities and experiences. Therefore, parents may need to reflect on their own parenting practices and consider incorporating more activities that support the development of executive functions into their child's daily routine.

Overall, parents play an important role in supporting their children's executive function development. By providing parental education courses and encouraging reflection on their parenting practices, schools can help parents understand the importance of executive function training and provide them with the necessary resources to support their children's development. Parents should be made aware that executive function training is just as important as academic achievement and that they can play a critical role in helping their children develop these important skills. By working together, parents and schools can ensure that children receive the support they need to develop the skills necessary for success in all areas of life.

5.4 Limitations

Like any other research, this study still has room for improvement. Owing to the restriction of timeframe, limited resources, and participants' experiences and knowledge, there are some limitation and difficulties in this research. First of all, the original targeted interviewees for this study were early childhood educators with diversified backgrounds. They have various teaching experience and academic level and work at different kinds of kindergartens. However, two novice target teachers with Higher Diploma qualifications declined the invitation as they did not feel comfortable to participate in the interviews, resulting in the sample comprising only experienced teachers of which most were degree holders.

Additionally, the participating kindergartens were well-established with a good reputation, all the participants were able to offer ample strategies as examples in interviews and demonstrated rich activities in class observation. Teachers who participated in the study are all dedicated to education and willing to share their experiences and contribute to the field. Therefore, even if some of the participants are not familiar with the term EFs, they can understand the meaning of each EF skill and articulate strategies since they are well-educated and experienced teachers. It should be noted that these findings may not be applicable to all teachers.

Apart from the above limitations, there were also some difficulties encountered by the researcher when conducting the research. During 2019 to 2021, the outbreak of COVID-19 led to the temporary closure of kindergartens, making it challenging for the researcher to arrange visits. Each class was observed for approximately an hour due to time constraints. Despite the limited time, the kindergarten principals were considerate and did not arrange classes on writing exercises for observation. They also expressed a desire to provide the researcher with more opportunities to observe how teachers interacted with children.

Finally, some participants mentioned some scenarios that happened in the project approach activities. Unfortunately, none of the kindergarten was conducting project approach on the dates that the researcher visited. The teaching and learning activities were recalled and reported by the participants. Though the researcher did have follow-up questions for more detailed information on interesting examples, more comprehensive data on how teachers promote EFs through project approach in a real situation could be collected if the researcher had class observation.

5.5 Research Recommendations

Based on the findings of this research, there are several recommendations for future research related to the topic of executive functions. Firstly, future research could explore how teachers promote children's executive functions during the implementation of project-based

learning approaches in the classroom. The current study did not observe how teachers promote executive functions during project-based learning, which is an important area to explore given the potential benefits of project-based learning for executive function development.

Moreover, this study aims to explore teacher's conception on EFs and strategies adopted in Hong Kong kindergartens for enhancing children's EFs. Due to time limitations and intermittent school suspensions caused by the pandemic, the researcher could only conduct one visit to each kindergarten. Therefore, in future research, it would be beneficial to arrange multiple visits to the same kindergarten. This would allow for an in-depth investigation using experimental design as to assess whether the children's executive functions have improved as a result of the teachers' intervention. It would provide stronger evidence of the impact of the teaching strategies on the enhancement of executive functions.

Furthermore, future research could explore the long-term outcomes of executive function training in early childhood education if multiple visits were possible. While the current study provides evidence that executive functions are important for school readiness and future success, it would be useful to understand how early executive function training may impact children's academic and social-emotional development in the long term. This would provide a more comprehensive understanding of the importance of executive function training and could inform early childhood education policies and practices.

Finally, future research could include the perspectives of parents on EFs. The purpose of this study is to explore the conceptions of early childhood educators regarding EFs and the approaches they employ to enhance children's EFs in kindergartens. Consequently, data were gathered through interviews conducted with teachers and principals, excluding parents. Nonetheless, the findings indicated that parents' expectations also influenced teachers' prioritization of teaching strategies. Therefore, it is recommended that future studies consider incorporating interviews with parents to examine the impact of parental involvement in promoting children's EFs. Parents play an important role in supporting their children's development, it would be useful to understand how parental involvement can contribute to the development of executive functions in young children.

Overall, there is a need for further research on executive functions in early childhood education. By exploring the views and practices of novice teachers, the impact of project-based learning, and the long-term outcomes of executive function training, we can gain a better understanding of how to effectively incorporate executive function training into early childhood education. Additionally, by exploring the role of parental involvement in promoting executive function development, we can ensure that children receive consistent support for their executive function development across different contexts. By prioritising research on executive functions in early childhood education, we can help ensure that all children have the opportunity to reach their full potential.

5.6 Conclusion

In conclusion, the findings of this research provide implications for the development of children's executive functions in early childhood education. The study revealed that teachers employed various strategies and approaches to support the development of children's executive functions, including the use of simple games and teaching approaches like project approach and High-Scope approach. However, there were also discrepancies in the beliefs and practices of teachers, with some teachers not being familiar with the concept of executive functions.

One of the main recommendations from this study is the need for teacher training on executive function development. It is important for teachers to understand the importance of executive functions for children's future success and to be equipped with the knowledge and skills to effectively incorporate executive function training into their teaching practices. Furthermore, professional development of teachers is needed to help bridge the gap between teachers' beliefs and practices by providing evidence-based theories.

Another recommendation is the need for kindergartens to embed simple games for training executive functions in the school curriculum. These games can be easily integrated into the existing curriculum and provide children with opportunities to develop their executive functions in a balanced and systematic manner. Additionally, kindergartens should provide

more child-directed learning opportunities, such as free play periods, project-based learning, and High Scope Learning, which have been shown to support the development of executive functions.

Future research can further explore how teachers promote children's executive functions during project approach in authentic classroom settings, as well as the long-term outcomes of executive function training in early childhood education.

Overall, this research highlights the importance of executive function development in early childhood education and the need for teachers to be equipped with the knowledge and skills to effectively incorporate executive function training into their teaching practices. With the right support and resources, children can develop the skills necessary for success in all areas of life, including academic achievement, social-emotional development, and future success. By prioritising the development of executive functions in early childhood education, we can help ensure that all children have the opportunity to reach their full potential.

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APPENDICES

Appendix 1

*For Participants

Hong Kong Baptist University **STUDY INFORMATION SHEET**

[Exploring Effective Strategies for Enhancing Executive Functions in Kindergarten]

I am TONG Lok Yi, student of Doctor of Education at Hong Kong Baptist University, you are invited to participate in this research study. The purpose of this study is to explore early childhood educators' perspectives on executive functions (EFs) and explores how to enhance children's executive functions through different strategies or activities in kindergarten setting.

INFORMATION

In this study, around 12 early childhood educators from different schools will undergo one to two sessions of individual interviews in order to examine their perspectives on EFs and find out what strategies have been adopted in their classrooms/schools for enhancing children's EFs. Each interview lasts for about 45 mins and will not involve any risk or discomfort to the participants. Around 2 to 3 kindergarten teachers among the participants will be invited to undergo a 30-45 mins class observation which will be conducted by the researcher in order to obtain more in-depth and concrete information.

BENEFITS

By taking part in this study, you can get a better understanding on EFs and review how to enhance children's EFs through different strategies or activities in kindergarten setting. The results will help your schools/ teachers plan for appropriate strategies to promote EFs in the future.

CONFIDENTIALITY

Number codes will be used in the research paper, the real names of the participants will not be disclosed. The interviews will be audio-recorded and transcribed by the researcher. All the data will be destroyed in three years when the research is completed.

CONTACT

If you have questions at any time about the study or the procedures, you may contact the researcher, Tong Lok Yi, (student of Doctor of Education at Hong Kong Baptist University, at 9826 2322) OR her supervisor, Prof. Vicky Tam, (Department of Education Studies at 3411 5690). If you feel you have not

been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact the Research Ethics Committee by email at hkbu_rec@hkbu.edu.hk or by mail to Graduate School, Hong Kong Baptist University, Kowloon Tong, Hong Kong.

PARTICIPATION

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time without penalty. If you withdraw from the study before data collection is completed your data will be destroyed.

This information will be presented to the subjects in written form.

CONSENT

I have read and understand the above information. I have received a copy of this form. I agree to participate in this study.

Signature of the Participant _____ Date _____

Appendix 2

*參與者適用

香港浸會大學

同意書

「探討如何能有效地提升幼兒的執行功能」

本人湯珞怡是浸會大學教育博士課程之學生，現誠邀你參加是次研究，以了解幼兒教育工作者對執行功能之看法，以及探討如何能有效地提幼兒的執行功能。

本研究將會邀請大約十二名幼兒教育工作者，進行一至兩次次面談訪問，需時約四十五分鐘。訪問後，亦會邀請其中的兩至三位參與者，參與由本人進行之教學觀察，以進一步獲取更深入及具體的資料。

參加本研究後，教育同工可以反思如何能更有效地提升幼兒的執行功能。調查結果亦能幫助老師和學校策劃合適的教學方案以促進幼兒的執行功能。此項研究不會令參與者面對風險或感到不安。若你在訪問過程感到不安，你可拒絕參與。參與本研究屬於自願性質。如果你中途退出，有關數據會被銷毀。

所得數據將會保密，在本研究完成後三年內銷毀。數據會用作研究報告及發佈，研究報告只報導總體分析結果，個別參與者身份絕不會被識別出來。如果閣下對本研究或其程序有任何疑問，歡迎隨時聯絡研究員湯珞怡（香港浸會大學教育學系博士生，電話：9826 2322）或其指導導師譚尚芸教授（香港浸會大學教育學系，電話：3411 5690）。閣下倘若認為研究安排不符本同意書所述，或者期間覺得作為參與者的權利受損，可以聯絡香港浸會大學（電郵至 Research Ethics Committee：hkbu_rec@hkbu.edu.hk，或郵寄「九龍塘香港浸會大學研究院」）。

同意書

我已經閱讀和明白上述內容，並已經收到本同意書副本。我願意參與本研究項目。

參加者姓名及簽名 _____ 日期_____

Appendix 3

*For the School Principal of the Participants

Hong Kong Baptist University

STUDY INFORMATION SHEET

[Exploring Effective Strategies for Enhancing Executive Functions in Kindergarten]

I am TONG Lok Yi, student of Doctor of Education at Hong Kong Baptist University, your teachers are invited to participate in this research study. The purpose of this study is to explore early childhood educators' perspectives on executive functions (EFs) and explores how to enhance children's executive functions through different strategies or activities in kindergarten setting.

INFORMATION

In this study, around 12 early childhood educators from different schools will undergo one to two sessions of individual interviews in order to examine their perspectives on EFs and find out what strategies have been adopted in their classrooms/schools for enhancing children's EFs. Each interview lasts for about 45 mins and will not involve any risk or discomfort to the participants. Around 2 to 3 kindergarten teachers among the participants will be invited to undergo a 30-45 mins class observation which will be conducted by the researcher in order to obtain more in-depth and concrete information.

BENEFITS

By taking part in this study, your teachers can get a better understanding on EFs and review how to enhance children's EFs through different strategies or activities in kindergarten setting. The results will help your schools/ teachers plan for appropriate strategies to promote EFs in the future.

CONFIDENTIALITY

Number codes will be used in the research paper, the real names of the participants and your school will not be disclosed. The interviews will be audio-recorded and transcribed by the researcher. All the data will be destroyed in three years when the research is completed.

CONTACT

If you have questions at any time about the study or the procedures, you may contact the researcher, Tong Lok Yi, (student of Doctor of Education at Hong Kong Baptist University, at 9826 2322) OR her supervisor, Prof. Vicky Tam, (Department of Education Studies at 3411 5690). If you feel your teachers have not been treated according to the descriptions in this form, or your teachers' rights as a participant in research have been violated during the course of this project, you may contact the Research Ethics

Committee by email at hkbu_rec@hkbu.edu.hk or by mail to Graduate School, Hong Kong Baptist University, Kowloon Tong, Hong Kong.

PARTICIPATION

Your teachers' participation in this study is voluntary; they may decline to participate without penalty. If they decide to participate, they may withdraw from the study at any time without penalty. If they withdraw from the study before data collection is completed their data will be destroyed.

This information will be presented to the subjects' principal in written form.

Appendix 4

*參與者之學校校長適用

香港浸會大學

同意書

「探討如何能有效地提升幼兒的執行功能」

本人湯珞怡是浸會大學教育博士課程之學生，現誠邀 貴校之老師參加是次研究，以了解幼兒教育工作者對執行功能之看法，以及探討如何能有效地提幼兒的執行功能。

本研究將會邀請大約十二名幼兒教育工作者，進行一至兩次次面談訪問，需時約四十五分鐘。訪問後，亦會邀請其中的兩至三位參與者，參與由本人進行之教學觀察，以進一步獲取更深入及具體的資料。

參加本研究後，教育同工可以反思如何能更有效地提升幼兒的執行功能。調查結果亦能幫助老師和學校策劃合適的教學方案以促進幼兒的執行功能。此項研究不會令 貴校之老師面對風險或感到不安。若 貴校之老師在訪問過程感到不安，他們可拒絕參與。參與本研究屬於自願性質。如果他們中途退出，有關數據會被銷毀。

所得數據將會保密，在本研究完成後三年內銷毀。數據會用作研究報告及發佈，研究報告只報導總體分析結果，個別參與者身份及 貴校之名字絕不會被識別出來。如果閣下對本研究或其程序有任何疑問，歡迎隨時聯絡研究員湯珞怡（香港浸會大學教育學系博士生，電話：9826 2322）或其指導導師譚尚芸教授（香港浸會大學教育學系，電話：3411 5690）。閣下倘若認為研究安排不符本同意書所述，或者期間覺得作為參與者的權利受損，可以聯絡香港浸會大學（電郵至 Research Ethics Committee：hkbu_rec@hkbu.edu.hk，或郵寄「九龍塘香港浸會大學研究院」）。

Appendix 5

Interview Questions

1. 你在幼稚園工作了多久?
 2. 在幼稚園階段中，當你見到小朋友能夠在哪些能力有發展/進步，令你最感到欣慰?
有特別/有趣的例子分享嗎?
 3. 你有聽過「執行功能」嗎? 如有，在什麼地方認識「執行功能」?(如果未有聽聞「執行功能」，研究員可簡介一下) 如果未有，你有否使用其他意思相似的詞彙?
 4. 你認為提升「執行功能」(或工作記憶、自制能力等) 重要嗎? 在香港的幼兒教育界普及嗎? 你有例子分享嗎?
 5. 為了達到上述的能力發展，你會常用哪些教學策略?
例如與小朋友制作腦圖、扮演遊戲.....
 6. 這些教學策略能如何提升幼兒的「執行功能」?
 7. 在你而言，提升小朋友「執行功能」有何難處及不足之處? 校方有相關的配合嗎?
-
1. How long have you been a kindergarten teacher?
 2. Children demonstrated a big improvement in which area(s) will make you feel most appreciated in the early childhood stage? Any interesting examples?
 3. Did you hear about the term “executive functions”? If yes, where have you encountered the information about executive functions?

(If not, the researcher can briefly explain: Executive functions are a set of skills, such as working memory, inhibition, cognitive flexibility that relate to students' abilities to manage their own learning and behaviour.) Please briefly describe your understanding about executive functions in your own words or alternative terms when referring to the set of skills mentioned above.

4. Do you think “executive functions” are important? Why or why not? Do you think EFs are well known in Hong Kong Kindergartens? What are your experiences on promoting “executive functions” in kindergarten settings?
5. Please indicate any strategies or activities that you currently use in your classroom to support “executive functions”.

(The following are some examples for the teachers if they need some clues:)

Brainstorming or mind mapping, pretend play/ role play, games require taking turns,

6. Based on your experiences, how the above strategies or activities promote the development of “executive functions”?
7. What are the challenges when promoting “executive functions”? Any support from school?

Appendix 6

Observation Guide

是次之教學觀察，目的旨在觀察老師能如何能提升幼兒的執行功能。在觀察期間，研究員將不會進行錄影、錄音或拍照，亦不會參與在該教學活動中。研究員只會抄錄一些筆記，作為研究次用，而所有文字記錄會於研究完成後三年內銷毀。

This class observation aims to observe how teacher promote young children's Executive Functions. During the observation, the researcher will not video tape, audio tape or photo shoot. The researcher will not participate in the teaching and learning activities, she will only jot down the fieldnotes for the research propose. All the paper records will be destroyed in three years after the completion of the research.

CURRICULUM VITAE

Academic qualifications of the thesis author, Ms. TONG Lok Yi:

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