How Do Children Learn? Beliefs and Practices Reported by Kindergarten Teachers in Singapore

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Abstract

This study explored the curriculum-related beliefs and practices reported by Singapore kindergarten teachers at a time when concerted efforts are being made to promote children's holistic development through a child-centered curriculum that emphasizes active learning through play and interaction. A questionnaire was administered to a sample of 167 teachers of 4- to 5-year-olds. Factor analyses revealed three reliable factors for teachers' beliefs and four factors for their classroom practices. Teachers endorsed philosophies in child-centeredness and teacher-centeredness but there was stronger endorsement of child-centered approach. Correlation and regression analyses conducted revealed some relationships between beliefs and reported practices as well as associations of beliefs and practices with certain personal and kindergarten factors. Overall, beliefs in child-centeredness and teacher-centeredness predicted interactive academic activities, and beliefs in teacher-centeredness influenced reports of engaging in structured academic and teacher-led activities after controlling for demographic and contextual variables.

Keywords: kindergarten, teacher beliefs and practices, Singapore

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Introduction

In recent years, governments worldwide are exerting considerable efforts to enhance the quality of early childhood education (ECE) for the optimal learning and development of preschool children. Many countries including Singapore have developed a curriculum framework as part of their national agenda to uplift the quality of early childhood curriculum and pedagogical practices (Organization for Economic Co-operation and Development [OECD], 2012). However, it is recognized that curriculum innovations and reforms cannot be achieved by disseminating curriculum documents alone for the effectiveness of such curriculum materials depends on how teachers interpret and put them into practice (Calderhead, 1996; Fullan, 2007).

Teachers' beliefs are integral aspects of the teaching process (Clark & Peterson, 1986; Fang, 1996; Kagan, 1992; Skott, 2015) and are assumed to have a significant influence on teachers' instructional decisions and actions that ultimately impact upon children's learning and development (Pajares, 1992; Spodek, 1988; Vartuli, 2005). That stated, extant research has repeatedly yielded mixed findings about the consistency between beliefs and practices (Fives & Buehl, 2012). This may be because personal and environmental factors impact on the relationship (Buehl & Beck, 2015). Nonetheless, the perspective that teachers' beliefs matter and relate to teaching practice continues to pervade the literature.

A considerable amount of studies has found that early childhood teachers' reported beliefs in child-centered or developmentally appropriate practices were often not manifested in their teaching practices, which tended to be more teacher-centered (Kwon, 2004; Li, Wang, & Wong, 2011; Song, 2015; Wen, Elicker, & McMullen, 2011; Wilcox-Herzog, 2002). The situation amongst Singaporean early childhood teachers is unknown as there is limited research on the topic. Against this background, this study set out to assess the general curriculum and instructional beliefs and practices of Singapore kindergarten teachers at a time when concerted efforts are being made to enhance the quality of ECE teaching and learning by promoting children's holistic development through a child-centered curriculum that emphasizes active learning through play and quality interactions.

Approaches to ECE

Much of the discourse on early childhood curriculum addresses appropriate practices for teaching young children. An ongoing debate stems from two different philosophies. The one based on behaviorist theory advocates a teacher-centered approach while the other based on constructivist theories, supports a child-centered approach (Feeny, Galper, & Seefelt, 2009). Extant literature shows that the two approaches are usually considered as polar opposites with child-centeredness being regarded as more progressive and developmentally appropriate than teacher-centeredness (Copple & Bredekamp, 2009; Tzuo, 2007; Wien, 1996). Furthermore, the education system established in East Asian countries, referred to as "Confucian heritage cultures" (Ho, 1994, p.285) has historically and traditionally been described as content-oriented and examination-driven, and is normally critiqued to be teacher-centered, didactic and old-fashioned. The child-centered approach, generally considered to originate from Western philosophies, is purported to entail more contemporary notions of appropriate practices in ECE (Rao, Ng, & Pearson, 2010).

Several studies have noted that while government authorities in China, Hong Kong, Korea, and Taiwan tended to recommend a child-centered approach, the philosophy underlying this westernized approach may be in conflict with the teaching and learning ideologies and assumptions that are mainly shaped by the social and traditional cultural values embedded in a predominantly Chinese society with a Confucian heritage (Hsieh, 2004; Kwon, 2004; Li, 2004; Li et al., 2011). For instance, Chinese families are known to place a premium value on education and qualities such as discipline, hard work, self-control, and academic performance (Huang & Gove, 2015). Moreover, the collectivistic nature of Asian societies which emphasizes conformity and de-emphasizes individualism has an impact on the daily practices, including education in these cultures (Lu & Shih, 1997). For example, ECE programs in China have been described as being academically focused and teacher-centered (Tobin, Hsueh, & Karasawa, 2009) with a prevalence of whole group teaching (Hu, Fan, Sao, & Li, 2015).

Similarly, there are concerns that reviewers of Singapore's kindergarten curriculum framework that de-emphasizes academic learning and emphasizes learning through play and less formal instructional practices are at odds with the demands embedded within a predominantly Chinese socio-cultural context and an educational context that is merit-

oriented and highly competitive (Ang, 2006, 2014; Lim & Torr, 2008). Ebbeck and Gokhale (2004) reported that most Singaporean parents prefer preschool education to be academic-oriented in order to help their children to be academically ready for future scholastic achievement and success. However, to date, this area of concern remains understudied in Singapore and even less is known about the thinking and classroom behaviors of preschool teachers in Singapore.

Although cultural differences between Eastern and Western countries may result in diverse educational philosophies and approaches being adopted, it is important to caution against dichotomizing Eastern and Western approaches to ECE when considering ways in nurturing and educating children. Cultures may be hard to change but Rao and Sun (2017) rationalized that cultural contexts are not unchanging and hybridization of educational approaches occurs over time.

Early Childhood Teachers' Beliefs and Practices

Some early research on teacher beliefs found that the practice of early childhood educators strongly reflected their thinking about how children learn and thus suggests that teachers' beliefs undergird their professional practice (Spodek, 1988). Subsequent research has further shown that teacher beliefs are important predictors of early childhood classroom practices (Hu, Fan, Yang, & Neitzel, 2017; Maxwell, McWilliam, Hemmeter, Ault, & Schuster, 2001; Mohamed & Al-Qaryouti, 2016) even though it is recognized that teachers' pedagogical practices are also impacted by other internal and external factors (McMullen, 1999; Parker & Neuharth-Pritchett, 2006). Moreover, teachers' beliefs about children and learning have an influencing effect on their pedagogy and thus the classroom quality (Pianta, Howes, Burchinal, Bryant, Clifford, Early, & Barbarin, 2005). As such, in addition to the structural and process quality aspects of ECE, the Organization for Economic Co-operation and Development (OECD) has included teachers' pedagogical beliefs under the concept of orientational quality as a third feature for measuring ECE quality (Wall, Litjens, & Taguma, 2015).

Investigations of teachers' ECE beliefs and practices have typically focused on assessing teachers' endorsement and employment of developmentally appropriate and inappropriate practices based on the framework adopted by the National Association for the Education of

Young Children (NAEYC). The most widely used instruments in these studies were the Teacher Beliefs Scale (TBS) and the Instructional Activities Scale (IAS), which were specifically developed to operationalize NAEYC's guidelines on developmentally appropriate practice (DAP) in the early years (Charlesworth, Hart, Burts, & Hernandez, 1991; Charlesworth, Hart, Burts, Thomasson, Mosley, & Fleege, 1993). Fundamentally, NAEYC's conception of DAP is grounded on a child-centered philosophy and calls for an effective curriculum and teaching practices based on what children need developmentally, individually and culturally (Copple & Bredekamp, 2009). On the other hand, developmentally inappropriate practice is associated with an emphasis on structured and teacher-directed instruction and learning of basic skills.

Teachers tended to believe in the importance of either child-centeredness or teacher-centeredness (Stipek & Byler, 1997). Studies have consistently found that pre-service and in-service early childhood educators generally believe more strongly in DAP or a child-centered approach than in developmentally inappropriate practices associated with a didactic, skills-based and teacher-centered approach (File & Gullo, 2002; Spidell Rusher, McGrevin, & Lambiotte, 1992; Trepanier-Street, Adler, & Taylor, 2007). The preference for a child-centered orientation is not a distinctive feature of teachers based in the American context. Studies conducted internationally and cross-culturally also indicated teachers' strong endorsement of DAP or child-centered practices (Abu-Jaber, Al-Shawareb, & Gheith, 2010; Hegde, Sugita, Crane-Mitchell, & Averett, 2014; McMullen, Elicker, Wang, Erdiller, Lee, Lin, & Sun, 2005; Ugaste, Tuul, Niglas, & Neudorf, 2014; Wang, Elicker, McMullen, & Mao, 2008).

Studies have also shown that teachers tended to endorse more child-centered practices in theory but employed less of these practices in their classroom. Although there is support from research suggesting congruence between teachers' beliefs and self-reported practices (Hegde & Cassidy, 2009; Heisner & Lederberg, 2011; Leung, 2012; McCarty, Abbott-Shim, & Lambert, 2001; Mohamed & Al-Qaryouti, 2016; Rentzou & Sakellariou, 2011), it was not always the case especially when teachers' beliefs were compared with their observed classroom practices (Kwon, 2004; Varol, 2013; Wen et al., 2011; Wilcox-Herzog, 2002).

It is important to note that many of these studies measured only an estimation of teachers' beliefs and practices using self-reported instruments such as the TBS and IAS even though

the tools have been tested to be reliable and valid. Despite the difficulty in determining whether what teachers declared as important for teaching and learning truly reflected their own philosophy and beliefs, the use of questionnaires is the most common method for data collection in research on teacher beliefs and practices. According to Schraw and Olafson (2015), questionnaires are extremely useful for they are easy to administer and score, and they generate data from large samples that can be statistically analysed and compared across different studies.

Factors Influencing Beliefs and Practices

The nature of teachers' beliefs and practices and their relationship are influenced by teacher-related factors and environmental-related factors (McMullen, 1999; McMullen & Alat, 2002; Parker & Neuharth-Pritchett, 2006; Vartuli, 2005; Wilcox-Herzog, Ward, Wong, & McLaren, 2015). Teacher-related factors include years of education, levels of professional training, specialized training in ECE, years of teaching experience and perceived levels of instructional and curriculum control. On the other hand, environmental-related factors encompass teachers' working condition, workload, support from colleagues and principal, parental expectations for children's school readiness, class size, and school location.

Buchanan, Burts, Bidner, and White (1998) found that teacher and classroom characteristics were predictors of the developmentally appropriate and inappropriate beliefs and practices of 277 first, second and third grade teachers. A larger class size and having more children from low socio-economic status in the class predicted teachers' developmentally inappropriate beliefs and practices, while teachers teaching in the lower grade level and more children with learning difficulties were more likely to endorse and employ DAP. Having more children in a class has also been found to negatively predict teachers' developmentally appropriate beliefs or practices amongst teachers in China (Wang et al., 2008), Oman (Mohamed & Al-Qaryouti, 2016), and India (Hegde & Cassidy, 2009).

A few studies have also reported that teachers who believed that they were more in control of what and how to teach had stronger beliefs in DAP and would employ DAP more frequently (Buchanan et al., 1998; Charlesworth et al., 1991; Parker & Neuharth-

Pritchett, 2006). Additionally, teachers without specialized training in ECE also predicted their developmentally inappropriate beliefs and practices and this is consistent with the finding by Heisner and Lederberg (2011) that trained child care teachers who had obtained the Child Development Associate (CDA) qualification believed more strongly in and utilized more DAP than untrained teachers.

Maxwell et al. (2001) found that the grade level taught by teachers, their beliefs and level of education were significant predictors of classroom practices. Consistent with Buchanan et al. (1998), Maxwell et al. (2001) found that teachers of lower grade levels showed more developmentally appropriate practices. Maxwell and colleagues also reported that teachers with more education (Master's degree versus Bachelor's degree) rather than years of teaching experience predicted teachers' observed use of DAP. On the contrary, job experience was found to significantly predict the self-reported endorsement for DAP by 264 pre-school teachers in Jordan (Mohamed & Al-Qaryouti, 2016) while teachers' professional training and general education level did not predict the early childhood curriculum beliefs held by 296 Chinese and 146 American teachers (Wang et al., 2008). A higher level of education (Bachelor's degree versus associate degree), specialization in education, more years of preschool teaching experience, and more mature teachers were found to be positively related to teachers' beliefs toward DAP amongst a sample of 1907 kindergarten teachers in Jordan (Abu-Jaber et al., 2010). In contrast, teachers' education and experience were not related to the beliefs and practices of 40 kindergarten teachers in India (Hegde & Cassidy, 2009).

In addition, teachers' educational beliefs are also influenced by macro-level factors such as society's values, cultures, norms, and educational structure and policy (Alexander, 2001; Moore, 2012). Several studies have noted that while teachers from cultures that are predominantly Chinese or influenced by Confucianism were generally found to agree with the child-centered approach, the inherent traditional values and cultural beliefs, and the social pressures and expectations present in these societies seemed to create a gap between their desired and actual employment of more child-centered practices (Kwon, 2004; Lee & Tseng, 2008; Pan & Liu, 2008).

Given the dearth of ECE research in Singapore, the nature and relationship of preschool teachers' curriculum and instructional beliefs and practices are largely understudied. Two

separate surveys of teachers' beliefs in English literacy instruction within Singapore's multi-cultural and multi-lingual context found that kindergarten teachers either subscribed to a child-centered approach (Lim & Torr, 2008) or an eclectic mix of child-centered and teacher-centered approaches (Lim & Torr, 2007). These findings suggest that it is not evident that the espoused beliefs of Singaporean kindergarten teachers were in conflict with Western notions of ECE approach. However, these two studies did not investigate the nature of teachers' classroom practices and the factors influencing their beliefs.

The Singapore Context

In Singapore, preschool education (PSE) refers to the formalized 3-year educational programs and services provided for children between 4 and 6 years in childcare centers and kindergartens, commonly referred to as preschools. Predominantly provided by the private sector including community foundations, religious bodies, and social and business organizations, PSE is neither mandatory nor part of the official education system. Nonetheless, almost all Singaporean children attend at least one year of PSE in a childcare center or kindergarten before they enter primary school in the year they turn 7 years of age. Currently, there are more than 1800 preschools in Singapore, of which about 480 are kindergartens. Previously under the auspices of the Ministry of Social and Family Development (MSF) for childcare centers and the Ministry of Education (MOE) for kindergartens, the newly formed Early Childhood Development Agency (ECDA) has been overseeing the entire preschool sector since 2013.

Typically known for its multi-racial society, Singapore is a cosmopolitan city state in South East Asia with a blend of Eastern and Western values, attitudes, and lifestyles. Fundamentally, the country consists of more than 70% of its population belonging to the Chinese race whose educational views are influenced by Confucian. In 2000, Singapore forged a policy framework to uplift the quality of PSE by investing resources in curriculum development, teacher training, research, regulations and quality standards. Since then, the government has put in place systems and structures aimed at raising teacher, program, and center quality. One significant step taken was the dissemination of an official document in 2003 that provides a framework for kindergartens to develop a quality curriculum with a focus on six learning areas that include *Aesthetics and Creative Expression*, *Discovery of*

the World, *Language and Literacy*, *Motor Skills Development*, *Numeracy*, and *Social and Emotional Development* for children's holistic development (Ministry of Education [MOE], 2012; Pre-school Education Unit, 2003). Developed based on broad teaching and learning principles drawn from international research on ECE curriculum and pedagogy, the framework was updated in 2012 and promotes an integrated learning approach with teachers supporting children's active learning through play and interactions in order to re-direct the focus of PSE from academic preparation to holistic education (MOE, 2012; Pre-school Education Unit, 2003).

In an investigation of how 123 kindergarten teachers prioritized the six learning areas deemed to be essential for children's holistic development, teachers' priority for *Social and Emotional Development* was positively correlated to their beliefs in child-centeredness, while priority for *Numeracy* and *Literacy* was positively correlated to beliefs in teacher-centeredness (Bautista, Ng, Múñez, & Bull, 2016). In addition, the researchers did not find any significant relationships between teachers' demographic factors such as age, level of education, and teaching experience and their beliefs about children and their learning. It is thus worthwhile to conduct more research into the nature of factors influencing preschool teachers' beliefs and practices to broaden our understanding of kindergarten education within the Singapore context.

The Present Study

In order to address the research gap in the Singapore context, this present study surveyed kindergarten teachers to answer the following research questions:

1. What are kindergarten teachers' self-reported beliefs and practices in early childhood teaching and learning?
2. How consistent are the beliefs and practices reported by the teachers?
3. What are the teacher and kindergarten factors that are associated with teachers' reported beliefs and practices?

On the basis of prior research, we hypothesized that the teachers would value practices associated with the widely endorsed child-centered approach, and there would be a positive correlation between their beliefs and reported practices. We also anticipated that the nature

of teachers' beliefs and practices would be related to certain demographic and kindergarten-related factors.

Method

Participants

This study focused on teachers from non-profit kindergartens as these centers make up the majority (60%) of kindergartens in Singapore and cater mainly to children from the lower to middle income families. Unlike centers run by commercial operators that are generally attended by children from families of higher socio-economic status and that offer more specialized programs, the curriculum and program in non-commercial kindergartens are also more representative of kindergarten teaching and learning in Singapore. An email was sent to the principals of all 336 non-profit kindergartens to invite their English Language teachers of 4- to 5-year-olds to complete an online questionnaire on kindergarten teaching and learning. Principals from 166 centers (49.4%) agreed to participate in the survey, of which 167 teachers from 115 centers (69.3%) completed the questionnaire. Within this sample, there were 79 (47.3%) teachers from government-subsidized kindergartens, 47 (28.1%) teachers from religious/society/ethnicity-affiliated kindergartens, and 41 (24.6%) teachers from the 15 newly established public kindergartens. All teachers were females and ranged in age, from 21 to more than 60 years old, with 47.3% of them between 21 and 30 years old. The teachers had a wide range of teaching experience from less than a year to 24 years ($M = 6.5$ years, $SD = 5.78$) of which 93 (55.7%) teachers had a preschool teaching diploma, 32 teachers (19.2%) had a diploma in preschool teaching and leadership, and 37 teachers (22.2%) had a university degree in ECE as their highest professional qualification. The remaining five teachers were either certificate-trained or untrained in ECE.

Instrument

A contextually appropriate questionnaire based on literature review and considerations

for the curriculum and pedagogical aspects within the local context was developed for this study to assess teachers' ECE beliefs and practices. The questionnaire was developed to ensure that it has an adequate coverage of key areas of kindergarten classroom teaching and learning. At the same time, care was taken to avoid having too many items in the questionnaire such that it becomes too onerous for the teachers to complete the survey. Drawing on ideas from the literature and existing tools used in other studies (Charlesworth et al., 1993; Kim & Buchanan, 2009; Kwon, 2004) for the content and format of the questionnaire, 30 items were first generated for the beliefs measure. Four local ECE teacher educators and specialists provided feedback on the trial version of the questionnaire and a pilot study was conducted with 10 local teachers from different kindergartens. Feedback obtained from the local experts and pilot study resulted in the deletion or improved readability of some items. The final version of the questionnaire was further reviewed by four experienced ECE academics.

The final instrument used consisted of three parts. Part A consisted of 28 belief statements related to how children learn, what they should learn, how the curriculum or learning environment should be organized and the role of a preschool teacher. Respondents were required to rate each statement on a 5-point scale from '1' for *not important at all'*, '2' for *'fairly important',* '3' for *'important'*, '4' for *'very important'* to '5' for *'extremely important'*. Part B required teachers to provide frequency ratings of 12 types of commonly found classroom activities on a 5-point scale from '1' for *'never'*, '2' for *'seldom'*, '3' for *'sometimes'*, '4' for *'frequently'* to '5' for *'very frequently'*. Teachers' standard demographic information was captured in the last part of the questionnaire.

Results

Nature of Teachers' Beliefs

Descriptive statistics. The item mean scores of teachers' belief ratings ranged from 2.00 to 4.51 indicating that the item with the lowest mean score was regarded as fairly important on average by the teachers. Table 1 shows the five most important and least important items rated by the teachers. The majority (60.5%) of the teachers regarded an

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emphasis on developing children's positive attitudes toward learning as extremely important while almost half (45.5%) of the teachers regarded the requirement for children to complete the same tasks at the same time to be fairly important. As shown in the table, the more important belief statements are related to the child-centered philosophy while the less important belief statements are mostly related to a teacher-centered philosophy.

Table 1. *General Nature of Teachers' Beliefs*

Beliefs	M (SD)
Most important	
Emphasize positive attitudes toward learning	4.51 (.68)
Develop literacy and numeracy skills through a variety of interactive activities	4.42 (.72)
Learn through exploration and experimentation	4.39 (.68)
Set up learning centers for learning through play	4.33 (.76)
Provide daily opportunities to develop social skills	4.31 (.76)
Least important	
Require children to complete the same tasks at the same time	2.00 (.83)
Plan activities that are just for fun and without any learning goals	2.01 (.99)
Follow a prescribed curriculum without considering children's interests and needs	2.02 (.92)
Do an activity according to teacher's plan all the time	2.08 (.80)
Curriculum should consist predominantly of teacher-led whole class activities	2.37 (.83)

Ratings based on '1' for '*not important at all*', '2' for '*fairly important*', '3' for '*important*', '4' for '*very important*' and '5' for '*extremely important*'.

Factor structure. In order to examine which items on teachers' beliefs group together coherently into components of belief constructs measured, an exploratory factor analysis (EFA) of teachers' ratings for their ECE beliefs was performed. Extensively used in the development and evaluation of tests and scales, EFA is normally carried out as the first step in the development of measures for its preliminary validation (Yong & Pearce, 2013). Ratings on the 28 belief statements were subjected to a principal components analysis (PCA) using the varimax and oblimin rotation methods. Both analyses yielded five factors with eigenvalues greater than one, which accounted for a total variance of 58.2%. A series of PCA was performed by setting the number of extracted factors at two, three and four in order to find the best factor structure for interpretation based on the following evaluation criteria: (a) satisfied Cattell's scree test (Cattell, 1996) and Horn's parallel analysis (Horn,

Table 2. *Three-factor Structure of Teachers' Beliefs*

Beliefs[*] *(How important are the following?)*	Factor 1: Child-centered, developmental approach	Factor 2: Teacher-centered, Academic approach	Factor 3: Free and Spontaneous Play	*M (SD)*
24. Teachers move around classroom to offer suggestions and ask questions to facilitate children's involvement	.81	.12	-.13	4.31 (.76)
22. Set up environment for learning through play	.80	.06	.11	4.26 (.77)
25. Set up learning centers for learning through play	.79	.14	-.04	4.33 (.76)
3. Learn through exploration and experimentation	.74	-.07	.16	4.39 (.68)
23. Conduct ongoing observations to assess children	.73	.06	-.11	4.20 (.80)
19. Provide daily opportunities to develop social skills	.72	-.13	.24	4.32 (.74)
13. Develop literacy and numeracy skills through a variety of interactive activities	.72	.06	-.01	4.42 (.72)
16. Emphasize positive attitudes towards learning	.68	.01	-.12	4.51 (.68)
20. Plan activities based on children's interests	.64	-.04	.44	3.95 (.89)
15. Curriculum is integrated and not divided into subjects	.63	-.04	.08	4.01 (.97)
2. Provide opportunities for children to decide on what they want to play, do and learn	.52	-.19	.42	3.78 (.78)
6. Children create their own learning activities	.51	.14	.39	3.63 (.95)
5. Learn through play with support from teachers	.45	.10	-.23	3.85 (.78)
14. Develop literacy and numeracy skills through structured and direct instruction	-.01	.75	.10	2.72 (.88)
7. Complete worksheets to develop concepts and skills	-.01	.73	.15	2.62 (.99)
8. Copy and practice writing letters, words and sentences to develop literacy skills	.07	.71	.04	3.11 (1.00)
17. Conduct mainly teacher-led whole class activities	-.03	.71	.19	2.37 (.83)
21. Require children to complete same tasks at the same time	-.11	.69	.16	2.00 (.83)
12. Require children to do activity according to the teacher's plan all the time	-.07	.66	.14	2.08 (.80)
10. Assess children using written tasks	.09	.63	.04	3.23 (1.02)
9. Learn to recognize and read simple words and sentences through repetition and recitation	.18	.60	-.04	3.10 (1.07)
27. Always provide instructions for play	.13	.59	-.03	2.77 (1.04)
1. Learn through direct instruction	-.08	.55	.16	2.84 (.81)
26. Follow a prescribed curriculum	-.06	.55	.09	2.03 (.90)
11. Engage in play planned by teachers to achieve learning goals	.27	.54	-.11	3.38 (.88)
18. Provide long time for play without teacher support	.07	.25	.77	2.53 (.94)
4. Learn through play without teacher involvement	.10	.24	.66	2.99 (.89)
28. Plan activities for fun without any learning goals	-.15	.21	.60	2.01 (.99)
Eigenvalue	6.58	5.29	1.92	
% of variance	23.51	18.88	6.85	
Cronbach's alpha	.90	.87	.68	

* Belief statements have been shortened to fit table.

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1965), (b) presence of a simple structure with no substantial cross loading items onto factors retained, (c) absence of factors with less than three items and item loadings that are less than .50. The three-factor solution, which accounted for 49.2% of the variance was accepted as it was meaningfully and conceptually aligned with literature on ECE approaches, and met all the evaluation criteria. As the correlational relationship between the three factors revealed by the oblique rotation was weak, it is reasonable to assume that the extracted factors were unrelated and to use the orthogonal rotation solution (Pedhazur & Schmelkin, 1991).

The three factors had high to moderate internal consistencies with Cronbach's alpha values at .90, .87 and .68. The first factor included 13 items related to beliefs about engaging children in active learning through exploration and play, guiding and scaffolding children's acquisition for literacy and numeracy skills through interactive activities, encouraging children to choose and initiate their learning experiences, and a curriculum that is integrated across developmental domains with an emphasis on developing non-academic skills. The second factor included 12 items on teaching children academic skills through direct instruction and practice mainly through whole class, structured activities and worksheets. The third factor included three items on playful activities initiated and led by the children without teacher involvement. Table 2 shows the factor structure with the three factors labeled as 'child-centered, developmental approach', 'teacher-centered, academic approach', and 'free and spontaneous play'.

Nature of Teachers' Reported Practices

Descriptive statistics. The mean scores of teachers' reported frequencies for various classroom activities ranged from 2.86 to 4.08 whereby a higher mean score indicates a more frequently conducted classroom activity on a weekly basis. Table 3 shows that outdoor activities were conducted least frequently while teacher-led whole class activities were most frequently conducted by the teachers.

Factor structure. A PCA using varimax rotation performed on the classroom activities yielded five factors with eigenvalues greater than one and accounted for 69.1% of the variance in the reported practices. The items making up these five factors were

Table 3. *General Nature of Teachers' Reported Classroom Practices*

Beliefs	*M (SD)*
Most frequently conducted	
Teacher-led whole class activities	4.08 (.89)
Structured activities to teach literacy skills	3.87 (.89)
Interactive activities to teach literacy skills	3.75 (.92)
Least frequently conducted	
Outdoor activities	2.86 (.85)
Play without teacher involvement	2.93 (1.07)
Child-initiated, teacher supported play	3.05 (1.02)

Frequency ratings based on '1' for '*never*', '2' for '*seldom*', '3' for '*sometimes*', '4' for '*frequently*' and '5' for '*very frequently*'.

conceptually meaningful, had loading values greater than .50 and did not cross load substantially. However, the internal consistencies measured by Cronbach's alpha had moderate to low values with three factors above .70 and two factors below .60. Table 4 shows the factor structure of the classroom activities, which were labeled as 'non-academic activities', 'interactive academic activities', 'structured academic activities', 'teacher-led

Table 4. *Factor Structure of Teachers' Reported Practices*

Classroom activity *(How often do children do the following?)*	Factor 1: Non-academic activities	Factor 2: Interactive Academic activities	Factor 3: Structured Academic activities	Factor 4: Teacher-led activities	Factor 5: Child-led play	*M (SD)*
11. Physical activities	.89	.15	.05	.08	.08	3.26 (.82)
12. Outdoor activities	.80	.01	.06	-.21	.13	2.86 (.85)
10. Music and movement activities	.58	.50	-.15	.14	.02	3.10 (.99)
9. Interactive activities to teach numeracy skills	.10	.82	.18	.02	.09	3.48 (.94)
8. Interactive activities to teach literacy skills	.14	.74	.26	.17	.14	3.75 (.92)
6. Structured activities to teach literacy skills	.14	.08	.88	.16	.05	3.87 (.89)
7. Structured activities to teach numeracy skills	-.10	.31	.77	-.01	-.11	3.43 (.90)
3. Play planned and guided by teacher	-.13	.08	.08	.77	-.02	3.56 (1.05)
2. Teacher-led small group activities	.18	.26	-.06	.72	-.07	3.61 (.95)
1. Teacher-led whole class activities	-.14	-.28	.35	.61	.26	4.08 (.89)
4. Play without teacher involvement	.12	-.04	.08	-.00	.82	2.93 (1.07)
5. Child-initiated, teacher supported play	.08	.31	-.15	.02	.69	3.05 (1.02)
Eigenvalue	2.89	1.93	1.32	1.12	1.01	
% of variance	24.11	16.11	10.98	9.36	8.42	
Cronbach's alpha	.72	.77	.73	.54	.41	

activities', and 'child-led play'. Since the internal consistency for Factor 5 is generally unacceptable at below .50, it was not included for subsequent data analyses and discussion.

Relationship between Teachers' Beliefs and Reported Practices

The bivariate correlational analysis results displayed in Table 5 reveal that some low but statistically significant positive correlations existed between beliefs and practices. Belief in a child-centered, developmental approach was positively correlated with non-academic and interactive academic activities, and belief in a teacher-centered, academic approach was positively correlated with non-academic, interactive academic, and structured academic activities. These findings suggest more consistency between child-centered belief and practices and less consistency between teacher-centered belief and practices.

Table 5. *Correlations between Teachers' Beliefs and Reported Practices*

	1	2	3	4	5	6	7
1. Child-centered, developmental approach	-	.10	.13	.18*	.28**	-.00	.05
2. Teacher-centered, academic approach		-	.37**	.16*	.18*	.24**	.14
3. Free and spontaneous play			-	.15	-.02	.04	-.06
4. Non-academic activities				-	.37**	.08	-.00
5. Interactive academic activities					-	.36**	.23**
6. Structured academic activities						-	.28**
7. Teacher-led activities							-

$^*p < .05$, $^{**}p < .01$

Association of Teacher and Kindergarten Factors with Teachers' Beliefs and Practices

Table 6 shows that teachers' age and teaching experience were negatively associated with teachers' beliefs in child-centered, developmental approach, and free and spontaneous play. On the other hand, a positive correlation was found between teachers' highest professional training level and their belief in a child-centered, developmental approach.

There were fewer significant correlations found between teacher and kindergarten factors, and their reported practices. As shown in Table 6, positive correlations were found between the frequency of teacher-led activities and teachers' teaching experience and class size. There was also a tendency for teachers from the public kindergartens to place greater

Table 6. *Associations of Teacher and Kindergarten Factors with Beliefs and Practices*

	Age	Teaching Experience	Professional training	Class size	Kindergarten type[+]
Beliefs					
Child-centered, developmental approach	-.21**	-.17*	.19*	.03	.13
Teacher-centered, academic approach	-.11	.03	-.02	-.02	.02
Free and spontaneous play	-.26**	-.18*	.13	-.08	.18*
Practices					
Non-academic activities	-.15	.00	.07	.01	.28**
Interactive academic activities	-.04	.05	-.04	-.00	.07
Structured academic activities	.08	.08	-.01	-.10	.02
Teacher-led activities	.08	.17*	-.09	.16*	.05

*$p < .05$, **$p < .01$
[+] Kindergarten type was coded according to 1 = Religious/society/ethnicity-affiliated kindergartens, 2 = government-subsidized kindergartens, and 3 = public kindergartens.

importance on free and spontaneous play and to conduct non-academic activities more frequently than teachers from other kindergartens.

A hierarchical multiple regression was performed to assess how well beliefs predicted the reported classroom practices, after controlling for the influence of teacher and kindergarten-related factors. Preliminary analyses were conducted to ensure that the assumptions of normality, linearity, multicollinearity and homoscedasticity were satisfied. Teachers' age, teaching experience, and professional training level were entered at Step 1, their class size and kindergarten type were entered at Step 2, and the three belief factors were entered at Step 3 to predict each of the practice factors.

The results displayed in Table 7 show that kindergarten factors accounted significantly for 7% of the total variance in non-academic activities whereas beliefs did not contribute significantly to an additional variance of 4% after being entered in step 3. The overall model obtained was however significant, $F(8, 158) = 1.58$, $p = .001$, with teachers' job experience ($\beta = .20$, $t = 2.08$, $p = .040$) and kindergarten type ($\beta = .30$, $t = 3.58$, $p = .000$) found to be significant predictors of non-academic activities. Teacher and kindergarten factors did not significantly predict interactive academic activities but a significant model was obtained after entering teachers' beliefs at step 3 which explained 12% of the total variance, $F(8, 158) = 3.17$, $p = .002$. Beliefs in child-centered, developmental approach ($\beta = .30$, $t = 3.84$, $p = .000$) and teacher-centered, academic approach ($\beta = .19$, $t = 2.32$, $p = .022$) were significant predictors in the final model. While teachers' beliefs uniquely

Table 7. *Summary of Hierarchical Regression Analyses for Teachers' Reported Practices*

Predictor	Practices							
	Non-Academic Activities		Interactive Academic activities		Structured Academic activities		Teacher-led activities	
	ΔR^2	B	ΔR^2	β	ΔR^2	β	ΔR^2	B
Step 1:	.04		.01		.01		.05*	
Age		-.25*		-.13		.05		-.03
Teaching experience		.17		.12		.05		.21
Professional training		.03		-.05		.01		-.08
Step 2:	.07**		.01		.02		.04*	
Age		-.19		-.11		.08		-.01
Teaching experience		.21*		.14		.06		.23*
Professional training		-.03		-.07		-.01		-.11
Class size		.08		.01		-.11		.16*
Kindergarten type		.31***		.10		.05		.16
Step 3:	.04		.12***		.07*		.03	
Age		-.13		-.05		.13		.01
Teaching experience		.20*		.12		.01		.20*
Professional training		-.05		-.10		.01		-.09
Class size		.07		-.01		-.11		.16*
Kindergarten type		.30***		.10		.05		.17
Child-centered, developmental approach		.13		.30***		.00		-.03
Teacher-centered, academic approach		.10		.19*		.27**		.17*
Free and spontaneous play		.05		-.12		-.05		-.09

*p < .05, **p < .01, ***p < .001

contributed to the additional variance of 7% in structured academic activities, and the influence of beliefs in teacher-centered, academic approach was found to be significant (β = .27, t = 3.30, p = .001), the overall model was however not significant, $F(8, 158) = 1.92$, p = .061. Similar to non-academic activities, teachers' beliefs did not account significantly for the additional variance of 3% in teacher-led activities whereas teacher factors entered in Step 1 and kindergarten factors entered in Step 2 yielded significant models and uniquely explained 5% and 4% of the total variance, respectively, in the data set. As a whole, teachers' beliefs improved the final model which was found to be statistically significant, $F(8, 158) = 2.50$, p = .014, with beliefs in teacher-centered, academic approach (β = .17, t = 2.09, p = .038), teachers' kindergarten teaching experience (β = .20, t = 2.03, p = .044) and class size (β = .16, t = 2.10, p = .037) having a significant influence on teacher-led activities.

Discussion

This study examined kindergarten teachers' reported curriculum and instructional beliefs and practices in relation to child-centered and teacher-centered orientations without juxtaposing the two approaches as developmentally appropriate versus inappropriate practices, respectively.

Dual Nature of Teachers' Beliefs and Practices

The results show that Singapore kindergarten teachers believed in the importance of both child-centered and teacher-centered approaches but they clearly preferred child-centered to teacher-centered practices. This finding corroborates those of previous studies (e.g. Rentzou & Sakellariou, 2011; Ugaste et al., 2014; Wen et al., 2011) that reported early childhood teachers tended to prioritize belief in child-centeredness, which is the widely accepted gold standard way of educating young children. Yet, it shows that the teachers also valued a teacher-centered, academic approach generally associated with more traditional methods of teaching. The is an important finding as it suggests that Singapore teachers may not perceive the two seemingly contrasting ECE orientations to be incompatible and thus the need to subscribe to one particular approach. It is possible that the teachers support the viewpoint of some scholars that child-centered and teacher-centered approaches are not two extreme points of the same continuum but rather both approaches belong to two separate dimensions that can be effectively engaged depending on the teaching and learning context, and children's needs (Buchanan et al., 1998; Maxwell et al., 2001).

The dual nature of Singapore teachers' beliefs is consistent with the outcome in an earlier research conducted by Kwon (2004) who found that Korean kindergarten teachers' beliefs were two-fold, reflecting both Western and Asian styles of teaching. Kwon (2004) attributed this outcome to the influence of teachers' exposure to Western conceptions of ECE curriculum and pedagogy during teacher training and their traditional Korean values. This may also be true in the case of Singapore given that since 2003, training courses and workshops have been mounted to disseminate the new curriculum guidelines and equip pre-service and in-service teachers with the knowledge and skills to employ a more holistic and

child-centered approach whereby children learn through play and exploration. Thus, teachers' stronger belief in child-centered practices could have been shaped by their exposure to more contemporary views about best practices in ECE during their teacher preparation or continual professional development programs. At the same time, teachers' views about kindergarten teaching and learning reflect Singapore's social cultural beliefs and educational focus that are attached to the value of teacher-centered, explicit and direct instruction needed to adequately prepare children for school readiness and achievement.

In terms of the types of classroom activities conducted, teachers' self-reported data suggest that most children were offered a mix of teacher-centered (e.g. teacher-led large and small group activities, teacher-planned play and academically-focused activities) and child-centered (e.g. free play, child-initiated play, non-academic activities) learning activities in the classroom. However, teachers reported higher frequencies of teacher-centered activities. These findings suggest that even when child-centered practices are highly valued in theory and reported in action occasionally, teacher-centered practices with a strong focus on academic skills continue to dominate classroom instructional experiences. In view of Singapore's intended shift from teacher-centeredness to child-centeredness in the kindergarten curriculum since 2003, the reported nature of teachers' beliefs and practices may possibly be indicative of a transition phase in the reform of kindergarten teaching practices as teachers seemed to be open to Western educational ideas and supplementing their conventional teaching methods with some child-centered activities. Further research is needed to ascertain the state of actual classroom teaching practices and children's learning experiences for a fuller understanding of the implementation of the curriculum reform.

Possible Links between Teachers' Reported Beliefs and Practices

Teachers reported conducting teacher-directed whole-class teaching with a focus on literacy development relatively frequently. In contrast, they reported engaging in activities that were less academic in nature and that supported children initiation less frequently. This is consistent with the evidence borne out in the literature, which suggests that teachers embraced child-centered practices in their philosophy but employed less of these practices in their classroom (Wilcox-Herzog et al., 2015).

Based on the correlational analyses results, it appears that teachers who believed in child-centeredness reported conducting non-academic activities more frequently and using more interactive activities to teach academic-related skills. This suggests a consistency of child-centered belief and their reported practices. Teachers believing more in teacher-centeredness were found to report higher frequencies in conducting interactive and structured academic, as well as non-academic and teacher-led activities. Even though this finding suggests a less clear-cut link between teacher-centered belief and their reported practices, it can possibly be explained in the Singapore context given that structured and interactive activities are commonly conducted in kindergartens. In Singapore, structured activities are deemed to involve explicit and direct instruction of specific knowledge and skills for literacy and numeracy development whereas interactive activities employ a variety of strategies and hands-on experiences to encourage children's interest and participation, which could be directed or initiated by the teacher or children. Therefore, the teacher-centered and child-centered qualities of interactive activities could possibly explain the reported frequency in conducting interactive academic activities even amongst teachers who believed more in the importance of teacher-centeredness.

In addition, the positive association found between teachers' beliefs in teacher-centered, academic approach and conduct of non-academic activities reflects the norm whereby learning activities on developing children's gross motor skills, and aesthetics and creative expression are typically conducted in kindergartens to promote children's holistic development. However, the lower emphasis placed on conducting non-academic activities such as outdoor, music and movement, and physical activities as revealed in the survey of classroom practices in this study warrants further investigation into the difficulties teachers may encounter in conducting these activities in a more frequent manner.

Factors Likely to Influence Teachers' Reported Beliefs and Practices

This study shows that some aspects of the nature of teachers' beliefs appeared to be related to their age, teaching experience, professional training and type of kindergarten they worked in while certain self-reported practices were related to their teaching experience, class size and kindergarten type. Thus, it provides an alternative perspective from the study that found no differences in teachers' beliefs according to their demographic variables

(Bautista et al., 2016). Unlike some previous studies which reported that older and more experienced teachers tended to agree more with beliefs towards child-centeredness (Abu-Jaber et al., 2010), this present study found that younger and less experienced teachers were more likely to endorse a child-centered and developmental approach. Younger and beginning teachers also emphasized the importance of free and spontaneous play more than matured and experienced teachers. It is plausible that younger and beginning teachers hold more idealistic views of classroom environments and thus focus less attention on the structural constraints which are commonly experienced in classroom teaching (File & Gullo, 2002). Teachers' idealistic views could stem from their recent teacher training program which is likely to place a greater emphasis on child-centered curricular and pedagogical practices given Singapore's intention to de-emphasize teacher-centeredness and academic learning in kindergarten education since 2000.

As suggested by the literature (Heisner & Leiderberg, 2011; Lee, Baik, & Chalesworth, 2006), teachers with more professional training in ECE were also found to place a greater emphasis on child-centered beliefs in this study. This finding implies that while it seems beneficial to recruit and retain teachers with a higher professional training level in ECE for the implementation of a child-centered curriculum, efforts could also be made to foster close working ties between less and more professionally trained teachers and to encourage and incentivize teachers, especially the older ones, to update their pedagogical knowledge and skills through continual professional development programs.

Additionally, teachers teaching in public kindergartens reported a more favorable perception of the importance of free play in kindergarten classrooms when compared to those from other kindergartens. This result is likely due to the fact that the majority of the surveyed public kindergarten teachers in this study was in the youngest age group (73%) and had less than five years of kindergarten teaching experience (78%).

After controlling the effects of teacher and kindergarten factors, teachers' child-centeredness belief was the strongest predictor of teachers' reported interactive academic activities while teacher-centeredness belief was a strong predictor of the self-reported frequencies in carrying out structured academic and teacher-led activities. While the strength of the relationships is not very strong, the significant predictions of some of teachers' self-reported practices by their beliefs suggest an alignment between the two

variables, especially when the significant associations found were in the expected direction.

The results in this study also showed that teachers' reported frequency of teacher-led activities was strongly predicted by class size and job experience. Teachers with a bigger class size tended to conduct teacher-led activities more frequently. This reflects the current state of class size and teacher-child-ratio of kindergartens in Singapore. The current regulatory guideline for K1 level classes is one teacher to 20 children. As it is uncommon for kindergarten level teachers to have extra manpower support from an assistant teacher or additional staff in their classrooms, this may have created some difficulties for a single teacher to allow for more child-led and less structured activities. It is recommended that consideration given to increase manpower supply within a classroom to achieve a better teacher-child-ratio may be worthwhile in moving towards a more balanced curriculum and higher quality program in the kindergartens.

Early childhood teachers' beliefs are often described to originate from their personal experiences, education, training, and values (Spodek, 1988). In the case of the present study, teachers who have been teaching for a longer period of time reported a higher frequency in conducting teacher-led activities. One possible explanation for this is that experienced or older teachers may hold on to more traditional views of how children learn due to the conventional teaching method they had personally experienced during their schooling days as students, with those views seemingly impacting on the classroom practice. It is also possible that more experienced teachers tended to focus more attention on direct teaching of specific knowledge and skills as they are more aware of the ongoing issues and concerns related to promoting children's school readiness for a smoother transition from preschool to primary school based on parents' feedback accumulated over time.

Kindergarten type was found to be the strongest predictor of non-academic activities, with teachers from public kindergartens reporting a higher frequency of conducting music and movement, physical and outdoor activities on a weekly basis. This finding can possibly be explained by the fact that the curriculum in MOE-run kindergartens is developed by curriculum specialists in the ministry, supposedly to operationalize the principles and guidelines articulated in the official curriculum framework. The curriculum thus aims to nurture children holistically by ensuring that ample attention is given to all aspects of a child's development to adequately prepare children for future learning.

Limitations of Study

There are limitations in this study. First, the relationships reported are correlational in nature and do not imply any causal connections. Second, the investigation of the belief-practice relationship was based on teachers' self-reported data collected at a single time point which may not reflect teachers' true behaviors as they might felt the necessity to provide socially desirable responses when asked about their curriculum-related beliefs and practices. Triangulation of self-reported and classroom observation data needs to be done to shed more light on the link between teacher beliefs and practices. Third, findings of the study cannot represent the beliefs and practices of teachers from all kindergarten levels and types as only teachers from the K1 level in non-commercial kindergartens were sampled. Further research involving a larger number of teachers sampled from the whole preschool sector including those from commercial kindergartens and childcare centers is recommended in the future. Lastly, the less satisfactory reliability obtained for the measure of teachers' classroom practices suggests that the subscale of the questionnaire could be strengthened by enhancing the variety and clarity of the items for future use to better capture kindergarten classroom teaching practices in Singapore.

Conclusion

This study is one of the first studies undertaken to assess kindergarten teachers' curriculum and instructional beliefs and practices in Singapore. Given the rapid changes in the educational policies and reforms taking place both locally and internationally to increase the quality of ECE through more child-centered practices, this study provides empirical data on teachers' beliefs in the importance of both child-centered and teacher-centered approaches to ECE. It also suggests that teachers' prioritized belief in child-centered practices did not lead them to reject but to down play their belief in teacher-centered practices. However, taking the data on teachers' reported classroom activities as a whole, the findings in this study seem to indicate that even when child-centered activities were reported by the teachers, Singapore kindergarten teachers may be structuring and enacting a curriculum that is still largely teacher-directed and instructional in nature with a

greater focus on teaching academic skills. Further research should be conducted to assess the extent and enactment of the two educational philosophies in reality to obtain a more accurate picture of the current curriculum and teaching practices in Singapore kindergarten classrooms. An investigation into the contextual factors underlying teachers' actual classroom behavior will also contribute towards a deeper understanding of the mismatch between teachers' higher emphasis on child-centered belief and higher frequencies of teacher-centered activities. The identification that teachers' beliefs, and some of their personal and environmental factors have an influence on their classroom practices from this study is useful to inform strategies that can be used to improve classroom practices. However, the belief-practice link remained inconclusive and more research needs to be done to determine the key to help teachers enact their beliefs to realize a curriculum with a more balanced manifestation of both child-centered and teacher-centered practices for better quality teaching and learning in the early years.

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