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Developing kindergarten teacher capacity for play-based learning curriculum: a mediation analysis

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**ABSTRACT**

This study explores kindergarten teachers’ beliefs about and practices of play-based learning with a focus on the mediation of teachers’ capacity building with designing a play curriculum. Quantitative data are collected through a questionnaire with three cohort samples of 90 kindergartens who participated in a university-school partnership project. The data drawn from the first and second cohort years of 50 kindergartens are examined by Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) to ensure reliability and validity of the constructs. The third cohort year data from 40 kindergartens are used for examining the mediation effect. Results reveal that teacher beliefs are significantly associated with their pedagogical practices of play-based learning and their perceptions of whole-child development. Capacity building of teachers to practice a play-based learning curriculum partially mediates these associations and exhibits a strong association. Such capacities refer to teachers being able to design and adjust a play-based learning curriculum based on school background and developmental needs of children. Findings have significant practical implications for teacher education and professional development by strengthening relevant capacities.

**Introduction**

Research on school restructuring and educational reform reveals that teachers play a central role in enacting and leading curriculum change (e.g., Cheung et al., 2018; Harris & Lambert, 2010; Ho, 2010; Louis & Lee, 2016). Evidence from professional development literature suggests that teacher capacity has a significant impact on providing quality education for children (e.g., Campbell et al., 2014; Harsh, 2010; Keung & Fung, 2021). Those studies show that developing teacher capacities in curriculum planning and pedagogical practices could consequently enhance teaching effectiveness and commitment to children’s learning (e.g., Hallinger & Heck, 2010; Ho & Chen, 2013; Keung & Cheung, 20192016). Such improvement in teacher capacities is particularly important for kindergarten education because teachers are at the coalface to help children achieve a
balance development at an early age and build a foundation for lifelong learning (Brown et al., 2012; Gronlund, 2010). Thus, strengthening teacher capacities not only enhance school improvement and effectiveness, but also have a far-reaching impact on children’s development and learning.

In recent years, a significant step towards building Hong Kong kindergarten teachers’ capacity for curriculum development has been witnessed by the implementation of some initiatives, for example, the free kindergarten education scheme, teacher qualification requirement programme, and quality review of kindergarten education, etc (Ho, 2010; Mak et al., 2018). Some new policies and recommendations have been made for improving the quality of early childhood education, such as setting up a regulatory framework and reference of performance indicators, establishing a quality assurance and accountability measures, and improving the monitoring and self-evaluation mechanism (Education and Manpower Bureau and Social Welfare Department, 2003; Education Bureau, 2017a; Kindergarten Inspection Section, 2020). The latest issue of the Kindergarten Education Curriculum Guide (hereafter the Guide; Curriculum Development Council, 2017) attaches great significance to highlighting the role of teachers in developing a child-centred curriculum. Building teachers’ capacities is suggested as an important step for improving teacher pedagogical practices, increasing teacher commitment to children learning, and promoting the quality of kindergarten education (Ho & Chen, 2003; Keung & Fung, 2021). While play is emphasised throughout the new curriculum guide as a vital vehicle for children development and learning, teacher-directed instruction is reported as common approach used in kindergartens (Cheung et al., 2018; Keung et al., 2021; Leung, 2012). This may reflect the absence of a school-based professional learning culture within the kindergarten context that supports the development of teacher capacity for curriculum improvement (Ho & Lee, 2013).

In facing the challenges of curriculum implementation, teacher beliefs are conceived as contributing factors to the improvement of curriculum planning and pedagogical practices (Cheung et al., 2021; Vries et al., 2014; Vu et al., 2014; Whitley et al., 2019). This strand of research has drawn attention to investigating how much kindergarten teachers are confident about their pedagogical content knowledge and competence, and how these would influence children learning (Keung & Cheung, 2019; Pyle & Danniels, 2017; Yin et al., 2021). Paradoxically, existing research has demonstrated a set of teacher beliefs which is incongruent with implementation practices (e.g., Chan, 2016; Rao & Li, 2009; Wen et al., 2014). This indicates that the relationships between teacher beliefs and implementation practices can be better explained by examining both the direct and indirect effects of teacher beliefs on pedagogical practices through capacity building of teachers. However, the current investigations were focused to establish association with little or no conclusive evidence to explain such possible mechanism. This study attempts to address the gaps in the literature by investigating the relationships between teacher beliefs, pedagogical practices, capacity building in curriculum planning, and teachers’ perceptions of whole-child development, with a focus on the play-based learning context.

Research on teacher play beliefs and pedagogical practices

Teacher beliefs are considered important for motivating teachers’ intentions to implement developmentally appropriate practices and model teaching behaviours (Cheung et al., 2021; Vries et al., 2014; Whitley et al., 2019). Early childhood research suggests that
teachers’ beliefs associated with perceived efficacy, indicate the likelihood of teachers’ intentions to develop a child-centred curriculum and pedagogy that meet children’s development and needs (Brown et al., 2012; Mak et al., 2018; Keung et al., 2020). Base on this, teacher beliefs could be related to the teaching itself (e.g., educational purpose and conceptualisation of teaching) and the teaching behaviours (e.g., choice and delivery of learning content, teaching approach, and strategy). Some studies have shown that teachers’ curriculum beliefs can extend children’s learning, which play a mediating role between teachers’ knowledge and classroom practices (Hedges & Cullen, 2003; Mohamed & Al-Qaryouti, 2016; Wen et al., 2011).

Similarly, kindergarten teachers’ play beliefs are the key to strengthening their knowledge, skills, and attitudes towards implementing a play-based curriculum (Bennett et al., 1997; Cheng, 2001; Fesseha & Pyle, 2016). Teachers’ beliefs might influence their learning motivation and effort to initiate what kinds of play activity could occur in classrooms (McInnes et al., 2011; Vu et al., 2014; Yin et al., 2021). Some empirical studies have shown that teachers with strong beliefs about the play-based learning concept are more likely to take initiatives in supporting the diversity of children’s play. This results in enabling children to reach higher levels of play experiences (Bennett et al., 1997; Canning, 2011; Keung & Fung, 2019). In doing so, teachers are required to work out teaching plans for formulating learning objectives, preparing play materials, and setting up play environments so that children have interesting materials and activities to simulate their creativity and imaginations during play. Gronlund (2010) shares the same view that ‘teachers have an important task with kindergarten children: to provide ample time, space, materials and support to lead children to engage in play that is safe, socially successful, filled with purpose and meaning, and imaginative’ (p. 9).

Likewise, Pyle and her colleagues conducted a series of studies on kindergarten teachers’ play beliefs and how these influence the early childhood programmes. In the scoping review of research on play-based pedagogies, Pyle et al. (2017) retrieved articles which pointed out significant discrepancies and challenges on implementing play-based learning in classroom settings. Those studies reported the difficulties on ‘integrating the concepts of play and learning’, ‘observed discrepancies between practices and reported beliefs’, and ‘reported barriers to the effective implementation of play-based learning strategies’ (p. 336). In their discussion, the potential reasons for the reported tensions and discrepancies are grounded from the differing beliefs of teachers’ perceptions on the role of play in children’s learning. From the qualitative quotes in the study conducted by Fesseha and Pyle (2016), their findings reflected the inconsistencies in teachers’ definitions on play and implementation practices in classrooms. Such discrepancy may lead to further understanding of how teachers perceive and assess their practices of play-based learning. In another study of Pyle and Danniels (2016), the results of their qualitative quotes highlighted a broader definition of play-based learning that could help teachers to interpret child-directed play-based pedagogy with the mandated curriculum goals and academic standards.

Much evidence has demonstrated the benefits of developing play pedagogy for children’s whole person development and well-being (e.g., Brown et al., 2012; Canning, 2011; Fesseha & Pyle, 2016; Keung & Cheung, 2019). Nevertheless, integrating play-based learning into developmentally appropriate programmes could be seen as a highly complicated task (Cheng & Stimpson, 2004; Fung, 2009). Previous studies have identified
several difficulties in implementing a play and learning curriculum, such as insufficient manpower and resources, limited knowledge and skills, as well as related professional training (Chan, 2016; Cheng, 2001; Keung et al., 2020). One barrier to participation in curriculum development is caused by heavy teaching duties and long working hours which create an unbearable workload among teachers. This is also a part of the possible barriers that influence its implementation (Cheng, 2001; Ho, 2003; Leung, 2012). As noted previously, extensive studies have been conducted regarding how teacher beliefs shape their perceptions and practices of teaching and learning. However, there is a dearth of empirical research examining factors that support teacher beliefs when implementing play curriculum and practices (McInnes et al., 2011; Rao & Li, 2017; Pyle & Danniels, 2017). More importantly, research examining the curricular coherence of play-based learning has rarely been done in the context of Hong Kong kindergartens. This study fills gaps in the literature by providing an investigation on the relationships between teachers’ play beliefs and practices of play-based learning and perceived whole-child development.

**Capacity building for teachers**

Researchers in the area of teacher development have placed emphasis on the educational change for enhancing teaching effectiveness and promoting sustainability development (Hallinger & Heck, 2010; Louis & Lee, 2012). The definition of capacity building, according to Harris and Lambert (2003), includes an innovative change for teachers which ‘is concerned with providing opportunities for people to work together in a new way’ (p. 4). These would be seen as a ‘bottom-up’ change that fosters a climate of collaboration, trust and cohesion within learning communities (Harris & Lambert, 2003, p.4-5). In a similar vein, Harsh (2010) denotes the multidimensional definition of capacity building as a part of the changing models which involve teachers enacting innovative changes to achieve organisational goals (Ho & Lee, 2016; Louis & Lee, 2012).

In the ‘sustainability stage’ of the changing model, Harsh (2010) highlights involving teachers to work collaboratively by refocusing ‘efforts to continue the desired practices and explore alternatives to using the innovation’ (p.5). This echoes with recent demands of teacher development requiring a high level of collaboration among teachers to produce a developmentally appropriate curriculum for children learning (Campbell-Evans et al., 2014; Huang et al., 2016). Such restructuring in work is understood as ‘teachers working collaboratively and deregulation that provides autonomy for teachers to pursue a high quality of work’ (Ho & Chen, 2013, p. 502). These changes also include the empowerment of teachers’ professional decision-making in school plans, strategies, and related policies. In this sense, the innovative changes address collaborative culture, which is a catalyst of developing teachers’ capacities and thus improve their pedagogical practices.

Turning to our study context, early childhood education has been acknowledged by the Hong Kong government in its recent reform initiatives as providing an important foundation for children’s development and growth. However, the Quality Review Report conducted by the Education Bureau of HKSAR revealed that more than 40% of the kindergartens were lagging behind in developing a comprehensive and balanced curriculum. The report also pointed out that about half of the kindergartens showed insufficient effectiveness in reviewing the curriculum plan and managing its implementation (Kindergarten Inspection Section, 2012). This observation is in line with some studies
reflected that time constraints and unsettled teaching work may impede the availability of kindergarten teachers to learn and discuss together about children learning in an effective way (Keung et al., 2019; Yin et al., 2021). Given that, it is worthy of attention to investigate how the recent reform initiatives in play-based learning contribute to upgrading of kindergarten teachers’ professional knowledge, skills, and practices. When facing demands for professional development, it is an urgent need to strengthen teacher capacity building for play-based learning so as to improve teaching practices, and thus bring about positive impact on children learning.

Context of the study

In 2015/16 school year, there were about 1,000 kindergartens and child-care centres in Hong Kong (Education Bureau, 2017b). They are operated either by private enterprises or non-profit-making organisations. Under the Pre-primary Education Voucher Scheme, free schooling is provided for all children aged between three and six years from the 2017/18 school year onwards. The core values of kindergarten education have been spelt out clearly in the Guide: it is required to nurture ‘children a balanced development in the domains of ethic, intellect, physique, social skills, and aesthetics, thus achieving the goal of whole-person education’ (Curriculum Development Council, 2017, p. 8). In this connection, the Guide suggests kindergartens develop a whole-person curriculum by connecting the six Key Learning Areas (i.e., Physical Fitness and Health, Language, Early Childhood Mathematics, Nature and Living, Self and Society, Arts and Creativity) through real-life themes (Curriculum Development Council, 2017, p. 18). From the curriculum perspective, the key emphasis is on developing a child-centred curriculum with the purpose of making children’s learning ‘meaningful and valuable’ (Curriculum Development Council, 2017, p. 25). In doing so, the Guide suggests incorporating various pedagogical approaches in developing children’s problem solving, critical thinking, and inquiry-based learning (Curriculum Development Council, 2017). Additionally, play-based learning has been highlighted in the latest kindergarten curriculum as an effective strategy that best suits the developmental characteristics, needs, and abilities of young children (Keung & Cheung, 20212011). Some studies have shown that young children participating in play-based learning activities helped them to grow and learn in various aspects (Keung & Fung, 2020; Keung et al., 2020). Play also has a clear role in whole-person education which supports emotional well-being, mental health, creativity, and social relationships, etc. In this regard, there is a growing importance on the role-taking of teachers who are responsible for integrating play into the curriculum (e.g., Fung, 2009; ; Mak et al., 2011).

Method

Participating kindergartens and teachers

A university–school partnership project was launched in the year 2015/16. The objectives of the partnership were to empower kindergarten teachers’ school-based curriculum development and the implementation of play-based learning, in order to ensure quality education for achieving children’s whole-person development. Across
three years, a total of 90 kindergartens participated in this project from September 2015 to February 2019. These kindergartens (2015–16 for 25 kindergartens, 2016–17 for 25 kindergartens, and 2017–19 for 40 kindergartens) received one-year or one-and-a-half-years in length of professional support and consultation related to effective teaching and learning in play-based learning from a university professional team.

This study utilised quantitative data from three cohort years of teacher questionnaires. We used the first-and second-year data from 50 kindergartens to examine the reliability and validity of the construct via Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Then, the third-year data with 40 kindergartens were used in the model testing. The third-year data was consisted of responses from 323 respondents of which 74% were teachers and assistant teachers, 22.6% were principals and head teachers. About half of the respondents (53.6%) had more than 10 years teaching experience. Almost all of the respondents (94.4%) had participated in collegial lesson plan meetings. The self-report data showed that 83.3% had teaching practice experiences of implementing play-based learning pedagogy in their own classes. Half of the respondents (52.3%) had participated in the centralised workshops offered by the project.

**Instruments and procedure**

The overall aim of the questionnaire was to collect teachers’ perceptions of play-based learning, curriculum planning, and implementation. The questionnaire was consisted of two parts. The structured part contained 35 items which covered three measures about teachers’ play beliefs, capacity building in curriculum planning, and teachers’ pedagogical practices of play-based learning (see the sample items in Table 1). As to perceived whole-person development, the present study referenced to Performance Indicators (Pre-primary Institutions)—Domain on Children’s Development (Education and Manpower Bureau and Social Welfare Department, 2003). A total of 29 items measured children’s learning outcomes in different aspects, including ‘Physical development’, ‘Cognitive and language development’, ‘Affective and social development’, and ‘Aesthetic development’. This set of perceived whole-child development scale has been validated in Keung and Cheung (2019). Another part was comprised of open-ended questions which asked respondents to rate factors affecting the implementation of play-based learning. All responses were on six-point Likert scale, ranging from 1 (strongly disagree) to 6 (strongly agree). Respondents were asked to complete the questionnaires after the intervention work of the project. It took on average about 20–30 mins to complete the questionnaire. We only used some of the question items to report and analyse in accordance with the focus of this study. The questionnaire draft was reviewed by early childhood education experts and frontline teachers. The participants responded to the questionnaire voluntarily with no incentive. They remained anonymous and were assured that the data would be used for research purposes only. All participating kindergartens completed and returned the questionnaires within the data collection period. The study sought ethical approval by the university’s research committee before conducting surveys.
Table 1. Descriptions and Cronbach’s alpha of constructs used in the present study.

<table>
<thead>
<tr>
<th>Constructs</th>
<th>No. of items</th>
<th>Sample items</th>
<th>M</th>
<th>SD</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers’ play beliefs</td>
<td>7</td>
<td>Play-based learning is based on understanding children’s needs and listening to their voices.</td>
<td>5.47</td>
<td>.46</td>
<td>.883</td>
</tr>
<tr>
<td>Capacity building in curriculum planning</td>
<td>4</td>
<td>Able to adjust curriculum according to children’s developmental needs.</td>
<td>5.26</td>
<td>.51</td>
<td>.808</td>
</tr>
<tr>
<td>Teachers’ pedagogical practices of play-based learning</td>
<td>6</td>
<td>Encourage children using multiple ways to express themselves during play-based learning.</td>
<td>5.29</td>
<td>.50</td>
<td>.890</td>
</tr>
<tr>
<td>Physical development</td>
<td>3</td>
<td>Children are well developed in the aspects of sensory functions, concentration ability and body coordination.</td>
<td>5.05</td>
<td>.58</td>
<td>.838</td>
</tr>
<tr>
<td>Cognitive and language development</td>
<td>3</td>
<td>Children are confident in communicating with others.</td>
<td>5.34</td>
<td>.50</td>
<td>.780</td>
</tr>
<tr>
<td>Affective and social development</td>
<td>3</td>
<td>Children are able to respect others and have a harmonious relationship with people.</td>
<td>5.13</td>
<td>.55</td>
<td>.844</td>
</tr>
<tr>
<td>Aesthetic development</td>
<td>3</td>
<td>Children are able to appreciate themselves and others’ works and performances.</td>
<td>5.04</td>
<td>.60</td>
<td>.806</td>
</tr>
</tbody>
</table>

Data analysis

SPSS 23.0 was used to conduct the descriptive results and reliability test and Mplus 8.0 was used to examine the construct validity of the measures for the Structural Equation Modelling (SEM) analysis. In the first step, EFA was conducted to identify which question items are conceptualised into meaningful constructs. CFA was subsequently performed to validate the factor structures of the models for measured variables. To estimate the degree of internal consistency, Cronbach’s alpha for each factor was carried out. Next, mediation analyses were applied to examine the effect of teachers’ play beliefs, pedagogical practices of play-based learning, and capacity building in curriculum planning on perceived whole-child development. The SEM method allows a robust analysis to be carried out for examining both the direct and indirect effects, and multiple mediators (Preacher & Hayes, 2011). Four fit indices were used to evaluate the goodness of fit to the models, namely $\chi^2$, Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Square Root Mean Residual (SRMR). The acceptable criteria for the indices that are both CFI and TLI greater than .90, and RMSEA below .06. A measurement model with a value of SRMR less than .08 was regarded as good fit (Hu & Bentler, 1999; Kline, 2005). In this study, Full Information Maximum Likelihood (FIML) estimation was applied to utilise all data from the respondents (Arbuckle, 1996).

Results

Reliability and construct validity

The reliability and validity of the constructs were examined before the mediation analysis. To do so, we used three cohort years of teachers’ survey data to perform a series of EFA and CFA, with the purpose of developing a psychometrically sound measurement model. The validation process was taken in three steps; firstly we validated the model involving teachers’ play beliefs, pedagogical practices of play-based learning, and capacity
building in curriculum planning (Model 1); then teachers’ perceptions of whole-child development (Model 2); and lastly, all measures were validated into the final measurement and mediation models.

Before performing CFA, we conducted EFA to establish a contextually appropriate measure for conceptualising teachers’ perceptions of play-based learning. We used the first-year data (2015–16) to test the construct validity; results of EFA showed that five items from pedagogical practices of play-based learning were suggested to be removed from the model due to those items being cross-loaded with other factors. One item from the teachers’ capability building in curriculum planning (i.e. ‘Able to adjust curriculum according to children’s developmental needs’) had low factor loading (less than .30) and cross-loaded with the factor of teachers’ pedagogical practices of play-based learning. However, we retained this item in the original construct because it did seem to measure teachers’ capacity building in curriculum planning. Then, we used the second-year data (2016–17) to test the construct validity on the remaining 18 items. The results of CFA showed that one item from capacity building in curriculum planning (i.e. ‘Able to invite parents involving learning activities for enhancing home-school collaboration and promoting children’s learning’) was further dropped from the model. Next, we used the third-year model (2017–19) to test the construct validity. Results of CFA showed the model fit with all the indices. A 3-factor model was thus constructed. Model 1 (including play beliefs, pedagogical practices of play-based learning, and capacity building in curriculum planning) fit with the 3-factor structure, indicating $\chi^2 = 194.09, df = 116, RMSEA = .046, CFI = .964, TLI = .957, SRMR = .048$. Model 2 (including different domains of whole-child development, i.e. physical, cognitive and language, affective and social, and aesthetic developments) showed the 5-factor second order structure, indicating: $\chi^2 = 66.428, df = 50, RMSEA = .032, CFI = .990, TLI = .987, SRMR = .027$. The survey data again showed that the goodness-of-fit statistics of the final model (Model 3) was well fit. Results showed that the 8-factor structure was well fit, indicating: $\chi^2 = 485.58, df = 367, RMSEA = .032, CFI = .973, TLI = .970, SRMR = .053$. The scales of teachers’ play beliefs, pedagogical practices of play-based learning, and capacity building in curriculum planning had acceptable reliability with factor loadings ranging from .496 to .851. The factor loadings of the four domains of teachers’ perceptions on whole-child development ranged from .662 to .928.

Table 1 presents the descriptive statistics of all factors on the third year’s data. On a six-point Likert scale, the teachers’ play beliefs and pedagogical practices of play-based learning scored 5.47 (SD = .46) and 5.29 (SD = .50) respectively. Teachers’ capacity building in curriculum planning had a lower mean score than the other two ($M = 5.26, SD = .51$). Among whole-child development factors, cognitive and language ($M = 5.34, SD = .50$) had the highest mean scores, followed by affective and social ($M = 5.13, SD = .55$), physical ($M = 5.05, SD = .58$), and aesthetic ($M = 5.04, SD = .60$). The results of Cronbach alpha for all scales yielded good reliability, which ranged from .780 to .890. In Table 2, the result of inter-correlation reported that all scales were positively correlated with each other, ranging from $r = .327$ to $r = .721$.

**SEM analysis**

A SEM model was constructed to examine the relationship between play beliefs, pedagogical practices of play-based learning, and capacity building in curriculum planning and teachers’ perceptions of whole-child development. The results showed that this
Table 2. Correlation matrix.

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Teachers’ play beliefs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Capacity building in curriculum planning</td>
<td>.404**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Teachers’ pedagogical practices of play-based learning</td>
<td>.367**</td>
<td>.578**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Physical development</td>
<td>.371**</td>
<td>.538**</td>
<td>.633**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) Cognitive and language development</td>
<td>.327**</td>
<td>.470**</td>
<td>.590**</td>
<td>.669**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) Affective and social development</td>
<td>.406**</td>
<td>.509**</td>
<td>.617**</td>
<td>.666**</td>
<td>.721**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(7) Aesthetic development</td>
<td>.378**</td>
<td>.476**</td>
<td>.520**</td>
<td>.585**</td>
<td>.579**</td>
<td>.605**</td>
<td></td>
</tr>
</tbody>
</table>

** Correlation is significant at the .01 level (2-tailed).

Measurement model had a good data fit ($\chi^2 = 485.58, df = 367, p < .001$, CFI = .973, TLI = .970, RMSEA = .032, SRMR = .053). As Figure 1 shows, teachers’ play beliefs had a positive direct effect on capacity building in curriculum planning ($\beta = .418, p < .000$), teachers’ pedagogical practices of play-based learning ($\beta = .193, p < .05$), and teachers’ perceptions of whole-child development ($\beta = .162, p < .010$). Likewise, capacity building in curriculum planning had a direct effect on pedagogical practices of play-based learning ($\beta = .522, p < .000$) and teachers’ perceptions of whole-child development ($\beta = .184, p < .010$). Teachers’ practices of play-based learning had the strongest direct effect on teachers’ perceptions of whole-child development ($\beta = .602, p < .000$). The factor loading of four whole-child development components ranged from .80 to .93.

**Mediation analysis**

The mediation analysis based on 5000 bootstrapping samples was conducted to examine indirect effects. This study reported the standardised estimates of indirect effect, with a 95% confidence interval (CI), and the ratio of indirect to total effect. According to Hayes (2009), an indirect effect is significant if the lower and upper boundaries of CI do not contain a zero value. Table 3 summarises the results of mediation analyses, indicating that teachers’ capacity building in curriculum planning positively mediated the paths from their play beliefs to perceived whole-child development ($\beta = .077, p < .05$). Teachers’ pedagogical practices of play-based learning positively mediated the paths from teachers’ play beliefs to perceived whole-child development ($\beta = .116, p < .05$). Teachers’ capacity building in curriculum planning and pedagogical practices of play-based learning positively mediated the paths from teachers’ play beliefs to perceived whole-child development ($\beta = .131, p < .000$).

**Discussion**

**The relationships between teacher play beliefs and pedagogical practices of play-based learning with perceptions of whole-child development**

There has been increasing attention towards improvements in teaching effectiveness and school restructuring in the past decade. With a minimal study has investigated the role of capacity building in supporting kindergarten teachers’ play-based learning practices, results of this study indicate that teacher play beliefs are positively associated with capacity building in curriculum planning. This is consistent with the past literature,
indicating that teachers with strong play beliefs can update their professional knowledge and skills for educational change and engage in professional learning (Huang et al., 2019; Mak et al., 2018; Vries et al., 2014). However, teacher play beliefs have only a weak direct relationship with pedagogical practices of play-based learning and perceptions of whole-child development. It can be understood that teachers’ play beliefs are not actions as such, but it requires them to transform play beliefs into pedagogical practices and thereby exerts a positive impact on various aspects of children’s development. For the mediation analyses, the results showcase significant indirect effects of teacher play beliefs on their perceptions of whole-child development through teachers’ pedagogical practices of play-

Figure 1. Effects of teachers’ play beliefs on perceived whole-child development through capacity building in curriculum planning and teachers’ pedagogical practices of play-based learning. * $p < .05$; ** $p < .01$; *** $p < .001$. Factor loadings are shown in the brackets.

Table 3. Mediation analysis of teachers’ capacity building in curriculum planning, and pedagogical practices of play-based learning on the effects of teachers’ play beliefs on perceived whole-child development.

<table>
<thead>
<tr>
<th>From teachers’ play beliefs to perceived whole-child development</th>
<th>Estimate</th>
<th>S.E.</th>
<th>95% C.I. (Lower)</th>
<th>95% C.I. (Upper)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Through capacity building in curriculum planning</td>
<td>0.077*</td>
<td>0.031</td>
<td>0.025</td>
<td>0.153</td>
</tr>
<tr>
<td>Through teachers’ pedagogical practices of play-based learning</td>
<td>0.116*</td>
<td>0.047</td>
<td>0.028</td>
<td>0.221</td>
</tr>
<tr>
<td>Through capacity building in curriculum planning and teachers’ pedagogical practices of play-based learning</td>
<td>0.131***</td>
<td>0.028</td>
<td>0.084</td>
<td>0.200</td>
</tr>
</tbody>
</table>

* $p < .05$; ** $p < .01$; *** $p < .001$
based learning. This indicates that teachers might need to internalise the concept of play, rather than be provided with direct instructions about specific strategies for practicing play-based learning. It also means that, when teachers hold stronger play beliefs, they are more willing to brainstorm and reinvent pedagogical practices, and thereby constructing realistic play activities in the classroom. All of these could facilitate teachers’ professional development and children’s whole-person development. Results of this study highlight the importance of teachers’ pedagogical practices for whole-child development when teacher can transform play beliefs into the instructional approaches and strategies.

**Mediating role of capacity building in curriculum development**

Our mediation analysis further reveals that significant indirect effects are found from teachers’ play beliefs on pedagogical practices through capacity building of teachers in curriculum planning. Findings show strong mediating effects on children’s whole-person development. That is, developing teachers’ capacity by addressing the coherence between curricular goals and implementation experiences can be a significant contributing factor to the improvement of pedagogical practices and this may result in enhancing its implementation effectiveness. Additionally, our SEM analysis shows that capacity building is positively associated with teachers’ pedagogical practices of play-based learning, which in turn has significant relationships with their perceptions of whole-child development. This result is in line with previous literature, suggesting the importance of developing kindergarten teachers’ capacity for designing and adjusting a play-based learning curriculum according to the school background and developmental needs of children (Campbell-Evans et al., 2014; Ho & Chen, 2010; Keung & Cheung, 2019). When teachers achieve a high level of content knowledge and skills, they are able to design more developmentally appropriate play-based learning activities. It leads to the innovative changes in the curriculum planning and design. Such changes are particularly important for kindergarten teachers to have a deepened understanding of how to develop play-based learning and implement a child-centred curriculum which is aligned with children’s developmental needs. Taken together, results of this study confirms that the capacity building of teachers has a pivotal role in reinforcing the connections between kindergarten teachers’ play beliefs, pedagogical practices of play-based learning, and whole-child development of children.

**Implications for practice and directions for future research**

This study provides some implications for developing professional capacity of kindergarten teachers. To our best knowledge, there is a scacity of research to investigate teacher capacity in the kindergarten context, particularly a focus on play-based learning. Our findings reveal the importance of strengthening professional competence for continuous improvement in enacting curriculum changes regarding school-based development. Enhancing teacher professional capacity requires teachers’ engagement in professional learning so that their knowledge and practices are upgraded. The resource inputs from kindergartens and restructuring culture might help to make possible innovative changes in the curriculum development (Ho & Chen, 2013). As the collegiate culture among Hong Kong kindergarten teacher is far from mature, principals and
administrators are advised to step forward on providing more collegial opportunities for teachers to increase professional dialogue (Keung et al., 2020; Kindergarten Inspection Section, 2012).

The present study offers empirical evidence that points to the significant role of developing teacher capacity to improve teachers’ pedagogical practices, and thus promote children’s whole-person development. Findings of this study inform us that teacher capacity in curriculum development can affect children’s play experience and various aspects of development. In light of this, kindergarten principals and administrators could pay more attention to developing teachers’ capacity through participation in educational improvement programmes within and across kindergartens (Ho & Chen, 2016; Huang et al., 2019; Keung et al., 2020). Some professional learning opportunities provide networks that allow teachers to share their views and professional experience in making a concerted effort to the implementation effectiveness. This echoes with the recommendations made by the Guide that encourages kindergartens by their participation in collaborative projects and disseminating good practices for professional sharing (Curriculum Development Council, 2017, p. 101).

Additionally, the findings of this study could be of benefit to pre-service teachers on recognising the importance of capacity building in the play-based learning implementation. As said, current literature addresses the importance of teachers’ beliefs on play and how it impacts on pedagogical practices (Chan, 2016; Keung & Cheung, 2019; Leung, 2012; Mohamed & Al-Qaryouti, 2016). However, there is a missing link to examine the mediation role of capacity building in play-based implementation. Our findings show that developing capability building of in-service teachers regarded as a contributing factor for enhancing the implementation effectiveness. It would be equivalent importance of pre-service teachers to understand of how to internalise the curriculum goals that align with children’s background and kindergarten’s context, as well as involve teachers and parents working collaboratively. In this connection, findings of the study provide an implication for strengthening professional development of pre-service teachers in the teacher education and training programme for better preparing teachers’ capability building.

Despite its significance, some limitations of this study are noted here. First, participating kindergartens were drawn from a university and school partnership project. Although the relatively large sample size used in this study, future research could adopt a stratified sampling design to include different teachers’ demographic backgrounds into the examination, such as teachers’ educational level and years of teaching experience. Second, this study used teachers’ perceptions to assess whole-child development instead of objective measures of children’s developmental outcomes as measurement variables. Future studies may explore other assessment tools to measure children’s developmental outcomes. Third, this study only used quantitative survey data. It did not cover the qualitative differences in teacher perceptions. As such, it is worth employing follow-up qualitative interviews with teachers and classroom observations to enrich and triangulate the data.

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