Physical Activities in Hong Kong Kindergartens:

Teachers' Self-Reported Practices and Quality Assessment

by

FAN, Chun Man, Thomas

A Dissertation Submitted to

The Education University of Hong Kong

in Partial Fulfillment of the Requirement for

the Degree of Doctor of Education

Principal Supervisor: Dr. BAUTISTA ARELLANO, Alfredo

Associate Supervisors: Dr. CHAN, King Chung Derwin

November 2024

Statement of Originality

I, FAN, Chun Man Thomas, hereby declare that I am the sole author of the dissertation, and the material presented in this dissertation is my original work except those indicated in the acknowledgment. I further declare that I have followed the University's policies and regulations on Academic honesty, Copyright, and Plagiarism in writing the dissertation, and no material in this dissertation has been submitted for a degree in this or other universities.

Declaring Use of AI Tools

I acknowledge using Grammarly (app.grammarly.com) to enhance the academic language of my own work. I submitted my entire report to Grammarly to check the accuracy of the language used in the report. The output generated by Grammarly was then utilized to correct my grammatical mistakes and improve my style of writing in the report.

Abstract

Encouraging active participation in physical activities among kindergarten children is a key priority in Hong Kong's Kindergarten Education Curriculum Guide (Curriculum Development Council [CDC], 2017), under the learning area of *Physical Fitness and Health*. Despite this emphasis, there is limited knowledge on physical activities and fundamental movement skills (FMS) teachers practice in kindergartens. Moreover, little is known about how the Education Bureau (EDB)'s inspectors assess the quality of the physical activities implemented by teachers.

This dissertation portfolio draws on Stork and Sanders's (2008) theoretical framework of high-quality physical activity programs in early childhood education. The aim of the dissertation was to depict the landscape of physical activity practices in Hong Kong kindergartens. To achieve the aim, three empirical studies were conducted.

Studies 1 and 2 were survey studies involving 526 kindergarten teachers in Hong Kong. Specifically, Study 1 examined the frequency of various types of physical activities conducted by Hong Kong teachers in kindergarten across different grade levels (K1, K2, K3) and the availability and utilization of venues for these activities. Study 2 explored the frequency of various FMS practiced in the physical activities conducted by these same teachers and the association among these FMS based on the frequency of use in classrooms across the three grade levels. Data were analyzed using descriptive and parametric statistical analyses. Study 1 revealed the prevalent use of low-intensity and low-risk physical activities. Indoor venues were commonly found in kindergartens and utilized more often for such activities than outdoor venues. Study 2 highlighted an imbalance in the types of FMS practiced by teachers. Some skills, such as "riding on pedal tricycles or bikes," were frequently practiced, whereas others, like "digging in sandbox," were rare. Findings highlighted the crucial role of the variable grade level in the practice of physical activities

and FMS. K3 teachers reported significantly higher frequency in conducting physical activities and practicing FMS than K1 and K2 teachers.

Study 3 was a content analysis of 164 quality review (QR) reports issued by EDB, intended to explore the presence of various types of physical activities, positive and negative feedback, and recommendations for improvement. Data were analyzed using word frequency and descriptive statistical analyses. EDB's inspectors were found to provide generic descriptions of physical activities in the QR reports with limited focus on this learning area. Their feedback was rather vague and superficial, lacking the specificity required for teachers and principals to improve their practices.

Overall, the findings revealed disparities between internationally accepted guidelines for physical activities and actual practices in Hong Kong kindergartens. The three above-mentioned studies highlight the need for improved alignment between the guidelines outlined in the Curriculum Guide and practical implementation. Findings are significant in informing stakeholders about teachers' training needs. This dissertation also informs the EDB on the need for more detailed feedback and shapes professional development initiatives tailored to enhance teachers' expertise in physical activities. By equipping teachers with comprehensive knowledge and skills, the quality of physical activity experiences for kindergarten children will be improved.

Keywords: Kindergarten Education; Physical Activity; Fundamental Movement Skills; Teaching Practices; Hong Kong

Acknowledgments

During my youth, I greatly admired those adorned with a doctoral degree, able to proudly mark the distinguished “Dr.” title on forms. It was a promise made to myself that I, too, would be qualified to tick that option one day. Four years ago, I embarked on a journey toward realizing this promise. This pursuit was full of challenges as Hong Kong grappled with social incidents and the COVID-19 pandemic. The shift from face-to-face to remote learning posed barricades to resource accessibility, peer collaboration, and maintaining an ideal academic environment. Amidst uncertainties surrounding research participant availability, data collection methods, and the pandemic’s impact on academic schedules, the path toward my goal became intricate and demanding. This achievement would not have been possible without the invaluable support and contributions of the following individuals.

Foremost, I would like to express my deepest gratitude to my principal supervisor, Dr. Alfredo Bautista. I am truly thankful for his guidance, mentorship, and encouragement that have propelled me toward our shared destination. Dr. Alfredo, I understand that I may not be the most brilliant or diligent student under your supervision, but I am so grateful for your unwavering support and belief in me throughout this journey. I eagerly look forward to our continued research collaboration. My sincere thanks also go to my associate supervisor, Dr. Derwin, King Chung Chan, for his relentless support and valuable comments on this dissertation. His insights and feedback have allowed me to expand my ideas and challenged my understanding of this project.

I would also like to thank the kindergarten teachers who generously participated in the survey for this dissertation. I appreciate each of them for their willingness to dedicate their precious time to completing the survey, which contributed to the success of this academic endeavor. Additionally, I wish to extend my appreciation to the Department of Early Childhood Education at the Education University of Hong Kong for their invaluable support

in facilitating my outreach to a broader group of kindergarten teachers.

Next, I would like to extend special thanks to Dr. Andy Kan, Dr. Ray Hui, Dr. Bryan Chiu, and Dr. Louis Fung, who were not only my esteemed colleagues at Hong Kong Metropolitan University but also pivotal supporters in initiating this challenging journey. Without their encouragement, this journey would not have even begun. Drawing upon an ancient Chinese proverb, "Studying alone without companions is to be isolated and ignorant," I was extremely fortunate to have been supported by a circle of brilliant, passionate, and trustworthy peers: Cathleen Ng, Charla Saamong, Ho Yan Lam, Jerry Yeung, Justine Chan, Million Wan, Shelly Xu, Venus Liu, and Yingying Pang.

I want to sincerely thank my family for their support in nurturing my dream, with special recognition to my mother, W.Y. Cheung, for her exceptional care of my daughter during my academic immersion in Canada. Her helping hand in alleviating the burdens of our family's schedules has been a tremendous blessing.

Last, I want to extend my eternal gratitude to my wife, Tammy, and my daughter, Tabitha. Tammy, my dearest life partner, words fall short of capturing the depth of my pride and appreciation for your unwavering support throughout my EdD pursuit. Despite your less fervent interest in research, your attentive and patient listening to my work has been a source of great comfort and encouragement. I am profoundly thankful for your enduring and endless love. Tabitha, the apple of my eye, you entered my life in the very first month of this doctoral journey as a true angel sent from above to accompany me on this voyage. Your companionship throughout this journey has been a priceless gift that I deeply treasure. Now, you might be wondering why Daddy, who was once a teacher, has transitioned into a doctor. It seems a discussion on this transformation is in the stars for us. I love you both immensely.

Table of Contents

Statement of Originality i
Declaring Use of AI Tools ii
Abstract iii
Acknowledgments v
Table of Contents vii
List of Abbreviations xi
List of Figures xii
List of Tables xiii
List of Publications xv
List of Conference Presentations Related to this Dissertation xvi

INTRODUCTION 1

Overview of Physical Activities and Fundamental Movement Skills 2
Physical Activities in Early Childhood Education 4
Variability in Physical Activities across Kindergarten Grade Levels 6
Physical Activities in Hong Kong Kindergartens: Curriculum vs Practice 7
On the Challenges of Limited Space and Facilities in Early Childhood Education Centers 10
Assessment Mechanism in Hong Kong Kindergartens: The Quality Review Reports 11
Theoretical Framework 13
Continuous and Active Engagement of Students 13
Adequate Space and Equipment 14
Developmentally Appropriate FMS 14
Quality Pedagogies and Instruction 14
Rationale of the Dissertation and Research Gaps 15
Overall Aim and Three Empirical Studies 16
Structure of the Dissertation 24

STUDY 1: Physical Activities in Hong Kong Kindergartens: Grade-Level Differences and Venue Utilization 26

Abstract 26
Introduction 28
Literature Review 30
Physical Activities in Early Childhood Education 30
Availability and Utilization of Venues for Physical Activities 33
Research Goals 35
Method 36

Participants *36*
Materials *37*
Procedure *40*
Data Analysis *41*
Results 42
Goal #1.1: Provision of Physical Activities across Grade Levels *42*
Goal #1.2: Availability and Utilization of Venues *47*
Discussion 50
Conclusion *54*
Limitations and Future Research *55*
Significance and Implications *56*

STUDY 2: Fundamental Movement Skills in Hong Kong Kindergartens: A Grade-level Analysis 58

Abstract 58
Introduction 60
Literature Review 61
Fundamental Movement Skills Development in Early Childhood Education *61*
Hong Kong's Curriculum Framework for Physical Activities and Fundamental Movement Skills Development *63*
Research Goals 65
Method 66
Participants *66*
Research Design and Data Collection Instrument *67*
Procedure *70*
Data Analysis *71*
Results 72
Goal #2.1: Fundamental Movement Skills Involved in Physical Activities *72*
Goal #2.2: Association Among Fundamental Movement Skills Based on the Frequency of Use in Classrooms *75*
Goal #2.3: Grade Levels Differences *79*
Discussion 83
Conclusion *86*
Limitations and Future Research *87*
Implications *88*

STUDY 3: Physical Activities in Hong Kong Kindergartens: A Content Analysis of the Quality Review Reports 90

Abstract 90

Introduction 92
Kindergarten Education in Hong Kong: The Quality Review (QR) Assessment *92*
Literature Review 94
Physical Activities in the Hong Kong Kindergarten Curriculum *94*
Implementation of Physical Activities in Kindergartens: Contexts and Trends *96*
Research Goals 99
Method 100
Data Sources *100*
Procedure *101*
Data Analysis *101*
Results 103
Goal #3.1: Overall Presence of Physical Activities in the Quality Review Reports *103*
Goal #3.2: Presence of Various Forms of Physical Activities *106*
Goal #3.3: Most Common Types of Positive Feedback *109*
Goal #3.4: Most Common Types of Negative Feedback and/or Recommendations *111*
Discussion 114
Conclusion *119*
Limitations and Future Research *119*
Practical Implications *120*

GENERAL DISCUSSION 122

Summary of Findings 123
Integrated Discussion 132
Continuous and Active Engagement of Students *133*
Adequate Space and Equipment *137*
Developmentally Appropriate FMS *139*
Quality Pedagogies and Instruction *142*
Conclusions 144
Limitations and Future Research 146
Implications 147

REFERENCES 151

APPENDIXES 185

Appendix 1. Participants' Demographic Background 185
Appendix 2. Distribution of Responses 186
Appendix 3. Ethical Approval 187
Appendix 4. Survey for Studies 1 & 2 188

Appendix 5. Proof of Acceptance of Study 1.....199

List of Abbreviations

ACSM	American College of Sports Medicine
ANOVA	Analysis of Variance
CDC	Curriculum Development Council
ECE	Early Childhood Education
EDB	Education Bureau
FMS	Fundamental Movement Skills
FQKES	Free Quality Kindergarten Education Scheme
KMO	Kaiser-Meyer-Olkin
PCA	Principal Component Analysis
QR	Quality Review
SHAPE America	Society of Health and Physical Educators

List of Figures

Figure 1. *Key Dimensions of High-Quality Physical Activity Programs in Early Childhood Education* 15

Figure 2. *Diagram Illustrating the Interrelationship Among the Three Studies* 22

Figure 3. *Illustrative Picture for the Skill of Crawling* 69

Figure 4. *Illustrative Picture for the Skill of Riding on Pedal Tricycles or Bikes* 69

Figure 5. *Overall Distribution of Response for Fundamental Movement Skills Involved in Physical Activities* 73

Figure 6. *Word Cloud of 60 Most Common Words in the Coded Textual Segments* 106

Figure 7. *Frequency and Percentage of Quality Review Reports Coded Under Each Form of Physical Activity (n=164)* 108

Figure 8. *Frequency and Percentage of Quality Review Reports Coded Under Each Category of Positive Feedback (n=164)* 110

Figure 9. *Frequency and Percentage of Quality Review Reports Coded Under Each Category of Negative Feedback (n=164)* 113

Figure 10. *Summary of the Four Dimensions of High-Quality Physical Activity Programs in Early Childhood Education* 133

List of Tables

Table 1. *Domains and Areas for Kindergarten Quality Review Assessment* 12

Table 2. *Provision of Physical Activities in Kindergartens: "How often did you conduct the following activity with children during your physical activity sessions (excluding free play)?"* 44

Table 3. *Provision of Physical Activities across Three Kindergarten Grade Levels* 46

Table 4. *Provision of Physical Activities across Three Kindergarten Grade Levels: Items with Statistically Significant Differences* 47

Table 5. *Provision of Venues in Kindergartens: "Does this venue exist in or near your school?" If yes, "How often did you conduct physical activities with children in this venue?"* 49

Table 6. *Participants' Demographic Information* 67

Table 7. *Frequency of Fundamental Movement Skills in Kindergartens: "How often did you implement activities that required the following skill during your physical activity sessions (excluding free play)?"* 74

Table 8. *Principal Component Analysis: Varimax Rotated Matrix of Fundamental Movement Skills* 77

Table 9. *Ranking of Fundamental Movement Skills among Three Kindergarten Grade Levels* 80

Table 10. *Seven Components of Fundamental Movement Skills across Three Kindergarten Grade Levels* 83

Table 11. *Descriptive Statistics of 60 Most Common Words in the Coded Textual Segments* 104

Table 12. *Coding Scheme for Various Forms of Physical Activities* 107

Table 13. *Coding Scheme for the Most Common Positive Feedback Regarding Physical Activities*.....109

Table 14. *Coding Scheme for Most Common Negative Feedback and/or Recommendations Related to Physical Activities*.....112

List of Publications

Study 1 is extracted from a published article entitled “Physical Activities in Hong Kong Kindergartens: Grade Level Differences and Venue Utilization.” The citation of this article is: Fan, T., Bautista, A., & Chan, D. K. C. (in press). Physical activities in Hong Kong kindergartens: Grade-level differences and venue utilization. *Journal of Research in Childhood Education*. https://doi.org/10.1080/02568543.2024.2420999.

Study 2 is extracted from a published article entitled “Fundamental movement skills in Hong Kong kindergartens: A grade-level analysis.” The citation of this article is: Fan, T., Bautista, A., & Chan, D. K. C. (2024). Fundamental movement skills in Hong Kong kindergartens: A grade-level analysis. *Education Sciences, 14*(8), 911. https://doi.org/10.3390/educsci14080911.

Study 3 is extracted from a published article entitled “Physical activities in Hong Kong kindergartens: A content analysis of the quality review reports.” The citation of this article is: Fan, T., Bautista, A., & Chan, D. K. C. (2024). Physical activities in Hong Kong kindergartens: A content analysis of the quality review reports. *Policy Futures in Education, 22*(4), 659-676. https://doi.org/10.1177/14782103231182741.

List of Conference Presentations Related to this Dissertation

1. Fan, T., Bautista, A. & Chan, D. K. C. (2024, June). Provision of physical activities in Hong Kong kindergartens: Grade level differences and venue utilization. Paper presented at the 1st EdUHK International Research. Conference on Early Childhood Education and Development (InCRECE 2024), Hong Kong SAR, China.
2. Fan, T. (2023, May). Physical activities in Hong Kong kindergartens: A survey study of teachers' practices. Paper presented at the DRHDC Research Seminar, Department of Early Childhood Education, The Education University of Hong Kong, Hong Kong.
3. Fan, T. C. M. & Bautista, A. (2021, October). Physical activities in Hong Kong kindergartens: Strengths and weaknesses. Paper presented at the 8th International Society for Physical Activity and Health (ISPAH) Congress, Vancouver, Canada, Virtual.
4. Fan, T. C. M. & Bautista, A. (2021, September). What is the role of physical activities in Hong Kong Kindergartens? A documentary analysis on quality review reports. Paper presented at the 5th Assembly of the International Motor Development Research Consortium (IMDRC), Komotini, Greece, Virtual.
5. Fan, T. C. M. & Bautista, A. (2021, June). Analyzing EDB's quality review (QR) reports: What's the role of physical activities? Paper presented at the Brown-bag Research Seminar. Departmental Research and Higher Degrees Committee (CRHDC), Department of Early Childhood Education, The Education University of Hong Kong, Hong Kong.
6. Fan, T. C. M. (2021, January). A documentary analysis on gross motor skills development in Hong Kong kindergartens. Paper presented at the International Graduate Studies Seminar (IGSS 2021), Hong Kong.

INTRODUCTION

This dissertation is situated in the Hong Kong Special Administrative Region, China, where kindergartens provide half-day or full-day center-based educational programs for children aged 3 to 6 (Ho & Bautista, 2022). Kindergarten education in Hong Kong is overseen by the Education Bureau (EDB), the government body responsible for educational policymaking and supervising the quality of educational programs (Bautista et al., 2022). As of the 2023/2024 academic year, there were 1,009 kindergartens and 11,733 registered kindergarten teachers in the city (EDB, 2024). Although kindergarten education is not compulsory, virtually all children enroll in center-based programs (Rao et al., 2018). Kindergarten education is divided into three grade levels, based on children's biological age: K1 (3-4 years), K2 (4-5 years), and K3 (5-6 years) (Yang & Li, 2022).

This Introduction chapter comprises ten sections. Firstly, I present an overview of physical activities and fundamental movement skills (FMS). The second section reviews literature related to physical activities in early childhood education (ECE), specifically during the age range of 3-6 years. The third section elaborates on the variability in physical activities across grade levels in kindergartens. Then, the fourth section delves into physical activities in Hong Kong kindergartens, with a focus on comparing curriculum and actual practices. The fifth section examines the challenges posed by the limited availability of space and facilities for the practice of physical activity in ECE centers. The sixth section describes the existing

quality assessment mechanism in Hong Kong kindergartens. It specifically illustrates how the EDB assesses the quality of kindergarten services and discusses the importance of quality review (QR) reports. The seventh section introduces Stork and Sanders's (2008) theoretical framework of high-quality physical activity programs in ECE. The eighth section presents the rationale of the dissertation and research gaps. Following this, the overall aim and three empirical studies are introduced in the ninth section. Finally, the chapter closes by outlining the structure of the dissertation portfolio. Throughout this dissertation portfolio, the terms "schools" and "teachers" are used interchangeably to denote kindergartens and kindergarten teachers.

Overview of Physical Activities and Fundamental Movement Skills

Physical activities have been defined as "any bodily movement produced by skeletal muscles that require energy expenditure" (World Health Organization, 2024). Research has shown that regular participation in physical activities among young children is strongly linked to improved motor development, cognitive development, psychosocial health, cardiometabolic health, bone health, and academic performance (Carson et al., 2017; Institute of Medicine, 2013; Tonge et al., 2021; Zurc & Planinšec, 2022).

International organizations have classified physical activities in various ways. For instance, the Department of Health of Hong Kong (2020) classified physical activities according to their intensity levels (i.e., light, moderate, or heavy). Children are recommended

to engage in physical activities that encompass both moderate to vigorous intensity for optimal health and well-being (American College of Sports Medicine [ACSM], 2015). The ACSM (2017) suggested that physical activities can be classified based on their environmental setting, including leisure, work-related, household, and transportation activities. Although there are numerous ways to categorize physical activities, conceptualizing them based on the FMS involved offers the distinct advantage of focusing on the specific body movements and their execution (Beaver et al., 2018).

FMS refer to a "specific set of gross motor skills that involve different body parts" (Western Sydney Local Health District, 2022), which serve as the "building blocks" for more complex movements required in sports and games (Lubans et al., 2010, p. 1020). Enhanced FMS in children have been associated with multiple developmental advantages, including lower body mass index (Lubans et al., 2010) and better development in language (Leonard & Hill, 2014). Moreover, children with advanced FMS are more likely to participate in vigorous physical activities when they progress into adulthood (Barnett et al., 2009). As these skills do not naturally develop with time, it is essential to provide children with appropriate learning opportunities, intentional practices, specific instructions, encouragement, and feedback (Veldman et al., 2018), ideally commencing from early childhood (Gil et al., 2008).

FMS are typically divided into three major categories: locomotor skills, stability skills, and manipulative skills (Cabrera et al., 2024; Education Department of Western

Australia, 2013a; Lu & Montague, 2016; Veldman et al., 2018). Locomotor skills comprise movements that involve transporting the body horizontally (e.g., walking, running, crawling, galloping) or vertically (e.g., jumping, hopping, leaping, climbing). Stability skills focus on balancing and controlling the body in stillness and during movement, such as static and dynamic balancing, bending, and rolling. Moreover, manipulative skills involve controlling objects using hands, fingers, or feet. Examples include throwing, catching, striking, dribbling, and kicking.

Physical Activities in Early Childhood Education

Researchers and policymakers concur on the importance of offering children abundant opportunities to participate in physical activities (Beaver et al., 2018; Chow et al., 2015a; Ministry of Education, 2023; Paris et al., 2018). Despite this consensus, the evidence consistently shows that children's exposure to physical activities in ECE settings is limited worldwide (Alcántara-Porcuna et al., 2022; Reilly, 2010; Sugiyama et al., 2012; Yuen, 2020). For instance, researchers examined the provision of physical activity participation in ECE centers among children in New Zealand (Ali et al., 2021) and Australia (Ellis et al., 2017) and found that children were inactive for over 70% of class time. Moreover, a systematic review conducted by Barbosa and Oliveira (2016) examined seven studies published between 2008 and 2012, encompassing 1681 children from 71 ECE centers in five countries. Their findings revealed that although children spent an average of 7.22 to 7.51 hours daily in those centers, a

major portion of their class time (ranging from 55% to 94%) was dedicated to sedentary activities. Similarly, in the United States, Brown et al. (2009) observed that the most prevalent class contexts were group time, transition, and naps, during which children were sedentary for over 90% of the class time.

The ECE literature has identified effective pedagogical practices for conducting physical activities with young children in kindergarten classrooms, aiming to support children's physical development. These practices include providing clear explanations and specific feedback to children (Paris et al., 2018) and supplementing verbal instructions with demonstrations at varying speeds and angles (Olmsted & Melnychuk, 2014). Additionally, teachers should be sensitive to potential physical competency differences among children (Essa & Burnham, 2019) and strive to minimize wait times during teaching activities, thereby offering children more opportunities for practice (Ministry of Education, 2023). Furthermore, teachers should maximize children's enjoyment and active engagement during the activities (Krogh & Morehouse, 2020) and refrain from using physical activities as punishments (Society of Health and Physical Educators [SHAPE America], 2021).

Despite the identification of these effective pedagogies, certain studies have indicated that the actual practices in classrooms do not always align with the recommendations outlined by researchers and official curriculum frameworks. For example, an observational study conducted in Singapore revealed that around half of the teachers did not give verbal

instructions and demonstrations, reinforce safety rules, or provide feedback to children during physical activities (Bautista et al., 2020). Similarly, teachers in the United States were found to commonly utilize physical activities as punitive measures for addressing disciplinary issues (Ward et al., 2015). Moreover, Brown et al. (2009) observed a lack of active encouragement in engaging children in physical activities.

Variability in Physical Activities across Kindergarten Grade Levels

Currently, there is limited discussion in the literature on potential variations in the types and frequencies of physical activities and FMS practiced across different kindergarten grade levels, which in Hong Kong are K1 (3-4 years of age), K2 (4-5 years of age), and K3 (5-6 years of age). Existing studies have predominantly focused on a single grade level or have not explored the differences between grade levels. For instance, Bautista et al. (2020) observed 108 K1 kindergarten classrooms in Singapore (equivalent to K2 in Hong Kong) and found that teachers did not consistently integrate physical activities into their daily class routine. Their research also revealed an uneven exposure to various FMS within Singapore's ECE centers. Specifically, stability skills were more frequently taught compared to locomotor and manipulative skills in the classroom.

In another study, Dowda et al. (2004) assessed the participation of 266 3-5-year-old children in moderate- to vigorous-intensity physical activities across nine ECE centers in the United States. They observed that children were more active when the centers organized

more outdoor field trips. Furthermore, Howie et al. (2013) investigated the practice of FMS with 231 children aged between 3 and 5 in ECE-based physical activities. They observed that locomotor skills were more commonly practiced in the physical activities conducted by teachers. Aside from these studies, there remains a gap in understanding the potential impact of grade levels on the frequency of physical activities and FMS practiced in kindergarten settings.

Further in-depth investigation into the types and frequencies of physical activities and FMS practiced across different kindergarten grade levels holds profound theoretical and practical implications. Such research is vital to shape the design of professional development initiatives tailored to broadening teachers' repertoire of age-appropriate physical activities and FMS, customized to cater to the distinct needs of teachers working with children at different grade levels.

Physical Activities in Hong Kong Kindergartens: Curriculum vs Practice

The Curriculum Development Council (CDC) of Hong Kong released the "Kindergarten Education Curriculum Guide: Joyful learning through play, balanced development all the way" (hereinafter referred to as the Guide) in 2017. This official framework is designed to inform the teaching practices of kindergarten teachers in Hong Kong. *Physical Fitness and Health* is considered one of the six key learning areas essential

for children's holistic development in the Guide (CDC, 2017). The learning objectives established for this learning area are:

> "(1) To develop gross and fine motor skills, acquire control over basic movements, and understand the concepts of space and direction; (2) To nurture an interest and habit of active participation in physical activities and develop positive values and attitudes; and (3) To use senses to explore the surroundings, raise awareness of health and safety, and develop self-protection abilities" (CDC, 2017, p. 32)

The Guide (CDC, 2017) provides guidance on expected pedagogical practices for kindergarten teachers. Teachers are advised to monitor the children's health to prevent overexertion, offer ample encouragement, and refrain from making comparisons between children's abilities. Furthermore, the Guide (CDC, 2017) illustrates learning expectations through examples, focusing on developing FMS through active participation in physical activities. For instance, students are expected to develop basic FMS (e.g., running, balancing, throwing), coordination, flexibility, and a sense of rhythm through engaging in physical activities. The Guide also highlights the anticipated outcomes of fostering team spirit, enhancing self-confidence, and understanding the functions of the five senses concurrently (CDC, 2017). Moreover, the Guide (CDC, 2017) recommends that half-day kindergartens allocate 45 to 60 minutes, while full-day kindergartens allocate 90 to 105 minutes daily to physical, music, and art activities.

At present, there is little understanding of the pedagogical practices of Hong Kong kindergarten teachers in relation to physical activities. A recent interview study conducted by Capio et al. (2021) reported that Hong Kong kindergarten teachers utilized diverse pedagogical approaches, including "game-based teaching, free play, and a 'do-after-me' approach with verbal instruction" (p. 753), to cultivate children's interest and encourage engagement in physical activities. Notably, this study echoed the call for professional development opportunities to equip teachers in designing physical activity programs tailored to the diverse abilities of learners and various environmental settings (Tucker et al., 2011). In another observational study involving 90 classes conducted by 25 teachers in Hong Kong, Chow et al. (2015a) reported that the majority of lesson time allocated by teachers was dedicated to class management, followed by observing, with only around one-fifth of the time devoted to promoting fitness. This study justified ongoing advocacy for more explicit guidelines in structuring classroom activities to enhance physical activity practices within kindergartens.

Furthermore, research conducted by Cheung (2010) noted that kindergarten teachers in Hong Kong typically relied on a "demonstration and practice" (p. 377) approach in their physical activity programs. To enhance the physical activity experiences in children, the author demonstrated a model incorporating a blend of physical activities with elements of exploration, imagination, and creative thinking. The outcomes indicated that children

exhibited a greater variety of movements with this approach. She recommended that activities should progress from simple to complex. Teachers should also recognize when a child moves beyond imitation to show that their creative ideas are valued. Despite these insights, there remains a need for a comprehensive understanding of the frequency of physical activities and FMS practiced by local kindergarten teachers in the classrooms.

On the Challenges of Limited Space and Facilities in Early Childhood Education Centers

Researchers have cautioned that restrictions on physical space in kindergartens limit the practice of physical activities, especially in urban areas. For instance, in densely populated urban jurisdictions such as Singapore (Bautista et al., 2020), Macau (Wong, 1999), and many cities in China (Bao et al., 2021), where space is limited, ECE centers commonly operate within residential buildings, leading to a scarcity of outdoor play areas and hindering the opportunities for children to engage in physical activities. Another study conducted by Lindsay et al. (2015), which involved a focus group interview with 44 ECE educators in Spain, revealed that most respondents encountered practical challenges in conducting physical activities due to inadequate space, impeding the practice of physical activities. Similarly, De Decker et al. (2013) reported comparable findings, with teachers from six European countries identifying space limitations (e.g., small classroom sizes) as the major constraint impacting the practice of physical activities in ECE centers.

Previous research conducted in Hong Kong kindergartens has brought attention to the issue of limited space for implementing physical activities. Due to the high population density and cost of land, arranging suitable premises with ample space for kindergartens is challenging (Rao et al., 2018). Currently, most kindergartens in the territory are situated in housing estates, office blocks, commercial centers, government building rooftops, and similar settings, leading to a deficiency of outdoor play areas in many kindergartens (Yuen & Gallagher, 2024). In a mixed-method study conducted by Yuen (2020) involving 327 local kindergartens, it was discovered that one-third of them faced difficulties securing adequate venues for physical activities. This challenge was particularly prominent in government-funded kindergartens, which have restricted access to outdoor venues, leading to children being confined to indoor spaces (Chow & Louie, 2013). To date, we know little about the availability and utilization of various venues for physical activities in or nearby kindergartens in Hong Kong. Thus, it is both theoretically and practically relevant to investigate this topic to inform decisions on resource allocation, infrastructure development, and policymaking to promote the effective utilization of available venues for physical activities.

Assessment Mechanism in Hong Kong Kindergartens: The Quality Review Reports

The EDB launched the Kindergarten Education Scheme in the 2017/2018 academic year to enhance the quality of kindergarten education in the region (EDB, 2022). To qualify for government subsidies under the Kindergarten Education Scheme, local kindergartens

must participate in the QR assessment and demonstrate satisfactory quality in four domains (see Table 1). The Physical Development area, encompassing two performance indicators, namely Physical Movements and Health Habits, is situated within the Child Development domain (EDB, 2017).

Table 1. *Domains and Areas for Kindergarten Quality Review Assessment*

Domain	Areas
Management and Organization	School Management
	Professional Leadership
Learning and Teaching	Curriculum Planning
	Child Learning and Teaching
School Culture and Support for Children	Caring and Support Services
	School Partners
Child Development	Cognitive Development
	Physical Development
	Affective and Social Development
	Aesthetic and Cultural Development

In order to assess the quality of kindergartens, EDB inspectors regularly visit kindergartens to conduct class observation, interview front-line teachers, and examine curriculum materials for QR purposes, lasting between 2.5 to 3.5 days (EDB, 2017). Subsequent to these visits, each kindergarten receives feedback and recommendations for improvement in the form of a QR report. These reports are then accessible to the public on the EDB's website. If a kindergarten fails the QR assessment, it will be excluded from the Kindergarten Education Scheme, resulting in the discontinuation of government subsidies.

The QR reports serve as a valuable research database as kindergartens diligently prepare for the QR to impress EDB inspectors and qualify for subsidies. Therefore, the observations documented in the QR reports can be considered as illustrating the best practices within each kindergarten (Rao et al., 2018), thereby making these reports a distinctive source of data. While existing research on quality assessment in Hong Kong kindergartens has commonly focused on various learning areas, such as arts and creativity (Yeung et al., 2022) and music (Ho & Bautista, 2022), there remains a substantial gap in the quality of physical activities in kindergartens from the government's perspective. This highlights the necessity for similar analysis in the realm of physical activities.

Theoretical Framework

This dissertation portfolio is grounded on the theoretical framework of high-quality physical activity programs in ECE proposed by Stork and Sanders (2008). These authors outlined four key dimensions that characterize such programs, supporting the physical development of young children (see Figure 1).

Continuous and Active Engagement of Students

A high-quality physical activity program should have a structured curriculum introducing fun and age-appropriate physical activities and FMS. The framework focuses on individualizing tasks, encouraging active participation, and providing plenty of practice opportunities and feedback to support learning and progress.

Adequate Space and Equipment

Children need ample space to move safely, actively, and engagingly. In addition, acquiring FMS necessitates access to open spaces such as a spacious room, gymnasium, or outdoor space (Sanders, 2006).

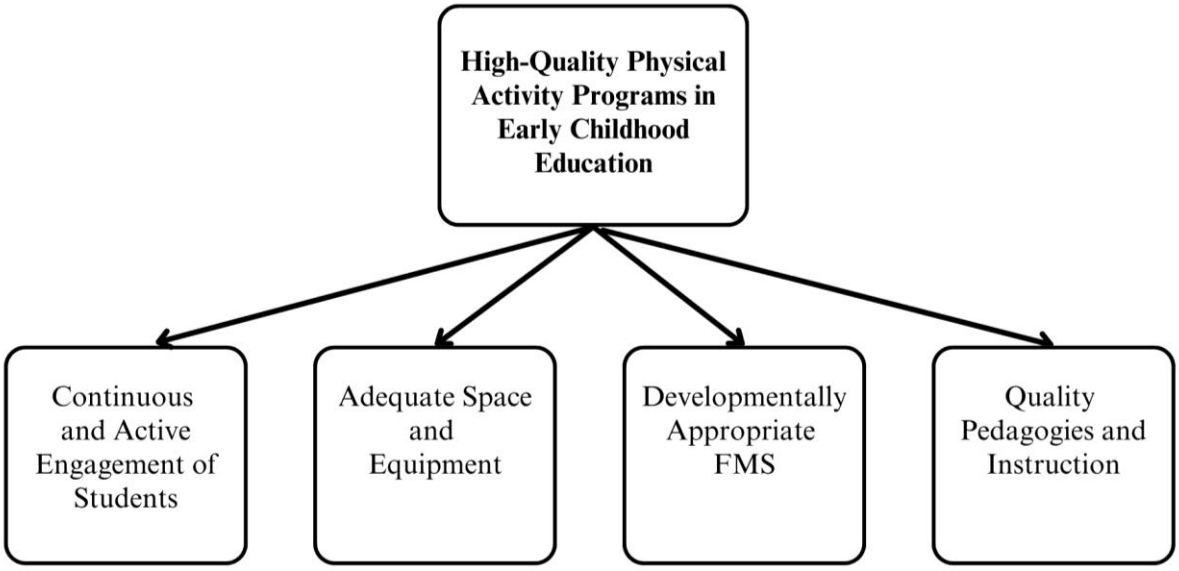
Developmentally Appropriate FMS

Developing FMS in young children is crucial for sustaining their interest in physical activities throughout life (Barnett et al., 2009). Thus, quality physical activity programs should focus on developing competence in various developmentally appropriate FMS in children.

Quality Pedagogies and Instruction

In a high-quality physical activity program, requiring extended periods of sitting goes against children's natural way of learning, which involves movement, exploration, and hands-on activities. The activities should encourage children to use various FMS and be flexible to accommodate differences in maturity, motivation, experiences, and practice. Moreover, instructional strategies should be tailored to the specific age group of the children involved.

Figure 1. *Key Dimensions of High-Quality Physical Activity Programs in Early Childhood Education*



Rationale of the Dissertation and Research Gaps

Drawing from existing works on the pedagogical practices of kindergarten teachers in relation to physical activities, this section summarizes the key research gaps that this dissertation intends to address. Firstly, previous studies examining ECE teachers' pedagogical practices in physical activities have predominantly focused on specific regions, such as the United States (Brown et al., 2009), Singapore (Bautista et al., 2020), Norway (Hagen, 2015; Kippe & Lyngstad, 2021), Finland (Reunamo et al., 2014) and Canada Tucker et al. (2011). While local studies (e.g., Capio et al., 2021; Chow et al., 2015b) have contributed valuable insights, they have primarily relied on observation and interview methods with a small sample of participants. Therefore, conducting large-scale quantitative

studies on the frequency of physical activities and FMS practiced within kindergarten settings in Hong Kong is crucial and highly timely.

Secondly, to the best of our knowledge, there is a gap in research regarding whether kindergarten grade levels influence the frequency of physical activities and FMS practiced in the classroom. Prior studies (e.g., Bautista et al., 2020; Dowda et al., 2004; Howie et al., 2013) have not delved into the distinctions between various grade levels, indicating the need for a more in-depth exploration across different grade levels to understand the potential variations.

Finally, there is limited information on how the Hong Kong Government, represented by the EDB, assesses the quality of the physical activities conducted in local kindergartens. Existing research that examines EDB's perspectives commonly focuses on other learning areas, such as arts and creativity (Yeung et al., 2022) and music (Ho & Bautista, 2022). Hence, a qualitative study to assess the current physical activity practices in the local context from the EDB's perspective is essential.

Overall Aim and Three Empirical Studies

The overall aim of this dissertation was to depict the landscape of physical activity practices in Hong Kong kindergartens. The resulting findings establish a baseline of the current physical activity practices in local kindergartens, thus revealing the scope in which

teachers require extra training. Ultimately, this knowledge can contribute to enhancing children's experiences in physical activity participation in Hong Kong kindergartens.

This dissertation consists of three empirical studies (Studies 1, 2, and 3) addressing distinct critical aspects of physical activities in Hong Kong kindergartens. These studies were planned concurrently at the inception of my Doctor of Education journey, underpinned by a shared theoretical framework (Stork & Sanders, 2008). While the studies are interrelated, their respective findings did not directly inform one another. In other words, the studies do not follow a sequential order and can be seen as standalone studies. Certain parts of the background information presented in them may be similar.

Study 1, entitled "Physical Activities in Hong Kong Kindergartens: Grade Level Differences and Venue Utilization," has been accepted for publication in the *Journal of Research in Early Childhood* (Fan et al., in press). It was a large-scale survey study examining the frequency of various types of physical activities conducted by Hong Kong teachers in kindergarten across different grade levels and the locations where these activities take place. The study had two research goals:

- **Goal #1.1** To investigate the provision of physical activities in Hong Kong kindergartens across the three grade levels (K1, K2, K3).
- **Goal #1.2** To examine the availability and utilization of venues in or nearby kindergartens for implementing physical activities.

Participants were 526 kindergarten teachers in Hong Kong, representing around 4.2% of the total population. In the survey, participants were first asked, “How often did you conduct the following activity with children during your physical activity sessions (excluding free play)?” A total of 18 physical activities were presented. Participants were asked to indicate the frequency of each activity using a 5-point Likert scale. Second, teachers were requested to report on the availability and utilization of various venues in or nearby their kindergartens. They were initially asked: “Does this venue exist in or nearby your school?” A total of 14 indoor and outdoor venues were listed, and teachers responded with either “Yes” or “No.” If a teacher answered “Yes,” they were then asked: “How often did you conduct physical activities with children in this venue?” A 5-point Likert scale was utilized to gauge the frequency of utilization. Descriptive statistics (frequencies, percentages, means, standard deviation) and ranking positions were computed among the measured physical activities and venues. In addition, parametric analysis (one-way ANOVA) and post hoc Tukey HSD test were employed to examine the variation among three kindergarten grade levels (K1, K2, K3).

Study 2, entitled “Fundamental Movement Skills in Hong Kong Kindergartens: A Grade-level Analysis,” has been published in the journal *Education Sciences* (Fan et al., 2024a). Conducted with the same sample of teachers, as part of the same survey, Study 2 focused on the FMS practiced in physical activities. The study had three research goals:

- **Goal #2.1** To investigate the frequency of a variety of FMS in the physical activities conducted by Hong Kong kindergarten teachers.
- **Goal #2.2** To investigate the association among these FMS based on the frequency of use in classrooms.
- **Goal #2.3** To analyze potential differences in FMS across the three grade levels of kindergarten education in Hong Kong (K1, K2, and K3).

In the survey, participants were asked, "How often did you implement activities that required the following skill during your physical activity sessions (excluding free play)?" A total of 29 FMS were presented. Participants were asked to indicate the frequency of each skill using a 5-point Likert scale. Descriptive statistics (frequencies, percentages, means, standard deviation), ranking position, and Principal component analysis (PCA) were performed among the measured 29 FMS. Moreover, parametric analysis (one-way ANOVA) and post hoc Tukey HSD test were conducted to examine the potential differences across the three grade levels.

Study 3, entitled "Physical Activities in Hong Kong Kindergartens: A Content Analysis of the Quality Review Reports," was published in the journal *Policy Futures in Education* (Fan et al., 2024b). It was a content analysis examining the feedback pertaining to physical activities in the QR reports, as described by the EDB inspectors. The study had four research goals:

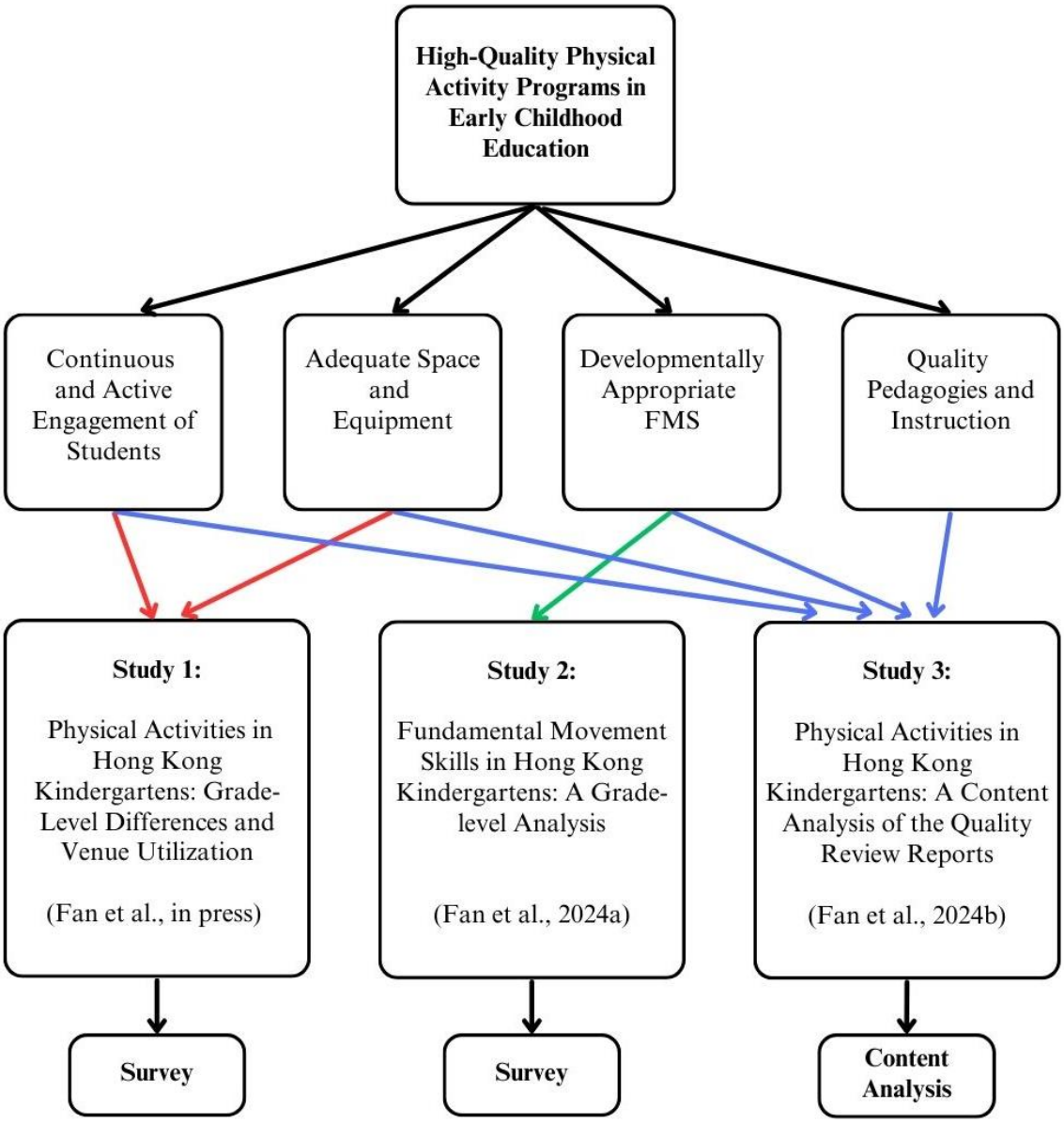
- **Goal #3.1** To examine the overall presence of content related to physical activities within the QR reports.
- **Goal #3.2** To analyze the presence of various forms of physical activities in the QR reports.
- **Goal #3.3** To explore the most common types of positive feedback given to kindergartens in relation to physical activities.
- **Goal #3.4** To explore the most common types of negative feedback and/or recommendations given to kindergartens in relation to physical activities.

The number of kindergartens represented in this study was 164, approximately 16% of the total number of kindergartens under the Kindergarten Education Scheme (EDB, 2024). First, the number of words coded in relation to physical activities was analyzed with descriptive statistics (overall frequency, average per QR report, maximum frequency, and percentages). Lexical analysis was also conducted by focusing on the vocabulary that appeared within the coded textual segments to examine the relative presence of those terms within the QR reports. Then, a word cloud was generated to graphically present the most common nouns, verbs, and adjectives in coded textual segments. Furthermore, three comprehensive coding schemes were developed by incorporating both inductive and deductive approaches (Saunders et al., 2012) to capture all the relevant contents in relation to physical activities in the QR reports.

Descriptive statistics (frequencies and percentages) were utilized to examine the appearance of each category within the QR reports.

The theoretical framework proposed by Stork and Sanders (2008) guides this doctoral dissertation, with each study focusing on specific components within this framework. Figure 2 illustrates the interrelationship between the three studies. Study 1 delved into the components of Continuous and Active Engagement of Students and Adequate Space and Equipment. Study 2 centered on the Developmentally Appropriate FMS component. Finally, Study 3 comprehensively examined all four components specified in the framework.

Figure 2. *Diagram Illustrating the Interrelationship Among the Three Studies*



Studies 1 and 2 investigated the self-reported physical activities and FMS practiced by kindergarten teachers across the three grade levels, as well as the locations where these activities take place. The Taxonomy of Movement Learning (Lu et al., 2014; Lu & Montague, 2016) was utilized to develop the survey questions. In Study 1, a list of physical activities was presented in a survey question aligned with the five categories of physical

activities in this taxonomy. Each category consists of several survey items: dance (e.g., free dance), gymnastics (e.g., rhythmic movement), individual physical activities (e.g., body awareness exercise), alternative environment physical activities (e.g., water play in water tanks/pool), and games (e.g., soccer). Similarly, a list of FMS was presented in Study 2 with reference to the three groups of FMS outlined in the taxonomy: locomotor (e.g., jumping vertically), stability (e.g., static balancing), and manipulative skills (e.g., bouncing a ball).

Study 3 investigated how the EDB, as a government body, described the presence of physical activities conducted by kindergarten teachers with young children. The positive and negative feedback and recommendations pertaining to physical activities in the QR reports were also analyzed. Stork and Sanders's (2008) theoretical framework aided me in identifying relevant themes for developing coding schemes, such as adequate planning and sufficient time. The framework allowed me to examine EDB's inspectors' perspectives and expectations on physical activities in local kindergartens and provide practical advice for kindergarten stakeholders (e.g., frontline principals and teachers, teacher educators, and professional development providers). Study 3 complements the findings from Studies 1 and 2. Through three empirical studies (Study 1, 2, and 3), this dissertation endeavored to establish a baseline of the current physical activity practices in local kindergartens.

Structure of the Dissertation

This dissertation comprises five chapters: Introduction, three empirical studies (Study 1, Study 2, and Study 3), and General Discussion. The three empirical studies, each focusing on distinct critical issues related to physical activity in kindergartens, are presented in the following chapters. The General Discussion chapter addresses the key findings, theoretical synthesis, conclusion, and implication of this dissertation portfolio, along with suggestions for future research. At the end of the dissertation, several appendices are provided, including the ethical approval for the studies and the questionnaires used in studies 1 and 2, with all references consolidated at the end of the thesis.

Overall, this dissertation portfolio enriches the limited literature on physical activities in Hong Kong kindergartens, providing valuable insight into the prevailing practices in local kindergartens. With the three aforementioned studies, various stakeholders (e.g., principals, teacher educators, professional development providers, and policymakers) can better understand teachers' specific needs in conducting physical activities at different grade levels. This knowledge not only informs the EDB on the need for more detailed feedback to practitioners (e.g., frontline teachers, principals), but also guides the development of responsive professional development initiatives tailored to expand teachers' repertoire of physical activities and FMS. By equipping teachers with ample knowledge and skills, the

quality of physical activity experiences for kindergarten children in Hong Kong will be enhanced.

STUDY 1: Physical Activities in Hong Kong Kindergartens: Grade-Level Differences and Venue Utilization[1]

Abstract

This study aimed to (1) investigate the provision of physical activities in Hong Kong kindergartens across different grade levels and (2) examine the availability and utilization of venues in or near kindergartens for physical activities. We surveyed 526 Hong Kong kindergarten teachers. Descriptive statistics and parametric statistical techniques (e.g., one-way ANOVA) were employed. Participants across all three grade levels reported implementing physical activities relatively infrequently (M = 2.47), with higher provision of unstructured physical activities involving low degrees of physical exertion and risk. However, K3 teachers (M = 2.55, SD = .45) were found to provide more physical activities than K1 teachers (M = 2.43, SD = .47, p = .033) and K2 teachers (M = 2.42, SD = .42, p = .030). Indoor venues were more commonly reported in or near kindergartens and were more frequently utilized for physical activities. In contrast, the availability and utilization of outdoor venues were limited. The results highlight the distance between internationally accepted physical activity guidelines and actual practices in Hong Kong kindergartens. We

[1] Fan, T., Bautista, A., & Chan, D. K. C. (in press). Physical activities in Hong Kong kindergartens: Grade-level differences and venue utilization. *Journal of Research in Childhood Education*. https://doi.org/10.1080/02568543.2024.2420999.

conclude that the limited opportunities for physical activities may not be enough for children to develop themselves optimally. Offering longer kindergarten programs and a wider range of easily accessible venues for physical activities would be vital to improving this situation.

Keywords: Physical Activities, Kindergarten Education, Classroom Practice, Grade Level, Venue, Hong Kong

Introduction

This survey study was conducted with kindergarten teachers in Hong Kong. Kindergartens in this city provide center-based educational services to children aged 3 to 6 on a half-day or full-day basis (Fan et al., 2024a). In the 2023/2024 academic year, there were 1,009 kindergartens and 11,733 registered kindergarten teachers in Hong Kong (Education Bureau [EDB], 2024). Although kindergarten education is non-mandatory, virtually all children in the city participate in kindergarten education programs (Rao et al., 2018). The enrollment of children in kindergartens is determined by their biological age, with three grade levels: Nursery (K1), Lower Kindergarten (K2), and Upper Kindergarten (K3) (EDB, 2023b).

Physical Fitness and Health is among the key learning areas for children's holistic development outlined in the Kindergarten Education Curriculum Guide (hereinafter referred to as the Guide) (Curriculum Development Council [CDC], 2017). In this area, kindergartens are expected to help children of different ages promote physical well-being, cultivate an interest in physical activities, and foster positive values and attitudes through a wide range of physical activities (CDC, 2017). The Guide (CDC, 2017) also recommends that half-day kindergartens arrange 45-60 minutes and full-day kindergartens arrange 90-105 minutes daily for activities that involve physical movement, music, and arts.

Kindergartens in Hong Kong are mandated to provide indoor play areas that adhere to a minimum floor space requirement of 1.8 m2 per child; outdoor play spaces are encouraged but not compulsory (EDB, 2023a). Most kindergartens are located in urban areas, in spaces such as residential estates, office blocks, religious institutions, shopping centers, and even rooftops of community centers (Yuen & Gallagher, 2024).

Hong Kong is well-known for its relatively low provision of physical activities in formal education settings (Chow et al., 2015b; Chung et al., 2019; Fan et al., 2024b) and for the limited space available in local schools (Rao et al., 2018; Yuen & Gallagher, 2024). Little research has been conducted to examine the specific types of physical activities teachers implement and how these vary across grade levels. Moreover, little is known about the availability and utilization of venues for physical activities in Hong Kong kindergartens. The objectives of this study are to investigate the provision of physical activities in Hong Kong kindergartens across different grade levels, as well as to examine the availability and utilization of venues for such activities. The literature review is divided into two sub-sections. First, we review the literature related to physical activities in early childhood education (ECE), specifically from 3 to 6 years of age. The second sub-section focuses on the provision of venues for physical activities in ECE settings.

Literature Review

Physical Activities in Early Childhood Education

Physical activity is defined as “any bodily movement produced by skeletal muscles that requires energy expenditure” (World Health Organization, 2024). Regular participation in physical activities supports the cardiorespiratory, musculoskeletal, and motor development of young children, and contributes to improved academic performance (Carson et al., 2017; Veldman et al., 2021; Zurc & Planinšec, 2022). International organizations such as American College of Sports Medicine (ACSM) (2015) proposed that children need to practice physical activities that involve both moderate and vigorous intensity.

International organizations have also established benchmarks to define quality physical activity programs in ECE settings. For example, the Society of Health and Physical Educators (SHAPE America) highlighted that physical activity programs should focus holistically on developing fundamental motor skills (FMS), acquiring basic movement and health-enhancing concepts, and promoting the enjoyment of moving to facilitate children’s motor, cognitive, emotional, and social development (SHAPE America, 2013). Moreover, the Australian Curriculum Assessment and Reporting Authority (2020) has suggested that the essence of physical activity programs should center around the acquisition of movement skills and understanding concepts that empower children to engage in a range of physical activities with confidence, competence, and creativity.

Western scholars have provided recommendations related to the forms of physical activities that can enhance children's development and enjoyment. As proposed by Lu et al. (2014) under the Movement Learning Framework, physical activity programs should comprise five categories of activities: (a) dance (e.g., free dance), (b) gymnastics (e.g., rhythmic movement), (c) individual physical activities (e.g., body awareness exercise), (d) alternative environment activities (e.g., water play in water tanks/pools), and (e) games (e.g., soccer, reaction time games). In 2020, the Australian Curriculum Assessment and Reporting Authority (2020) recommended that teachers incorporate a wide range of physical activities, such as active play (e.g., forms of play that require strength) and expressive exercise (e.g., imitation games), during the dedicated physical activity time. Furthermore, Sutapa et al. (2020) proposed that physical activities in ECE should primarily be grounded in a playful and enjoyable manner. The authors encouraged teachers to engage children in physical activities through various types of games, such as circle games (e.g., parachute game), chasing games (e.g., cats and mice), and circuit games (e.g., setting up a series of fitness stations) (Ministry of Education, 2013).

Studies conducted in Scandinavian countries have highlighted the importance of ECE centers in promoting children's physical development. For instance, Norwegian ECE centers have a longstanding tradition of daily outdoor play (Hagen, 2015; Kippe & Lyngstad, 2021), where children are more physically active compared to their leisure time (Fossdal et al., 2018;

Nilsen et al., 2019). In an observational study involving 823 Finnish children, Reunamo et al. (2014) found that over 70% of vigorous-intensity physical activity in these settings took place during free play.

These findings radically differ compared to other countries, in which the exposure of young children to physical activities tends to be insufficient. For instance, Bautista et al. (2020) highlighted that Singapore's ECE teachers do not consistently implement physical activities involving gross motor skills every day. Comparable findings have been documented in Spain, where physical activities in ECE programs are only implemented once a week (Alcántara-Porcuna et al., 2022). A systematic review conducted by Barbosa and Oliveira (2016) examined seven studies published between 2008 and 2012, representing 1681 children from 71 ECE centers in five countries. Although children spent an average of 7.22 to 7.51 hours per day at school, it was reported that they engaged in sedentary behaviors during most of the school hours (ranging from 55% to 94%). Yuen (2020) indicated that approximately 80% of half-day kindergartens in Hong Kong allocated less than 30 minutes to physical activities daily, while 63% of full-day kindergartens allocated between 30 and 40 minutes.

Currently, there is limited research documenting the frequency and diversity of physical activities teachers implement in kindergarten settings and how the activities differ according to the grade level of children in the Hong Kong context, K1, K2, and K3 (3-4, 4-5, and 5-6 years of age, respectively). The existing data about the provision of physical activity

in kindergartens have been primarily based on observation and secondary data analysis. For example, Bautista et al. (2020) highlighted imbalanced exposure to various gross motor skills within Singapore's ECE centers. Certain non-locomotor skills were more frequently taught than locomotor skills or manipulative skills in the classroom. More recently, Fan et al. (2024b) analyzed 164 Kindergarten Education Quality Review (QR) Reports issued by the Hong Kong EDB. Their findings revealed that physical games (e.g., race games) and physical movement with music (e.g., rehearsed dance for public performance) were commonly taught in Hong Kong kindergartens. In contrast, physical activities involving various gross motor skills were identified as the least observed physical activities. Furthermore, (Brown et al., 2009) conducted an observational study in 24 ECE centers located in South Carolina. The findings indicated that teachers rarely arranged physical games for children in the class. Considering the above research gap, the first goal of this study was to investigate the provision of physical activities in Hong Kong kindergartens across different grade levels.

Availability and Utilization of Venues for Physical Activities

The international literature highlights the importance of having adequate venues in and/or near ECE centers to support a broad range of physical activities. A study conducted by Chow and Louie (2013) showed that the existence of large areas and play spaces was crucial for the practice of locomotor skills (i.e., skills typically require more expansive areas). Henderson et al. (2015) revealed that teachers tended to restrict children's physical activity

level and choices in cases where the physical space in schools was limited. Moreover, Dowda et al. (2009) discovered that large playgrounds, along with more portable equipment, were associated with increased levels of moderate to vigorous intensity of physical activities.

Previous studies have also examined the differences in the forms of physical activities implemented in indoor versus outdoor venues. Indoor venues (e.g., classrooms, multipurpose rooms, assembly halls, dance studios) are typically used for physical activities that tend to require lower levels of physical exertion (Brown et al., 2009), such as dance (Derscheid et al., 2010). In contrast, outdoor venues, such as parks, rooftops, or grass pitches, have been recognized as essential spaces for implementing physical activities (Skarstein & Ugelstad, 2020), especially for physical play (Saamong et al., 2023) and those involving the manipulation of balls and objects (e.g., basketball, golf) (Brown et al., 2009).

Research studies, however, have consistently revealed that ECE centers often lack appropriate venues for physical activities, especially in urban contexts (Moser & Martinsen, 2010). In densely populated urban areas such as Singapore, ECE centers often operate within residential buildings, leading to a lack of outdoor space and compromising locomotor and manipulative skills (Bautista et al., 2020). In Hong Kong, more than one-third of kindergartens reported difficulties arranging suitable venues for physical activities that required large spaces (Yuen, 2020), particularly in government-funded kindergartens, which

have limited access to outdoor venues, and children are often restricted to indoor venues (Chow & Louie, 2013).

In cases where kindergartens have limited venues for physical activities, leveraging community resources, such as parks, nature trails, and recreation facilities (e.g., outdoor playgrounds, sports fields) can serve as additional options for teachers to implement physical activities (Cashmore & Jones, 2008). However, a survey conducted by Nonis (2005) revealed that half of Singapore's ECE teachers had never utilized community resources for physical activities. The reasons teachers provided included unawareness of available venues, insufficient information about the venues, the venues being developmentally inappropriate for young children, limited opportunities (e.g., time constraints) to use those venues, and the venues being too far from schools. To date, we know little about the availability and utilization of various venues for physical activities in or near kindergartens in Hong Kong. Thus, the second goal of the present study is to address this knowledge gap.

Research Goals

This study delves into the implementation of physical activities by Hong Kong kindergarten teachers, with a focus on the frequency and variety of physical activities across grade levels, as well as the locations where teachers conduct these activities with children. More specifically, our investigation was guided by two research goals:

- Goal #1.1 To investigate the provision of physical activities in Hong Kong kindergartens across the three grade levels (K1, K2, and K3).
- Goal #1.2 To examine the availability and utilization of venues in or near kindergartens for implementing physical activities.

Method

Participants

Participants were 526 kindergarten teachers in charge of 3- to 6-year-old children in Hong Kong (499 females, 22 males, and five participants did not disclose their gender), from both government-funded (83.5%) and non-government-funded (16.5%) kindergartens. As shown in Appendix 1, 196 responses (37.3%) corresponded to K1 teachers, 157 responses (29.8%) to K2 teachers, and 173 responses (32.9%) to K3 teachers. Regarding educational qualifications, 338 (64.3%) participants held an associate degree or higher diploma (or below), 138 (26.2%) had a bachelor's degree, and 50 (9.5%) possessed postgraduate qualifications (or above). Most participants worked on a full-time basis (92.8%).

In terms of teaching roles, 70.9% of the participants were class teachers, 12.9% were assistant teachers, 6.7% were specialized teachers, 5.5% were head teachers, and 4.0% were principals. The participants' age range was diverse, with 342 (65.0%) were falling between 20 and 29 years old, 102 (19.4%) were between 30 and 39, 49 (9.3%) were between 40 and 49, 29 (5.5%) were over 50, and 4 (0.8%) were aged 20 or younger. Finally, 312 (59.3%)

participants had five years or less experience as kindergarten teachers, 149 (28.3%) had five to 15 years of experience, and 65 (12.4%) had over 15 years of experience (see Appendix 1).

Our sample represented approximately 4.2% of the total population of kindergarten teachers in Hong Kong, and it reflected the characteristics of the local teacher population in terms of gender, educational qualifications, and type of school (EDB, 2024).

Materials

The data were collected through a survey designed to investigate various topics related to physical activities in Hong Kong kindergartens. The survey included the following sections and items:

(1) **Demographics:** This section aimed to gather participants' basic information, including educational qualifications, type of school, teaching role, working mode, age, and teaching experience. In addition, teachers were requested to indicate the kindergarten grade level they would refer to in the subsequent sections of the survey.

(2) **Provision of physical activities:** This section aimed to assess the frequency of specific physical activities conducted by teachers with children. The question posed was "How often did you conduct the following activity with children during your physical activity sessions (excluding free play)?" A total of 18 types

of physical activity were listed, for example, “Rhythmic movement,” “Reaction time games,” and “Basketball.” All the activities listed involved moderate to vigorous levels of intensity. Teachers were asked to indicate the frequency of each activity using a 5-point Likert scale, with the following response options: *Never*, *Rarely* (1-3 times per year), *Occasionally* (once a week or less), *Frequently* (several times per week), and *Very Frequently* (every day).

(3) **Availability and utilization of venues for physical activities:** Teachers were asked to indicate the availability and utilization of specific venues in or near their kindergartens. The initial question posed was “Does this venue exist in or near your school?” A total of 14 venues were presented. Teachers responded either “Yes” or “No.” When a teacher answered “Yes,” the following question was asked: “How often did you conduct physical activities with children in this venue?”. A 5-point Likert scale ranging from *Never* to *Very Frequently* was used to assess the frequency of utilization.

A four-stage process was carried out to ensure the content validity of the survey. The details of each stage are outlined below:

Stage 1: Preliminary list of physical activities and venues.

At the beginning of the survey development, an extensive literature review was conducted to gather information about the most typical physical activities in ECE settings.

The relevant literature was examined, including that of Antala et al. (2019), Beaver et al. (2018), and Essa and Burnham (2019), along with the Hong Kong Official Curriculum Guide (CDC, 2017). This literature provided a broad overview of the physical activities recommended in kindergartens, both internationally and locally, as well as the venues needed. Based on this review, a preliminary list of physical activities and venues was developed. Then, we assessed the content validity of the preliminary list using expert judgment, a method by which advice is solicited from experts in the area of interest (Hughes, 1996). Five experts in early childhood physical activities were consulted to evaluate the clarity and suitability of the physical activities and venues included in the preliminary list. The experts verified that the survey exhibited a high degree of comprehensiveness and inclusivity in its scope.

Stage 2: Preliminary drafts of the survey

We revised the list of physical activities and venues according to the experts' suggestions. Then, we designed a preliminary survey draft incorporating various response formats (e.g., "Yes" versus "No," 5-point Likert scales). In addition, several demographic items and screening questions were added to ensure that only participants representative of the target group could respond to the survey.

Stage 3: Pilot testing

A total of 30 local kindergarten teachers were recruited for a pilot study. Teachers were requested to complete the survey and provide feedback on the relevance of the items and the response choices provided.

Stage 4: Finalization and translation

Based on the teachers' feedback received during the pilot testing stage, amendments were made to the survey. Then, we agreed with the final version of the survey and translated the finalized survey from English to Traditional Chinese. To ensure translation accuracy, an external research assistant performed the back-translation. Finally, the survey was set up on the "Qualtrics online survey platform"[2] in both English and Traditional Chinese.

Procedure

Ethical approval was obtained from the Human Research Ethics Committee of the first author's institution. After the email addresses were acquired from the EDB's website[3], a formal invitation letter with the information sheet outlining the purpose of the study, a consent form, and a hyperlink to access the survey on the Qualtrics platform were sent to the principals of all kindergartens in Hong Kong. The principals were kindly requested to help distribute the survey to the teachers in their kindergartens in charge of teaching 3- to 6-year-old kindergarten children. To maximize participation, two follow-up emails (two weeks after

[2] Please refer to http://www.qualtrics.com
[3] Please refer to https://kgp2023.azurewebsites.net/edb/.

the initial email and one week before the conclusion of the survey period) were sent to the principals to ask for their help in encouraging their teachers' participation. As the survey was distributed to many kindergartens, we lacked the precise number of teachers who received our survey. Therefore, we are unable to provide information regarding the response rate in this instance. The survey on the Qualtrics platform was active for one and a half months, allowing teachers adequate time to complete it. All participants completed the survey using either computers or mobile devices in their preferred language. Before proceeding with the survey, teachers were informed that all information collected would be reported anonymously and treated strictly confidentially. Additionally, teachers were requested to provide informed consent before answering the survey questions.

Data Analysis

A total of 670 completed survey entries were initially recorded. Then, we eliminated 144 invalid entries for various reasons during the data screening process. More precisely, 87 participants reported that they were not currently kindergarten teachers, 26 participants were found to have completed the items randomly (i.e., inconsistently), and 31 participants completed the survey within an unreasonably short time. Descriptive statistics were then generated to provide a preliminary overview of the participants' socio-demographic backgrounds. The response choices of the Likert scales for each item were converted into numeric values (i.e., *Never* = 1, *Rarely* = 2, *Occasionally* = 3, *Frequently* = 4, and *Very*

Frequently = 5). To address Goal #1.1, we analyzed the data using descriptive statistics (e.g., frequencies, percentages, means, standard deviation). Also, Cronbach's alpha was computed to evaluate the reliability of the results. We then calculated the mean score of each of the 18 physical activities to determine their respective ranking positions (i.e., 1st, 2nd, 3rd). Activities with the highest means (i.e., closest to 5) were ranked 1st, and so on. Furthermore, we ran one-way ANOVA to examine how the frequency of physical activities varied across different kindergarten grade levels. Subsequently, a post hoc Tukey HSD test was performed for any significant differences. For Goal #1.2, we employed various descriptive statistics, such as frequencies, percentages, overall means, and standard deviations to showcase the availability and utilization of each venue. All the data analyses were conducted using IBM SPSS Statistics for Windows, version 28.0.

Results

Goal #1.1: Provision of Physical Activities across Grade Levels

Overall, the most common response choices were Rarely, Never, and Occasionally, whereas Frequently and Very Frequently were selected less often (see Appendix 2). The Cronbach's alpha value of the sample was .824, demonstrating a fairly high level of internal consistency and reliability (Taber, 2018).

Table 2 presents the descriptive statistics (including the frequencies and percentages for each response choice, overall mean score, and standard deviations) of teachers' responses

to the 18 physical activities. The resulting means ranged from 1.22 to 3.99. Specifically, none of the physical activities obtained a mean score above 4 (*Frequently*). Among the 18 physical activities presented, four activities obtained mean scores above 3 (e.g., “rhythmic movement,” “playing with playground equipment”), eight activities obtained mean scores between 2 and 3 (e.g., “reaction time games,” “imitation games”), and six activities obtained mean scores between 1 and 2 (e.g., “forms of play that require strength,” “body awareness exercises”).

Table 2. *Provision of Physical Activities in Kindergartens: "How often did you conduct the following activity with children during your physical activity sessions (excluding free play)?"*

Physical Activities	Never (1)		Rarely (2)		Occasionally (3)		Frequently (4)		Very Frequently (5)		Overall Mean (*SD*)	95% CI
	n	%	n	%	n	%	n	%	n	%		
Rhythmic movement	13	2.5	42	8.0	101	19.2	152	28.9	218	41.4	3.99 (1.07)	(3.90, 4.08)
Playing with playground equipment	52	9.9	77	14.6	105	20.0	146	27.8	146	27.8	3.49 (1.30)	(3.38, 3.60)
Free dance	36	6.8	84	16.0	162	30.8	141	26.8	103	19.6	3.36 (1.16)	(3.26, 3.46)
Circuit games	32	6.1	58	11.0	193	36.7	183	34.8	60	11.4	3.34 (1.02)	(3.26, 3.43)
Reaction time games	12	2.3	123	23.4	262	49.8	114	21.7	15	2.9	2.99 (.81)	(2.92, 3.06)
Imitation games	35	6.7	128	24.3	209	39.7	119	22.6	35	6.7	2.98 (1.00)	(2.90, 3.07)
Circle games	12	2.3	138	26.2	273	51.9	87	16.5	16	3.0	2.92 (.80)	(2.85, 2.99)
Chasing games	62	11.8	180	34.2	199	37.8	69	13.1	16	3.0	2.61 (.96)	(2.53, 2.70)
Rehearsed dance for public performance	28	5.3	254	48.3	158	30.0	76	14.4	10	1.9	2.59 (.87)	(2.52, 2.67)
Race games	96	18.3	209	39.7	174	33.1	40	7.6	7	1.3	2.34 (.91)	(2.26, 2.42)
Soccer	164	31.2	216	41.1	113	21.5	29	5.5	4	.8	2.04 (.90)	(1.96, 2.11)
Basketball	169	32.1	211	40.1	117	22.2	26	4.9	3	.6	2.02 (.89)	(1.94, 2.09)
Forms of play that require strength	184	35.0	213	40.5	99	18.8	27	5.1	3	.6	1.96 (.89)	(1.88, 2.03)
Body awareness exercises	225	42.8	182	34.6	83	15.8	26	4.9	10	1.9	1.89 (.97)	(1.80, 1.97)
Physically challenging play	265	50.4	158	30.0	80	15.2	15	2.9	8	1.5	1.75 (.92)	(1.67, 1.83)
Water play in water tanks / pool	299	56.8	185	35.2	29	5.5	12	2.3	1	.2	1.54 (.72)	(1.48, 1.60)
Motion-sensing games	392	74.5	89	16.9	35	6.7	9	1.7	1	.2	1.36 (.70)	(1.30, 1.42)
Golf	430	81.7	78	14.8	14	2.7	4	.8	0	0	1.22 (.52)	(1.18, 1.27)
OVERALL	139.2	26.5	145.8	27.7	133.7	25.4	70.8	13.5	36.4	6.9	2.47 (.45)	(2.43, 2.51)

The most commonly implemented physical activities were "rhythmic movement" and "playing with playground equipment." Over half of the participants reported implementing these *Frequently* or *Very Frequently*. This was followed by six activities for which most participants chose *Occasionally*, such as "free dance," "circuit games," and "reaction time games." Five activities, including "rehearsed dance for public performance" and "race games," were relatively less common, as most participants reported implementing them

Rarely. Finally, five activities, such as “body awareness exercises” and “physically challenging play,” were ranked at the bottom of the table, as most teachers reported that they had *Never* implemented them in the classes.

Table 3 presents the mean, standard deviation, and rank position for each physical activity among the three kindergarten grade levels. The ranking positions of the listed physical activities were consistently similar among all three levels. Teachers in all three grade levels implemented “rhythmic movement” more frequently than other activities. Conversely, activities including “physically challenging play,” “water play in water tanks / pool,” “motion-sensing games,” and “golf” were infrequently implemented by teachers, as the mean scores below two were recorded for all of them across all three grade levels. Additionally, Table 3 shows the statistically significant differences in the overall mean scores across the three kindergarten grade levels. K3 teachers reported the highest overall mean score of the 18 physical activities compared to K1 and K2 teachers. One-way ANOVA revealed a significant difference among the three groups, F (2, 523) = 4.257, p = .015. Post hoc comparisons using the Tukey HSD test indicated that the mean score for K3 (M = 2.55, SD = .45) was significantly higher than that of K1 (M = 2.43, SD = .47, p = .033) and K2 (M = 2.42, SD = .42, p = .030).

Table 3. *Provision of Physical Activities across Three Kindergarten Grade Levels*

Physical Activities	Overall Mean (*SD*)	K1		K2		K3	
		Rank	*M* (*SD*)	Rank	*M* (*SD*)	Rank	*M* (*SD*)
Rhythmic movement	3.99 (1.07)	1st	4.02 (1.13)	1st	3.93 (1.05)	1st	4.01 (1.04)
Playing with playground equipment	3.49 (1.30)	2nd	3.64 (1.28)	2nd	3.41 (1.33)	3rd	3.39 (1.30)
Free dance	3.36 (1.16)	3rd	3.40 (1.19)	4th	3.23 (1.15)	2nd	3.44 (1.14)
Circuit games	3.34 (1.02)	4th	3.37 (1.07)	3rd	3.27 (1.02)	4th	3.38 (.97)
Reaction time games	2.99 (.81)	7th	2.96 (.84)	6th	2.95 (.82)	5th	3.08 (.77)
Imitation games	2.98 (1.00)	5th	3.00 (1.06)	5th	3.01 (.92)	6th	2.94 (1.02)
Circle games	2.92 (.80)	6th	2.98 (.82)	7th	2.83 (.78)	7th	2.93 (.79)
Chasing games	2.61 (.96)	9th	2.45 (.91)	8th	2.66 (.99)	8th	2.76 (.96)
Rehearsed dance for public performance	2.59 (.87)	8th	2.51 (.86)	9th	2.51 (.88)	8th	2.76 (.85)
Race games	2.34 (.91)	10th	2.11 (.95)	10th	2.40 (.88)	10th	2.54 (.83)
Soccer	2.04 (.90)	11th	1.99 (.97)	13th	1.87 (.83)	11th	2.24 (.86)
Basketball	2.02 (.89)	12th	1.89 (.92)	12th	1.93 (.83)	11th	2.24 (.88)
Forms of play that require strength	1.96 (.89)	14th	1.80 (.89)	11th	1.99 (.91)	13th	2.10 (.85)
Body awareness exercises	1.89 (.97)	13th	1.81 (.97)	14th	1.85 (.95)	14th	2.00 (.99)
Physically challenging play	1.75 (.92)	15th	1.64 (.82)	15th	1.75 (.97)	15th	1.87 (.97)
Water play in water tanks/pool	1.54 (.72)	16th	1.58 (.76)	16th	1.45 (.68)	16th	1.57 (.70)
Motion-sensing games	1.36 (.70)	17th	.1.38 (.70)	17th	1.34 (.69)	17th	1.36 (.71)
Golf	1.22 (.52)	18th	1.21 (.55)	18th	1.22 (.47)	18th	1.24 (.54)
OVERALL	2.47 * (.45)		2.43 (.47)		2.42 (.42)		2.55 * (.45)

Table 4 shows the items with statistically significant differences in the provision of physical activities across the three kindergarten grade levels. When comparing the frequency of "chasing games" and "forms of play that require strength" among the three grade levels, significant differences ($p < .01$) were found. K3 teachers implemented these activities more

frequently than teachers did at K1. The post hoc (Tukey) test further revealed that teachers at K3 implemented "rehearsed dance for public performance," "soccer," and "basketball" more frequently than K1 and K2 teachers. Finally, teachers in K2 and K3 reported a higher frequency of "race games" than did those in K1.

Table 4. *Provision of Physical Activities across Three Kindergarten Grade Levels: Items with Statistically Significant Differences*

Physical Activities	*F* (2, 523)	K1	K2	K3
		M (*SD*) [95% CI]	*M* (*SD*) [95% CI]	*M* (*SD*) [95% CI]
Chasing games [a]	5.226	2.45 (.91) [*] [2.32, 2.58]	2.66 (.99) [2.50, 2.81]	2.76 (.96) [2.62, 2.91]
Rehearsed dance for public performance [b]	5.019	2.51 (.86) [***] [2.39, 2.63]	2.51 (.88) [***] [2.37, 2.65]	2.76 (.85) [2.64, 2.89]
Race games [c]	11.308	2.11(.95) [1.98, 2.25]	2.40 (.88) [*] [2.26, 2.54]	2.54 (.83) [2.42, 2.67]
Soccer [b]	7.757	1.99 (.97) [***] [1.85, 2.13]	1.87 (.83) [*] [1.74, 2.00]	2.24 (.86) [2.11, 2.37]
Basketball [b]	8.607	1.89 (.92) [*] [1.76, 2.02]	1.93 (.83) [*] [1.80, 2.06]	2.24 (.88) [2.11, 2.37]
Forms of play that require strength [a]	5.584	1.80 (.89) [*] [1.68, 1.93]	1.99 (.91) [1.85, 2.14]	2.10 (.85) [1.98, 2.23]

Note. CI = Confidence interval
[*] $p < .01$, [***] $p < .05$
[a] K3 > K1. [b] K3 > K1 and K2. [c] K2 and K3 > K1.

Goal #1.2: Availability and Utilization of Venues

The second and third columns of Table 5 indicate whether eight indoor and six outdoor venues were available at the participants' kindergartens. Only four indoor and one outdoor venues exhibited availability rates exceeding 50%. The venue with the highest availability rate was the "classroom," as more than 97% (n = 511) of the participants reported its presence in their kindergartens. The following most commonly available venues were the

"multipurpose / activity room" (*n* = 430, 81.7%), "music classroom" (*n* = 367, 69.8%), "gross motor room / area" (*n* = 364, 69.2%), and "park" (*n* = 336, 63.9%). The remaining venues, especially those pertaining to outdoor venues, obtained lower availability rates. For instance, more than 80% of the teachers indicated the absence of "rooftop" (*n* = 432, 82.1%), "grass pitch" (*n* = 449, 85.4%), and "nature trail" (*n* = 476, 90.5%) in or near the participants' kindergartens.

Table 5. *Provision of Venues in Kindergartens: "Does this venue exist in or near your school?" If yes, "How often did you conduct physical activities with children in this venue?"*

Venues	No (%)	Yes (%)	Never	Rarely	Occasionally	Frequently	Very Frequently	Mean (SD)	95% CI
Indoor									
Gross motor room / area	162 (30.8)	364 (69.2)	1 0.3%	5 1.4%	36 9.8%	94 25.8%	228 62.6%	**4.49 (.75)**	(4.41, 4.57)
Multipurpose / Activity room	96 (18.3)	430 (81.7)	7 1.6%	11 2.6%	52 12.1%	129 30.0%	231 53.7%	**4.32 (.90)**	(2.23, 4.40)
Indoor playground	279 (53.0)	247 (47.0)	24 9.7%	10 4.0%	32 13.0%	70 28.3%	111 44.9%	**3.95 (1.27)**	(3.79, 4.11)
Music classroom	159 (30.2)	367 (69.8)	47 12.8%	39 10.6%	90 24.5%	69 18.8%	122 33.2%	**3.49 (1.38)**	(3.35, 3.63)
Classroom	15 (2.9)	511 (97.1)	53 10.4%	102 20.0%	139 27.2%	71 13.9%	146 28.6%	**3.30 (1.35)**	(3.19, 3.42)
Assembly hall	334 (63.5)	192 (36.5)	23 12.0%	40 20.8%	48 23.4%	38 19.8%	43 22.4%	**3.20 (1.32)**	(3.01, 3.39)
Dance studio	419 (79.7)	107 (20.3)	21 19.6%	21 19.6%	25 23.4%	20 18.7%	20 18.7%	**2.97 (1.39)**	(2.71, 3.24)
Gymnasium	354 (67.1)	173 (32.9)	92 53.2%	61 35.3%	14 8.1%	3 1.7%	3 1.7%	**1.64 (.84)**	(1.51, 1.76)
Outdoor									
Outdoor playground	266 (50.6)	260 (49.4)	31 11.9%	38 14.6%	57 21.9%	62 23.8%	72 27.7%	**3.41 (1.35)**	(3.24, 3.57)
Rooftop	432 (82.1)	94 (17.9)	32 34.0%	14 14.9%	17 18.1%	12 12.8%	19 20.2%	**2.70 (1.54)**	(2.39, 3.02)
Grass pitch	449 (85.4)	77 (14.6)	22 28.6%	18 23.4%	22 28.6%	7 9.1%	8 10.4%	**2.49 (1.28)**	(2.20, 2.78)
Nature trail	476 (90.5)	50 (9.5)	12 24.0%	27 54.0%	8 16.0%	2 4.0%	1 2%	**2.06 (.87)**	(1.81, 2.31)
Sports field	350 (66.5)	176 (33.5)	72 10.9%	61 34.7%	25 14.2%	9 5.1%	9 5.1%	**1.99 (1.11)**	(1.82, 2.15)
Park	190 (36.1)	336 (63.9)	134 39.9%	134 39.9%	44 13.1%	15 4.5%	9 2.7%	**1.90 (.97)**	(1.80, 2.01)

Note. CI = Confidence interval

Considering only the participants who responded "Yes" to the prior question, Table 5 also shows the descriptive statistics (i.e., frequencies, percentages, overall mean score, and standard deviations) reflecting teachers' frequency of utilization of the listed venues. The resulting means of the indoor venues ranged from 1.64 to 4.49, while those of the outdoor venues ranged from 1.90 to 3.41. Five indoor venues, including "gross motor room/area,"

"multipurpose/activity room," "indoor playground," "music classroom," and "classroom," were frequently utilized by the participants. Most teachers reported utilizing these venues *Very Frequently*. In contrast, "gymnasium" was identified as the least-utilized indoor setting, with more than half of the teachers conducting no physical activities with children. Of the six outdoor venues, only the "outdoor playground" was frequently utilized, with half of the teachers (51%) conducting physical activities there either *Very Frequently or Frequently*. In contrast, "rooftop," "grass pitch," "nature trail," "sports field," and "park" were the least utilized outdoor venues. Most teachers reported conducting physical activities in these settings, either *Rarely* or *Never*.

Discussion

Goal #1.1 was to investigate the provision of physical activity provided by Hong Kong kindergartens across the three grade levels (K1, K2, and K3). The overall mean score of 2.47 (out of five) for the 18 physical activities indicated a relatively low level of implementation. Most physical activities (14 out of 18) scored below the mean value of three (between Never and Occasionally), which highlights the limited extent to which these activities are implemented in Hong Kong kindergartens. These findings are consistent with a previous documentary analysis of QR reports (Fan et al., 2024b), which revealed that Hong Kong kindergarten teachers tend to conduct physical activities infrequently. This could be partly because two-thirds of kindergartens in Hong Kong offer half-day programs (EDB,

2023c). Half-day programs typically offer 3-hour sessions with tightly packed teaching schedules. Each segment within the schedule usually lasts 20 to 30 minutes (Yeung et al., 2022). It is, therefore, challenging for teachers to cover all learning areas within such limited time. As Talley et al. (2012) suggested, the major disadvantages of half-day ECE programs are having a cramped curriculum and providing rushed instruction. Additionally, academic performance is highly valued in Hong Kong (Li, 2004), similar to other Asian societies such as Singapore (Deng et al., 2013), Thailand (Amornsriwatanakul et al., 2022), and the Philippines (Saamong et al., 2024). Parents place particular importance on their children's proficiency in academic areas such as mathematics and language. To satisfy parental expectations, teachers often compromise non-academic areas (e.g., *Physical Fitness and Health*, Arts and Creativity), as well as time for play (Rao et al., 2018).

Teachers reported different levels and frequencies for the various types of physical activities. The most frequently implemented activities were "rhythmic movement," "playing with playground equipment," and "free dance." Note that these activities integrate physical movement with music, arts, and play. This is aligned with the curriculum integration principles outlined in the Guide (CDC, 2017), which recommends that teachers design teaching and learning activities that address multiple learning areas concurrently. However, it is important to note that these activities generally involve low physical exertion and risk (Brown et al., 2009). Our findings are, therefore, inconsistent with the study by Chow et al.

(2015a), who reported a high level of moderate to vigorous physical activities in Hong Kong kindergartens. One potential explanation for our findings could be the absence of specific guidelines for the frequency and intensity of physical activity in kindergarten. While it is specified in the current Guide (CDC, 2017) that a minimum time requirement for physical, music, and art activities, it fails to offer explicit guidance and concrete examples to support teachers in conducting physical activities. Teachers could avoid activities that involve high intensity and risk due to their concern for children's safety and their desire to prevent injuries (Obeng, 2009). The limited variety of physical activities could also be attributed to inadequate training (Obeng, 2009). Similar to other countries and jurisdictions in the West (Martyniuk & Tucker, 2014), Global South (Hannaway et al., 2019; Saamong et al., in press), and Asia (Wang, 2019), kindergarten teachers in Hong Kong receive minimal training in physical activities during their teacher preparatory training (Mak et al., 2021). For example, teachers typically only complete a single 36-hour module on physical activity as part of their 5-year undergraduate curriculum for pre-service teachers (The Education University of Hong Kong, 2025). As a result, teachers often lack the necessary competence to design and implement a diverse range of physical activities (Lu & Montague, 2016) and struggle to identify appropriate types of physical activities for ECE settings (Obeng, 2009).

Our findings indicated that both the quantity and types of physical activities implemented at the different grade levels differ. K3 teachers reported the highest overall

mean score for the 18 physical activities among all three grade levels. Specifically, K3 teachers had a significantly higher mean score for “chasing games,” “forms of play that require strength,” “rehearsed dance for public performance,” “soccer,” “basketball,” and “race games” than did K1 and K2 teachers. This finding is unique compared to that of a prior study conducted in Singapore (Bautista et al., 2020), which focused solely on K1 (equivalent to K2 in Hong Kong) and did not investigate differences across grade levels. The present study has, therefore, made a relevant contribution to the scarce literature on physical activities in ECE.

Goal #1.2 was to examine the availability and utilization of venues in or near kindergartens for implementing physical activities. Indoor venues were more commonly reported in or near kindergartens. Half of the indoor venues, including “classroom,” “multipurpose/activity room,” “music classroom,” and “gross motor room/area” were highly available. Alongside high availability, most teachers also reported very frequent utilization of these venues. In contrast, teachers reported that most outdoor venues were unavailable in their kindergartens. For instance, only 10% to 20% of the respondents reported the availability of “rooftop,” “grass pitch,” or “nature trail” in or near their kindergartens.

These findings may be caused by multiple factors. First, similar to other Asian countries and jurisdictions such as Singapore (Bautista et al., 2020), China (Bao et al., 2021), and Japan (Schneider et al., 2015), Hong Kong is a highly urbanized city with a very dense

population, presenting a well-known challenge of limited space availability. Due to the high cost of properties and lands, kindergartens in the region often lack sufficient space and are unable to afford additional outdoor spaces for physical activities (Rao et al., 2018). Indeed, in contrast with countries where outdoor venues are mandated, such as England (Yuen, 2020) and Finland (Määttä et al., 2019), these venues are merely recommended but not compulsory in Hong Kong (EDB, 2023a). Second, the limited duration of kindergarten programs in Hong Kong poses a challenge in allowing teachers to arrange off-campus physical activities for children. The logistics involved in taking children to outdoor venues outside the campus require considerable time, and teachers may be reluctant to sacrifice that precious time from their already compressed schedule. Finally, safety and hygiene concerns could be other possible factors for the limited utilization of outdoor venues. Kindergartens in Hong Kong often operate in urban areas close to busy roads and face various hygiene issues, such as mosquito and rodent infestation, noise, and air pollution (Yuen, 2020). These factors understandably raise concerns among teachers, leading them to hesitate to utilize nearby outdoor venues, even if they are available.

Conclusion

In summary, our evidence highlights the distance between internationally accepted physical activity guidelines and actual physical activity provision in Hong Kong kindergartens. Teachers tend to implement physical activities that involve low levels of

physical exertion and risk. This level of intensity clearly falls short of the recommended standards (e.g., ACSM, 2015; Institute of Medicine, 2013). We conclude that such restricted levels and opportunities for physical activities may not be adequate for children to develop themselves optimally. Moreover, our evidence indicates that indoor venues are more commonly available in or near kindergartens and are more frequently utilized for physical activities than outdoor venues. This highlights the need to assess and address the limited availability and/or accessibility of outdoor venues in Hong Kong kindergartens. Efforts should be made to provide teachers with training and resources that enable them to identify and utilize available outdoor venues in the community.

Limitations and Future Research

This study has several limitations. First, although the sample size of teacher respondents was large, the data collection relied solely on self-reported surveys. Future studies should incorporate other data sources, such as observations and interviews to verify whether what teachers reported in the survey aligns with their actual classroom practices, thereby allowing for data triangulation. Second, our findings showed that certain outdoor venues were underutilized by kindergarten teachers. However, the exact reasons behind this phenomenon have not been explored. It would be imperative for future research to delve into the underlying reasons and thoroughly assess why teachers are not utilizing these outdoor spaces. Furthermore, because the study was not designed to examine the relationships

between various types of physical activities, future studies should explore the correlation of different types of physical activities practiced in kindergartens. Finally, the present study reflects only the provision of physical activity in Hong Kong kindergartens. Future research should collect data from other jurisdictions and countries, especially in the Global South, to examine the generalization and international comparison of the findings presented here.

Significance and Implications

The current study has several important implications for ECE stakeholders, including curriculum designers, teacher educators, professional development providers, and policymakers. We suggest that curriculum designers further clarify the official expectations of the Guide (CDC, 2017) by providing practical examples for each learning objective in this area. It would also be vital to stress the importance of engaging children in physical activities that are of moderate to vigorous intensity rather than solely low physical exertion and less challenging activities. Curriculum designers should also develop more explicit guidelines for physical activities in kindergartens, including recommendations on the optimal frequency of physical activities (Fan et al., 2024a). Specific time recommendations for physical activities would allow teachers to devote more attention to improving the implementation of physical activities in the future. To improve the quality and variety of physical activities implemented in kindergartens, we believe that there is an urgent need to enhance teacher training in relation to this learning area. It is recommended that local tertiary institutions and

professional development providers offer more comprehensive and in-depth training to pre- and in-service kindergarten teachers (Mak et al., 2021). Finally, considering the urbanized nature and space limitations in Hong Kong, it is unrealistic to impose a mandatory requirement for kindergartens to include outdoor venues. For this reason, the government should implement initiatives to enhance teachers' awareness of the outdoor venues already present and foster a culture of utilizing them frequently and regularly.

STUDY 2: Fundamental Movement Skills in Hong Kong Kindergartens: A Grade-level Analysis[4]

Abstract

Fundamental movement skills (FMS) are essential building blocks for children's physical development and future participation in physical activity. While early childhood curriculum frameworks recognize the importance of teaching FMS, little research has been conducted to explore actual teaching practices in center-based programs and their variations across different grade levels. The goals of this study were to investigate (1) the frequency of a variety of FMS in the physical activities conducted by Hong Kong kindergarten teachers, (2) the association among these FMS based on the frequency of use in the classroom, and (3) potential differences in FMS across the three grade levels of kindergarten education in Hong Kong. Participants were 526 kindergarten teachers. Descriptive statistics, principal component analysis, and parametric statistical techniques (e.g., one-way ANOVA) were employed to analyze their responses to a survey, in which we asked teachers to report the frequency with which FMS are involved in their classroom physical activities. Overall, we found that participants practiced an imbalanced set of FMS in classrooms. K3 teachers were

[4] Fan, T., Bautista, A., & Chan, D. K. C. (2024). Fundamental movement skills in Hong Kong kindergartens: A grade-level analysis. *Education Sciences*, *14*(8), 911. https://doi.org/10.3390/educsci14080911. This is an open-access article. Authors retain the copyright to reprint the publication, as described in the journal's website: https://www.mdpi.com/journal/education/about.

found to incorporate a wider variety of FMS into their physical activities compared to K1 and K2 teachers. Through principal component analysis, seven components of activities were identified. K3 teachers were found to implement more activities involving Springing, Object Manipulation, Uneven Locomotor Movements, and Agility and Coordination. We conclude there is a need to provide structured opportunities for teachers to better facilitate children's FMS acquisition. Offering more explicit guidelines and further professional development for teachers would be crucial to enhance this situation.

Keywords: Kindergarten Education, Fundamental Movement Skills, Teaching Practices, Grade Level, Hong Kong

Introduction

Fundamental movement skills (FMS) are essential building blocks for children's physical development and their future participation in physical activities (Lubans et al., 2010). Previous research has consistently demonstrated the positive association between FMS and children's cognitive, social, and physical development (e.g., Capio et al., 2015; Geertsen et al., 2016; Williams et al., 2008). While it is widely accepted that the development of FMS should be prioritized in kindergarten programs (Gil et al., 2008; Society of Health and Physical Educators [SHAPE America], 2013), there is a scarcity of research on the specific skills being taught in kindergarten classrooms. This study aimed to examine the teaching of FMS in Hong Kong kindergartens, focusing on the frequency and associations of various FMS involved in the physical activities conducted by teachers. Additionally, this study sought to identify potential differences in these skills across the three grade levels of kindergarten education in Hong Kong. The literature review is divided into two sub-sections. First, we review the international literature focusing on FMS in early childhood education (ECE), specifically during 3-6 years of age. In the second sub-section, we delve into Hong Kong's kindergarten education curriculum pertaining to physical activities and FMS.

Literature Review

Fundamental Movement Skills Development in Early Childhood Education

FMS refer to "a specific set of gross motor skills that involve different parts of the body" (Western Sydney Local Health District, 2022). These skills form the basis for acquiring more intricate and specialized movement utilized in play, sports, games, and other physical activities (Education Department of Western Australia, 2013a). In children, advanced FMS are associated with a range of health and developmental benefits, including lower body mass index (Lubans et al., 2010), improved working memory (Niederer et al., 2011) and self-confidence (Copeland et al., 2012). Moreover, research has shown that better FMS competency in childhood is associated with higher levels of physical activities during adolescence and adulthood (Barnett et al., 2009). However, the development of FMS is not solely a natural process that occurs over time. Instead, it requires sufficient coaching, reinforcement, and intentional practice (Ali et al., 2021), particularly during early childhood (Lubans et al., 2010). For example, recent studies (e.g., Lee et al., 2021; Marinšek & Denac, 2020; Williams et al., 2008) have suggested that active physical engagement in music-and-movement is developmentally appropriate and readily integrated into kindergarten classrooms, serving as an effective method to support FMS development in young children.

FMS can be classified into three main groups: locomotor skills, body management skills, and object control skills (Bolger et al., 2021; Education Department of Western

Australia, 2013a; Montesinos et al., 2023). Locomotor skills refer to the skills that enable children to move their body horizontally (e.g., walking, running, jumping long, crawling, skipping) or vertically (e.g., jumping high, hopping, climbing, galloping, leaping). These skills are often practiced in a spacious environment, preferably outdoors (McClintic & Petty, 2015). The evidence shows that physical activities involving locomotor skills often involve a higher intensity level (Kain et al., 2018). Body management skills encompass the ability to maintain balance and control of the body when stationary and during movement. Examples include static or dynamic balancing, bending, stretching, rolling, tumbling, and twisting. Finally, object control skills are those that allow children to manipulate objects using their hands, fingers, and feet. These skills include rolling a ball, tossing, throwing, catching, dribbling, kicking, pulling, pushing, balancing objects, and riding on pedal tricycles.

The existing studies on the provision of FMS in kindergarten physical activities have primarily utilized observation methods. In addition, to the best of our knowledge, no study has yet explored how the provision varies across different grade levels. For instance, Bautista et al. (2020) conducted an observational study involving 108 K1 kindergarten classrooms in Singapore (equivalent to K2 in Hong Kong). Their findings revealed that FMS activities were absent in over 40% of the observed classrooms, indicating that kindergarten teachers did not consistently incorporate physical activities into their daily routines. Additionally, the study

highlighted a tendency among teachers to prioritize body management skills over locomotor and object control skills. Studies conducted in the United States have investigated the involvement of FMS in early childhood center-based physical activities (Brown et al., 2009; Howie et al., 2013). These studies found that locomotor skills were commonly involved in the physical activities conducted by teachers. Thus, the potential impact of grade level on the frequency of the FMS practiced in kindergarten settings remains unknown.

Hong Kong's Curriculum Framework for Physical Activities and Fundamental Movement Skills Development

In Hong Kong, kindergartens provide center-based education programs for children aged 3-6 years, available on both half-day and full-day basis (Ho & Bautista, 2022). Despite being non-mandatory, almost all children in Hong Kong participate in kindergarten programs (Rao et al., 2018). Children are enrolled in kindergartens based on their chronological age and are divided into three grade levels known as K1 (3-4 years), K2 (4-5 years), and K3 (5-6 years) (Yang & Li, 2022).

In 2017, the Curriculum Development Council (CDC) of Hong Kong published the "Kindergarten Education Curriculum Guide" (hereinafter referred to as the Guide), which serves as a curriculum framework to guide the practice of local kindergarten teachers (CDC, 2017). The Guide includes *Physical Fitness and Health* as one of the six learning areas for children's all-rounded development. The three objectives established for this learning area

include (1) promoting the proficient development of FMS, (2) fostering an interest in physical activities while instilling positive values and attitudes, and (3) cultivating a sense of health, safety, and self-protection (CDC, 2017).

Regarding *Physical Fitness and Health* (CDC, 2017), the Guide offers comprehensive guidelines to kindergarten teachers, encompassing pedagogical approaches and learning expectations. These guidelines highlighted the importance of providing ample encouragement, avoiding comparing children's abilities, and increasing the level of difficulty progressively to ensure effective FMS acquisition in children. The Guide (CDC, 2017) also provides examples that illustrate the learning expectations in relation to *Physical Fitness and Health*. These examples spotlighted the anticipated development of FMS through engaging in physical activities. Moreover, it is expected that children can develop team spirit, enhance their self-confidence, and gain an understanding of the functions of the five senses simultaneously. Additionally, the Guide (CDC, 2017) recommends that half-day kindergartens allocate 45 to 60 minutes, and full-day kindergartens allocate 90 to 105 minutes daily to physical, music, and art activities.

Previous studies in Hong Kong have primarily focused on the exposure to physical activities in kindergarten settings, rather than analyzing the specific FMS involved in such activities. For instance, Fan et al. (2024b) examined 164 kindergarten inspection reports issued by the Hong Kong Education Bureau (EDB). Overall, findings revealed a limited

presence of physical activities in Hong Kong kindergartens. Yuen (2020) also conducted a survey of 327 kindergartens in Hong Kong. It was found that 80% of the kindergartens exclusively offered half-day programs provided limited exposure to physical activities, with sessions lasting less than 30 minutes. Similar findings have been reported in other countries, including New Zealand (Ali et al., 2021) and the United States (Pate et al., 2008), where children had limited opportunities to engage in physical activities during class time.

Research Goals

While numerous studies have investigated the practice of FMS in kindergarten settings (e.g., Da Silva et al., 2024; Montesinos et al., 2023), research on the frequency and association of the FMS involved in physical activities across different grade levels is still limited. Thus, the current study aims to address this research gap in the Hong Kong setting. This study had three research goals:

- Goal #2.1 To investigate the frequency of a variety of FMS in the physical activities conducted by Hong Kong kindergarten teachers.
- Goal #2.2 To investigate the association among these FMS based on the frequency of use in classrooms.
- Goal #2.3 To analyze potential differences in FMS across the three grade levels of kindergarten education in Hong Kong (K1, K2, and K3).

Method

Participants

A total of 526 Hong Kong kindergarten teachers (female: 94.7%; male: 4.2%; unspecified: 1.0%) participated in the study, representing approximately 4.2% of the total population of kindergarten teachers in the territory (EDB, 2024). Table 6 presents the demographic information of the participants. Among the respondents, 37.3% (n = 196) were K1 teachers, 29.8% (n = 157) were K2 teachers, and 32.9% (n = 173) were K3 teachers. The age range of the participants was wide. Most of them (65.0%) were between 20 and 29 years old, 19.4% between 30 and 39, 9.3% between 40 and 49, 5.5% who were older than 50, and finally 0.8% who were 20 or younger. Most participants (92.8%) worked full-time. In terms of educational qualifications, 64.3% of the participants held an associate degree or higher diploma (or below), 26.2% had a bachelor's degree, and 9.5% possessed postgraduate qualifications or above. Regarding teaching experience, 59.3% of participants had five years or less experience as kindergarten teachers, 28.3% had five to 15 years of experience, and 12.4% had more than 15 years of experience. Note that the gender distribution and educational qualifications accurately reflect the composition of the Hong Kong kindergarten sector (EDB, 2024).

Table 6. *Participants' Demographic Information*

Characteristics	Frequency (*N* = 526)	Percentage
Gender		
Female	499	94.7%
Male	22	4.2%
Unspecified	5	1.0%
Kindergarten Level		
K1	196	37.3%
K2	157	29.8%
K3	173	32.9%
Age		
20 or below	4	0.8%
20 - 29	342	65.0%
30 - 39	102	19.4%
40 - 49	49	9.3%
50 - 59	27	5.1%
60+	2	0.4%
Working Mode		
Part-time	38	7.2%
Full-time	488	92.8%
Educational Qualification		
Associate degree/ Higher diploma or under	338	64.3%
Bachelor's degree	138	26.2%
Postgraduate or above	50	9.5%
Teaching Experience		
Five years or less	312	59.3%
5 - 15 years	149	28.3%
15+ years	65	12.4%

Research Design and Data Collection Instrument

This study utilized a quantitative survey (Ian, 2022). The survey began by collecting demographic information from the participating teachers, including information about their educational qualifications, working mode (full-time vs. part-time), age, and amount of teaching experience. Additionally, teachers were asked to specify the grade level they would be referring to in the subsequent survey section. Next, we asked the participants to indicate the frequency with which a variety of FMS were involved in physical activities they

conducted in classrooms. The question posed was: “How often did you implement activities that required the following skill during your physical activity sessions (excluding free play)?” A list of 29 FMS commonly observed in 3-6 year-old children was presented, such as “Crawling,” “Static balancing,” and “Ball bouncing.” Teachers were asked to indicate the frequency of each skill using a 5-point Likert scale, with response options ranging from *Never*, *Rarely* (1-3 times per year), *Occasionally* (once a week or less), *Frequently* (several times per week), and *Very frequently* (every day).

A four-phase process was employed to ensure the survey’s content validity. The details of each phase are outlined below:

- **Phase 1: Literature review, preliminary list of FMS, and expert judgment.** The list of 29 FMS included in the survey was based on a detailed review of various bodies of literature, including several taxonomies of movement skills (e.g., Harrow, 1972; Seefeldt, 1980; Singer & Gerson, 1981), manuals commonly used in early childhood teacher education that specifically focus on physical activities (e.g., Beaver et al., 2018; Education Department of Western Australia, 2013b; Paris et al., 2018), and the Hong Kong official Curriculum Guide (CDC, 2017). Each skill was accompanied by an illustrative picture to facilitate understanding (for examples, see Figure 3 and Figure 4). To ensure the comprehensiveness and inclusiveness of this list of FMS, five specialists in early

childhood physical activities education reviewed several preliminary versions and assessed their clarity and suitability.

Figure 3. *Illustrative Picture for the Skill of Crawling*

Figure 4. *Illustrative Picture for the Skill of Riding on Pedal Tricycles or Bikes*

- **Phase 2: Preliminary version of survey.** We revised the list of FMS, based on the feedback from the specialists. Subsequently, a preliminary survey draft was developed by incorporating a 5-point Likert scale.
- **Phase 3: Survey piloting.** We piloted the preliminary survey draft with 30 kindergarten teachers. Teachers were asked to think out loud while completing the survey to better understand their thinking processes. After completing the

survey, individual interviews were conducted with the teachers to gather feedback on the relevance and clarity of the survey items and the proposed response choices.

- **Phase 4: Final version and translation**. Considering the comments collected in Phase 3, refinements were made to the survey. The final version of the survey was translated from English to Traditional Chinese. To ensure the accuracy of the translation, a back-translation was carried out by an external research assistant. Lastly, the survey was uploaded to the "Qualtrics Online Survey Platform" (http://www.qualtrics.com) for distribution and data collection.

Procedure

Ethical approval was obtained from the Human Research Ethics Committee of the authors' University (Reference number: 2022-2023-0298). An invitation letter, along with an information sheet explaining the study's objectives, a consent form, and the survey link, was sent to every kindergarten principal in Hong Kong. Principals were asked to spread the invitation to all teachers responsible for teaching K1, K2, and K3 children in their kindergartens. To encourage participation, two follow-up emails were sent to the principals as a friendly reminder to encourage their assistance in distributing the survey. The first follow-up email was sent two weeks after the initial email, and the second one was sent one week before the end of the survey period. Because the survey was distributed across a large number

of kindergartens, the exact number of teachers who received the survey was unknown. Thus, the response rate could not be determined. The survey remained active on the Qualtrics platform for 1.5 months. Participants had the flexibility to use either computers or mobile devices and could choose their preferred language. Before starting the survey, teachers were assured that all collected information would be kept anonymous and confidential. Informed consent was also obtained from teachers before they proceeded to answer the survey questions.

Data Analysis

During the data-cleaning process, 144 out of the initial 670 completed survey entries were deemed invalid and thus excluded for various reasons (e.g., the participant was not working as a kindergarten teacher, the participant gave inconsistent answers to the control questions, the participant completed the survey in an unreasonably short amount of time). We converted the response options of the Likert scales into numeric values: *Never* = 1, *Rarely* = 2, *Occasionally* = 3, *Frequently* = 4, and *Very Frequently* = 5. For Goal #2.1, we utilized descriptive statistics (e.g., frequencies, percentages, means, standard deviation) to analyze the data. For Goal #2.2, a principal component analysis was run to explore potential underlying components among the 29 FMS. Principal component analysis is a statistical technique often used for variable reduction to replace a large number of variables while preserving as much of the variation in the original data set as possible (Jolliffe, 2002). Varimax (orthogonal)

rotation was applied to interpret the results. Additionally, Cronbach's alpha was computed to evaluate the internal consistency of each component. For Goal #2.3, we utilized the mean score of each of the 29 FMS to determine their respective ranking position (i.e., 1st, 2nd, 3rd) for each kindergarten grade level. Skills with higher means were ranked higher. Subsequently, one-way ANOVAs were performed to examine the effects of kindergarten grade levels (K1, K2, and K3) on the frequency of FMS. A post-hoc Tukey HSD test was performed to detect significant differences. All data analyses were done using IBM SPSS Statistics for Windows, Version 28.0.

Results

Goal #2.1: Fundamental Movement Skills Involved in Physical Activities

As shown in Figure 5, the response options *Occasionally* and *Rarely* were most commonly chosen by teachers, followed by *Frequently* and *Never*. In contrast, the option *Very Frequently* was the least chosen.

Figure 5. *Overall Distribution of Response for Fundamental Movement Skills Involved in Physical Activities*

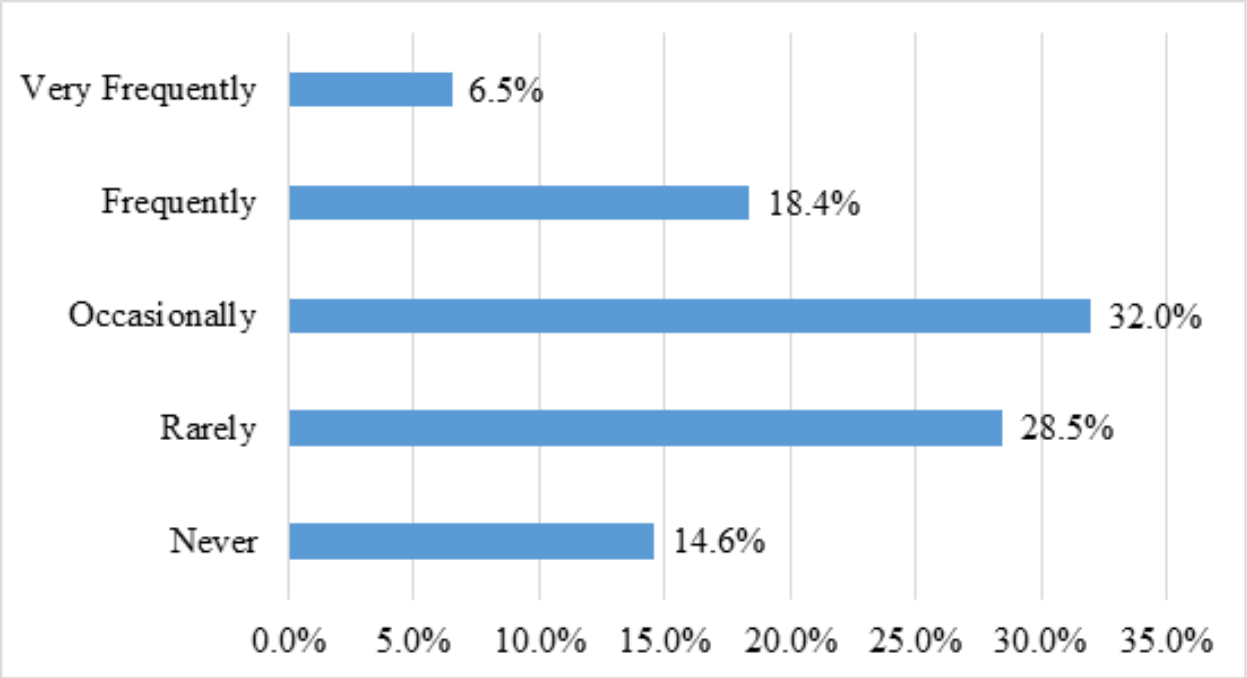


Table 7 presents the descriptive statistics of teachers' responses to the 29 FMS, including the frequencies and percentages for each response choice, overall mean score, and standard deviations. The resulting means ranged from 1.61 to 3.77, with the maximum score being 5. The most common response choice for each skill is highlighted in grey. None of the FMS obtained a mean score above 4 (*Frequently*). Among the 29 skills presented, 11 skills obtained a mean score over 3 (e.g., "Riding on pedal tricycles or bikes" "Bending and stretching"), 16 skills obtained a mean score between 2 to 3 (e.g., "Climbing," "Skipping"), and two skills obtained a mean score between 1 to 2 (i.e., "Rope skipping" and "Digging in sandbox").

Table 7. *Frequency of Fundamental Movement Skills in Kindergartens: "How often did you implement activities that required the following skill during your physical activity sessions (excluding free play)?"*

Fundamental Movement Skills	Never (1)		Rarely (2)		Occasionally (3)		Frequently (4)		Very Frequently (5)		Overall Mean (*SD*)	95% *CI*	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%		*LB*	*UB*
Riding on pedal tricycles or bikes	20	3.8	52	9.9	117	22.2	178	33.8	159	30.2	**3.77 (1.10)**	3.67	3.86
Bending and stretching	22	4.2	70	13.3	138	26.2	169	32.1	127	24.1	**3.59 (1.12)**	3.49	3.68
Walking or running on different levels	31	5.9	92	17.5	156	30.2	110	20.9	134	25.5	**3.43 (1.21)**	3.32	3.53
Jumping high (vertically)	25	4.8	53	10.1	191	36.3	191	36.6	66	12.5	**3.42 (.99)**	3.33	3.50
Tossing, throwing, and/or catching	5	1.0	71	13.5	216	41.1	196	37.3	38	7.2	**3.36 (.84)**	3.29	3.43
Dynamic balancing	15	2.9	70	13.3	213	40.5	184	35.0	44	8.4	**3.33 (.91)**	3.25	3.40
Walking or running on different pathways	10	1.9	82	15.6	216	41.1	162	30.8	56	10.6	**3.33 (.93)**	3.25	3.41
Ball bouncing / dribbling	18	3.4	94	17.9	228	43.3	149	28.3	37	7.0	**3.18 (.92)**	3.10	3.26
Crawling	22	4.2	115	21.9	211	40.1	128	24.3	50	9.5	**3.13 (1.00)**	2.05	3.22
Kicking a ball	16	3.0	124	23.6	240	45.6	120	22.8	26	4.9	**3.03 (.89)**	2.95	3.11
Hopping	42	8.0	93	17.7	222	42.2	150	28.5	19	3.6	**3.02 (.96)**	2.94	3.10
Climbing	94	17.9	106	20.2	140	26.6	119	22.6	67	12.7	**2.92 (1.28)**	2.81	3.03
Skipping	49	9.3	153	29.1	210	39.9	89	16.9	25	4.8	**2.79 (.99)**	2.70	2.87
Lifting and/or raising objects	63	12.0	162	30.8	170	32.3	113	21.5	18	3.4	**2.74 (1.04)**	2.65	2.82
Pulling and/or pushing objects	42	8.0	189	35.9	180	34.2	100	19.0	15	2.9	**2.73 (.95)**	2.65	2.81
Static balancing	72	13.7	163	31.0	185	35.2	84	16.0	22	4.2	**2.66 (1.04)**	2.57	2.75
Jumping long (horizontally)	55	10.5	184	35.0	211	40.1	67	12.7	9	1.7	**2.60 (.90)**	2.53	2.68
Rolling a ball	53	10.1	192	36.5	220	41.8	53	10.1	8	1.5	**2.56 (.86)**	2.49	2.64
Leaping	74	14.1	185	35.2	186	35.4	71	13.4	10	1.9	**2.54 (.96)**	2.46	2.62
Walking on bucket stilts	124	23.6	159	30.2	165	31.4	64	12.2	14	2.7	**2.40 (1.06)**	2.31	2.49
Balancing objects	60	11.4	243	46.2	183	34.8	36	6.8	4	.8	**2.39 (.81)**	2.32	2.46
Jumping off a platform with low height	119	22.6	180	34.2	148	28.1	63	12.0	16	3.0	**2.39 (1.05)**	2.30	2.48
Dodging	118	22.4	217	41.3	147	27.9	42	8.0	2	.4	**2.23 (.90)**	2.15	2.30

Galloping	130	27.4	199	37.8	156	29.7	37	7.0	4	.8	**2.21 (.92)**	2.13	2.29
Rolling/ tumbling	131	24.9	215	40.9	146	27.8	33	6.3	1	.2	**2.16 (.88)**	2.08	2.23
Twisting	141	26.8	204	38.8	144	27.4	30	5.7	7	1.3	**2.16 (.93)**	2.08	2.24
Hitting a ball with hands or equipment	154	29.3	198	37.6	143	27.2	27	5.1	4	.8	**2.10 (.91)**	2.03	2.18
Rope skipping	208	39.5	186	35.4	105	20.0	22	4.2	5	1.0	**1.92 (.92)**	1.84	1.99
Digging in sandbox	311	59.1	139	26.4	53	10.1	15	2.9	8	1.5	**1.61 (.89)**	1.54	1.69
OVERALL	76.7	14.6	144.5	28.5	173.8	32.0	96.6	18.4	41.2	6.5	**2.62 (.44)**	2.58	2.65

Note. CI = Confidence interval. LB = Lower bound. UB = Upper bound. The response choice with the highest percentage for each skill is highlighted in grey.

As shown in Table 7, "riding on pedal tricycles or bikes" and "bending and stretching" were the most frequently involved skills, with over half of the teachers reported practicing these skills *Very Frequently* and *Frequently*. Following these highly reported skills, there were 16 skills for which most teachers indicated *Occasionally*, such as "walking or running on different levels," "tossing, throwing, and/or catching," and "dynamic balancing." Nine skills, such as "pulling and/or pushing objects," "Jumping long (horizontally)," and "balancing objects," were relatively less common, as most teachers reported practicing them *Rarely*. Among the skills listed, "pope skipping" and "digging in sandbox" were ranked at the lowest position in the table. Most teachers reported that they had *Never* practiced them in their classrooms.

Goal #2.2: Association Among Fundamental Movement Skills Based on the Frequency of Use in Classrooms

Table 8 presents the results of the principal component analysis conducted on the 29 FMS, using Varimax (orthogonal) rotation. The correlation among the skills was well-defined

for principal component analysis, as indicated by the high Kaiser-Meyer-Olkin (KMO) of .903 and a significant result ($p < .001$) in Bartlett's test of Sphericity. Seven components were extracted based on an eigenvalue set at 1, explaining a cumulative variance of 54.416% for all variables. The average commonality among all items was 0.59, indicating stability in the analysis (Beavers et al., 2013). It is worth noting that a loading of 0.7 is typically considered as the threshold for component importance. However, Hair et al. (2011) suggested that a loading of 0.4 or above can still be considered acceptable. Thus, a cutoff point of 0.4 for component loading was used in this study. As a result, the skill "Walking or running on different pathways" was excluded from the analysis as its loading of 0.35 fell below this cutoff point.

Table 8. *Principal Component Analysis: Varimax Rotated Matrix of Fundamental Movement Skills*

Fundamental Movement Skills	Component						
	1	2	3	4	5	6	7
Jumping high (vertically)	.595						
Bending and stretching	.578						
Hopping	.517						
Dynamic balancing	.430						
Riding on pedal tricycles or bikes		.611					
Climbing		.565					
Static balancing		.468					
Crawling		.453					
Kicking a ball			.707				
Ball bouncing / dribbling			.700				
Tossing, throwing and/or catching			.639				
Pulling and/or pushing objects			.573				
Lifting and/or raising objects			.566				
Balancing objects			.440				
Jumping off a platform with low height				.691			
Jumping long (horizontally)				.592			
Walking or running on different levels				.570			
Skipping					.757		
Galloping					.757		
Leaping					.700		
Rope skipping						.708	
Walking on bucket stilts						.688	
Dodging						.430	
Rolling/ tumbling							.711
Twisting							.649
Rolling a ball							.458
Hitting a ball with hands or equipment							.488
Digging in sandbox							.444

Percentage of variance explained: 54.416%.
(Component 1: 26.715%, Component 2: 5.679%, Component 3: 5.408%, Component 4: 4.692%, Component 5: 4.347%, Component 6: 4.113% and Component 7: 3.462%).
Kaiser-Meyer-Olkin (KMO) = .903.
Bartlett's test of sphericity = $p < .001$.

The principal component analysis allowed us to identify seven components. We labeled each component based on the common characteristics of its corresponding items. The details of each identified component and their labels are as follows (from highest to lowest frequency):

Component 1: Springing

This component (*M* = 3.34, *SD* = .66, Cronbach's Alpha = .805) correlated most strongly with "jumping high (vertically)." All items in this component were focused on the development of springing competence.

Component 2: Interlimb Coordination

This component (*M* = 3.12, *SD* = .73, Cronbach's Alpha = .825) strongly correlated with "riding on pedal tricycles or bikes." All the items in this component were related to the movement requiring coordination between the left and right limbs.

Component 3: Object Manipulation

This component (*M* = 2.90, *SD* = .64, Cronbach's Alpha = .813) had the strongest correlation with "kicking a ball" and comprised items related to manipulating objects.

Component 4: Even Locomotor Movements

This component (*M* = 2.80, *SD* = .80, Cronbach's Alpha = .823) showed the strongest correlation with "jumping off a platform with low height." All items within this component could be completed in a single movement.

Component 5: Uneven Locomotor Movements

This component (*M* = 2.51, *SD* = .66, Cronbach's Alpha = .815) correlated most strongly with "skipping" and "galloping." All items in this component obtained high loadings and consisted of multiple movements performed on uneven rhythms.

Component 6: Agility and Coordination

This component (*M* = 2.18, *SD* = .72, Cronbach's Alpha = .820) correlated strongly with "rope skipping" and included skills involving hand, foot, and eye coordination.

Component 7: Body Control

This component (*M* = 2.12, *SD* = .60, Cronbach's Alpha = .818) strongly correlated with "rolling/ tumbling" and "twisting." The other three items related to object manipulation obtained relatively less but acceptable loadings.

Goal #2.3: Grade Levels Differences

Table 9 presents each FMS's mean, standard deviation, and rank position across the three kindergarten grade levels. While the skills' ranking positions were generally similar across the three grade levels, there was notable wide variability for four specific skills (highlighted in grey). The skill with the widest difference in ranking was "walking on bucket stilts," which ranked 26th for K1, 22nd for K2, and 13th for K3. The other three skills with vast ranking differences were "crawling" (4th for K1, 10th for K2, and 12th for K3), "hopping" (14th for K1, 9th for K2, 8th for K3), and "rolling/ tumbling" (22nd for K1, 27th for K2 and K3). K3 teachers reported the highest overall mean score for the 29 skills compared to K1 and K2 teachers. A one-way ANOVA test revealed a significant difference between the three grade levels, F (2, 523) = 13.085, $p < .001$. Post hoc comparisons using the

Tukey HSD test indicated that the mean score for K3 (M = 2.75, SD = .42) was significantly higher than K1 (M = 2.55, SD = .47, $p < .001$) and K2 (M = 2.55, SD = .40, $p < .001$).

Table 9. *Ranking of Fundamental Movement Skills among Three Kindergarten Grade Levels*

Fundamental Movement Skills	Overall Mean (*SD*)	K1		K2		K3	
		Rank	*M* (*SD*)	Rank	*M* (*SD*)	Rank	*M* (*SD*)
Riding on pedal tricycles or bikes	**3.77 (1.10)**	1st	3.79 (1.16)	1st	3.66 (1.08)	1st	3.84 (1.04)
Bending and stretching [d]	**3.59 (1.12)**	6th	3.38* (1.12)	2nd	3.60 (1.18)	2nd	3.82 (1.01)
Walking or running on different levels	**3.43 (1.21)**	2nd	3.52 (1.16)	3rd	3.36 (1.22)	5th	3.38 (1.25)
Jumping high (vertically) [e]	**3.42 (.99)**	3rd	3.43 (1.04)	7th	3.26*** (1.00)	3rd	3.55 (.91)
Tossing, throwing, and/or catching	**3.36 (.84)**	8th	3.31 (.86)	4th	3.33 (.85)	4th	3.46 (.80)
Dynamic balancing	**3.33 (.91)**	7th	3.35 (.92)	5th	3.28 (.95)	7th	3.35 (.85)
Walking or running on different pathways	**3.33 (.93)**	5th	3.41 (.98)	6th	3.27 (.88)	9th	3.28 (.91)
Ball bouncing / dribbling [f]	**3.18 (.92)**	9th	3.05*** (.98)	8th	3.11*** (.90)	5th	3.38 (.85)
Crawling [a]	**3.13 (1.00)**	4th	3.42 (.92)	10th	2.96* (.86)	12th	2.96* (1.12)
Kicking a ball [e]	**3.03 (.89)**	10th	3.02 (.93)	12th	2.86*** (.87)	10th	3.20 (.83)
Hopping [c]	**3.02 (.96)**	14th	2.72* (1.02)	9th	3.10 (.84)	8th	3.29 (91)
Climbing	**2.92 (1.28)**	11th	2.81 (1.30)	11th	2.90 (1.32)	11th	3.07 (1.23)
Skipping	**2.79 (.99)**	15th	2.70 (1.06)	13th	2.77 (.99)	14th	2.90 (.90)
Lifting and/or raising objects	**2.74 (1.03)**	12th	2.77 (1.08)	15th	2.61 (1.02)	15th	2.82 (.99)
Pulling and/or pushing objects	**2.73 (.95)**	13th	2.74 (.89)	14th	2.64 (1.01)	16th	2.79 (.97)
Static balancing	**2.66 (1.03)**	16th	2.61 (1.06)	16th	2.58 (1.03)	16th	2.79 (1.01)
Jumping long (horizontally)	**2.60 (.90)**	18th	2.56 (.96)	17th	2.54 (.84)	18th	2.71 (.88)
Rolling a ball	**2.57 (.86)**	17th	2.59 (.90)	18th	2.50 (.83)	20th	2.59 (.84)
Leaping	**2.54 (.96)**	19th	2.52 (1.04)	19th	2.45 (.96)	19th	2.65 (.84)
Walking on bucket stilts [f]	**2.40 (1.06)**	26th	2.03* (1.05)	22nd	2.30* (1.00)	13th	2.91 (.91)
Balancing objects [d]	**2.39 (.81)**	21st	2.29*** (.84)	20th	2.36 (.74)	21st	2.54 (.82)

Jumping off a platform with low height	**2.39 (1.05)**	20th	2.42 (1.09)	20th	2.36 (1.06)	24th	2.37 (1.02)
Dodging [f]	**2.23 (.90)**	23rd	2.11* (.94)	26th	2.08* (.78)	22nd	2.49 (.91)
Galloping [f]	**2.21 (.92)**	26th	2.03* (.98)	23rd	2.17*** (.84)	23rd	2.46 (.87)
Rolling/ tumbling	**2.16 (.88)**	22nd	2.22 (.92)	27th	2.06 (.84)	27th	2.17 (86)
Twisting	**2.16 (.93)**	24th	2.07 (.96)	24th	2.14 (.90)	26th	2.28 (.91)
Hitting a ball with hands or equipment	**2.11 (.91)**	25th	2.06 (.97)	25th	2.11 (.87)	28th	2.16 (.88)
Rope skipping [f]	**1.92 (.92)**	29th	1.69* (.92)	28th	1.71* (.74)	25th	2.36 (.91)
Digging in sandbox [b]	**1.61 (.89)**	28th	1.73 (1.01)	29th	1.50*** (.83)	29th	1.58 (.79)
OVERALL	**2.62 (.44)**		2.55* (.47)		2.55* (.40)		2.75 (.42)

The skills with wide variability are highlighted in grey.
*$p < .001$, ***$p < .05$
[a] K1 > K2 and K3. [b] K1 > K2. [c] K2 and K3 > K1. [d] K3 >K1. [e] K3 > K2. [f] K3 > K1 and K2

Table 9 also presents the FMS in which statistically significant differences were found when comparing the frequency of each skill across the kindergarten grade levels. When comparing the frequency of "Crawling" across three grade levels, significant differences ($p < .001$) were found. K1 teachers practiced this skill in physical activities more frequently than those at both K2 and K3. Similarly, there was a significant difference ($p < .05$) in the frequency of "digging in sandbox," with K1 teachers practicing this skill more frequently than K2 teachers. The post hoc (Tukey) test indicated that K2 and K3 teachers practiced "hopping" more frequently than K1 teachers. Additionally, teachers at K3 practiced "bending and stretching" and "balancing objects" more frequently than K1 teachers, as well as "jumping high (vertically)" and "kicking a ball" more frequently than K2 teachers. Finally, teachers in K3 reported a higher frequency of "ball bouncing / dribbling," "walking on bucket stilts," "dodging," "galloping," and "rope skipping" compared to both K1 and K2 teachers.

Table 10 presents the rank position, mean scores, and standard deviations of the seven components of FMS across different grade levels. K3 teachers reported the highest overall mean score for the seven components of FMS compared to K1 and K2 teachers. A one-way ANOVA test revealed a significant difference between the three grade levels (F (2, 523) = 9.421, $p < .001$). Post hoc comparisons using the Tukey HSD test indicated that the mean score for K3 (M = 2.85, SD = .48) was significantly higher than K1 (M = 2.65, SD = .54, $p < .001$) and K2 (M = 2.63, SD = .46, $p < .001$). Significant differences were found when comparing the component mean scores for Object Manipulation and Uneven Locomotor Movements ($p < .05$) across three grade levels. Specifically, K3 teachers had significantly higher mean scores than that of K1 and K2 teachers.

Moreover, K3 teachers also had significantly higher mean scores for Agility and Coordination compared to K1 and K2 teachers ($p < .001$). The component mean score for Springing was significantly higher among K3 teachers compared to both K1 ($p < .001$) and K2 teachers ($p < .05$).

Table 10. *Seven Components of Fundamental Movement Skills across Three Kindergarten Grade Levels*

Components	F (2, 523)	K1		K2		K3	
		Rank	*M* (*SD*)	Rank	*M* (*SD*)	Rank	*M* (*SD*)
Springing [a]	8.821	1st	3.22* (.72)	1st	3.31*** (.63)	1st	3.50 (.59)
Interlimb Coordination	1.945	2nd	3.16 (.74)	2nd	3.02 (.69)	2nd	3.16 (.76)
Object Manipulation [a]	5.162	3rd	2.86*** (.66)	3rd	2.82*** (.64)	3rd	3.03 (.61)
Even Locomotor Movements	.476	4th	2.84 (.82)	4th	2.75 (.78)	4th	2.82 (.80)
Uneven Locomotor Movements [a]	5.422	5th	2.42*** (.84)	5th	2.46*** (.74)	5th	2.67 (.71)
Agility and Coordination [a]	48.299	7th	1.95* (.74)	7th	2.03* (.59)	6th	2.59 (.64)
Body Control	1.054	6th	2.13 (.64)	6th	2.06 (.56)	7th	2.15 (.58)
OVERALL [a]			2.65* (.54)		2.63* (.46)		2.85 (.48)

* $p < .001$, *** $p < .05$
[a] K3 > K1 and K2

Discussion

Goal #2.1 was to investigate the frequency of a variety of FMS in the physical activities conducted by Hong Kong kindergarten teachers. The overall mean score of 2.62 (out of five) for the 29 FMS reflects that these skills were *rarely* to *occasionally* involved in kindergarten physical activities. This finding is similar to the findings by Chow et al. (2015b), who found that only 0.2% of lesson time was dedicated to developing gross motor skills in Hong Kong kindergartens. The rather low presence of FMS in kindergarten classrooms could be attributed to various factors, such as the short duration of kindergarten programs in Hong Kong (Yuen, 2020), teachers prioritizing academic areas (e.g., languages

and mathematics) in order to meet parental expectations (Rao et al., 2018), or teachers' insufficient knowledge about the FMS that should or could be practiced (Lu & Montague, 2016). Further research is needed to examine the specific factors that contribute to the relatively low presence of FMS in Hong Kong kindergartens.

The frequency of the 29 FMS that we presented varied widely. Some skills (e.g., "riding on pedal tricycles or bikes," "bending and stretching") were frequently involved in physical activities, while others, such as "rope skipping" and "digging in sandbox" were rarely practiced. Our findings contrast with the study by Brown et al. (2009), who found that walking and running were prevalent in the physical activities conducted by teachers in the United States, while throwing and tumbling were less frequently observed. Nonetheless, both studies identified a somewhat imbalanced practice of FMS in physical activities, highlighting the need for teachers to cover the various FMS in a more balanced way to facilitate children's holistic development (Barnett et al., 2016; Hardy et al., 2010).

Goal #2.2 was to investigate the association among FMS based on the frequency of use in the classroom. This topic has not been yet investigated. We identified seven FMS components with different frequencies. In decreasing frequency order, these were: Springing, Interlimb Coordination, Object Manipulation, Even Locomotor Movements, Uneven Locomotor Movements, Agility and Coordination, and Body Control. The most frequently practiced FMS component was Springing, which combined locomotor skills (i.e., "jumping

high [vertically],” “hopping”) with body management skills (i.e., “bending and stretching,” “dynamic balancing”). Lee et al. (2021) demonstrated an example of this combination of FMS in Taiwan, where children engaged in music-related physical activities that required similar FMS. Considering the prevalence of rhythmic movement activities in Hong Kong kindergartens (Fan et al., in press), we infer that teachers may practice Springing FMS through in the context of music-and-movement activities, a strategy supported by previous studies (Lee et al., 2021; Marinšek & Denac, 2020; Williams, 2018).

In contrast, the components of Agility and Coordination and Body Control seemed to be rarely practiced in kindergartens. One plausible explanation could be that kindergarten teachers’ lack the necessary knowledge and pedagogical competence to design physical activities involving these FMS components (Tucker et al., 2011), due to the limited preparation in this field received during teacher education programs. This issue constitutes an important barrier to quality physical education (Lu & Montague, 2016; Montesinos et al., 2023; Saamong et al., in press). Indeed, kindergarten teachers are typically trained to be generalists (Martínez-Bello et al., 2021) and thus lack sufficient training in physical activities and motor skills development (Marinsek & Kovac, 2019). This problem is not specific to Hong Kong, but it is also evident in many countries, such as Canada (Martyniuk & Tucker, 2014) and the Philippines (Saamong et al., 2023). This issue justifies ongoing calls for more explicit guidelines, illustrated with examples of classroom activities, intended to support

teachers in the design and implementation of developmentally appropriate physical activities (Capio et al., 2022; Saamong et al., 2024).

Regarding Goal #2.3, our findings indicated the significant role of the variable grade level in influencing the practice of FMS in the physical activities conducted in kindergartens. While the most common FMS were similar across grade levels, our findings demonstrated that K3 teachers practice FMS in physical activities more frequently compared to K1 and K2 teachers. Furthermore, the range of FMS practiced by K3 teachers was broader. Specifically, K3 teachers were found to practice FMS in Springing, Object Manipulation, Uneven Locomotor Movements, and Agility and Coordination significantly more often in their physical activities, as compared to the teachers from lower levels. These findings are distinctive and make an important contribution to the literature in this area, as prior studies (e.g., Bautista et al., 2020) have focused on a single grade level.

Conclusion

In conclusion, our findings shed light on the disparity between globally accepted guidelines pertaining to the practice of FMS in ECE and the actual operation in Hong Kong kindergartens, mirroring similar trends in other non-academic domains such as music and arts (Ho & Bautista, 2022; Yeung et al., 2022). In this context, teachers seem to practice an imbalanced set of FMS, which deviates from the recommendations put forth by international organizations (e.g., Education Department of Western Australia, 2013a; SHAPE America,

2013). This approach does not adequately support the holistic development of FMS in children. Additionally, our study identified seven components of FMS based on their frequency of use. These results contribute to a better understanding of how FMS are being taught in kindergarten classrooms and enable teachers to identify any potential deficiencies in their instructional practices. These findings made an important contribution by uncovering clusters of frequency-based FMS which have not yet been reported. Finally, our evidence highlights the importance of the variable grade level in the practice of FMS in Hong Kong kindergartens. While we observed similarities in the most common types of FMS across the three grade levels, K3 teachers were found to practice a broader range of FMS more frequently than K1 and K2 teachers. This underscores the importance of providing teachers across different grade levels with appropriate training and resources to enhance their ability to incorporate a richer and more diverse spectrum of FMS.

Limitations and Future Research

There are several limitations that must be acknowledged. Despite the large sample size of teacher respondents, this study relied solely on self-reported survey data. Future studies would benefit from utilizing multiple data sources (e.g., observation) to corroborate whether teachers' self-reported practices align with their actual implementation in the classroom and allow for data triangulation. Secondly, while this study explored the associations of FMS based on the frequency of use in classrooms, it did not delve into the

underlying reasons for these associations. Interviews with teachers could be conducted to explore the factors influencing the variation in FMS practice across grade levels. Finally, this study focused solely on Hong Kong kindergarten teachers. To gain a more comprehensive understanding of FMS involvement in ECE settings, future research should include data from teachers based in other countries and jurisdictions.

Implications

The findings of this study bring important implications for ECE stakeholders, including curriculum designers, policymakers, teacher educators, and professional development providers. We suggest that curriculum designers provide more explicit expectations and guidelines regarding the involvement of FMS in physical activities, along with concrete examples that can be easily implemented in kindergartens. Moreover, it would be beneficial for curriculum designers to benchmark the curriculum against recent updates in physical activity curricula from other countries, such as Singapore (Ministry of Education, 2023) and Australia (Western Sydney Local Health District, 2022), to ensure alignment with international practices. Considering that the decision to attend professional development is currently at the discretion of teachers and principals, we recommend that the government introduce initiatives to enhance teachers' awareness in this specific learning domain and promote a culture of active participation in in-service training. Additionally, teacher educators and professional development providers should also design training courses

tailored to the specific needs of teachers at the different grade levels. These courses should provide practical and age-appropriate physical activities that involve a wide range of FMS. By equipping teachers with abundant knowledge and skills, children will have better physical development and overall health in the long run.

STUDY 3: Physical Activities in Hong Kong Kindergartens: A Content Analysis of the Quality Review Reports [5]

Abstract

In Hong Kong, the Education Bureau (EDB) is responsible for the quality assurance of kindergarten education services. EDB inspectors regularly conduct school visits to monitor kindergartens' performance and publish a Quality Review (QR) report for each kindergarten. Given the limited research on pedagogical practices pertaining to physical activities in Hong Kong kindergartens, the current study analyzes the content concerning this learning area in the QR reports. We analyzed 164 QR reports (published between 2017 and 2020) according to four analytic dimensions: (1) Overall presence of content pertaining to physical activities; (2) References to specific forms of physical activities; (3) Positive feedback; and (4) Negative feedback and recommendations. The presence of physical activities in the QR reports was found to be low (5% on average). EDB inspectors alluded to physical activities generically, without specifying the motor skill(s) at hand. Both positive and negative feedback focused primarily on matters pertaining to children's time of exposure to physical activities and teachers' pedagogical quality. Our evidence suggests the existence of potential gaps between Hong Kong's kindergarten policies pertaining to physical activity and actual

[5] Fan, T., Bautista, A., & Chan, D. K. C. (2024). Physical activities in Hong Kong kindergartens: A content analysis of the quality review reports. *Policy Futures in Education, 22*(4), 659-676. https://doi.org/10.1177/14782103231182741. Copyright © 2024 by The Authors. Reprinted by Permission of Sage Publications.

practices. Further professional development seems necessary to strengthen both teachers' pedagogies and inspectors' understanding of physical activities.

Keywords: Physical Activities, Kindergartens, Curriculum, Pedagogy, Quality Assessment, Hong Kong

Introduction

Kindergarten Education in Hong Kong: The Quality Review (QR) Assessment

In Hong Kong, kindergartens offer education services for 3- to 6-year-old children on a half-day (3 hours) and whole-day (6 hours) basis. Almost every child in the city enrolls in kindergarten education programs (Bautista et al., 2021). The Education Bureau (EDB) is the government body responsible for overviewing the quality of education services provided to young children (EDB, 2021). In the 2020/2021 academic year, Hong Kong had a total of 1,046 kindergartens. While all kindergartens operate privately, over 70% of them are subsidized by the government (EDB, 2024). These are referred to as *local* kindergartens in this article.

In the 2017/ 2018 academic year, the EDB launched the Free Quality Kindergarten Education Scheme (FQKES) to improve the quality of kindergarten education and ensure affordability and accessibility to kindergarten education for all children and families in the territory (EDB, 2016). All kindergartens joining the FQKES are required to participate in the QR assessment (EDB, 2017). To be eligible to receive the government's subsidies, local kindergartens must show certain levels of quality and fulfill the criteria established by the EDB. Government inspectors regularly conduct 2.5 to 3.5 days of school visits for QR purposes. Feedback and recommendations for improvement are given to each kindergarten in the form of a QR report. These QR reports are also made available on the EDB's website for

public information. When a kindergarten fails the QR assessment exercise, the kindergarten is excluded from the FQKES scheme, and the provision of government subsidies ceases (EDB, 2016).

The QR reports constitute a large-scale database of high value to different stakeholders in the kindergarten sector (e.g., school leaders, curriculum designers, front-line teachers). Indeed, the QR reports describe the observations of EDB assessors in natural settings. They also analyze the strengths and weaknesses of kindergartens considered to meet the minimum quality standards in Hong Kong. Finally, they provide recommendations and guidelines for further improvement. These characteristics make the QR reports a particularly interesting database for research purposes.

The QR assessment exercise is based on a series of performance indicators set by EDB (2017), which include four major domains: "(1) Management and Organization; (2) Learning and Teaching; (3) School Culture and Support for Children; and (4) Child Development" (p. 5). The Physical Development area, which is the focus of the present study, falls into the major domain of Child Development. Physical Development includes two performance indicators: Physical Movements (which assesses children's gross and fine motor skills) and Health Habits (which assesses children's awareness of personal hygiene and self-care abilities) (EDB, 2017). This study looks specifically into children's physical activities at kindergartens.

Given the limited research focusing on physical activities in Hong Kong kindergartens, the present study analyzed the feedback pertaining to this learning area in the QR reports to better understand its role in the local setting. Findings contribute to enriching the limited literature on physical activity pedagogical practices and serve as evidence to analyze the correspondence between Hong Kong's official policies and actual practices on the ground. The literature review section is divided into two sub-sections. First, we examine Hong Kong's official curriculum guide from the perspective of physical activity, focusing on the role of this learning area and the specific learning objectives expected from children. Second, we review the international literature, focusing on studies related to physical activities in kindergartens.

Literature Review

Physical Activities in the Hong Kong Kindergarten Curriculum

Physical activity refers to "any bodily movement produced by skeletal muscles that requires energy expenditure" (World Health Organization, 2024). Research has shown that young children's physical activity is highly associated with health and developmental benefits, such as bone health (Janz et al., 2010), psychosocial behavior (Timmons et al., 2012), as well as academic performance (Zeng et al., 2017). Western scholars such as Lu and Montague (2016) and organizations like the Society of Health and Physical Educators

(SHAPE America) (2018) have emphasized the importance of exposing young children to physical activities in kindergarten education programs.

In 2017, the Curriculum Development Council (CDC) of Hong Kong published the "Kindergarten Education Curriculum Guide: Joyful learning through play, balanced development all the way" (hereinafter referred to as the Guide), an official framework designed to inform the practice of local kindergarten teachers in the territory (CDC, 2017). The Guide considers *Physical Fitness and Health* one of the six learning areas essential for all-rounded child development. This learning area aims to "help children of different age groups develop a strong and healthy body, an interest in participating in physical activities, positive values and attitudes and good living habits through diversified physical activities." (CDC, 2017, p. 31). The three learning objectives established for *Physical Fitness and Health* are:

> "(1) To develop gross and fine motor skills, acquire control over basic movements, and understand the concepts of space and direction; (2) To nurture an interest and habit of active participation in physical activities and develop positive values and attitudes; and (3) To use senses to explore the surroundings, raise awareness of health and safety, and develop self-protection abilities." (CDC, 2017, p. 32)

The Guide provides several examples of learning expectations for *Physical Fitness and Health* (CDC, 2017). For instance, children are expected to develop gross (locomotor,

non-locomotor, and manipulative) and fine (e.g., coordination) motor skills. It is stated that children can develop social skills and build relationships with peers during physical activities. They may also learn the functions of the five senses and develop healthy living habits.

The Guide also outlines the expected pedagogical practices for kindergarten teachers. For example, teachers are required to pay attention to the state of children's health during activities to avoid over-training. The difficulty of learning activities should be increased progressively to enable children to adapt the skills step by step. Furthermore, teachers should appreciate children's performance and avoid comparing their abilities. Consistent with the performance indicators (EDB, 2017), the Guide suggests that kindergartens should allocate 45 to 60 minutes in half-day kindergartens and 90 to 105 minutes in whole-day kindergartens for physical, music, and art activities every day. The aim is to ensure that teachers can provide adequate time for children to practice physical activities.

Implementation of Physical Activities in Kindergartens: Contexts and Trends

The international literature has identified effective teaching strategies to create adequate opportunities and positive experiences for children to participate in physical activities within kindergarten settings. In a scoping review, Mak et al. (2021) indicated that fundamental motor skills (FMS) training is a commonly adopted teaching strategy in kindergartens' physical activity programs. Evidence shows that FMS training can significantly enhance children's physical activity levels, especially in those activities

involving locomotor skills. Another common teaching strategy is infusing game elements into physical activities. Such elements can increase enjoyment and are associated with higher participation levels in children who are usually less active. Other strategies, such as embedding physical activities within the context of integrated curriculum units, also positively impact children's physical engagement level (Ward et al., 2010).

Kindergarten teachers may also consider children's physical ability differences when planning and implementing classroom activities (Essa & Burnham, 2019). During the practice, teachers should give clear instructions and constructive feedback to facilitate skills development (Veldman et al., 2018). For those children who are frustrated with the new skills, teachers should provide extra support, for example, slow-motion demonstrations, so that children can learn confidently (Moravcik et al., 2013). Furthermore, teachers should maximize children's enjoyment during physical activities and avoid punishments and reprimands (SHAPE America, 2021). Positive reinforcement, such as encouragement and praise, is vital in raising children's active engagement, self-confidence, and participation in physical activities (Kippe & Lyngstad, 2021).

Research conducted in kindergartens worldwide, however, shows that there is insufficient exposure to physical activities. Indeed, several studies have shown that many center-based kindergarten programs provide limited exposure to physical activities. For example, Bautista et al. (2020) revealed that Singapore's kindergartens do not conduct

physical activities involving gross motor skills on a daily basis. In Spain, Alcántara-Porcuna et al. (2022) found that physical activities in kindergartens are only conducted once or twice per week. In Hong Kong, Chow et al. (2015a) indicated that kindergartens arrange less than 30 minutes for physical activities in a half-day session; children are primarily sedentary in the remaining class time. Similar findings have been reported in Western countries such as New Zealand (Ali et al., 2021), Australia (Ellis et al., 2017), and the United States (Willis et al., 2021), where kindergarten children spend around 70% of their time sitting, standing, and engaging in other sedentary behaviors.

Furthermore, studies have also shown that many kindergarten teachers do not follow the pedagogical recommendations offered in official curriculum frameworks and the international literature. For instance, in an observational study conducted in Singapore (Bautista et al., 2020), around half of kindergarten teachers failed to (a) give verbal instructions to children, (b) demonstrate physical skills before the practice, (c) recall the safety rules, and (d) provide feedback to the children during the activities. Chow et al. (2015a) found that kindergarten teachers in Hong Kong spend most of their class time focusing on class management matters, while only 21% of the time was spent teaching and demonstrating skills. In the United States, kindergarten teachers were found to use physical activities to punish children that displayed disciplinary problems (Ward et al., 2015).

To the best of our knowledge, no study has investigated the quality of physical activities in kindergarten education from the perspective of assessment authorities, specifically utilizing content analysis techniques. Existing studies in Hong Kong have mainly examined children's physical activity levels, focusing on a limited number of kindergartens. For instance, Chow et al. (2015b) observed 90 lessons in four Hong Kong kindergartens and found that students only spent approximately 10% of their lesson time in moderate to vigorous physical activities. More recently, Cheung (2020) measured teachers' and children's physical activity levels in 12 kindergartens. It was found that children were more active in classes delivered by more active teachers. Aside from these studies, we know little about the pedagogical practices employed by teachers in Hong Kong local kindergartens. The present study addresses this critical knowledge gap.

Research Goals

Conducted in Hong Kong, this study analyzes the QR reports with a focus on physical activities to determine the correspondence between official policies in local kindergartens and teachers' pedagogical practices, as described by the EDB inspectors. More specifically, the study has four research goals:

- Goal #3.1 To examine the overall presence of content related to physical activities within the QR reports.

- Goal #3.2 To analyze the presence of various forms of physical activities in the QR reports.
- Goal #3.3 To explore the most common types of positive feedback given to kindergartens in relation to physical activities.
- Goal #3.4 To explore the most common types of negative feedback and/or recommendations given to kindergartens in relation to physical activities.

Method

Data Sources

The study presents a content analysis of the QR reports published by the EDB after the academic year 2017/2018, when the current kindergarten curriculum framework was released (CDC, 2017). Content analysis is a research technique often used to analyze qualitative materials by examining the presence of different terms, phrases, and/or ideas that can distinguish the themes and patterns in a series of documents (Columbia University Irving Medical Center, 2019). The number of kindergartens represented was 164, which is approximately 22% of the total number of local kindergartens in the city (N = 763 in 2020/21). The analysis included one QR report published in 2017 (0.6%), 33 in 2018 (20.1%), 122 in 2019 (74.4%), and eight in 2020 (4.9%), which was approximately 40% of the QR reports database. These reports were originally written in Chinese and translated into English by EDB. To maintain language consistency, only reports translated into English were

analyzed. These QR reports covered kindergartens in different geographical areas across the territory.

Procedure

All 164 reports were downloaded from the EDB website[6] and imported into the MAXQDA Analytics Pro 2020, an analytical software developed by VERBI (VERBI Software, 2019). A series of analytic categories focusing on physical activities were designed for the analysis. Two coders who specialized in early childhood education (ECE) read and completed the coding separately using MAXQDA. At the end of the individual coding, the coders met to discuss the disagreements and reached a 100% consensus.

Data Analysis

To address Goal #3.1, we computed the number of words coded pertaining to physical activities and calculated the percentage of words coded compared to the total number of accumulated words in the QR reports using MAXQDA. We also conducted a lexical analysis by focusing on the vocabulary that appeared within the coded textual segments to examine the relative presence of those terms within the QR reports. Furthermore, we generated a word cloud to graphically represent the most common nouns, verbs, and adjectives in coded textual segments.

[6] Please refer to https://www.edb.gov.hk/en/edu-system/preprimary-kindergarten/quality-assurance-framework/qr/qr-report/index.html

To address Goal #3.2, #3.3, and #3.4, we designed three comprehensive coding schemes, which allowed us to capture all the relevant contents pertaining to physical activities in the QR reports. Note that all categories were non-mutually exclusive. Descriptive statistics (frequencies and percentages) were used to examine the appearance of each category within the QR reports. For simplicity, the definitions and examples of each category obtained from the QR reports are presented in the Results section.

In Goal #3.2, we designed six categories to analyze the various forms of physical activities. Categories were designed by applying both an inductive approach (starting from the data) and a deductive approach (starting from existing frameworks) (Saunders et al., 2012). We created three categories to capture physical activities described generically, that is, without specifying the physical skills at hand. These categories were: Generic Physical Activities (e.g., “morning exercise”), Physical Movement with Music (e.g., “rhythmic movement”), and Physical Games and/or Play (e.g., “physical group games”). In addition, we created three categories to capture those physical activities that involved specific types of gross motor skills, namely: Locomotor Skills (e.g., “running”), Non-locomotor Skills (e.g., “bending”), and Manipulative Skills (e.g., “throwing balls”).

Regarding Goal #3.3, we designed six categories using an inductive approach (Saunders et al., 2012) to investigate the most common types of positive feedback regarding physical activities. The categories were: Sufficient Time, Diverse Types of Activities,

Teacher Competencies, Adequate Planning and/or Implementation, Children's Positive Learning Experiences, and Provision of Professional Development.

Finally, to address Goal #3.4, we examined the most common types of negative feedback and/or recommendations for improvement related to physical activities using four categories, which were also designed using an inductive approach (Saunders et al., 2012). The categories were: Insufficient Time, Lack of Diverse Types of Activities, Poor Teachers' Pedagogical Practices and/or Children's Learning Experiences, and Inadequate Environment.

Results

Goal #3.1: Overall Presence of Physical Activities in the Quality Review Reports

In total, there were 2,225,589 words accumulated in the 164 QR reports. A partial total of 107,552 words were coded as related to physical activities, with an average of 655 words (4.7%) per QR report. The presence of coded segments in the reports ranged from a minimum of 66 words (0.5%) to a maximum of 1,844 words (13.2%).

Table 11 presents the 60 most common words in the coded textual segments, including each word's overall frequency, average and maximum appearance, and percentage of reports in which each word appeared. To enhance the comprehensiveness of the analysis, both singular and plural instances of the nouns (e.g., activity, activities) and different tenses of verbs (e.g., play, plays, playing) were considered the same term. We excluded words such as adverbs (e.g., very), conjunctions (e.g., when), prepositions (e.g., at), and pronouns (e.g.,

they). All words included are organized according to the word types (nouns, verbs, and adjectives) and ranked by frequency (high to low).

Table 11. *Descriptive Statistics of 60 Most Common Words in the Coded Textual Segments*

Word	Overall frequency	Average per QR report	Maximum frequency	Percentage of QR reports in which the word appeared
Nouns				
Activity	797	4.86	13	98.7%
Children	699	4.26	18	99.4%
Music	286	1.74	3	87.2%
School	272	1.66	5	71.3%
Teacher	243	1.48	7	65.9%
Choice	157	0.96	4	73.2%
Skill	142	0.87	5	50.0%
Development	119	0.73	5	45.7%
Game	111	0.68	5	34.8%
Time	109	0.66	2	48.2%
Opportunity	107	0.65	3	45.1%
Art	101	0.62	1	56.7%
Day	98	0.60	4	49.4%
Exercise	93	0.57	2	35.4%
Movement	93	0.57	5	36.6%
Motor	91	0.55	6	31.7%
Schedule	81	0.49	2	39.0%
Balance	76	0.46	3	35.4%
Body	63	0.38	4	23.8%
Arrangement	61	0.37	2	28.7%
Part	61	0.37	1	27.4%
Area	49	0.30	2	18.9%
Amount	42	0.26	2	22.0%
Ability	41	0.25	3	17.7%
Coordination	37	0.23	2	17.1%
Venue	34	0.21	4	13.4%
Space	32	0.20	3	14.6%
Equipment	31	0.19	3	13.4%
Class	30	0.18	3	12.2%
Effectiveness	29	0.26	2	12.8%
Verbs				
Play	169	1.03	5	43.3%
Design	153	0.93	5	52.4%
Provide	124	0.76	2	51.8%
Arrange	123	0.75	3	45.7%
Engage	100	0.61	3	43.3%
Learn	99	0.60	3	34.8%
Train	96	0.59	1	39.6%
Participate	85	0.52	4	38.4%

Take	82	0.50	2	36.0%
Facilitate	73	0.45	2	32.3%
Make	67	0.41	3	30.5%
Improve	50	0.30	2	23.8%
Ensure	48	0.29	2	21.3%
Diversify	48	0.29	1	16.5%
Enhance	46	0.28	2	20.1%
Review	39	0.24	1	17.7%
Conduct	37	0.23	1	17.1%
Enjoy	37	0.23	3	18.3%
Lead	36	0.22	1	18.3%
Teach	35	0.21	1	11.6%
Develop	30	0.18	3	13.4%
Adjectives				
Physical	756	4.61	11	98.2%
Sufficient	156	0.95	6	65.2%
Daily	138	0.84	2	56.1%
Gross	89	0.54	6	31.7%
Different	70	0.43	3	28.1%
Good	64	0.39	3	26.8%
Adequate	53	0.32	2	28.1%
Rhythmic	45	0.27	1	24.4%
Appropriate	30	0.18	3	14.6%

As shown in Table 11, the most common word types in coded textual segments were nouns (30 words), followed by verbs (21 words), and adjectives (9 words). Activity, children, music, school, and teacher were the five most common nouns, while play, design, provide, arrange, and engage were the most common verbs. The most common adjectives were physical, sufficient, daily, gross, and different. The 60 most common words in coded textual segments are presented graphically in Figure 6. Three colors are used: red for nouns, blue for verbs, and green for adjectives. The size of words captured in the word cloud reflects their relative frequency within the QR reports.

Figure 6. *Word Cloud of 60 Most Common Words in the Coded Textual Segments*

Note that specific terms strongly related to physical activities and teachers' pedagogical practice had a relatively low presence within the QR reports. These included the nouns such as exercise (35.4% reports only), movement (36.6%), and motor (31.7%), verbs such as participate (38.4%) and teach (11.6%), and adjectives such as gross (31.7%). Furthermore, some terms frequently linked with teaching and learning in physical activities did not appear, including active, demonstration, energy, feedback, fitness, fundamental, and muscle.

Goal #3.2: Presence of Various Forms of Physical Activities

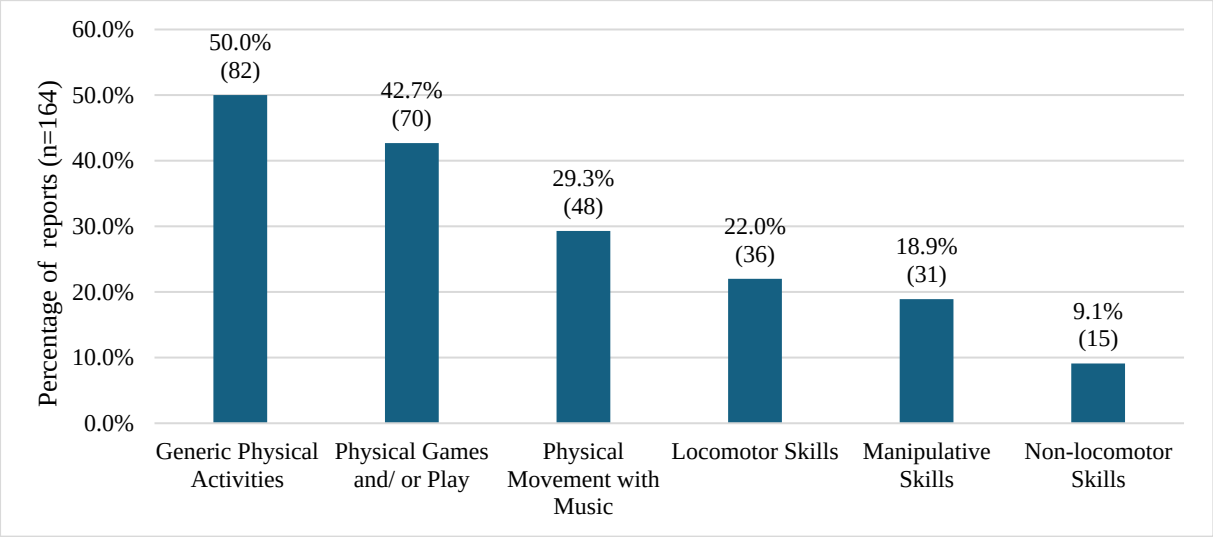
Table 12 presents the definitions and examples of the categories designed to analyze the presence of various forms of physical activities.

Table 12. *Coding Scheme for Various Forms of Physical Activities*

Categories	Definitions
Generic Physical Activities	Generic or unspecified references to physical activity and/or exercise.
Physical Movement with Music	Reference to activities that involve moving to music. For example, rhythmic movement and/or dance.
Physical Games and/or Play	Refer to the activities that require children to move according to games and/or play conditions, such as reacting quickly to the signals or sudden changes.
Locomotor Skills	Reference to physical skills that involve moving the body from one place to another, such as running, jumping, hopping, crawling, climbing, walking, and/or leaping.
Non-locomotor Skills	Reference to physical skills that involve moving the body and limbs on the spot and revolving around an axis, for example, balancing, bending, turning, curling, stretching, and/or twisting.
Manipulative Skills	Reference to physical skills that involve using the arms, hands, and feet to interact with objects, for example, bouncing a ball, throwing, catching, tossing, rolling, and/or kicking.

Of the 164 QR reports analyzed, 122 (74.4%) reports were coded under at least one form of physical activity. The mean of categories alluded to in each report was 2.1 (min = 0; max = 6). More specifically, 45 reports (36.9%) alluded to one category, 29 reports (23.8%) to two categories, 23 reports (18.9%) to three categories, 17 reports (13.9%) to four categories, six reports (4.9%) to five categories, and two reports (1.6%) to six categories. Figure 7 presents the frequency and percentage of QR reports that refer to each form of physical activity.

Figure 7. *Frequency and Percentage of Quality Review Reports Coded Under Each Form of Physical Activity (n=164)*



Half of the QR reports (50%) alluded to the Generic Physical Activities category, which contained general references without detailing the exact form of physical activities or exercises involved (e.g., “physical skills training,” “physical activities,” “morning exercise”). The next category was Physical Game and/or Play (42.7%). Examples of activities mentioned in the reports for this category included “teachers organize physical games with sufficient amount of physical exercises” and “interesting physical play to demonstrate their creativity and team spirit.” Physical Movement with Music appeared in 29.3% of the QR reports. Reports indicated that children participated in rhythmic movements during the school day (e.g., “follow the beats to engage in rhythmic movements”).

In contrast, references to FMS were identified in a low number of reports. Only 22% of the reports described Locomotor Skills (e.g., “They also enjoy running or jumping”), and 18.9% alluded to Manipulative Skills (e.g., “children control, throw and catch balls”). Non-

locomotor Skills were identified in the lowest number of reports (9.1%) (e.g., “they can complete the movements of balancing”).

Goal #3.3: Most Common Types of Positive Feedback

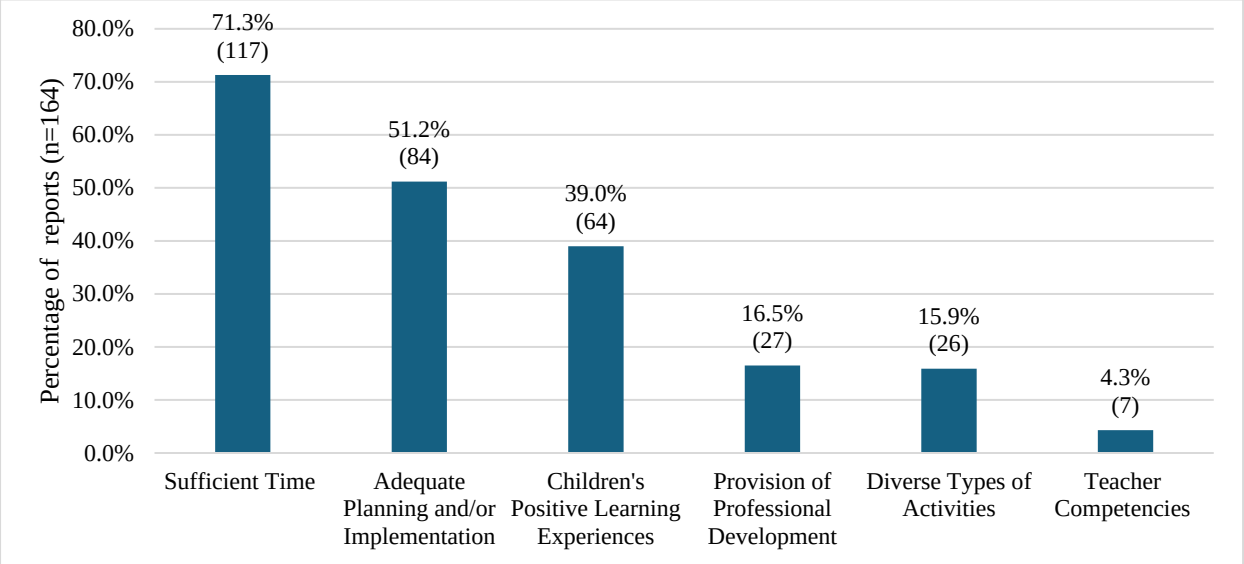
Table 13 presents the definitions of the categories designed for the analysis.

Table 13. *Coding Scheme for the Most Common Positive Feedback Regarding Physical Activities*

Categories	Definitions
Sufficient Time	Reference to teachers providing children with sufficient time for the practice of physical activities.
Diverse Types of Activities	Reference to the provision of diversified types of physical activities.
Teacher Competencies	Reference to teachers having adequate basic competencies (e.g., knowledge, skills, abilities) to teach physical activities.
Adequate Planning and/or Implementation	Reference to the adequate planning and/or implementation of physical activities, including activity design, delivery, classroom management, and/or space utilization.
Children’s Positive Learning Experiences	Reference to children enjoying, actively engaged and/or interested in physical activities.
Provision of Professional Development	Reference to teachers receiving sufficient and/or adequate professional development in relation to physical activities.

Of the 164 QR reports reviewed, 144 reports (87.8%) were coded under at least one category of positive feedback. The mean of categories alluded to in each report was 2.4 (min = 0; max = 5). More precisely, 45 reports (31.3%) alluded to one category, 46 reports (31.9%) to two categories, 33 reports (22.9%) to three categories, 11 reports (7.6%) to four categories, and nine reports (6.3%) to five categories. Figure 8 shows the frequency and percentage of QR reports coded under each category for positive feedback.

Figure 8. *Frequency and Percentage of Quality Review Reports Coded Under Each Category of Positive Feedback (n=164)*



The most common category of positive feedback was Sufficient Time, which appeared in 71.3% of the reports. Reports commented positively on the exposure of physical activities for children (e.g., "the school provides children with adequate opportunities for participating in physical activities every day"). Overall, the reports appreciated the balanced class schedule arrangement of the kindergartens. The following category was Adequate Planning and/or Implementation (51.2%). Reports showed appreciation for the adequate design of activities (e.g., "Teachers plan interesting physical activities and group play according to children's physical developmental characteristics"), as well as for teachers' pedagogical strategies (e.g., "teachers give clear instructions when leading physical and music activities"). Some reports further commented on the appropriate venue utilization

during activities (e.g., “teachers fully utilize the indoor play area to shorten children’s wait time”).

The QR reports paid less attention to the remaining categories. Children’s Positive Learning Experiences appeared in only 39% of the reports. These reports described children’s performance with some adjectives (e.g., “children are energetic and eager to make attempts”). Provision of Professional Development was found in only 16.5% of the reports that revealed the forms of professional development activities offered by the school (e.g., “external support services and arranges collaborative lesson planning, observation, and evaluation”). Only 15.9% of the reports alluded to the Diverse Types of Activities (e.g., “children are engaged in diversified physical activities”). Lastly, only 4.3% of the reports were coded under Teacher Competencies, which described the teachers’ essential competencies in teaching physical activities were adequate (e.g., “teachers are conscious of taking part in children’s free choice and physical activities”).

Goal #3.4: Most Common Types of Negative Feedback and/or Recommendations

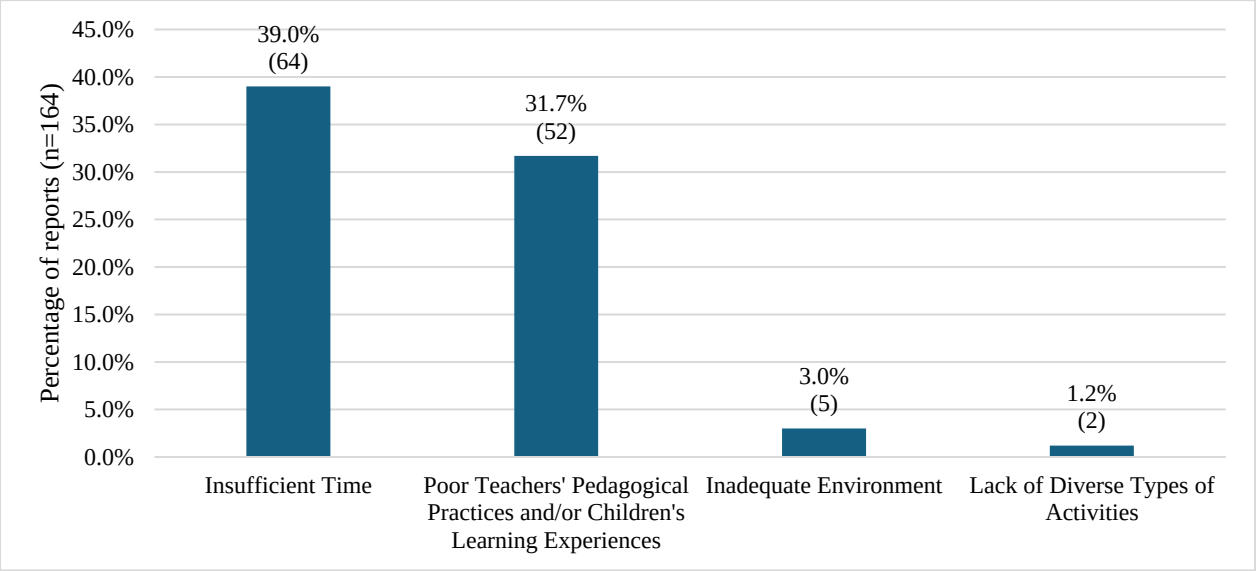
The definitions of categories designed to address Goal #3.4 are presented in Table 14.

Table 14. *Coding Scheme for Most Common Negative Feedback and/or Recommendations Related to Physical Activities*

Categories	Definitions
Insufficient Time	Reference to children not having sufficient time to practice physical activities and/or recommendations to improve in this matter.
Lack of Diverse Types of Activities	Reference to insufficient provision of diversified activities and/or recommendations to improve in this matter.
Poor Teachers' Pedagogical Practices and/or Children's Learning Experiences	Reference to poor pedagogical practice by teachers and/or poor learning experiences provided to children and/or recommendations to improve in these matters.
Inadequate Environment	Reference to the inadequate environment for the practice of physical activities and/or recommendations to improve in this matter.

Of the 164 QR reports reviewed, only 50.6% (83 reports) contained at least one negative feedback and recommendation category. The categories for negative feedback in each report ranged from a minimum of zero categories to a maximum of three categories. The mean of categories alluded to in each report was 1.2 (min = 0; max = 3). More specifically, 48 reports (57.8%) alluded to one category, 31 reports (37.3%) to two categories, and four reports (4.8%) to three categories. Figure 9 shows the frequency and percentage of QR reports that referred to each category.

Figure 9. *Frequency and Percentage of Quality Review Reports Coded Under Each Category of Negative Feedback (n=164)*



Insufficient Time, which only appeared in 39% of the reports, was the most common category for negative feedback. These reports expressed concerns about children's inadequate exposure to physical activities during the typical school day (e.g., "there is insufficient time for free choice, music, physical and art activities daily"). Some kindergartens failed to provide enough time for K3 children (5-6 years of age) to participate in physical activities, as children were required to complete primary school simulation activities to prepare them for the transition to primary school (e.g., "the school has been failing to arrange music and physical activities for K3 children on a daily basis during the primary one simulation period"). Consequently, the reports advised these kindergartens to make necessary arrangements to ensure children's engagement in physical activities (e.g., "the school needed

to adjust its timetable to allow children to have sufficient time to engage in physical, music and free-choice activities").

Poor Teachers' Pedagogical Practices and Children's Learning Experiences were mentioned in only 31.7% of the reports. These reports commented negatively on the pedagogical practices of teachers (e.g., "spend too much time on explanation"), resulting in poor learning experiences (e.g., "some children do not show much interest in the activities"). The EDB inspectors recommended that teachers and kindergartens take measures to improve the situation (e.g., "the management should strengthen teachers' skills in conducting physical activities and guide them to make appropriate intervention"). Only five reports (3.0%) alluded to the category Inadequate Environment. Reports highlighted that some venues are undesirable for conducting physical activities (e.g., "affected by the noise"), as well as safety issues due to inappropriate classroom settings (e.g., "teacher's view was likely to be obstructed because of the classroom design"). Finally, only two reports (1.2%) alluded to the category Lack of Diverse Types of Activities (e.g., "teachers may make use of more diversified activity modes to enhance children's interest in learning").

Discussion

The current study aimed to determine the correspondence between Hong Kong's official kindergarten curriculum and teachers' pedagogical practices pertaining to physical activities, as described by the EDB inspectors in the QR reports. We have presented a content

analysis of 164 QR reports covering kindergartens from different districts in Hong Kong, which provides an overall account of how physical activities are being implemented in local kindergartens.

In Goal #3.1, we examined the presence of physical activities in the QR reports. While content related to physical activities appeared in all 164 QR reports analyzed, its presence was minimal (lower than 5% on average). In some reports, the proportion of content coded was as low as 0.5%. Some terms frequently linked with physical activities (e.g., exercise, gross, motor, fundamental, movement) rarely appeared or were fully absent. In Goal #3.2, we analyzed the presence of various forms of physical activities in the QR reports. We found that EDB inspectors alluded to physical activities generically and that the motor skill(s) at hand were not specified in detail. Overall, these findings revealed a marginal emphasis on physical activities in the QR reports, with the use of rather vague language by the EDB inspectors.

The low status and generic description of physical activities in the QR reports may be caused by multiple factors. One factor could be the limited presence of physical activities in local kindergartens, which could be why the EDB inspectors did not elaborate much on physical activities within the QR report. Similar tendencies have been identified in other studies conducted in kindergartens worldwide, for example, in Spain (Alcántara-Porcuna et al., 2022) and Singapore (Bautista et al., 2020). In a society that prioritizes academic

performance like Hong Kong (Mak et al., 2021), another influencing factor could be that the EDB inspectors paid more attention to the academic learning areas (such as numeracy and language) over physical activities during the assessment exercise. The limited presence of physical activity content in the QR reports could be a reflection of the high societal emphasis on academic learning, which is common in Asian societies (Gupta, 2018; Yang et al., 2021).

Another possible reason for the limited presence of physical activities in Hong Kong could be the small size of classrooms, shared spaces, and facilities in local kindergartens, which reflect the characteristics of this heavily populated urban city. Some researchers have argued that the lack of play spaces (Louie & Chan, 2003) and outdoor facilities (Yang & Li, 2018) in kindergartens hinder the implementation of play and physical activity programs. In Hong Kong, most kindergartens operate inside residential buildings and lack sufficient physical space and facilities for children to move freely, especially in outdoor settings (Chow et al., 2015a).

A previous study on school inspection in England pointed out that inspection quality is inconsistent when school inspectors lack front-line teaching experience and relevant knowledge in the assessment area(s) (Baxter, 2013). Since the EDB inspectors team consists of officers and front-line teachers specialized on various learning areas (EDB, 2017), it is possible that EDB inspectors might have insufficient subject knowledge and teaching

experience pertaining to physical activities. Perhaps, for this reason, descriptions of physical activities were rather generic and somewhat imprecise.

In Goal #3.3, we explored the most common types of positive feedback given to kindergartens in relation to physical activities. While Sufficient Time was the theme most frequently alluded to, it is unclear whether the exposure to physical activities was in fact sufficient. The reason is that the minimum time expectation in Hong Kong combines physical activities with music and the arts, with 45-60 minutes in half-day programs and 90-105 minutes in whole-day programs (CDC, 2017). This time recommendation would be considered clearly insufficient in Western countries. For instance, the guideline proposed by Institute of Medicine (2013) in the United States suggests that kindergartens should arrange at least 15 minutes every hour for physical activities. Our findings, therefore, call for future investigation of the actual duration of physical activities in Hong Kong local kindergartens. The second most frequent positive feedback was Adequate Planning and/or Implementation. However, this category only appeared in approximately half of the QR reports. We lack information about the performance of teachers in the remaining kindergartens. We also found few references related to children's experiences, which is inconsistent with the curriculum objective of nurturing children's interests and habits in physical activities (CDC, 2017). It would be important for EDB inspectors to focus on how children experience and perceive

physical activities in kindergartens, as fun and enjoyment are among the most important factors for children's continuous participation in physical activities (Mak et al., 2021).

Finally, in Goal #3.4, we explored the most common types of negative feedback and/or recommendations given to kindergartens in relation to physical activities. While the most common positive feedback was Sufficient Time, some reports also warned about the lack of exposure to physical activities, especially among K3 children (5-6 years of age). This situation happens because many kindergartens focus on preparing children for primary school, so teachers reduce the time in non-academic areas. As a result, kindergartens often sacrifice time for physical activities (Rao et al., 2018). The next highest frequency of negative feedback was Poor Teachers' Pedagogical Practices and/or Children's Learning Experiences. This result could be due to insufficient teacher training in physical activities. Traditionally, kindergarten teachers in Hong Kong are trained to be generalists (Bautista et al., 2022). In the tertiary education curricula, limited courses focusing on physical activities and motor skill development are provided to pre-service kindergarten teachers (Mak et al., 2021). Similarly, a study focusing on teacher training in Canada reported that over 70% of students majoring in ECE had not taken physical activities-related courses in their teacher training program (Martyniuk & Tucker, 2014). As a result, like in other Asian regions (Wang, 2019), teachers in Hong Kong kindergartens may not be fully confident and capable of designing and delivering physical activities due to inadequate and/or insufficient preparation.

Conclusion

Although *Physical Fitness and Health* is one of the six key learning areas in the curriculum, the presence of physical activities in the QR reports is minimal, and the EDB inspectors tend to describe physical activities rather generically. We infer that the EDB inspectors did not pay sufficient attention to this learning area, perhaps due to a lack of specific content knowledge to assess the performance of physical activities and/or due to the limited implementation of physical activities in kindergartens, perhaps due to competing academic priorities and expectations (Rao et al., 2018). Both positive and negative feedback focused primarily on matters pertaining to the time of exposure to physical activities and teachers' pedagogical quality. Our evidence suggests the existence of potential gaps between Hong Kong kindergarten policies and actual physical activity practices, specifically with regard to time of exposure (Chow et al., 2015a) and pedagogical strategies (Mak et al., 2021). Considering that prior studies in the area of physical activities in local kindergartens are limited, more investigations on teachers' pedagogical practices regarding physical activities seem necessary.

Limitations and Future Research

The study has several limitations. First, the QR reports were the only data source utilized. Although the dataset of QR reports analyzed for this study includes many kindergartens across the city, they only represent the perspectives of the EDB inspectors

based on what they actually see in kindergartens during the school inspection. Future studies may consider additional data sources, such as interviews and large-scale surveys, to gain more insights into other key stakeholders' views and perspectives (e.g., teachers, principals, teacher trainers, and parents). This would allow for data triangulation. Second, the QR reports only reflect the performance of kindergartens under FQKES, thus excluding international and private/independent kindergartens. Future research should collect data from different kindergarten providers to allow for generalization. Finally, the current study indicates the low presence of physical activities in the QR reports, but the underlying reasons are uncertain. It is unclear whether teachers neglect physical activities in their daily teaching, perhaps due to pressures from parents and/or school leaders, or whether the EDB inspectors paid low attention during the QR exercise due to insufficient training. Further research is needed to provide more comprehensive accounts on these matters.

Practical Implications

This study has several practical implications for kindergarten stakeholders. First, we believe it is important to raise the inspectors' level of knowledge in the area of physical activities to better assess the quality of practices in kindergartens. The current study shows that some inspectors may not even know the right terminology to accurately refer to certain physical skills. Adequate training with practical knowledge and concrete examples of physical activities should be provided to them. This would allow inspectors to offer more

constructive advice and recommendations to kindergartens' principals and teachers for improving their pedagogical practices on physical activities in the future. Second, local tertiary institutions and professional development providers must offer pre- and in-service kindergarten teachers more solid training in the area of physical activity (Mak et al., 2021) to prepare them better to meet the learning objectives and expectations of current policy frameworks (CDC, 2017). Once teachers are equipped with sufficient knowledge and skills, they will be more confident to plan and deliver physical activities in class, which may positively impact the physical development and health of young children in the long run, thereby narrowing the gap between curriculum and practice (Wong, 2021).

GENERAL DISCUSSION

Framed within the theoretical framework of high-quality physical activity programs in ECE proposed by Stork and Sanders (2008), this doctoral dissertation aimed to depict the landscape of physical activity practices in Hong Kong kindergartens. Each of the three empirical studies included herein highlights a unique critical aspect of physical activities in Hong Kong kindergartens. More specifically, Studies 1 and 2 focused on investigating the self-reported physical activities and FMS practiced by kindergarten teachers across the three grade levels, as well as the locations where these activities take place. In turn, Study 3 explored how the EDB, as a government body, described the practices of physical activities conducted by kindergarten teachers with young children. Therefore, the findings of this dissertation contribute to a more comprehensive understanding of the current landscape of physical activity practices in Hong Kong kindergartens.

In this chapter, I first present a summary of the findings from the three empirical studies featured in the dissertation portfolio (Studies 1, 2, and 3). Next, the chapter presents an integrated discussion of the four key dimensions of high-quality physical activity programs in ECE proposed by Stork and Sanders (2008), along with the conclusions of this dissertation. I then discuss the limitations of the studies presented in this dissertation and outline potential directions for future research. Lastly, the chapter ends by presenting key implications derived from the dissertation.

Summary of Findings

Study 1, entitled "Physical Activities in Hong Kong Kindergartens: Grade-Level Differences and Venue Utilization," examined the implementation of physical activities by Hong Kong kindergarten teachers with a focus on the frequency and variety of physical activities across grade levels, as well as the locations where teachers conduct these activities with children (Fan et al., in press).

- Goal #1.1 was to investigate the provision of physical activities in Hong Kong kindergartens across the three grade levels (K1, K2, and K3). Findings revealed a relatively low level of implementation of physical activities by kindergarten teachers. The most frequently implemented activities, including "rhythmic movement" and "free dance," typically involve low physical exertion and risk (Brown et al., 2009). These findings align with previous studies conducted in Singapore (Bautista et al., 2020) and the United States (Brown et al., 2009), where children were reported to have minimal engagement in moderate to vigorous physical activities during classroom time. Additionally, K3 teachers reported a significantly higher frequency of conducting physical activities compared to K1 and K2 teachers. Particularly, K3 teachers reported conducting "chasing games," "forms of play that require strength," "rehearsed dance for public performance," "soccer," "basketball," and "race games" more often than K1 and K2 teachers. This comparison across grade levels holds significance, as

prior studies (e.g., Bautista et al., 2020; Hardy et al., 2010) have predominantly concentrated on an individual grade level and have not explored variations across grade levels.

- Goal #1.2 was to examine the availability and utilization of venues in or near kindergartens for implementing physical activities. It was found that indoor venues, such as the "classroom," "multipurpose / activity room," "music classroom," and "gross motor room / area" were highly available in kindergartens and utilized very frequently for conducting physical activities. In contrast, the availability and utilization of outdoor venues were found to be limited. While these results differ from Western countries such as Canada (Tucker et al., 2011) and Norway (Moser & Martinsen, 2010), where ample outdoor spaces and equipment are available in ECE centers, the findings reflect the reality in highly populated urban societies in Asia, such as Macau (Wong, 1999), Singapore (Nonis, 2005), and various cities in China (Bao et al., 2021).

To sum up, the evidence from Study 1 suggests that the low level of implementation and low intensity of physical activities in Hong Kong kindergartens do not align with the recommended standards set by international organizations (e.g., ACSM, 2015; Institute of Medicine, 2013), potentially hindering optimal child development. Additionally, the findings revealed that indoor venues were more commonly available in or near kindergartens and were

utilized more frequently for physical activities compared to outdoor venues, which parallels the Yuen and Gallagher (2024) study's findings of over one-third of kindergartens in Hong Kong encountered challenges in arranging appropriate venues for physical activities, especially outdoor venues. These findings could be attributed to several factors, such as limited space availability due to the high cost of properties and land (Rao et al., 2018), the short duration of kindergarten programs with packed teaching schedules (Bautista et al., 2021), as well as concerns regarding safety and hygiene associated with using outdoor venues near busy roads and housing estates (Yuen, 2020). This highlights the urgent need to address the limited availability and/or accessibility of outdoor venues in Hong Kong kindergartens. The findings also reveal that it is crucial to make efforts to provide teachers with training and resources that enable them to identify and leverage available outdoor venues in the community (Nonis, 2005).

Study 2, entitled "Fundamental Movement Skills in Hong Kong Kindergartens: A Grade-Level Analysis", was designed to explore the frequency of various FMS practiced in the physical activities conducted by Hong Kong kindergarten teachers. This study also examined the association among these FMS based on the frequency of use in classrooms across the three grade levels (Fan et al., 2024a).

- Goal #2.1 was to investigate the frequency of a variety of FMS in the physical activities conducted by Hong Kong kindergarten teachers. The findings showed

that FMS were rarely to occasionally practiced in kindergarten physical activities. Certain skills such as “riding on pedal tricycles or bikes” and “bending and stretching” were frequently practiced in physical activities, while others like “rope skipping” and “digging in the sandbox” were rarely involved. Interestingly, Brown et al. (2009) found that walking and running were the most commonly practiced FMS in US kindergartens, whereas throwing and tumbling were less commonly practiced.

- Goal #2.2 was to investigate the association among these FMS based on the frequency of use in classrooms. Through PCA, seven components were identified: Springing (the most frequent), Interlimb Coordination, Object Manipulation, Even Locomotor Movements, Uneven Locomotor Movements, Agility and Coordination, and Body Control (the least frequent). Springing was the most frequently practiced FMS component, which integrated locomotor skills (i.e., “jumping high [vertically],” “hopping”) with body management skills (i.e., “bending and stretching,” “dynamic balancing”). Such combinations of FMS were identified in studies conducted in Taiwan (Lee et al., 2021) and Spain (Romero-Naranjo et al., 2024), where children engaged in music-related physical activities that required similar FMS. Given the prevalence of rhythmic movement activities in Hong Kong kindergartens (Ho & Bautista, 2022), it is likely that

teachers incorporate the practice of Springing FMS within the context of music and movement activities, an approach supported by prior studies (Carretero-Martínez & Romero-Naranjo., 2015; Marinšek & Denac, 2020; Williams, 2018).

- Goal #2.3 was to analyze potential differences in FMS across the three grade levels (K1, K2, and K3) of kindergarten education in Hong Kong. It was found that K3 teachers practiced FMS significantly more often compared to K1 and K2 teachers. Moreover, a wider range of FMS was found to be practiced by K3 teachers. In particular, K3 teachers were reported to practice FMS related to Springing, Object Manipulation, Uneven Locomotor Movements, and Agility and Coordination significantly more frequently than the teachers from other grade levels. These findings are unique and make a valuable contribution to the existing literature in this field, as previous studies (e.g., Bautista et al., 2020; Chow et al., 2015b) have solely delved into a single grade level or have not explored the differences between grade levels.

The findings from Study 2 indicate that Hong Kong kindergarten teachers tend to practice an imbalanced set of FMS, deviating from the guidelines set by international organizations (e.g., Education Department of Western Australia, 2013a; SHAPE America, 2020), highlighting the importance for teachers to cover the diverse range of FMS in a more balanced manner to promote children's all-rounded development (Hardy et al., 2010).

Additionally, the study identified seven components of FMS based on their usage in Hong Kong kindergarten classrooms. These findings provide valuable insight into how FMS are being practiced in kindergartens, allowing teachers to identify any potential weaknesses in their teaching practices. This information contributes by revealing clusters of FMS based on the usage that was unreported previously in studies examining the frequency of various physical activities and FMS (e.g., Brown et al., 2009; Chow et al., 2015a). The present study represents an important extension of those studies. Lastly, the results highlight the significance of the grade level variability in the FMS practice in Hong Kong kindergartens. While similarities in the most frequently practiced FMS across the three grade levels were noted, K3 teachers were found to practice a wider array of FMS more frequently compared to K1 and K2 teachers. This emphasizes the necessity of providing teachers with appropriate training and resources to enhance their competence in incorporating a more diverse range of FMS into their teaching activities across different grade levels (Montesinos et al., 2022).

Finally, **Study 3** is entitled “Physical Activities in Hong Kong Kindergartens: A Content Analysis of the Quality Review Reports” (Fan et al., 2024b). It was designed to examine the presence of various types of physical activities, positive and negative feedback, and recommendations for improvement, as described by the EDB’s inspectors in the QR reports.

- Goal #3.1 was to examine the overall presence of content in relation to physical activities within the QR reports. The findings revealed that the overall presence of content pertaining to physical activities in the QR reports analyzed was minimal, averaging less than 5% of the reports' textual content, which aligns with comparable trends observed in other non-academic learning areas like music (Ho & Bautista, 2022) and art and creativity (Yeung et al., 2022). Moreover, certain terms commonly associated with physical activities (e.g., exercise, gross, motor) were seldom mentioned or completely absent in the reports.
- Goal #3.2 was to analyze the presence of various forms of physical activities in the QR reports. Findings suggested that EDB's inspectors alluded to physical activities generically and the specific motor skills practiced were not detailed in depth. This could be attributed to various factors. One possible reason could be the limited presence of physical activity during the EDB's inspections. A similar trend of limited physical activities was noted in different countries, including New Zealand (Ali et al., 2021) and Australia (Ellis et al., 2017). Another explanation could be the EDB's inspectors might have inadequate subject knowledge and teaching experience (Baxter, 2013). This could have resulted in vague and imprecise descriptions of physical activities.

- Goal #3.3 was to explore the most common types of positive feedback given to kindergartens in relation to physical activities. The analysis revealed that "Sufficient time" was the most frequently alluded to feedback, which is aligned with trends pertaining to music, another non-academic learning area examined in the QR reports (Ho & Bautista, 2024). However, there was a lack of reference to children's experiences and perceptions of physical activities within kindergartens in the feedback provided. This finding contrasts with those of Yeung et al. (2022), in which more than half of QR reports described the "children's behaviors and reactions" (p. 100) within the art and creativity learning area. Such oversight of children's experiences is concerning as the element of fun and enjoyment is vital in developing a lifestyle of regular physical activities in children (Coulter & Woods, 2011; Mak et al., 2021). It is, therefore, inconsistent with the curriculum objective of nurturing children's interests and habits in physical activities (CDC, 2017).
- Goal #3.4 was to explore the most common types of negative feedback and/or recommendations given to kindergartens in relation to physical activities. Although "Sufficient time" was the most commonly alluded to positive feedback, some reports raised concerns about inadequate exposure to physical activities, particularly among K3 children (5–6 years of age), due to preparations for

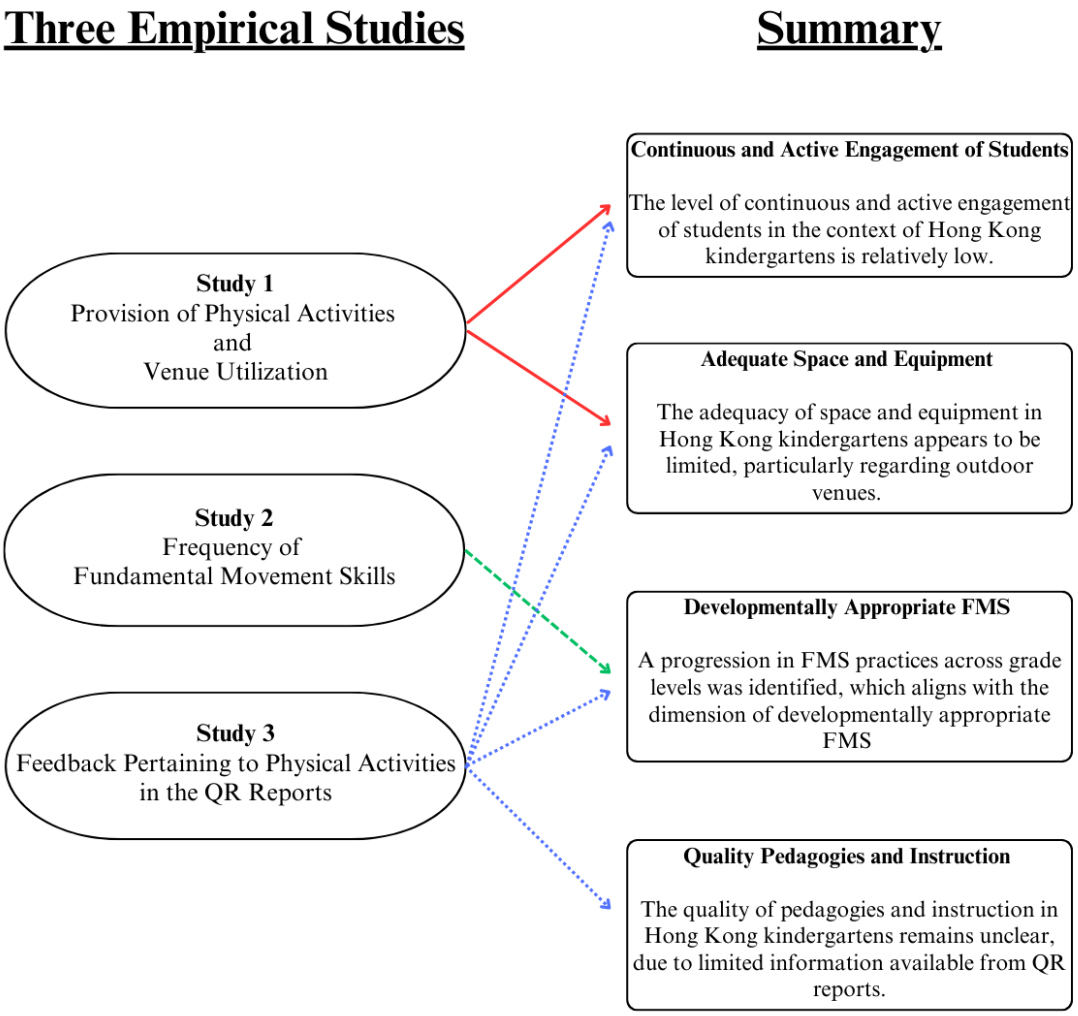
primary school. This finding aligns with Chan's (2016) study, which found that kindergartens in Hong Kong prioritize academic readiness for primary school, resulting in less time allocated for non-academic learning areas in K3.

Study 3 uncovered a marginal emphasis on physical activities within the QR reports, despite *Physical Fitness and Health* being a key learning area in the official kindergarten curriculum framework (CDC, 2017). The content in relation to physical activities in the reports is scant, echoing similar trends seen in other non-academic learning areas (Ho & Bautista, 2022; Yeung et al., 2022). Furthermore, EDB's inspectors tend to offer generic descriptions of physical activities. The feedback, whether positive or negative, predominantly focused on the duration of exposure to physical activities, often using rather vague language instead of providing specific and detailed feedback. These findings are similar to those of Alkutich and Abukari (2018), who also found superficial feedback in Dubai's school inspection reports. It is inferred that the EDB's inspectors may not have allocated adequate attention to the *Physical Fitness and Health* learning area, possibly due to a lack of specific subject knowledge required to examine the practice of physical activities (Baxter, 2013). Another possibility is the limited presence of physical activities in kindergartens during EDB's visit, possibly influenced by competing academic priorities and expectations (Chen, 2022).

Integrated Discussion

As explained in the Introduction chapter, this dissertation is grounded in the theoretical framework proposed by Stork and Sanders (2008) for high-quality physical activity programs in ECE, which comprises four dimensions: Continuous and Active Engagement of Students, Adequate Space and Equipment, Developmentally Appropriate FMS, and Quality Pedagogies and Instruction. Moreover, the Taxonomy of Movement Learning developed by Lu and Montague (2016) provides additional support for the research conducted in this dissertation. In the Introduction chapter, the alignment of the three studies with the theoretical framework depicted in Figure 2 was elucidated. In the following subsections, I draw on Figure 10 to further demonstrate how each of the three studies conducted provided further evidence for the different dimensions outlined in the theoretical framework.

Figure 10. *Summary of the Four Dimensions of High-Quality Physical Activity Programs in Early Childhood Education*



Continuous and Active Engagement of Students

Continuous and active engagement of students is the first dimension in the theoretical framework of high-quality physical activity programs in ECE proposed by Stork and Sanders (2008). This dimension emphasized that physical activities in kindergartens should prioritize fun and age-appropriate activities and FMS (ACSM, 2015; Krogh & Morehouse, 2020; Mak et al., 2021). The framework poses that it is essential to tailor teaching activities for children

with various abilities, encourage active participation, and offer sufficient opportunities for practice and feedback to support learning and progress in young learners (Beaver et al., 2018; Essa & Burnham, 2019; Ministry of Education, 2023).

The findings of this dissertation suggest that the level of continuous and active engagement of children, which are essential elements highlighted by Stork and Sanders's (2008) framework, is relatively low in the context of Hong Kong kindergartens. In fact, Study 1 revealed that kindergarten teachers in Hong Kong conducted physical activities for children relatively infrequently, as evidenced by the overall mean score of 2.47 (out of 5) for the activities presented in the survey. Most physical activities scored below the mean value of three, highlighting the limited implementation of these activities in kindergarten settings. One influencing factor could be the prioritization of academic performance. Parents in Hong Kong, similar to those in other Asian countries like Singapore (Deng et al., 2013), Philippines (Saamong et al., 2024), and Thailand (Amornsriwatanakul et al., 2022), place particular importance on their children's academic achievements in academic subjects like mathematics and languages (Chan & Chan, 2003; Chen et al., 2017). To meet parental expectations, teachers often sacrifice non-academic areas including arts and creativity (Yeung & Bautista, 2024) and music (Ho & Bautista, 2022). Another potential factor is the prevalence of half-day ECE programs. As noted by Talley et al. (2012), the major disadvantages of half-day ECE programs are having a cramped curriculum and providing rushed instruction. In Hong Kong,

two-thirds of kindergartens offer half-day programs with 3-hour sessions and tightly packed teaching schedules (EDB, 2023c). Each segment in the schedule typically lasts only 20 to 30 minutes (Yeung et al., 2022), making it challenging for teachers to cover all key learning areas adequately.

An important finding of the dissertation is the discontinuous engagement of young children in physical activities across different grade levels. The findings suggest that while K1 and K2 students engaged in physical activities, the continuity of engagement diminishes when students advance to K3. In Study 1, K3 teachers were found to provide a broader range of physical activities compared to teachers in K1 and K2. Contrastingly, Study 3 revealed a reduction in the actual time of students' engagement, particularly among K3 children. Such a decrease in engagement could be attributed to many kindergartens focusing on preparing children for primary school, leading teachers to reduce the time allocated to non-academic areas (Rao et al., 2018; Watkins, 2009). Consequently, kindergartens often sacrifice time for physical activities. In accordance with the framework outlined by Stork and Sanders (2008), such a decline in engagement levels in K3 indicates a discontinuity in the engagement of physical activities with young children in Hong Kong, which is concerning.

The engagement opportunities for physical activities in Hong Kong kindergartens appear to be somewhat limited. It is characterized by low-intensity and low-risk activities based on teachers' self-reported surveys and the QR reports issued by the EDB. As shown in

Study 1, the most frequently implemented physical activities in Hong Kong kindergartens were found to be “rhythmic movement” and “free dance,” which integrate physical movement with music, arts, and play. While these activities align with the curriculum integration principles outlined in the Guide (CDC, 2017) and the music and movement approach supported by previous studies (e.g., Lee et al., 2021; Romero-Naranjo et al., 2024), they generally involve low intensity and risk (Brown et al., 2009). These findings, therefore, contrast with the study by Chow et al. (2015a), which reported a high level of moderate to vigorous physical activities in Hong Kong kindergartens. In Study 3, it was noted that the EDB’s inspectors provided vague and generic descriptions of physical activities in the QR reports. The reports mentioned only a limited variety of physical activities, with no indication of the intensity levels involved in these activities. It is believed that the limited presence of physical activities in local kindergartens may have influenced the EDB’s inspectors’ minimal elaboration on this area in the QR reports. The EDB’s inspectors likely observed few instances of physical activities during their visits, leading to their limited discussion of physical activities. Similar tendencies of limited physical activity presence have been identified in other studies conducted in ECE centers worldwide, for example, in Spain (Alcántara-Porcuna et al., 2022) and the United States (Willis et al., 2021).

Adequate Space and Equipment

The second dimension in the theoretical framework of high-quality physical activity programs in ECE proposed by Stork and Sanders (2008) emphasizes the importance of adequate space and equipment. This dimension is deemed important by Stork and Sanders (2008), as children require ample space and equipment to participate in physical activities safely, actively, and engagingly (American Academy of Pediatrics et al., 2011; Moser & Martinsen, 2010; SHAPE America, 2022; Skarstein & Ugelstad, 2020). Prior studies have demonstrated positive associations between larger outdoor play areas and higher levels and intensity of physical activities (Dowda et al., 2009; True et al., 2017). In addition, the acquisition of FMS, especially locomotor skills, necessitates access to open spaces such as a spacious room, gymnasium, or outdoor space (Chow & Louie, 2013; Sanders, 2006).

Overall, the adequacy of space and equipment in Hong Kong kindergartens appears to be limited, particularly regarding outdoor venues, which are commonly unavailable in Hong Kong kindergartens. Study 1 found that indoor venues in or nearby kindergartens were commonly found and utilized more often for physical activities. In contrast, outdoor venues were less accessible and utilized to a lower extent. Most outdoor venues presented in the survey were reported as unavailable in kindergartens, which is a common trend in densely populated urban cities like Singapore (Nonis, 2005) and Macau (Wong, 1999). In contrast with less populated areas in countries such as Germany (Yuen, 2020) and Finland (Määttä et

al., 2019), where outdoor venues are mandated, outdoor spaces are merely recommended but not compulsory in Hong Kong kindergartens (EDB, 2023a).

In turn, Study 3 revealed that EDB's inspectors did not specifically address the adequacy of space and equipment in the QR reports. Instead, this aspect was grouped under the theme of planning and implementation, lacking dedicated attention. The descriptions of space and equipment adequacy were vague and lacked depth, indicating a need for more consideration of the availability and utilization of both indoor and outdoor venues for physical activities in kindergartens. This finding is consistent with a study conducted by Alkutich and Abukari (2018) in Dubai, where the recommendations offered in school inspection reports were superficial and did not address the adequacy of space and equipment. The lack of outdoor spaces poses challenges in providing diverse and engaging physical activities for children in kindergartens (Chow & Louie, 2013), hindering the attainment of a high-quality physical activity program in ECE, as proposed by Stork and Sanders (2008).

In highly urbanized cities like Hong Kong, where population density is high, and property costs are exorbitant (Gopinathan & Lee, 2018), kindergartens often face constraints in accessibility to outdoor space and equipment (Rao et al., 2018; Yuen, 2020). To overcome these challenges, it is important for teachers to prioritize and optimize physical activity opportunities to ensure that all children receive the necessary exposure to physical activities (Jiménez et al., 2010), even in the absence of expansive outdoor spaces (Cashmore & Jones,

2008). It is also crucial to equip teachers with strategies to explore resources outside of the kindergarten settings (Nonis, 2005). Additionally, collaboration with parents plays a vital role in promoting physical activities for children (Alcántara-Porcuna & Rodríguez-Martín, 2022). Educating parents about the benefits and importance of physical activities can increase the likelihood of children engaging in such activities (Gustafson & Rhodes, 2006). For instance, encouraging parents to take their children to parks or engage in physical activities during their time at home can further enhance children's opportunities for physical activity beyond kindergarten hours (Lin & Li, 2018).

Developmentally Appropriate FMS

The third dimension in the theoretical framework of high-quality physical activity programs in ECE proposed by Stork and Sanders (2008) focuses on the acquisition of developmentally appropriate FMS. Gabbard (2000) stressed the importance of ensuring FMS practices in ECE programs are developmentally appropriate. By acquiring developmentally appropriate FMS, children can cultivate an interest in physical activities (Barnett et al., 2009; Beaver et al., 2018; Essa & Burnham, 2019), thereby supporting their physical development and continuous engagement in physical activities throughout their lives (Hardy et al., 2010). Therefore, teachers are encouraged to consider the diverse individual differences among children (Ministry of Education, 2023) and to monitor the progressive development of FMS (Januário et al., 2015).

Generally, the findings revealed that there are limited opportunities for children to acquire developmentally appropriate FMS in Hong Kong kindergartens. Study 2 revealed that the frequency of a variety of FMS in the physical activities conducted by Hong Kong kindergarten teachers was relatively low, with an overall mean score of 2.62 (out of five) for the 29 FMS assessed. This finding indicated that such skills were rarely to occasionally practiced in kindergarten physical activities, aligning with the study by Chow et al. (2015a) that reported only 0.2% of lesson time was spent practicing FMS in Hong Kong kindergartens. Study 2 also highlights that while some FMS (e.g., "riding on pedal tricycles or bikes," "bending and stretching") were frequently implemented in classrooms, other FMS (e.g., "rope skipping," "digging in sandbox") were rarely practiced by teachers. Contrastingly, Brown et al. (2009) identified that walking and running were the most frequently practiced FMS in early childhood centers in the United States, whereas throwing and tumbling were less frequently involved. Despite that, both studies noted a rather imbalanced practice of FMS.

Nevertheless, the findings indicated a progression in FMS practices across grade levels, which aligns with the dimension of developmentally appropriate FMS. As shown in Study 2, K3 teachers demonstrated a broader range of FMS practices compared to K1 and K2 teachers. Specifically, K3 teachers were reported to practice FMS in relation to Springing, Object manipulation, Uneven Locomotor movements, and Agility and coordination

significantly more often in their physical activities. These results align with the expected pedagogical practices of progressively increasing the level of difficulty and complexity of activities as outlined in the Guide (CDC, 2017). However, in Study 3, it was found that EDB's inspectors provided generic descriptions of physical activities in the QR reports. Specific FMS practices were rarely mentioned. One possible explanation could be the potential lack of relevant knowledge among EDB's inspectors in the assessment area (Baxter, 2013). Given that the EDB's inspectors team comprises officers and front-line teachers specialized in different learning domains (EDB, 2017), it is plausible that inspectors have limited subject knowledge related to physical activities, resulting in generic and imprecise descriptions of FMS in the QR reports.

As mentioned above, parents play a crucial role in exposing children to a diverse range of physical activities to aid in the acquisition of developmentally appropriate FMS that may not be readily available in kindergarten settings (Gustafson & Rhodes, 2006; Hernández et al., 2008). While kindergartens face challenges in practicing various types of developmentally appropriate physical activities and FMS, parents can take the initiative in offering opportunities for their children to engage in such activities outside of the school environment (Lin & Li, 2018). For instance, parents can expose children to more intensive forms of physical activities, such as water sports, as they mature. Such an approach can be considered developmentally appropriate and beneficial for their overall physical development

(Zecevic et al., 2010). By actively engaging children in a range of physical activities outside of school hours, parents can complement and enhance the physical activities experiences children receive in kindergartens. (Alcántara-Porcuna & Rodríguez-Martín, 2022).

Quality Pedagogies and Instruction

The final dimension within the framework of high-quality physical activity programs in ECE proposed by Stork and Sanders (2008) is the quality pedagogies and instruction. To achieve high-quality pedagogies and instruction, teaching activities in kindergartens should be structured to promote the utilization of various FMS (Education Department of Western Australia, 2013a) and should be adaptable to accommodate differences in children's maturity, motivation, experiences, and practice levels (Krogh & Morehouse, 2020; Paris et al., 2018).

The quality of pedagogies and instruction in Hong Kong kindergartens remains unclear. As found in Study 3, both positive and negative feedback on pedagogies and instruction quality provided in QR reports only appeared in half of the reports or less. The feedback given by EDB's inspectors was often vague and superficial, focusing more on issues of time management rather than on teachers' pedagogies and instructions (e.g., planning and implementation), which is comparable to music, another non-academic learning area covered in the QR reports (Ho & Bautista, 2024), leaving a gap in understanding the performance of teachers. This phenomenon is not specific to Hong Kong, but it is also evident in other countries and jurisdictions, such as Dubai (Alkutich & Abukari, 2018) and

England (Baxter, 2013). One possible explanation for this lack of detailed feedback on pedagogies and instruction in physical activities could be due to the EDB's inspectors' limited understanding of physical activities, possibly because they had restricted frontline teaching experiences (Baxter, 2013), inadequate training in specific subject area (Ho & Bautista, 2022), and/or due to the lack of concrete practical examples offered in the Guide (Capio et al., 2022).

In the dissertation, the focus has been primarily on examining the physical activities and FMS teachers practiced in classrooms. The information about the physical activities and FMS practiced by teachers is largely based on self-reported surveys conducted as part of the research. However, the level of detail obtained from these surveys may not be extensive enough to provide a comprehensive understanding of teachers' practices. Additionally, the study highlights that there is limited information available from QR reports regarding how teachers implement pedagogies and instruction in practice. Drawing from insights gained from other studies in Hong Kong (e.g., Capio et al., 2021; Cheung & Zhang, 2020; Chow et al., 2015a), it is evident that teachers employ certain pedagogies and strategies in their teaching. Nevertheless, the absence of detailed information from QR reports may pose limitations in fully capturing the features of teachers' practices and the effectiveness of their pedagogies and instruction (Alkutich & Abukari, 2018). Moving forward, further research

that includes classroom-based observations of teachers' practices could provide valuable insights into how teachers conduct physical activities in classrooms, as discussed below.

Conclusions

In summary, the evidence of this dissertation showed that the quality of physical activity programs in Hong Kong kindergartens is not entirely aligned with the theoretical framework of high-quality physical activity programs in ECE proposed by Stork and Sanders (2008), highlighting the need for certain enhancements. The three empirical studies revealed disparities between internationally accepted guidelines for physical activities (e.g., ACSM, 2015; Institute of Medicine, 2013; SHAPE America, 2020) and actual practices in Hong Kong kindergartens in terms of intensity and frequency. The current practices fail to meet the expectations outlined in the continuous and active engagement dimension of the Stork and Sanders's (2008) theoretical framework of high-quality physical activity programs in ECE. It is concluded that such limited opportunities and intensity may not be adequate for children to engage in physical activities continuously and actively.

Secondly, evidence indicates that the adequacy of space and equipment in Hong Kong kindergartens appears to be low, particularly with regard to outdoor venues, which are commonly unavailable in kindergartens. Indoor venues are more commonly available in or nearby kindergartens and are more frequently utilized for physical activities than outdoor venues. This spotlights the need to assess and address the limited availability and/or

accessibility of outdoor venues in Hong Kong kindergartens (Chow & Louie, 2013). Efforts should also be made to provide teachers with training and resources that enable them to identify and utilize available venues in the community (Cashmore & Jones, 2008; Nonis, 2005).

Third, the results of this dissertation identified a progression in FMS practice across grade levels in Hong Kong kindergartens, which aligns with the concept of developmentally appropriate FMS (Gabbard, 2000; Stork & Sanders, 2008). While similarities were identified in the most common types of physical activities and FMS across the three grade levels, K3 teachers were found to practice a wider range of activities and FMS than K1 and K2 teachers. Such practices are consistent with the expected pedagogical practices of progressively increasing the level of difficulty and complexity of activities as outlined in the Guide (CDC, 2017). However, despite the increased variety of physical activities and FMS in K3, the actual time allocated for practical engagement decreased, thereby impacting the continuous engagement of children in these activities.

Finally, the findings showed that the quality of pedagogies and instruction in Hong Kong kindergartens remains unclear due to the absence of specific feedback from EDB's inspectors. The presence of content regarding physical activities in the QR reports is minimal, and the EDB's inspectors tend to describe the activities rather generically. This lack of specific feedback hinders practitioners, including frontline teachers and principals, from

making informed improvements based on the feedback provided (Alkutich & Abukari, 2018). This issue supports the continuous demands for more detailed guidelines illustrated with tangible examples for physical activities (Capio et al., 2022; Saamong et al., 2024) and more structured training for school inspectors (Alkutich & Abukari, 2018; Baxter, 2013).

Limitations and Future Research

There are some limitations that should be acknowledged when interpreting and applying the results from this dissertation. Firstly, while the three studies had a sizable participant sample, they relied on self-reported survey responses and QR reports. The information obtained from these surveys and reports may not be detailed enough to provide a comprehensive insight into teachers' practices in Hong Kong kindergartens. Future studies should explore additional data sources, such as classroom observations, to corroborate whether teachers' self-reported practices and EDB's inspectors' observations align with teachers' actual practices in the classrooms. This may also enable data triangulation, strengthening the credibility and internal validity of findings (Berg & Latin, 2008).

Secondly, while this dissertation indicated the low frequency of physical activities and FMS practiced in kindergartens, it did not delve into the underlying reasons for such infrequency. It remains unclear whether teachers overlook physical activities in their teaching routines, potentially influenced by academic priorities set by parents and school leaders (Gopinathan & Lee, 2018; Watkins, 2009). Additionally, it is uncertain if the EDB's

inspectors may have paid imbalance attention to specific learning areas during school visits due to inadequate training and experience (Baxter, 2013). Future research should consider conducting interviews, either individually or in focus group discussions, with key ECE stakeholders, including teachers, principals, EDB's inspectors, and parents, to explore the factors and challenges that influence the implementation of physical activities in classrooms.

Finally, this dissertation exclusively focuses on the practices of physical activities and FMS in Hong Kong kindergartens, which limited the generalizability of the findings. It is challenging to ascertain whether the practices are unique to Hong Kong or representative of broader trends. To achieve a more robust understanding of physical activities and FMS practices in ECE settings, it would be imperative for future research to replicate similar studies with diverse population groups from different jurisdictions and countries. This would help with generalization and facilitate international comparisons (Creswell, 2009).

Implications

This dissertation has several important implications for various ECE stakeholders, including curriculum designers, teachers' educators, professional development providers, and policymakers. The first implication relates to the need for curriculum designers to further clarify the official expectations of the Guide (CDC, 2017) by providing concrete and practical examples for each learning objective in this learning area (Capio et al., 2022). Curriculum designers are advised to embrace the importance of engaging children in moderate to

vigorous-intensity physical activities, as recommended by ACSM (2015). Explicit guidelines, including recommendations on the optimal forms and frequency of physical activities (Capio et al., 2022; Saamong et al., 2024), should be offered to support teachers in designing lessons that align with the intended learning outcomes set forth by the curriculum (CDC, 2017). This may also help teachers ensure that children engage in appropriate levels of physical activities (Institute of Medicine, 2013) and practice FMS that are appropriate for their age group (Krogh & Morehouse, 2020). In addition, it is recommended that curriculum designers benchmark the local curriculum against recent updates in physical activities curricula from other countries, such as Singapore (Ministry of Education, 2023) and Australia (Western Sydney Local Health District, 2022), to ensure alignment with international up-to-date practices.

Secondly, this dissertation establishes a baseline of the current physical activity practices in Hong Kong kindergartens, revealing the area where teachers require extra training. This information forms the basis for designing impactful professional development programs that respond to kindergarten teachers' previous experiences, needs, and motivations (Bautista & Ortega-Ruíz, 2015; West & Bautista, 2022). Hence, it is advised that local tertiary institutions and professional development providers enhance their training programs for both pre-service and in-service kindergarten teachers by incorporating practical knowledge and age-appropriate physical activities to meet the distinct needs of teachers

working with children at various grade levels (Mak et al., 2021; Montesinos et al., 2023; Tucker et al., 2011).

Thirdly, given the urbanized environment and high property costs in Hong Kong (Gopinathan & Lee, 2018; Yuen & Gallagher, 2024), mandating the inclusion of outdoor venues could impose a financial burden on kindergartens, escalating operational challenges (Rao et al., 2018). Davies (1996) pointed out that kindergarten teachers may not fully grasp the potential benefits of the outdoor environment for children's physical development. This lack of understanding, coupled with kindergartens potentially not prioritizing outdoor physical activities in the curriculum, aligns with the findings of the present dissertation. Therefore, it is crucial for the Hong Kong Government to introduce initiatives to raise teachers' awareness of existing outdoor venues in the community (Nonis, 2005) and promote a culture of regular and frequent utilization of these spaces creatively for physical activities with young children (Nicaise et al., 2011). Ultimately, children could benefit from increased opportunities to engage in physical activities within an outdoor setting, particularly a higher level of physical activities and the development of locomotor skills (Chow & Louie, 2013; Vanderloo et al., 2013).

Finally, this dissertation reveals the potential lack of expertise in physical activities among EDB's inspectors when evaluating the practices in kindergartens. Therefore, it is important to enhance the knowledge level of these inspectors in the field of physical activities

to enable them to conduct more effective quality assessments. For instance, EDB's inspectors could familiarize themselves with the theoretical framework proposed by Stork and Sanders (2008) for high-quality physical activity programs in ECE and the Taxonomy of Movement Learning (Lu et al., 2014; Lu & Montague, 2016). The frameworks that guided this dissertation provide valuable insights and tools that can better equip inspectors to assess and support the implementation of physical activities in kindergartens. Adequate training, coupled with practical knowledge (e.g., appropriate terminology to accurately illustrate specific FMS) and concrete examples of physical activities, should be provided to the assessors. Such training would empower EDB's inspectors to offer more constructive advice and recommendations to kindergarten principals and teachers, thereby improving their pedagogical practices on physical activities in the future (Alkutich & Abukari, 2018; Baxter, 2013).

REFERENCES

Alcántara-Porcuna, V., & Rodríguez-Martín, B. (2022). Parents' and teachers' perceptions of physical activity in schools: A meta-ethnography. *The Journal of School Nursing*, *38*(1), 98-109. https://doi.org/10.1177/1059840520972005

Alcántara-Porcuna, V., Sánchez-López, M., Martínez-Andrés, M., Martínez-Vizcaíno, V., Ruíz-Hermosa, A., & Rodríguez-Martín, B. (2022). Teachers' perceptions of barriers and facilitators of the school environment for physical activity in schoolchildren: a qualitative study. *Qualitative Research in Sport, Exercise and Health*, 1-25. https://doi.org/10.1080/2159676X.2022.2037696

Ali, A., McLachlan, C., McLaughlin, T., Mugridge, O., Conlon, C., Mumme, K., & Knightbridge-Eager, T. (2021). Fundamental movement skills and physical activity of 3-4-year-old children within early childhood centers in New Zealand. *Children*, *8*(9), 742. https://doi.org/10.3390/children8090742

Alkutich, M., & Abukari, A. (2018). Examining the benefit of school inspection on teaching and learning: a case study of Dubai private schools. *Journal of Education and Practice*, *9*(5).

American Academy of Pediatrics, American Public Health Association, & National Resource Center for Health Safety in Child Care. (2011). *Caring for our children: National health and safety performance standards; Guidelines for early care and education*

programs (3rd ed.). Elk Grove Village, IL: American Academy of Pediatrics, Washington, DC: American Public Health Association.

American College of Sports Medicine (ACSM). (2015). *Physical activity in children and adolescents*. https://www.acsm.org/docs/default-source/files-for-resource-library/physical-activity-in-children-and-adolescents.pdf

American College of Sports Medicine (ACSM). (2017). *ACSM's resources for the exercise physiologist* (2nd ed.). Lippincott Williams & Wilkins.

Amornsriwatanakul, A., Noosorn, N., Poonchob, K., Wongwat, R., Sornprasit, S., Markmee, P., Rosenberg, M., & Milton, K. (2022). How to make physical activity promotion work in Thai Schools: Perspectives of multiple stakeholders. *Journal of Physical Activity and Health*, *19*(1), 63-70. https://doi.org/10.1123/jpah.2021-0504

Antala, B., Demirhan, G., Carraro, A., Oktar, C., Oz, H., & Kaplánová, A. (2019). *Physical education in early childhood education and care: Researches, best practices, situation* (1st ed.). Slovak Scientific Society for Physical Education and Sport and FIEP.

Australian Curriculum Assessment and Reporting Authority. (2020). *Understand how health and physical education works*. https://www.australiancurriculum.edu.au/f-10-curriculum/health-and-physical-education/?year=12993&strand=Personal%2C+Social+and+Community+Health&stra

nd=Movement+and+Physical+Activity&capability=ignore&capability=Literacy&capability=Numeracy&capability=Information+and+Communication+Technology+%28ICT%29+Capability&capability=Critical+and+Creative+Thinking&capability=Personal+and+Social+Capability&capability=Ethical+Understanding&capability=Intercultural+Understanding&priority=ignore&priority=Aboriginal+and+Torres+Strait+Islander+Histories+and+Cultures&priority=Asia+and+Australia%E2%80%99s+Engagement+with+Asia&priority=Sustainability&elaborations=true&elaborations=false&scotterms=false&isFirstPageLoad=false

Bao, Y., Gao, M., Luo, D., & Zhou, X. (2021). Effects of children's outdoor physical activity in the urban neighborhood activity space environment. *Frontiers in Public Health, 9.* https://doi.org/10.3389/fpubh.2021.631492

Barbosa, S., & Oliveira, A. (2016). Physical activity of preschool children: A review. *Journal of Physiotherapy & Physical Rehabilitation, 1*(2), 111. https://doi.org/10.4172/2573-0312.1000111

Barnett, L. M., Stodden, D., Cohen, K. E., Smith, J. J., Lubans, D. R., Lenoir, M., Iivonen, S., Miller, A. D., Laukkanen, A., Dudley, D., Lander, N. J., Brown, H., & Morgan, P. J. (2016). Fundamental movement skills: An important focus. *Journal of Teaching in Physical Education, 35*(3), 219-225. https://doi.org/10.1123/jtpe.2014-0209

Barnett, L. M., Van Beurden, E., Morgan, P. J., Brooks, L. O., & Beard, J. R. (2009). Childhood motor skill proficiency as a predictor of adolescent physical activity. *Journal of Adolescent Health*, *44*(3), 252-259. https://doi.org/10.1016/j.jadohealth.2008.07.004

Bautista, A., Bull, R., Ng, E. L., & Lee, K. (2021). "That's just impossible in my kindergarten." Advocating for 'glocal' early childhood curriculum frameworks. *Policy Futures in Education*, *19*(2), 155-174. https://doi.org/10.1177/1478210320956500

Bautista, A., Ho, Y. L., Fan, T., Yeung, J., & Bryant, D. (2022). Teacher professional development in Hong Kong: Describing the current infrastructure. *International Journal for Research in Education*, *46*(2), 202-260. https://doi.org/10.36771/ijre.46.2.22-pp202-260

Bautista, A., Moreno-Núñez, A., Vijayakumar, P., Quek, E., & Bull, R. (2020). Gross motor teaching in preschool education: Where, what, and how do Singapore educators teach? *Infancia y Aprendizaje / Journal for the Study on Education and Development*, *43*(2), 443-482. https://doi.org/10.1080/02103702.2019.1653057

Bautista, A., & Ortega-Ruíz, R. (2015). Teacher professional development: International perspectives and approaches. *Psychology, Society, & Education*, *7*(3). https://doi.org/10.25115/psye.v7i3.1020

Baxter, J. A. (2013). Professional inspector or inspecting professional? Teachers as inspectors in a new regulatory regime for education in England. *Cambridge Journal of Education*, *43*(4), 467-485. https://doi.org/10.1080/0305764x.2013.819069

Beaver, N., Wyatt, S., & Jackman, H. (2018). *Early education curriculum: A child's connection to the world* (7th ed.). Cengage Learning.

Beavers, A. S., Lounsbury, J. W., Richards, J. K., Huck, S. W., Skolits, G. J., & Esquivel, S. L. (2013). Practical considerations for using exploratory factor analysis in educational research. *Practical Assessment, Research & Evaluation, 18,* Article 6. https://doi.org/10.7275/qv2q-rk76

Berg, K. E., & Latin, R. W. (2008). *Research methods in health, physical education, exercise science, and recreation* (3rd ed.). Lippincott Williams & Wilkins.

Bolger, L. E., Bolger, L. A., O'Neill, C., Coughlan, E., O'Brien, W., Lacey, S., Burns, C., & Bardid, F. (2021). Global levels of fundamental motor skills in children: A systematic review. *Journal of Sports Sciences*, *39*(7), 717-753. https://doi.org/10.1080/02640414.2020.1841405

Brown, W. H., Pfeiffer, K. A., McIver, K. L., Dowda, M., Addy, C. L., & Pate, R. R. (2009). Social and environmental factors associated with preschoolers' nonsedentary physical activity. *Child Development*, *80*(1), 45-58. https://doi.org/10.1111/j.1467-8624.2008.01245.x

Cabrera, E. A., Romero-Naranjo, F. J., & Lledó, A. L. (2024). Motor skills and neuromotricity. Theoretical-practical justification through the BAPNE method. *Retos*, *52*, 338-349. https://doi.org/10.47197/retos.v52.101707

Capio, C. M., Chan, W. L., & Li, E. S. (2021). Addressing the needs of early childhood teachers in promoting motor development through a co-design process. *Journal of Education for Teaching*, *47*(5), 752-755. https://doi.org/10.1080/02607476.2021.1959268

Capio, C. M., Jones, R. A., Ng, C. S. M., Sit, C. H. P., & Chung, K. K. H. (2022). Movement guidelines for young children: Engaging stakeholders to design dissemination strategies in the Hong Kong early childhood education context. *Frontiers in Public Health*, *10*. https://doi.org/10.3389/fpubh.2022.1007209

Capio, C. M., Sit, C. H. P., Eguia, K. F., Abernethy, B., & Masters, R. S. W. (2015). Fundamental movement skills training to promote physical activity in children with and without disability: A pilot study. *Journal of Sport and Health Science*, *4*(3), 235-243. https://doi.org/10.1016/j.jshs.2014.08.001

Carretero-Martínez, A., & Romero-Naranjo., F. J. (2015). Stimulation of fine psychomotor skills in children. Methodological introduction according to the BAPNE method. *International Journal of Innovation and Research in Educational Sciences*, *2*(6), 497-501.

Carson, V., Lee, E.-Y., Hewitt, L., Jennings, C., Hunter, S., Kuzik, N., Stearns, J. A., Unrau, S. P., Poitras, V. J., Gray, C., Adamo, K. B., Janssen, I., Okely, A. D., Spence, J. C., Timmons, B. W., Sampson, M., & Tremblay, M. S. (2017). Systematic review of the relationships between physical activity and health indicators in the early years (0-4 years). *BMC Public Health*, *17*(5), 854. https://doi.org/10.1186/s12889-017-4860-0

Cashmore, A. W., & Jones, S. C. (2008). Growing up active: A study into physical activity in long day care centers. *Journal of Research in Childhood Education*, *23*(2), 179-191. https://doi.org/10.1080/02568540809594654

Chan, L. K. S., & Chan, L. (2003). Early childhood education in Hong Kong and its challenges. *Early Child Development and Care*, *173*(1), 7-17. https://doi.org/10.1080/0300443022000022387

Chan, W. L. (2016). The discrepancy between teachers' beliefs and practices: a study of kindergarten teachers in Hong Kong. *Teacher Development*, *20*(3), 417-433. https://doi.org/10.1080/13664530.2016.1161658

Chen, J. J. (2022). Between the foreground and the background lies the middle ground: Painting a harmonious early childhood curriculum landscape. *ECNU Review of Education*, *5*(2), 328-337. https://doi.org/10.1177/20965311221092035

Chen, J. J., Li, H., & Wang, J.-y. (2017). Implementing the project approach: A case study of hybrid pedagogy in a Hong Kong kindergarten. *Journal of Research in Childhood Education*, *31*(3), 324-341. https://doi.org/10.1080/02568543.2017.1309479

Cheung, P. (2020). Teachers as role models for physical activity: Are preschool children more active when their teachers are active? *European Physical Education Review*, *26*(1), 101-110. https://doi.org/10.1177/1356336X19835240

Cheung, P., & Zhang, L. (2020). Environment for preschool children to learn fundamental motor skills: The role of teaching venue and class size. *Sustainability*, *12*(22), 9774. https://doi.org/10.3390/su12229774

Cheung, R. H. P. (2010). Designing movement activities to develop children's creativity in early childhood education. *Early Child Development and Care*, *180*(3), 377-385. https://doi.org/10.1080/03004430801931196

Chow, B. C., & Louie, L. (2013). Difference in children's gross motor skills between two types of preschools. *Perceptual and Motor Skills*, *116*(1), 253-261. https://doi.org/10.2466/25.06.10.pms.116.1.253-261

Chow, B. C., Mckenzie, T. L., & Louie, L. (2015a). Children's physical activity and associated variables during preschooler physical education. *Advances in Physical Education*, *5*, 39-49. https://doi.org/10.4236/ape.2015.51005

Chow, B. C., Mckenzie, T. L., & Louie, L. (2015b). Physical activity and its context during preschool classroom sessions. *Advances in Physical Education, 5,* 194-203. https://doi.org/10.4236/ape.2015.53024

Chung, J. W. Y., Wong, W. S., Wong, T. K. S., Wong, B. Y. M., Kwok, P. S. T., & Yan, V. C. M. (2019). The analysis of changes in the physical fitness of Hong Kong preschoolers following the adoption of an integrated physical fitness curriculum. *International Journal of Science and Healthcare Research, 4*(3), 185- 193. https://doi.org/https://www.ijshr.com/IJSHR_Vol.4_Issue.3_July2019/IJSHR0029.pdf

Columbia University Irving Medical Center. (2019). *Content analysis*. Retrieved 1 July 2022 from https://www.publichealth.columbia.edu/research/population-health-methods/content-analysis

Copeland, K. A., Kendeigh, C. A., Saelens, B. E., Kalkwarf, H. J., & Sherman, S. N. (2012). Physical activity in child-care centers: Do teachers hold the key to the playground? *Health Education Research, 27*(1), 81-100. https://doi.org/10.1093/her/cyr038

Coulter, M., & Woods, C. B. (2011). An exploration of children's perceptions and enjoyment of school-based physical activity and physical education. *Journal of Physical Activity & Health, 8*(5), 645-654. https://doi.org/10.1123/jpah.8.5.645

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). Sage.

Curriculum Development Council (CDC). (2017). *Kindergarten education curriculum guide*. https://www.edb.gov.hk/attachment/en/curriculum-development/major-level-of-edu/preprimary/ENG_KGECG_2017.pdf

Da Silva, R. H., Nobre, G. C., Pessoa, M. L. F., Soares, Í. A. A., Bezerra, J., Gaya, A. R., Mota, J. A. P. S., Duncan, M. J., & Martins, C. M. L. (2024). Physical activity during school-time and fundamental movement skills: a study among preschoolers with and without physical education classes. *Physical Education and Sport Pedagogy*, *29*(3), 302-314. https://doi.org/10.1080/17408989.2022.2083094

Davies, M. M. (1996). Outdoors: An important context for young children's development. *Early Child Development and Care*, *115*(1), 37-49. https://doi.org/10.1080/0300443961150104

De Decker, E., De Craemer, M., De Bourdeaudhuij, I., Wijndaele, K., Duvinage, K., Androutsos, O., Iotova, V., Lateva, M., Alvira, J. M. F., Zych, K., Manios, Y., & Cardon, G. (2013). Influencing factors of sedentary behavior in European preschool settings: An exploration through focus groups with teachers. *Journal of School Health*, *83*(9), 654-661. https://doi.org/10.1111/josh.12078

Deng, Z., Gopinathan, S., & Lee, C. K. E. (2013). *Globalization and the Singapore curriculum: From policy to classroom*. Springer Singapore. https://doi.org/10.1007/978-981-4451-57-4

Department of Health. (2020). *Physical activity guide for children aged 2 to 6 - For kindergartens and child care centre*. Hong Kong. Retrieved from https://www.startsmart.gov.hk/files/pdf/physical_guide_en.pdf

Derscheid, L. E., Umoren, J., Kim, S.-Y., Henry, B. W., & Zittel, L. L. (2010). Early childhood teachers' and staff members' perceptions of nutrition and physical activity practices for preschoolers. *Journal of Research in Childhood Education, 24*(3), 248-265. https://doi.org/10.1080/02568543.2010.487405

Dowda, M., Brown, W. H., McIver, K. L., Pfeiffer, K. A., O'Neill, J. R., Addy, C. L., & Pate, R. R. (2009). Policies and characteristics of the preschool environment and physical activity of young children. *Pediatrics, 123*(2), e261-e266. https://doi.org/10.1542/peds.2008-2498

Dowda, M., Pate, R. R., Trost, S. G., Almeida, M. J. C. A., & Sirard, J. R. (2004). Influences of preschool policies and practices on children's physical activity. *Journal of Community Health, 29*(3), 183-196. https://doi.org/10.1023/b:johe.0000022025.77294.af

Education Bureau (EDB). (2016). *Free quality kindergarten education*. https://applications.edb.gov.hk/circular/upload/EDBC/EDBC16007E.pdf

Education Bureau (EDB). (2017). *Performance indicator-kindergarten*. https://www.edb.gov.hk/attachment/en/edu-system/preprimary-kindergarten/quality-

assurance-framework/performance-indicators-pre-primary-institutions/PI_KG_EN.pdf

Education Bureau (EDB). (2021). *Our work.* https://www.edb.gov.hk/en/about-edb/info/our-work/index.html

Education Bureau (EDB). (2022). *Kindergarten administration guide*. https://www.edb.gov.hk/attachment/en/edu-system/preprimary-kindergarten/free-quality-kg-edu/Admin_Guide_Eng%202022_July.pdf

Education Bureau (EDB). (2023a). *Operation manual for pre-primary institutions (Version 3)*. https://www.edb.gov.hk/attachment/en/edu-system/preprimary-kindergarten/about-preprimary-kindergarten/Operation_Manual_eng.pdf

Education Bureau (EDB). (2023b). *Overview of kindergarten education in Hong Kong*. https://www.edb.gov.hk/en/edu-system/preprimary-kindergarten/overview/index.html

Education Bureau (EDB). (2023c). *Student enrolment statistics, 2022/23*. https://www.edb.gov.hk/attachment/en/about-edb/publications-stat/figures/Enrol_2022.pdf

Education Bureau (EDB). (2024). *Key statistics on kindergarten*. https://www.edb.gov.hk/en/about-edb/publications-stat/figures/index.html

Education Department of Western Australia. (2013a). *Fundamental movement skills: Book 1 - Learning, teaching and assessment*.

https://myresources.education.wa.edu.au/docs/default-source/resources/first-steps-fundamental-movement-skills/first021.pdf?sfvrsn=31b77f95_3

Education Department of Western Australia (2013b). *Fundamental movement skills: Book 2 - The tools for learning, teaching and assessment*. https://myresources.education.wa.edu.au/docs/default-source/resources/first-steps-fundamental-movement-skills/first022.pdf?sfvrsn=e84dd527_3

Ellis, Y. G., Cliff, D. P., Janssen, X., Jones, R. A., Reilly, J. J., & Okely, A. D. (2017). Sedentary time, physical activity and compliance with IOM recommendations in young children at childcare. *Preventive Medicine Reports, 7*, 221-226. https://doi.org/10.1016/j.pmedr.2016.12.009

Essa, E. L., & Burnham, M. M. (2019). *Introduction to early childhood education* (eighth ed.). SAGE Publications.

Fan, T., Bautista, A., & Chan, D. K. C. (2024a). Fundamental movement skills in Hong Kong kindergartens: A grade-level analysis. *Education Sciences, 14*(8), 911. https://doi.org/10.3390/educsci14080911

Fan, T., Bautista, A., & Chan, D. K. C. (2024b). Physical activities in Hong Kong kindergartens: A content analysis of the quality review reports. *Policy Futures in Education*, *22*(4), 659-676. https://doi.org/10.1177/14782103231182741

Fan, T., Bautista, A., & Chan, D. K. C. (in press). Physical activities in Hong Kong kindergartens: Grade-level differences and venue utilization. *Journal of Research in Childhood Education*. https://doi.org/10.1080/02568543.2024.2420999

Fossdal, T. S., Kippe, K., Handegård, B. H., & Lagestad, P. (2018). "Oh oobe doo, I wanna be like you" associations between physical activity of preschool staff and preschool children. *PLOS ONE, 13*(11), e0208001. https://doi.org/10.1371/journal.pone.0208001

Gabbard, C. (2000). Outcome-based preschool physical education. *International Journal of Physical Education, 37*(1), 17-23. https://ezproxy.eduhk.hk/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=esu&AN=507679344&site=ehost-live&scope=site

Geertsen, S. S., Thomas, R., Larsen, M. N., Dahn, I. M., Andersen, J. N., Krause-Jensen, M., Korup, V., Nielsen, C. M., Wienecke, J., Ritz, C., Krustrup, P., & Lundbye-Jensen, J. (2016). Motor skills and exercise capacity are associated with objective measures of cognitive functions and academic performance in preadolescent children. *PLOS ONE, 11*(8), e0161960. https://doi.org/10.1371/journal.pone.0161960

Gil, P., Contreras, O. R., Roblizo, M.-J., & Gómez, I. (2008). Educational potential of physical education in pre-school and infant education: Attributes and opinions.

Journal for the Study of Education and Development, *31*(2), 165-178. https://doi.org/10.1174/021037008784132950

Gopinathan, S., & Lee, M. H. (2018). Excellence and equity in high-performing education systems: policy lessons from Singapore and Hong Kong. *Journal for the Study of Education and Development*, *41*(2), 203-247. https://doi.org/10.1080/02103702.2018.1434043

Gupta, A. (2018). How neoliberal globalization is shaping early childhood education policies in India, China, Singapore, Sri Lanka and the Maldives. *Policy Futures in Education*, *16*(1), 11-28. https://doi.org/10.1177/1478210317715796

Gustafson, S. L., & Rhodes, R. E. (2006). Parental correlates of physical activity in children and early adolescents. *Sports Medicine*, *36*(1), 79-97. https://doi.org/10.2165/00007256-200636010-00006

Hagen, T. L. (2015). Hvilken innvirkning har barnehagens fysiske utemiljø på barns lek og de ansattes pedagogiske praksis i uterommet. *Nordic Early Childhood Education Research Journal*, *10*. https://doi.org/10.7577/nbf.1430

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, *19*(2), 139-151. https://doi.org/10.2753/MTP1069-6679190202

Hannaway, D., Govender, P., Marais, P., & Meier, C. (2019). Growing early childhood education teachers in rural areas. *Africa Education Review, 16*(3), 36-53. https://doi.org/10.1080/18146627.2018.1445974

Hardy, L. L., King, L., Farrell, L., Macniven, R., & Howlett, S. (2010). Fundamental movement skills among Australian preschool children. *Journal of Science and Medicine in Sport, 13*(5), 503-508. https://doi.org/10.1016/j.jsams.2009.05.010

Harrow, A. J. (1972). *A taxanomy of the psychomotor domain*. David Mckay Co.

Henderson, K. E., Grode, G. M., O'Connell, M. L., & Schwartz, M. B. (2015). Environmental factors associated with physical activity in childcare centers. *International Journal of Behavioral Nutrition and Physical Activity*, *12*(1). https://doi.org/10.1186/s12966-015-0198-0

Hernández, J.-L., Velázquez, R., Martínez, M. E., Garoz, I., López, C., & López, Á. (2008). Frequency of physical activity in children and teenagers: Relation with their perception of motor self-efficacy, practice within their social environment, and their satisfaction with physical education. *Journal for the Study of Education and Development, 31*(1), 79-92. https://doi.org/10.1174/021037008783487129

Ho, Y. L., & Bautista, A. (2022). Music activities in Hong Kong kindergartens: A content analysis of the Quality Review reports. *Revista Electrónica de LEEME,* (49), 32. https://doi.org/10.7203/leeme.49.24249

Ho, Y. L., & Bautista, A. (2024). Quality assessors' feedback and recommendations on music education in Hong Kong kindergartens. *Education Sciences*, *14*(5), 466. https://doi.org/10.3390/educsci14050466

Howie, E. K., Brown, W. H., Dowda, M., McIver, K. L., & Pate, R. R. (2013). Physical activity behaviours of highly active preschoolers. *Pediatric Obesity*, *8*(2), 142-149. https://doi.org/10.1111/j.2047-6310.2012.00099.x

Hughes, R. T. (1996). Expert judgement as an estimating method. *Information and Software Technology*, *38*(2), 67-75. https://doi.org/https://doi.org/10.1016/0950-5849(95)01045-9

Ian, J. (2022). *Research methods for sports studies* (Vol. Fourth edition). Routledge.

Institute of Medicine. (2013). *Educating the student body: Taking physical activity and physical education to school*. National Academies Press. https://doi.org/10.17226/18314

Januário, N., Rosado, A., Mesquita, I., Gallego, J., & Aguilar-Parra, J.-M. (2015). Student retention of the information transmitted by the teacher in physical education classes depending on the characteristics of the information. *Journal for the Study of Education and Development*, *38*(1), 212-242. https://doi.org/10.1080/02103702.2014.996405

Janz, K. F., Letuchy, E. M., Gilmore, J. M. E., Burns, T. L., Torner, J. C., Willing, M. C., & Levy, S. M. (2010). Early physical activity provides sustained bone health benefits later in childhood. *Medicine and Science in Sports and Exercise*, *42*(6), 1072-1078. https://doi.org/10.1249/MSS.0b013e3181c619b2

Jiménez, R., García, T., Santos-Rosa, F. J., Moreno, A., & Cervelló, E. M. (2010). Analysis of relationships between goal orientations, motivational climate, assessment of physical education and dispositional flow in secondary school physical education students. *Journal for the Study of Education and Development*, *33*(1), 107-116. https://doi.org/10.1174/021037010790317289

Jolliffe, I. T. (2002). *Principal component analysis* (2nd ed.). Springer.

Kain, J., Leyton, B., Soto-Sánchez, J., & Concha, F. (2018). In preschool children, physical activity during school time can significantly increase by intensifying locomotor activities during physical education classes. *BMC Research Notes*, *11*(1). https://doi.org/10.1186/s13104-018-3536-x

Kippe, K., & Lyngstad, I. (2021). The views, collective awareness and staff practices in promoting physical activity in preschools: An analysis of two preschools in Norway with high and low levels of physical activity. *Education 3-13*, *50*(7), 966-978. https://doi.org/10.1080/03004279.2021.1929377

Krogh, S. L., & Morehouse, P. (2020). *The early childhood curriculum: Inquiry learning through integration* (3rd ed.). Routledge. https://doi.org/10.4324/9780429280764

Lee, L., Liang, W. J., & Sun, F. C. (2021). The impact of integrating musical and image technology upon the level of learning engagement of pre-school children. *Education Sciences*, *11*(12), 788. https://doi.org/10.3390/educsci11120788

Leonard, H. C., & Hill, E. L. (2014). Review: The impact of motor development on typical and atypical social cognition and language: a systematic review. *Child and Adolescent Mental Health*, *19*(3), 163-170. https://doi.org/10.1111/camh.12055

Li, Y. L. (2004). The culture of teaching in the midst of Western influence: The case of Hong Kong kindergartens. *Contemporary Issues in Early Childhood*, *5*(3), 330-348. https://doi.org/10.2304/ciec.2004.5.3.6

Lin, X. Y., & Li, H. (2018). Parents' play beliefs and engagement in young children's play at home. *European Early Childhood Education Research Journal*, *26*(2), 161-176. https://doi.org/10.1080/1350293X.2018.1441979

Lindsay, A. C., Salkeld, J. A., Greaney, M. L., & Sands, F. D. (2015). Latino family childcare providers' beliefs, attitudes, and practices related to promotion of healthy behaviors among preschool children: A qualitative study. *Journal of Obesity*, *2015*, 409742. https://doi.org/10.1155/2015/409742

Louie, L., & Chan, L. (2003). The use of pedometry to evaluate the physical activity levels among preschool children in Hong Kong. *Early Child Development and Care*, *173*(1), 97-107. https://doi.org/10.1080/0300443022000022459

Lu, C., Francis, N., & Lodewyk, K. (2014). Movement domain. In D. Robinson & L. Randall (Eds.), *Teaching physical education today* (pp. 208-225). Thomson Educational.

Lu, C., & Montague, B. (2016). Move to learn, learn to move: Prioritizing physical activity in early childhood education programming. *Early Childhood Education Journal*, *44*(5), 409-417. https://doi.org/10.1007/s10643-015-0730-5

Lubans, D. R., Morgan, P. J., Cliff, D. P., Barnett, L. M., & Okely, A. D. (2010). Fundamental movement skills in children and adolescents. *Sports Medicine*, *40*(12), 1019-1035. https://doi.org/10.2165/11536850-000000000-00000

Määttä, S., Gubbels, J., Ray, C., Koivusilta, L., Nislin, M., Sajaniemi, N., Erkkola, M., & Roos, E. (2019). Children's physical activity and the preschool physical environment: The moderating role of gender. *Early Childhood Research Quarterly*, *47*, 39-48. https://doi.org/10.1016/j.ecresq.2018.10.008

Mak, T. C. T., Chan, D. K. C., & Capio, C. M. (2021). Strategies for teachers to promote physical activity in early childhood education settings - A scoping review. *International Journal of Environmental Research and Public Health*, *18*(3), 867. https://doi.org/10.3390/ijerph18030867

Marinšek, M., & Denac, O. (2020). The effects of an integrated programme on developing fundamental movement skills and rhythmic abilities in early childhood. *Early Childhood Education Journal*, *48*(6), 751-758. https://doi.org/10.1007/s10643-020-01042-8

Marinsek, M., & Kovac, M. (2019). Beliefs of Slovenian early childhood educators regarding the implementation of physical education. *European Physical Education Review*, *25*(3), 659-674. https://doi.org/10.1177/1356336x18761538

Martínez-Bello, V. E., Bernabé-Villodre, M. D. M., Lahuerta-Contell, S., Vega-Perona, H., & Giménez-Calvo, M. (2021). Pedagogical knowledge of structured movement sessions in the early education curriculum: Perceptions of teachers and student teachers. *Early Childhood Education Journal*, *49*(3), 483-492. https://doi.org/10.1007/s10643-020-01090-0

Martyniuk, O. J., & Tucker, P. (2014). An exploration of early childhood education students' knowledge and preparation to facilitate physical activity for preschoolers: A cross-sectional study. *BMC Public Health, 14:727*. https://doi.org/10.1186/1471-2458-14-727

McClintic, S., & Petty, K. (2015). Exploring early childhood teachers' beliefs and practices about preschool outdoor play: A qualitative study. *Journal of Early Childhood Teacher Education*, *36*(1), 24-43. https://doi.org/10.1080/10901027.2014.997844

Ministry of Education. (2013). *Nurturing early learners: A curriculum for kindergartens in Singapore - Motor skills development*. https://www.ecda.gov.sg/growatbeanstalk/Documents/MOE%20NEL%20Resources/NEL_educators%20guide%20vol%205_motorskillsdev.pdf

Ministry of Education. (2023). *Educators' guide for health, safety and motor skills development*. https://www.nel.moe.edu.sg/qql/slot/u143/2022/EG2022/Nurturing%20Early%20Learners%202022%20Educators%20Guide%20Health%20Safety%20and%20Motor%20Skills.pdf

Montesinos, C. H., Gil-Madrona, P., & Losada-Puente, L. (2022). Early childhood teacher professional development in physical education and its impact on preschooler motor development. In Information Resources Management Association (Ed.), *Research anthology on early childhood development and school transition in the digital era* (pp. 1019-1035). IGI Global. https://doi.org/10.4018/978-1-6684-7468-6.ch051

Montesinos, H. C., Gil Madrona, P., Losada Puente, L., Brian, A., & Saraiva, L. (2023). The relationship between early childhood teachers' professional development in physical education and children's fundamental movement skills. *Early Education and Development, 35*(5), 950-963. https://doi.org/10.1080/10409289.2023.2221766

Moravcik, E., Nolte, S., & Feeney, S. (2013). *Meaningful curriculum for young children*. Pearson.

Moser, T., & Martinsen, M. T. (2010). The outdoor environment in Norwegian kindergartens as pedagogical space for toddlers' play, learning and development. *European Early Childhood Education Research Journal*, *18*(4), 457-471. https://doi.org/10.1080/1350293x.2010.525931

Nicaise, V., Kahan, D., & Sallis, J. F. (2011). Correlates of moderate-to-vigorous physical activity among preschoolers during unstructured outdoor play periods. *Preventive Medicine*, *53*(4), 309-315. https://doi.org/https://doi.org/10.1016/j.ypmed.2011.08.018

Niederer, I., Kriemler, S., Gut, J., Hartmann, T., Schindler, C., Barral, J., & Puder, J. J. (2011). Relationship of aerobic fitness and motor skills with memory and attention in preschoolers (Ballabeina): A cross-sectional and longitudinal study. *BMC pediatrics*, *11*(1), 34. https://doi.org/10.1186/1471-2431-11-34

Nilsen, A. K. O., Anderssen, S. A., Resaland, G. K., Johannessen, K., Ylvisaaker, E., & Aadland, E. (2019). Boys, older children, and highly active children benefit most from the preschool arena regarding moderate-to-vigorous physical activity: A cross-sectional study of Norwegian preschoolers. *Preventive Medicine Reports*, *14*, 100837. https://doi.org/https://doi.org/10.1016/j.pmedr.2019.100837

Nonis, K. P. (2005). Kindergarten teachers' views about the importance of preschoolers' participation in sports in Singapore. *Early Child Development and Care*, *175*(7-8), 719-742. https://doi.org/10.1080/0300443042000244000

Obeng, C. S. (2009). Physical activity lessons in preschools. *Journal of Research in Childhood Education*, *24*(1), 50-59. https://doi.org/10.1080/02568540903439391

Olmsted, B., & Melnychuk, N. (2014). The instructional process. In D. Robinson & L. Randall (Eds.), *Teaching physical education today* (pp. 77-99). Thompson Educational.

Paris, J., Beeve, K., & Springer, C. (2018). *Introduction to curriculum for early childhood education*. College of the Canyons.

Pate, R. R., McIver, K., Dowda, M., Brown, W. H., & Addy, C. (2008). Directly observed physical activity levels in preschool children. *Journal of School Health*, *78*(8), 438-444. https://doi.org/10.1111/j.1746-1561.2008.00327.x

Rao, N., Lau, C., & Chan, S. (2018). *Responsive policymaking and implementation: From equality to equity. A case study of the Hong Kong early childhood education and care system*. Teachers College. http://ncee.org/wp-content/uploads/2019/03/EA-Hong-Kong-Case-Study-032519.pdf

Reilly, J. J. (2010). Low levels of objectively measured physical activity in preschoolers in child care. *Medicine & Science in Sports & Exercise*, *42*(3).

https://journals.lww.com/acsm-msse/Fulltext/2010/03000/Low_Levels_of_Objectively_Measured_Physical.14.aspx

Reunamo, J., Hakala, L., Saros, L., Lehto, S., Kyhälä, A.-L., & Valtonen, J. (2014). Children's physical activity in day care and preschool. *Early Years*, *34*(1), 32-48. https://doi.org/10.1080/09575146.2013.843507

Romero-Naranjo, F. J., Andreu-Cabrera, E., & Francisco Arnau-Mollá, A. (2024). Neuromotricity in early childhood education. Development tables as an interdisciplinary proposal according to the BAPNE method. *Retos*, *53*, 162-177. https://doi.org/10.47197/retos.v53.101080

Saamong, C. R. S., Deogracias, P. K. E., Saltmarsh, S. O., Chan, D. K. C., & Capio, C. M. (2023). Early childhood teachers' perceptions of physical activity: A scoping review. *Early Childhood Education Journal*. https://doi.org/10.1007/s10643-023-01575-8

Saamong, C. R. S., Oropilla, C. T., Bautista, A., & Capio, C. M. (2024). A context-specific exploration of teacher agency in the promotion of movement and physical activities in early childhood education and care settings. *Pedagogy, Culture & Society*, 1-18. https://doi.org/10.1080/14681366.2024.2301836

Saamong, C. R. S., Oropilla, C. T., Chan, D. K. C., & Capio, C. M. (in press). Movement and physical activity experiences of early childhood teachers: Practices and contexts. *Journal for the Study of Education and Development.*

Sanders, S. (2006). Physical education in kindergarten year. In D. Gullo (Ed.), *K today: Teaching and learning in the kindergarten year* (pp. 127-137). National Association for the Education of Young Children.

Saunders, M., Lewis, P., & Thornhill, A. (2012). *Research methods for business students* (6th ed.). Pearson.

Schneider, A., Mertes, C. M., Tatem, A. J., Tan, B., Sulla-Menashe, D., Graves, S. J., Patel, N. N., Horton, J. A., Gaughan, A. E., Rollo, J. T., Schelly, I. H., Stevens, F. R., & Dastur, A. (2015). A new urban landscape in East–Southeast Asia, 2000–2010. *Environmental Research Letters*, *10*(3), 034002. https://doi.org/10.1088/1748-9326/10/3/034002

Seefeldt, V. (1980). Developmental motor patterns: Implications for elementary school physical fitness. In C. H. Nadeau, W. R. Halliwell, K. M. Newell, & G. C. Roberts (Eds.), *Psychology of motor behavior and sport* (pp. 314-323). Human Kinetics.

Society of Health and Physical Educators (SHAPE America). (2013). *National physical education standards*. https://www.shapeamerica.org/standards/pe/default.aspx

Society of Health and Physical Educators (SHAPE America). (2018). *Physical education is essential for all students: No substitutions, waivers or exemptions for physical education.* https://www.shapeamerica.org/uploads/pdfs/2018/advocacy/position-statements/Physical-Education-is-Essential-for-All-Students.pdf

Society of Health and Physical Educators (SHAPE America). (2020). *Active start: A statement of physical activity guidelines for children from birth to age 5*. https://cpin.us/sites/default/files/fcab_resources/virtual/Active%20Start_2020_Final.pdf

Society of Health and Physical Educators (SHAPE America). (2021). *Physical activity should not be used as punishment and/or behavior management* https://www.shapeamerica.org/uploads/2021/advocacy/position-statements/Physical-Activity-Should-Not-Be-Used-as-Punishment-and-or-Behavior-Management.pdf

Society of Health and Physical Educators (SHAPE America). (2022). *Guidelines for facilities, equipment, instructional materials & technology in K-12 physical education*. https://issuu.com/shapeamerica/docs/shape_america_guidelines_for_facilities_equipment_?fr=sNDE4ZTQ3NDU1MTM

Singer, R. N., & Gerson, R. F. (1981). Task classification and strategy utilization in motor skills. *Research Quarterly for Exercise and Sport*, *52*(1), 100-116. https://doi.org/10.1080/02701367.1981.10609301

Skarstein, T. H., & Ugelstad, I. B. (2020). Outdoors as an arena for science learning and physical education in kindergarten. *European Early Childhood Education Research Journal*, *28*(6), 923-938. https://doi.org/10.1080/1350293x.2020.1836590

Stork, S., & Sanders, Stephen W. (2008). Physical education in early childhood. *The Elementary School Journal*, *108*(3), 197-206. https://doi.org/10.1086/529102

Sugiyama, T., Okely, A. D., Masters, J. M., & Moore, G. T. (2012). Attributes of child care centers and outdoor play areas associated with preschoolers' physical activity and sedentary behavior. *Environment and Behavior*, *44*(3), 334-349. https://doi.org/10.1177/0013916510393276

Sutapa, P., Prasetyo, Y., Pratama, K. W., Karakauki, M., Mustapha, A., & Idrus, S. Z. S. (2020). Motor Development Index (MDI) based on combination of Human Development Index (HDI) and Sport Development Index (SDI) as a success parameter of motor development among preschool children: An observational study. *Journal of Physics: Conference Series, 1529*, 032003. https://doi.org/10.1088/1742-6596/1529/3/032003

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education*, *48*(6), 1273-1296. https://doi.org/10.1007/s11165-016-9602-2

Talley, L., Cook, R., Naylor, P.-J., & Temple, V. A. (2012). Physical activity during full-day and half-day kindergarten. *Northwest Journal of Teacher Education*, *10*(1). https://doi.org/10.15760/nwjte.2012.10.1.14

The Education University of Hong Kong. (2025). Course list. https://www.apply.eduhk.hk/ug/pdf/programmes/course_list/BSocSc(PSY)&BEd(ECE).pdf

Timmons, B. W., LeBlanc, A. G., Carson, V., Connor Gorber, S., Dillman, C., Janssen, I., Kho, M. E., Spence, J. C., Stearns, J. A., & Tremblay, M. S. (2012). Systematic review of physical activity and health in the early years (aged 0-4 years). *Applied Physiology, Nutrition, and Metabolism*, *37*(4), 773-792. https://doi.org/10.1139/h2012-070

Tonge, K. L., Jones, R. A., & Okely, A. D. (2021). The relationship between educators' and children's physical activity and sedentary behaviour in early childhood education and care. *Journal of Science and Medicine in Sport*, *24*(6), 580-584. https://doi.org/10.1016/j.jsams.2021.02.003

True, L., Pfeiffer, K. A., Dowda, M., Williams, H. G., Brown, W. H., O'Neill, J. R., & Pate, R. R. (2017). Motor competence and characteristics within the preschool environment. *Journal of Science and Medicine in Sport, 20*(8), 751-755. https://doi.org/10.1016/j.jsams.2016.11.019

Tucker, P., van Zandvoort, M. M., Burke, S. M., & Irwin, J. D. (2011). Physical activity at daycare: Childcare providers' perspectives for improvements. *Journal of Early Childhood Research*, *9*(3), 207-219. https://doi.org/10.1177/1476718x10389144

Vanderloo, L. M., Tucker, P., Johnson, A. M., & Holmes, J. D. (2013). Physical activity among preschoolers during indoor and outdoor childcare play periods. *Applied Physiology, Nutrition, and Metabolism, 38*(11), 1173-1175. https://doi.org/10.1139/apnm-2013-0137

Veldman, S. L., Jones, R. A., Santos, R., Sousa-Sa, E., & Okely, A. D. (2018). Gross motor skills in toddlers: Prevalence and socio-demographic differences. *Journal of Science and Medicine in Sport, 21,* 1226-1231. https://doi.org/10.1016/j.jsams.2018.05.001

Veldman, S. L., Paw, C. A., Mai, J., & Altenburg, T. M. (2021). Physical activity and prospective associations with indicators of health and development in children aged< 5 years: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity, 18*(1), 1-11. https://doi.org/10.1186/s12966-020-01072-w

VERBI Software (2019) MAXQDA 2020 [computer software]. Berlin, Germany: VERBI Software. Available at: http://maxqda.com.

Wang, F. (2019). An analysis and research on the development of preschool physical education. *Advance in Social Science, Education and Humanities Research, 415,* 67-71. https://doi.org/https://dx.doi.org/10.2991/assehr.k.200312.013

Ward, D. S., Vaughn, A., McWilliams, C., & Hales, D. (2010). Interventions for increasing physical activity at child care. *Medicine & Science in Sports & Exercise, 42*(3), 526-534. https://doi.org/10.1249/MSS.0b013e3181cea406

Ward, S., Bélanger, M., Donovan, D., & Carrier, N. (2015). Systematic review of the relationship between childcare educators' practices and preschoolers' physical activity and eating behaviours. *Obesity Reviews*, *16*(12), 1055-1070. https://doi.org/10.1111/obr.12315

Watkins, D. A. (2009). Motivation and competition in Hong Kong secondary schools: The students' perspective. In C. K. K. Chan & N. Rao (Eds.), *Revisiting the Chinese learner: Changing contexts, changing education* (pp. 71-88). Springer.

West, J. J., & Bautista, A. (2022). Global perspectives on teacher professional development: Navigating the pandemic. *International Journal for Research in Education*, *46*(2), 1-27. https://doi.org/10.36771/ijre.46.2.22-pp1-27

Western Sydney Local Health District. (2022). *Fundamental movement skills*. https://www.wslhd.health.nsw.gov.au/Healthy-Children/Our-Programs/Munch-Move/Fundamental-Movement-Skills

Williams, H. G., Pfeiffer, K. A., O'Neill, J. R., Dowda, M., McIver, K. L., Brown, W. H., & Pate, R. R. (2008). Motor skill performance and physical activity in preschool children. *Obesity*, *16*(6), 1421-1426. https://doi.org/10.1038/oby.2008.214

Williams, K. E. (2018). Moving to the beat: Using music, rhythm, and movement to enhance self-regulation in early childhood classrooms. *International Journal of Early Childhood*, *50*(1), 85-100. https://doi.org/10.1007/s13158-018-0215-y

Willis, E. A., Hales, D., Burney, R., Smith, F. T., Vaughn, A. E., & Ward, D. (2021). Providing time in the schedule is sufficient for increasing physical activity in childcare. *Transtational Journal of the ACSM*, *6*(2). https://doi.org/10.1249/TJX.0000000000000156

Wong, J. M. S. (2021). 'Are we becoming professionals?' Pre-service early childhood teachers' perceptions of the professionalism of early childhood teachers in Hong Kong. *Early Years*, 23-38. https://doi.org/10.1080/09575146.2021.1954604

Wong, S. S. (1999). *A comparative study on the preschool physical education curriculum in Zhuhai, China and Macau government kindergartens.* Hong Kong Educational Research Association (HKERA) 13th Annual Conference: Restructuring Schools in Changing Societies, The Hong Kong Institute of Education, China.

World Health Organization. (2024). *Physical activity*. https://www.who.int/news-room/fact-sheets/detail/physical-activity

Yang, W., & Li, H. (2018). Cultural ideology matters in early childhood curriculum innovations: a comparative case study of Chinese kindergartens between Hong Kong and Shenzhen. *Journal of Curriculum Studies*, *50*(4), 560-585. https://doi.org/10.1080/00220272.2018.1428367

Yang, W., & Li, H. (2022). The role of culture in early childhood curriculum development: A case study of curriculum innovations in Hong Kong kindergartens. *Contemporary Issues in Early Childhood*, *23*(1), 48-67. https://doi.org/10.1177/1463949119900359

Yang, W., Li, H., & Ang, L. (2021). Early childhood curriculum policies and practices in Singapore: The case of glocalisation. *Policy Futures in Education*, *19*(2), 131-138. https://doi.org/10.1177/1478210320987689

Yeung, J., & Bautista, A. (2024). Hong Kong preschool stakeholders' perspectives on the teaching and learning of arts and creativity. *Pedagogy, Culture & Society*, *32*(5), 1475-1494. https://doi.org/10.1080/14681366.2023.2190751

Yeung, J., Bautista, A., Siu, C. T. S., Tam, P. C., & Wong, K. M. (2022). Arts and creativity in Hong Kong kindergartens: A document analysis of quality review reports. *Creativity. Theories – Research - Applications*, *9*(1), 87-107. https://doi.org/10.2478/ctra-2022-0005

Yuen, G. (2020). *Public policy research on "Investigating space in kindergartens under the free quality kindergarten education scheme": Key findings*. https://www.eduhk.hk/ielc/other/ppn/resources/impact/themes/whole-school-commitment/research%20brief/Investigating%20Space%20in%20Kindergartens.pdf

Yuen, G., & Gallagher, M. (2024). Hong Kong kindergartens in urban space: Policy aspirations, historical trajectories, and contemporary disparities. *Children's Geographies*, *22*(3), 350-365. https://doi.org/10.1080/14733285.2023.2283134

Zecevic, C. A., Tremblay, L., Lovsin, T., & Michel, L. (2010). Parental influence on young children's physical activity. *International journal of pediatrics*, *2010*.

Zeng, N., Ayyub, M., Sun, H. C., Wen, X., Xiang, P., & Gao, Z. (2017). Effects of physical activity on motor skills and cognitive development in early childhood: A systematic review. *Biomed research international*, *2017*. https://doi.org/10.1155/2017/2760716

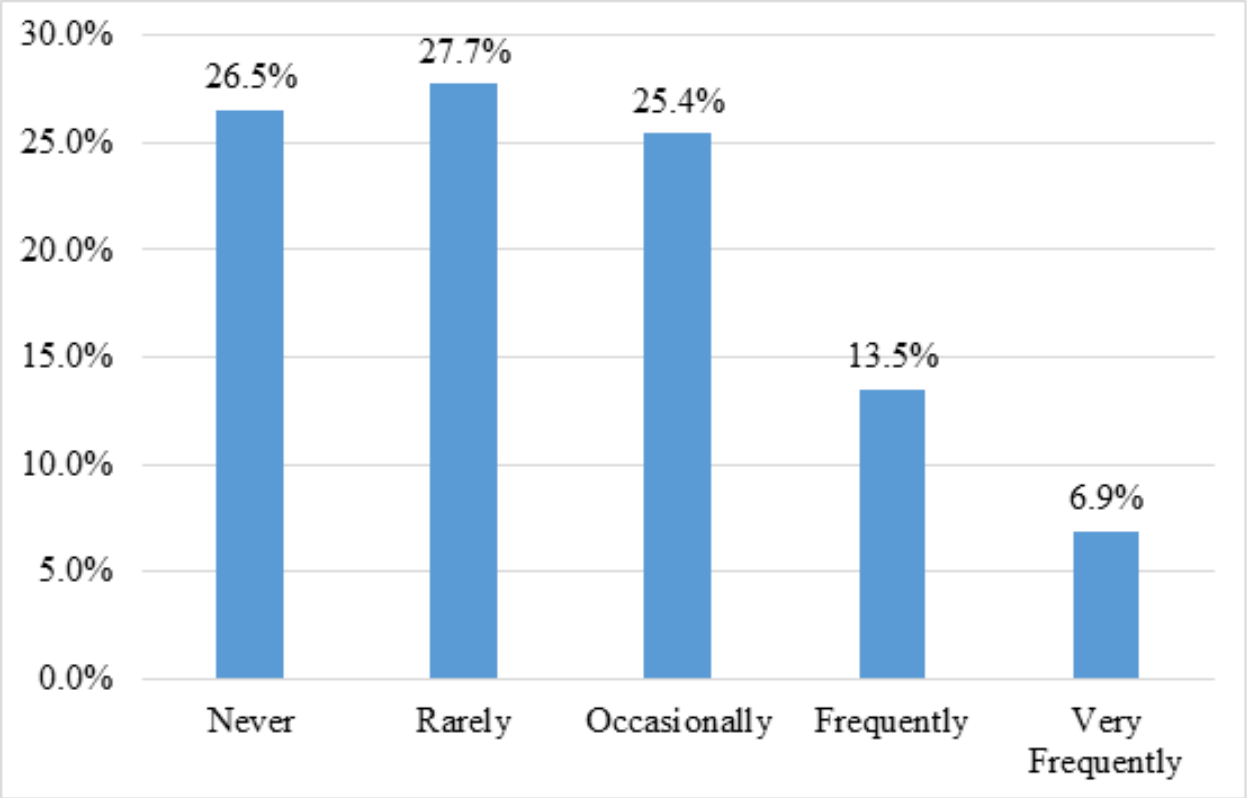
Zurc, J., & Planinšec, J. (2022). Associations between physical activity and academic competence: A cross-sectional study among slovenian primary school students. *International Journal of Environmental Research and Public Health*, *19*(2), 623. https://doi.org/10.3390/ijerph19020623

APPENDIXES

Appendix 1. *Participants' Demographic Background*

Characteristics	Frequency (N = 526)	Percentage
Gender		
Female	499	94.7%
Male	22	4.2%
Prefer not to mention	5	1.0%
Kindergarten Level		
K1	196	37.3%
K2	157	29.8%
K3	173	32.9%
Educational Qualification		
Associate degree/ Higher diploma or below	338	64.3%
Bachelor's degree	138	26.2%
Postgraduate or above	50	9.5%
Type of School		
Government funded school	439	83.5%
Non-government funded school	87	16.5%
Working Mode		
Part-time	38	7.2%
Full-time	488	92.8%
Teaching Role		
Principal	21	4.0%
Head teacher	29	5.5%
Class teacher	373	70.9%
Specialized teacher	35	6.7%
Assistant teacher	68	12.9%
Age		
20 or below	4	0.8%
20 - 29	342	65.0%
30 - 39	102	19.4%
40 - 49	49	9.3%
50+	29	5.5%
Teaching Experience		
Five years or less	312	59.3%
5 - 15 years	149	28.3%
15+ years	65	12.4%

Appendix 2. *Distribution of Responses*



Appendix 3. *Ethical Approval*

香港教育大學
The Education University of Hong Kong

20 April 2023

Mr FAN Chun Man
Doctor of Education Programme
Graduate School

Dear Mr Fan,

Application for Ethical Review <Ref. no. 2022-2023-0298>

I am pleased to inform you that approval has been given by the Human Research Ethics Committee (HREC) for your research project:

Project Title: Physical Activities in Hong Kong Kindergartens: Teachers' Pedagogical Practices and Professional Development

Ethical approval is granted for the project period from 20 April 2023 to 31 August 2024. If a project extension is applied for lasting more than 3 months, HREC should be contacted with information regarding the nature of and the reason for the extension. If any substantial changes have been made to the project, a new HREC application will be required.

Please note that you are responsible for informing the HREC in advance of any proposed substantive changes to the research proposal or procedures which may affect the validity of this ethical approval. You will receive separate notification should a fresh approval be required.

Thank you for your kind attention and we wish you well with your research.

Yours sincerely,

Jacqueline Hui (Ms)
Secretary
Human Research Ethics Committee

c.c. Prof HO Wing Kei, Acting Chairperson, Human Research Ethics Committee

香港新界大埔露屏路十號
10 Lo Ping Road, Tai Po, New Territories, Hong Kong
T (852) 2948 8888 F (852) 2948 6000 www.eduhk.hk

Appendix 4. *Survey for Studies 1 & 2*

香港教育大學
The Education University of Hong Kong

Department of Early Childhood Education

Physical Activities in Hong Kong Kindergartens: Teachers' Self-Reported Practices

Ref. no. 2022-2023-0298

This survey takes **5-10 minute**s. It is for teachers in charge of 3- to 6-year-old children in Hong Kong kindergartens, child-care centers, and nurseries. The objective is to investigate the types of physical activity and fundamental movement skills teachers conduct in the class. The survey is available in **Traditional Chinese** and **English** (select your preferred language above). Please help us with the study. Thank you!

Consent

Attachment: Information Sheet

I hereby consent to participate in the captioned research supervised by Associate Professor Dr. Alfredo BAUTISTA and conducted by Mr. Thomas FAN Chun Man, who are staff and student of the Department of Early Childhood Education at The Education University of Hong Kong. I understand that information obtained from this research may be used in future research and may be published. However, **my right to privacy will be retained, i.e., my personal details will not be revealed**. The procedure, as set out in the attached Information Sheet, has been fully explained. **My participation in the project is voluntary**. I acknowledge that I have the right to question any part of the procedure and can withdraw at any time without negative consequences.

I consent to participate in the survey:

- Yes
- No

Please confirm your response. Do you consent to participate?

- Yes
- No

Section 1

1. Do you currently work as a teacher responsible for 3- to 6-year-old children in Hong Kong kindergartens, child-care centers, and nurseries? (If you work as a principal, vice principal, and/or head teacher and currently do not teach, please answer "NO.")

- Yes
- No

2. Please confirm your response:

- I am NOT a teacher and/or do not currently teach in Hong Kong kindergartens, child-care centers, or nurseries.
- I currently work as a teacher responsible for 3- to 6-year-old children in Hong Kong kindergartens, child-care centers, or nurseries.

3. Gender

- Female
- Male
- Others (please specify):
- I prefer not to say

4. Are you a Qualified Kindergarten Teacher?

- Yes
- No

5. Role/s you play in your current school (Tick all the apply)

- Principal/ Vice Principal
- Coordinator / Supervisor / Head Teacher
- Class teacher
- Specialized teacher (What is your area of specialist?)
    - English (including NET)
    - Putonghua
    - Physical activity
    - Music
    - Art
    - Supporting non-Chinese speaking (NCS) students
    - Supporting students with special needs or at risk of developmental delay
    - Others (specify): _____
- Assistant teacher

6. Academic Qualifications

Completed (Tick all that apply)

- Secondary School Diploma (e.g., HKCEE, HKAL & HKDSE)
- Foundation Diploma (e.g., Yi Jin Diploma)
- Associate Degree / Higher Diploma
- Bachelor's Degree
- Postgraduate Diploma (e.g., PGDE)

- Master's Degree
- Doctorate Degree
- Others (specify): _____

7. In progress (Tick all that apply)

- Secondary School Diploma (i.e., HKCEE, HKAL & HKDSE)
- Foundation Diploma (e.g., Yi Jin Diploma)
- Associate Degree / Higher Diploma
- Bachelor's Degree
- Postgraduate Diploma (e.g., PGDE)
- Master's Degree
- Doctorate Degree
- Others (specify): _____

8. Age (year-old)

- 20 or below
- 20-29
- 30-39
- 40-49
- 50-59
- 60 or above

9. Total years of experience teaching children aged 3 to 6 (in any country):

- This is my 1st year of teaching
- 1-3
- 3-5
- 5-10
- 10-15
- 15+

10. Type of kindergarten, child-care center, or nursery where you currently work

- Kindergarten education scheme school (receive Government subsidies)
- Non-scheme school (do not receive Government subsidies)

11. Working Mode

- Part-time
- Full-time

12. What Type of program do you currently work for?

- Half-day (3 hours)
- Whole-day / Long whole-day (6 hours or above)
- Both

13. Level/s you teach this year: (Tick all that apply)

- K1 (3- to 4- year-old)
- K2 (4- to 5- year-old)
- K3 (5- to 6- year-old)

You will need to answer this survey thinking about only one level.

14. Please indicate the kindergarten level you want to think about.
    - K1 (3- to 4- year-old)
    - K2 (4- to 5- year-old)
    - K3 (5- to 6- year-old)

15. Type of program you want to think about.
    - Half-day (3 hours)
    - Whole-day / Long whole-day (6 hours or above)

16. Approximately what is the teacher to pupil ratio at this level?
    ___ pupil per teacher

17. Do you conduct/assist in physical activity sessions daily with your children at this level?
    - Yes
    - No
        - Do you teach daily? Yes/ No

18. Average duration of your physical activity sessions (excluding free play):
    ___ min/day

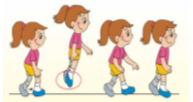
19. Average duration of your physical activity sessions (including free play):
    ___ min/day

20. Does your school have any curriculum plan/ progression plan for physical activity?
    - Yes
    - No

Section 2

In this section, we present a series of physical skills. Please think of the above-indicated level (K1, K2, or K3) in the past academic year.

How often did you implement activities that required the following skill during your physical activity sessions (excluding free play)?

			Very frequently (every day)	Frequently (several times per week)	Occasionally (once a week or less)	Rarely (1-3 times per year)	Never
1.	Walking or running on different pathways (e.g., following a straight, curved, or zigzag pathway set on the floor, free running)						
2.	Walking or running on different levels (e.g., upstairs, downstairs, going up a slope)						
3.	Jumping high (vertically)						
4.	Jumping long (horizontally)						
5.	Jumping off a platform with low height						
6.	Crawling (e.g., through a tunnel)						
7.	Hopping (e.g., playing hopscotch)						
8.	Skipping						
9.	Galloping						
10.	Leaping						

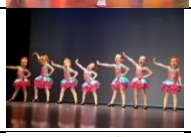
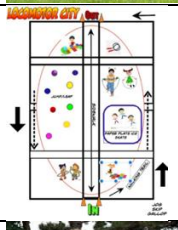
11.	Dodging (e.g., to avoid being touched by a ball)						
12.	Climbing (e.g., on a climbing frame, rock climbing)						
13.	Static balancing (e.g., on one foot, on a wobble board)						
14.	Dynamic balancing (e.g., walking on a beam, walking with an object on the head)						
15.	Bending and stretching						
16.	Rolling/ tumbling (e.g., back and forth on the floor)						
17.	Twisting (e.g., Twister game, twist on a chair)						
18.	Rolling a ball (e.g., bowling game)						
19.	Tossing, throwing and/or catching (e.g., alone or with partners)						
20.	Hitting a ball with hands or equipment (e.g., bat, stick)						

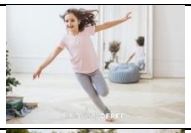
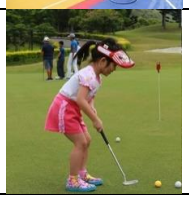
21.	Ball bouncing / dribbling						
22.	Kicking a ball						
23.	Pulling and/or pushing objects (e.g., big box)						
24.	Lifting and/or raising objects (e.g., water bottles raise, building big blocks)						
25.	Riding on pedal tricycles or bikes						
26.	Walking on bucket stilts						
27.	Balancing objects (e.g., egg on a spoon)						
28.	Digging in sandbox						
29.	Rope skipping						

Session 3

In this section, we present a series of activities that involve physical movement. Please think of the above-indicated level in the past academic year.

How often did you conduct the following activity with children during your physical activity sessions (excluding free play)?

			Very frequently (every day)	Frequently (several times per week)	Occasionally (once a week or less)	Rarely (1-3 times per year)	Never
1.	Rhythmic movement						
2.	Free dance						
3.	Rehearsed dance for public performance (e.g., festival, parents' day)						
4.	Body awareness exercises (e.g., Yoga)						
5.	Water play in water tanks/pool						
6.	Playing with playground equipment (e.g., slide, swing, seesaw)						
7.	Physically challenging play (e.g., risky play)						
8.	Reaction time games (e.g., musical chair, red light-green light)						
9.	Forms of play that require strength (e.g., tug of war)						
10.	Circuit games (i.e., a series of stations that children play through in a set order)						
11.	Race games (e.g., three-legged race, relay race)						

12.	Imitation games (e.g., imitate animal movement, shadow play)						
13.	Chasing games (e.g., hide and seek, tag game)						
14.	Circle games (e.g., monkey in the middle, parachute game)						
15.	Motion-sensing games (e.g., Kinect for Xbox)						
16.	Soccer						
17.	Basketball						
18.	Golf/ SNAG Golf						
19.	Other sports Please specify:						

Section 4

In this section, we present a series of venues.

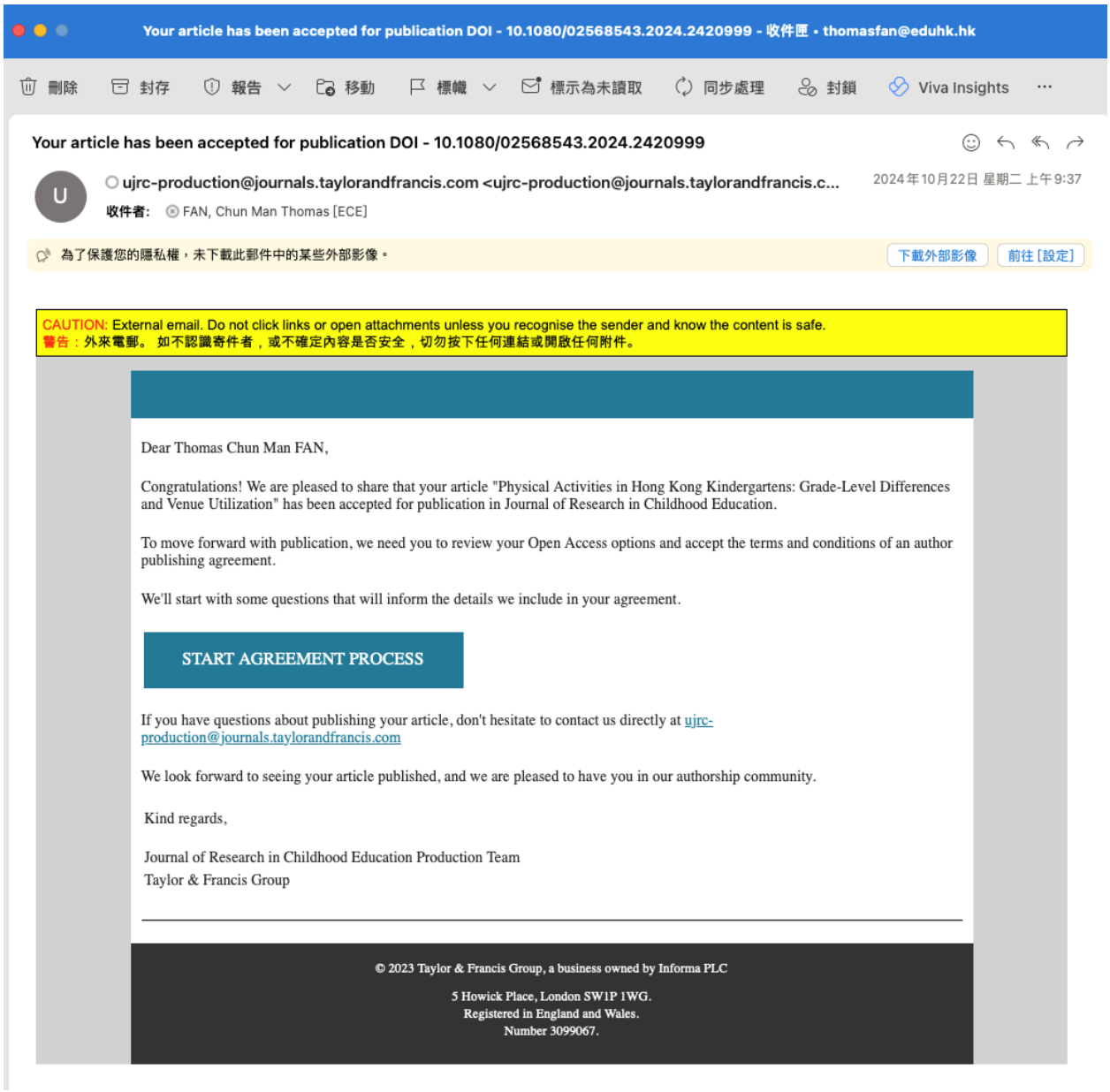
1. Does this venue exist in or nearby your school?
2. If yes, how often did you conduct physical activities with children in this venue?

				Very frequently (every day)	Frequently (several times per week)	Occasionally (once a week or less)	Rarely (1-3 times per year)	Never
1.	Multipurpose/ Activity room		Yes/No					
2.	Indoor playground		Yes/No					
3.	Gymnasium		Yes/No					
4.	Classroom		Yes/No					
5.	Dance studio		Yes/No					
6.	Music classroom		Yes/No					
7.	Gross motor room/ area		Yes/No					
8.	Assembly Hall		Yes/No					
9.	Outdoor playground		Yes/No					
10.	Grass pitch		Yes/No					
11.	Sports field (including the field located at a nearby housing		Yes/No					

	estate) (e.g., basketball court)							
12.	Nature trail		Yes/No					
13.	Park		Yes/No					
14.	Rooftop		Yes/No					

Thank you for completing this survey. If you have any concerns or questions regarding this project, please contact Mr. Fan Chun Man @s.eduhk.hk).

Appendix 5. *Proof of Acceptance of Study 1*



Your article has been accepted for publication DOI - 10.1080/02568543.2024.2420999 - 收件匣 - thomasfan@eduhk.hk

刪除 封存 報告 移動 標幟 標示為未讀取 同步處理 封鎖 Viva Insights ···

Your article has been accepted for publication DOI - 10.1080/02568543.2024.2420999

U ujrc-production@journals.taylorandfrancis.com <ujrc-production@journals.taylorandfrancis.c... 2024年10月22日 星期二 上午9:37

收件者: FAN, Chun Man Thomas [ECE]

為了保護您的隱私權，未下載此郵件中的某些外部影像。 下載外部影像 前往 [設定]

CAUTION: External email. Do not click links or open attachments unless you recognise the sender and know the content is safe.
警告：外來電郵。 如不認識寄件者，或不確定內容是否安全，切勿按下任何連結或開啟任何附件。

Dear Thomas Chun Man FAN,

Congratulations! We are pleased to share that your article "Physical Activities in Hong Kong Kindergartens: Grade-Level Differences and Venue Utilization" has been accepted for publication in Journal of Research in Childhood Education.

To move forward with publication, we need you to review your Open Access options and accept the terms and conditions of an author publishing agreement.

We'll start with some questions that will inform the details we include in your agreement.

START AGREEMENT PROCESS

If you have questions about publishing your article, don't hesitate to contact us directly at ujrc-production@journals.taylorandfrancis.com

We look forward to seeing your article published, and we are pleased to have you in our authorship community.

Kind regards,

Journal of Research in Childhood Education Production Team
Taylor & Francis Group

---FINAL PAGE---