



# MONASH University

## **Play Pedagogy in Science Education:**

### **Early Childhood Teachers of Chinese Heritage in Australian Contexts**

*Siyan Jiang*

*Bachelor of International Economics and Trade*

*Huaqiao University, China*

*Master of Teaching in Early Childhood Education*

*Monash University, Australia*

*Graduate Certificate of Education Research*

*Monash University, Australia*

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### **Abstract**

Drawing on a cultural-historical theoretical approach, this study is interested to understand ways culture is learned, and teachers shape and are shaped by their environment. Therefore, the study focuses on the ways Chinese heritage teachers understand and utilise play pedagogy in science teaching within Australian early childhood settings, and how the teachers' cultural heritage influences their perceptions and practice with regard to early childhood science education.

The study reports on six teachers of Chinese heritage, working in different early childhood settings in Melbourne, Australia. The teachers were interviewed (n= 6 hours) to gain insights into their use of play pedagogy in science teaching and learning, and ways their Chinese cultural heritage informed their pedagogy (or not). Data were analysed following Hedegaard's (2008c) three levels of interpretation. Vygotsky's concept of the social situation of development was drawn on to develop an understanding of the relationship between the environment and the six Chinese heritage teachers' use of play pedagogy in science education.

The findings reveal that the pedagogical approaches adopted by Chinese heritage teachers were situated in two main areas, the first being teacher-led activities where children's play was intended as a basis or a medium for science teaching and learning. The second prominent pedagogical style saw child-initiated play as a primary source driving children's science learning, where teacher-led activity was intended to complement the learning potential of the play. Further findings indicated that each teacher's pedagogical preference for teaching science involved complex decisions, influenced by their cultural background, personal educational experience, and the social context of their workplace. The findings of this study coincided with Vygotsky's argument that each individual teacher experiences the social situation differently as their relationships with the situations are different. New to the

literature concerns the teachers' understanding of intentional teaching with play-based curriculum.

The outcomes of this study contribute to a greater awareness of the influence of cultural heritage when immigrant EC teachers make decisions about their pedagogical practice.

Despite being a small-scale study, it has the potential to make a contribution to practicing EC teachers by increasing their awareness of personal cultural heritage for reflection and self-review whilst working in a cross-cultural context. Future research in this area is required as immigrant early childhood educators are an underrepresented group in the research literature and contribute on a large scale to our early childhood sector.

### **Declaration**

This thesis is an original work of my research and contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

Signature: .....

Print Name: .....Siyan Jiang.....

Date: .....24/03/2022.....

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### **List of Abbreviations**

ABS	Australian Bureau of Statistics
CHT	Cultural-Historical Theory
DAP	Developmentally Appropriate Practice
DET	Department of Education and Training
EC	Early Childhood
ECE	Early Childhood Education
ECEC	Early Childhood Education and Care
EYLF	Early Years Learning Framework
Macro-SSD	Macro Social Situation of Development
Micro-SSD	Micro Social Situation of Development
MOE	Ministry of Education
NECPRC	National Education Committee of the People's Republic of China
SARs	Special Administrative Regions
SSD	Social Situation of Development
VEYLDF	Victorian Early Years Learning and Development Framework

## **Chapter 1: Introduction**

This study focuses on the ways Chinese heritage teachers understand and utilise play pedagogy in science teaching within Australian early childhood settings, and how the teachers' cultural heritage influences their perceptions and practice with regard to early childhood science education. In order to address the research problem of this study, this chapter first gives the background of the study and evaluates the current state of early childhood science education, which provides a basis for identifying where there is a need for greater understanding in the literature. The purpose, and the research questions of the study are then introduced, before describing the significance of the study. The theoretical and methodological frameworks are also outlined in this chapter, followed by an overview of this thesis.

### **Background of the Study**

In recent years early childhood education (ECE) (birth to age five) has emphasised the importance of cognitive outcomes for young children and providing academic foundations for school readiness (Elsbeth & Murray, 2018; Fler, 2011; Hakkarainen & Bredikyte, 2014; O'Sullivan & Ring, 2018). This growing trend has contributed to increased emphasis on the role of teaching and learning in the early childhood curricula of many countries. In Australia, the first national curriculum for early years (Department of Education and Training [DET], 2019) known as the Being Belonging and Becoming: Early Years Learning Framework was launched in 2009. This national framework is characterised by a combined pedagogical practice of play-based learning, and the pedagogical concept of intentional teaching, which stresses the importance of teachers' mediation in children's learning within playful environments (Fler & Hoban, 2012; Grieshaber, 2010). However, free play has long been privileged over teaching in Australian Early Childhood Education (ECE) (Grieshaber 2008,

2010; Leggett & Ford, 2013). This shift of emphasis from children's free play to teacher-involved programmes at a policy level, has led to a contradiction in practice between early childhood (EC) teachers' traditional beliefs about child-centred learning and their expectations to intentionally teach in support of increased child learning outcomes (Lewis, Fler, & Hammer, 2019). The shift in emphasis has implications for early childhood science learning where in the past, learning outcomes for science were not necessarily made explicit. The emerging tensions associated with teacher practice also potentially shape affordances for science learning.

### **Current Status of Early Childhood Science Education**

The tension between policy and practice is a current concern in early childhood science education. According to Fler (2017), the prevailing models of teaching science in ECE settings tend to focus on the provision of rich learning environments where discovery learning is promoted with minimal teacher involvement. The science teaching practices are likely to be based on EC teachers' pedagogical philosophy, and accordingly, quality science learning opportunities for young children are provided when children engaged with a materially rich play-based environment, thereby de-emphasising the role of the teacher in the exploration process (Fler, 2009a; Fler, Gomes, & March, 2014). These perspectives and practices prevail in Australian ECE and seem to be consistent with international research. For instance, Zhang and Birdsall (2016) in examining the ways 20 New Zealand EC teachers provided affordances for science learning, noted that a hands-off play pedagogy is the common pedagogical characteristic shared by the teachers, in which little scientifically meaningful teacher-child interactions is involved in the process of exploring the resources and environment.

It is recognised that a commonly held belief among EC teachers that free play is a natural form of young children's learning and development has been historically and ideologically ingrained in the ECE of many English-speaking countries, underpinned by

classical and developmental theories (Fleer, 2021; Grieshaber, 2010; Hedge, 2014). The prevailing view about play and learning may contribute to the tension between policy and practice within early childhood science education. However, in regard to international teachers working in Australia, for instance, Chinese heritage teachers who have been profoundly influenced by Chinese cultural ideas in which the attitude towards the role of play in children learning tends to be negative (Bai, 2005; Tobin, Hsueh, & Karasawa, 2009; Rao, Ng, & Pearson, 2010), are at the same time exposed to Western views through Initial Teacher Education courses and the social context of their workplace. Despite cultural distinctions in the understanding of the play-learning relationship between Australia and China, much of the EC science literature discusses teachers' perceptions and practice without considering the potential influence of teachers' cultural heritage on their pedagogy. Missing from current studies is an understanding of the role culture plays in the teaching of science in ECE.

### **Seeking A Nuanced Understanding from the Literature**

Many studies in science education are focused on individual teachers' personal perspectives, for example, teacher science knowledge and teacher confidence in science (Fleer, 2009a; Greenfield, Jirout, Dominguez, Greenberg, Maier, & Fuccillo, 2009; Zhang & Birdsall, 2016). However, little attention has been paid to examining the influence of EC teachers' cultural heritage on their pedagogy despite immigrant-born educators being an indispensable part of the ECE workforce in Australia. According to the unpublished 2011 Australian Census data, the proportion of immigrant-born staff accounted for 24.8% of the ECE workforce at a national level (Golebiowska, Boyle, Pennec and Horvath, 2018). Specifically, the permanent migrants whose country of birth is China (excludes Special Administrative Regions [SARs] and Taiwan) represent around 14.6% of the immigrant population in the State of Victoria (Australian Bureau of Statistics [ABS], 2016). Prior to the COVID pandemic, it was estimated that the number of immigrant-born educators in the Australian ECE workforce would continue to increase (ABS, 2016). Despite representing a

significant proportion of the ECE workforce, it is difficult to locate studies about immigrant educators from government publications and research literature (Golebiowska et al., 2018). Therefore, we know little about how teachers' cultural heritage influences their pedagogical decision-making in their science teaching, and how their own cultural expectations are further negotiated within a cross-cultural context. To seek a nuanced understanding of the cultural influence on EC teachers, this research explores Chinese heritage teachers' understanding of pedagogy used in their science teaching in Victorian early years settings.

### **Purpose of the Study**

The focus of the study reported is Chinese heritage teachers' understanding of ways play pedagogy is interpreted and used when teaching young children science in Australian contexts. The aim of this study is to gain a better insight into the cultural influence on immigrant-born teachers' pedagogical decision in the area of science education based on empirical data. It is expected the findings will inform an understanding of the interplay between the social environment and individual teachers working in a cross-cultural context.

### **Research Questions**

Based on the limited information in the literature concerning Chinese heritage EC teachers in Victorian settings, the following research questions are posed in order to explore the cultural influence on Chinese heritage teachers' perceptions and practice with regard to early childhood science education.

- In what ways is play pedagogy used in science education by Chinese heritage early childhood teachers, working in Australia?
- What influences early years teachers of Chinese heritage as they determine preferred pedagogical approaches for science education?

### **Significance of the Study**

Although a small-scale study, the findings may contribute to a greater awareness of the influence of cultural heritage when immigrant EC teachers make decision about their

pedagogical practice. Further, a deeper understanding of how play pedagogy and intentional teaching is used in science education by Chinese heritage EC teachers will be presented.

Using a cultural-historical (Vygotsky, 1987) theoretical understanding of EC teachers' perspectives can be further extended to gain insights into their daily practices.

### **Theory Guiding the Study**

Drawing on Vygotsky's (1987) cultural-historical theory to frame the study, it is recognised that his system of interrelated concepts informs an understanding of learning and development. Culture is presented in a broad way within Vygotsky's theory, and is seen as fundamental to learning and development. Vygotsky suggests that culture is a primary determinant of acquiring knowledge, and individuals learn from attitudes and beliefs situated in their own culture. However, due to the small scale and short timeframe of the study, the concept of the social situation of development is used to understand the relationship between the environment and the Chinese heritage teachers' use of play pedagogy in science education.

### **Outline of the Study**

Six early childhood teachers of Chinese heritage, working in different early childhood settings in Melbourne, Australia, were interviewed to gain insights into their use of play pedagogy in science teaching, and ways their Chinese cultural heritage informed their pedagogy (or not). In total, six hours of semi-structured interview data were collected. Data were analysed following Hedegaard's (2008c) three levels of interpretation, including common sense interpretation, situated practice interpretation and thematic level interpretation.

### **Overview of the Thesis**

The thesis is composed of eight chapters.

Chapter 1 states the background to the research problem and the rationale for conducting this study. This chapter also presents the purpose of the study, research questions,

and significance of the research. As well, the theoretical and methodological approaches are briefly explained, and the thesis structure is outlined.

Chapter 2 presents a critical review of empirical and theoretical studies in relation to different forms of play pedagogy prevalent in different cultural contexts, through reflecting the cultural and pedagogical differences in the understanding and use of play pedagogy in Australian and Chinese ECE contexts respectively.

Chapter 3 focuses on the theoretical framework of this study. This chapter first discusses three basic principles of cultural-historical theory, in order to explain why and how cultural-historical theory offers a frame for this study. This is followed by explaining the concept of social situation of development (SSD). Finally, Vygotsky's understanding of the ways culture informs learning and development is outlined.

Chapter 4 frames the methodology of this study and presents the detailed research design with the theoretical basis of methodological decisions of the design. In addition, it introduces the selection and background information of participants, data collection, data analysis, and ethical considerations of this study.

Chapter 5 explicitly answers Research Question one of this study. This chapter presents the findings related to Chinese heritage teachers' perspectives and their self-reported practice concerning the use of play pedagogy when teaching children science in Australian ECE settings.

Chapter 6 explicitly answers Research Question two of this study. This chapter presents the findings which argue that the interplay between the Australian social environment and the six Chinese heritage teachers' personal life experience create opportunities for the teachers to make decisions about their different teaching styles of science.



Chapter 7 is the discussion chapter of this study, which brings together the empirical work and theory to further synthesise and discuss the findings pertinent to the two research questions. This chapter indicates the coexistence of the similarities and differences in the use of play pedagogy by the six Chinese heritage teachers in Australian ECE contexts. It is argued that recognising the reciprocity between the social situation and the individual is essential to understand the influences of culture and ways this supports teachers to utilise different pedagogies when teaching young children science.

Chapter 8 brings together the literature, theory and findings to summarise new understandings. The study is concluded through overall concluding remarks, which is followed by recommendations for future research, and implications for literature and practice.

## **Chapter 2: Literature Review**

### **Introduction**

This chapter presents a review of empirical studies in relation to the diversity of play pedagogy in Early Childhood Education (ECE) in Australia and China. First, the review outlines the importance of immigrants to Early Childhood Education and Care (ECEC) in Australia. Second, the current policy and practice of play pedagogy prevalent in Australian early childhood science education is discussed. Finally, the review presents an overview of Chinese ECE and changes in policy. This chapter then concludes with a summary to highlight the need for the current study.

### **Setting the Context-Immigrant-born Early Childhood Educators in Australia**

Influenced by Australian annual immigration program, immigrant-born educators have become an indispensable part of the ECEC workforce in Australia. According to the unpublished 2011 Australian Census data, Golebiowska, Boyle, Pennec and Horvath (2018) found that the proportion of immigrant-born staff accounted for 24.8% of the ECEC workforce at a national level. Prior to the COVID pandemic the proportion was estimated to be increasing. As shown in the Australian Census and Migrants Integrated Dataset, the total immigrant population in the State of Victoria was 601,756 in 2016 and Victoria is generally ranked as the second largest immigration state or territory in Australia (Australian Bureau of Statistics [ABS], 2016). Therefore, considering these statistics, it can be reasonably anticipated that the immigrant-born educators are likely to have a critical role in the provision of ECEC services across Victoria. Here it should be mentioned that permanent migrants whose country of birth is China (excludes Special Administrative Regions [SARs] and Taiwan) represented around 14.6% of the immigrant population in Victoria, only after migrants from India (17.9%) (ABS, 2016).

Despite representing a significant proportion of the ECEC workforce in Australia, it seems that immigrant-born educators do not receive enough attention in the literature. As Golebiowska et al. (2018) suggest, it is difficult to find available information about immigrant educators in Australia because they seem to have been excluded from government publications. For example, in the national 2010, 2013 and 2016 ECEC workforce censuses (DET, 2011, 2014, 2017), an overview of the ECEC workforce was mainly presented from demographic areas such as age, gender, and qualifications, but there was little information about immigrant-born educators irrespective of the census drawn upon. It is apparent that more could be done to find out about this important group who contributes to Australian early childhood workforce. If this gap persists, the ability of policy makers and early childhood professionals to understand the discrepancy between policy and practice may be limited. Therefore, to address the need for more information in this area, a brief overview of the cultural and educational traditions within Australian and Chinese society will be presented respectively in the following sections, on the basis of which valuable insights will be gained into Chinese heritage educators' perspectives on science education in the early years.

### **Play Pedagogy in Australian Early Childhood Education and Care**

#### ***Intentional Teaching in the Early Years Learning Framework (EYLF)***

The interpretation and definition of adult-guided play varies considerably according to different cultural and political backgrounds (Fleer, 2021). In the Australian context, adult-guided play, when there is an intent to teach about a given cognate area, is also known as 'intentional teaching' (see the national framework *Early Years Learning and Development Framework: Belonging, Being and Becoming* [EYLF], Department of Education and Training [DET], 2019). The EYLF is characterized by a combined pedagogical practice of play-based learning and intentional teaching to stress the importance of teachers' mediation in the promotion of children's learning within a play-based curriculum (Grieshaber, 2010). In the

EYLF, intentional teaching is understood as “involve[ing] educators being deliberate, purposeful and thoughtful in their decisions and action. Intentional teaching is the opposite of teaching by rote or continuing with traditions simply because things have ‘always’ been done that way” (DET, 2019, p. 17). Teachers are encouraged to actively provide intellectually challenging interactions with children and plan opportunities for intentional teaching to help them foster high-level thinking skills, by using a variety of strategies, such as open questioning and shared thinking. Nevertheless, as its definition demonstrates, the intentional teaching approach implemented is distinguished from formalised teaching prevalent in schools for those aged five and above, but is deeply embedded in a rich playful context.

***The Integrated Approaches in the Victorian Early Years Learning and Development Framework (VEYLDF)***

To better elaborate on intentional teaching in a play-based context, it is advocated in the state of Victoria, that early childhood professionals use integrated teaching and learning approaches to advance young children’s knowledge and skills. The integrated approach is a key practice principle in the Victorian Early Years Learning and Development Framework (VEYLDF) (Department of Education and Training [DET], Victoria, 2016). The integrated approach is comprised of three specific learning types, namely adult-led learning, child-directed play and learning, and guided play and learning (DET, Victoria, 2016). According to the VEYLDF, adult-led learning involves play experiences and other teaching opportunities that are deliberately planned by teachers based on their knowledge of children (DET, Victoria, 2016). Child-directed play is largely centred around children who can lead their own learning in an exploratory process, with the adult’s role as an observer (DET, Victoria, 2016). Different from adult-led and child-directed learning, guided play and learning focuses on the educator’s active involvement in children’s play, with an emphasis on capturing spontaneous teaching opportunities that arise from play (DET, Victoria, 2016). It is clear

from the VEYLDF that the three approaches are equally valued and advocated. Central to the integrated approaches is that early childhood teachers are able to make purposeful and deliberate choices about pedagogical approach within their own particular contexts. For example, it is essential for teachers to make decisions about what concepts and knowledge should be introduced to children and how this should be done, while at the same time it is vitally important for teachers to make judgements about “whether, when and how to intervene in children’s learning”, or simply choose to observe rather than participate (DET, Victoria, 2016, p. 15). The integrated approaches can be seen as further elaboration of the definition of intentional teaching in the EYLF (DET, 2019). Therefore, the two terms will be used interchangeably in the study.

As an example of integrating different approaches, the model of teacher-guided play, named as Scientific Playworlds, was put forward by Fler (2017) to support science learning in the early years. In this model, the role of early childhood teachers is significantly foregrounded in a more proactive and cooperative way, different from the role when engaging in a passive academic-oriented play pedagogy (see Appendix 1 for three modes of play pedagogy). Specifically, in Playworlds, teachers are encouraged to create and share collective imaginary situations with children through building a problem-involved play narrative together. In the process of solving the problem, young children are given the opportunity to understand and utilise scientific concepts in a contextualised play narrative. A distinguishing feature of this approach is that play is utilized to support young children’s concept formation within the play-based program. Spontaneous teachable moments are embedded in child-initiated play, with an emphasis on children’s science-related interest arising from their play. Based on this model, teachers are encouraged to make full use of ‘improvisation’ to spontaneously create a supportive environment regarding children’s interest to further promote their learning about science. As Duncan (2009) argued, the

recognition and response to any and every opportunity in which children's learning can be developed and extended should be expected from an intentional teacher, "whether that learning be child-initiated, teacher-initiated, routine, planned or unexpected" (p. 1). Scientific Playworld is a model that integrates child and teacher-initiated play and learning into an organic whole, providing an opportunity for learning science in a playfully contextualised environment.

### ***The Gap between the Proposed and the Implemented Curriculum***

Influenced by developmental theories, free play has long been privileged over teaching in Australian ECEC (Grieshaber 2008, 2010; Leggett & Ford, 2013). As Fleer asserted (2009b), a common belief among Australian early childhood professionals is that young children are able to learn 'something' on their own through engaging with the environment in the process of free play. As a result, it appears that the notion of intentional teaching is not easily embraced by Australian teachers working in early years settings. Numerous studies indicated that many early childhood teachers showed reluctance or unwillingness to implement intentional teaching in their practice so that teacher's guidance in child play is marginalised or silenced to some degree (Cherrington, 2018; Kilderry, 2015; McLaughlin, Aspden, & Snyder, 2016; Tayler, 2016; Thomas, Warren, & deVries., 2011). For instance, within the research into preschool teachers' involvement in children's play, the results demonstrated that the amount of time teachers spent in play activities was minimal, which was directly connected to a belief that teachers usually viewed their roles in children's play as narrator, material provider, observer and enquirer, rather than play partner (Devi, Fleer, & Li, 2018).

There is little doubt that the understandings of and practice about the play-learning relationship held by Australian early childhood teachers have an impact on teaching used in science activities. Before illustrating the argument with concrete examples, it is important to

note that the nature of Australian ECEC curricula is intended to be indicative instead of prescriptive, irrespective of whether it is at the federal or state level. The five learning outcomes advocated in the EYLF (DET, 2019) are not directly oriented towards any specific content knowledge. For example, science is not explicitly mentioned in the curriculum and therefore it is not compulsory for young children to achieve any specific learning objectives regarding science. Fler, Gomes, and March (2014) found that in the Australian context, teachers were inclined to employ an informal program when teaching science to young children. For instance, a discovery-based approach has been prevalent in Australian early years science classrooms, where rich science-related materials and equipment are displayed in a playful environment named as science corners or centres, and children are expected to learn about science through an exploratory process (Fler, 2015b). It is not uncommon for early childhood teachers to perceive science knowledge as embedded in children's day-to-day experience leading to an expectation that children are bound to pick up 'something' about science on their own (Edwards and Loveridge, 2011; Fler, 2009a). On the basis of the available evidence, it can be concluded that child-led play and learning seems to have a dominant role in Australian early childhood science education. As stated earlier, child-led play is clearly advocated in the Australian ECEC frameworks in which three play modes are equally valuable and pedagogically significant. However, learning may become inefficient or even problematic when one type of play has a predominant role (Wood, 2014).

## **Play Pedagogy and Science Education in Chinese Contexts**

### ***The Understanding of Play in Traditional Confucian Culture***

Although culture is dynamic and changes, Confucian culture has historically exerted a strong influence on Chinese peoples' beliefs about education, and still does (Bai, 2005). In this context, play is not encouraged and even disliked. Specifically, as Bai (2005) asserted, the image of a proper child in Confucianism is usually expressed as 'young but mature' (i.e.,

shaonian laocheng). A young child who displays naïve and childish behaviour is often criticised by Confucian educators, whereas a child who seems mature and sophisticated is highly respected as this type of behaviour is expected of a young child. As a result, in Confucian classics there are anecdotes about mature behaviours when they were young (see Confucius, 475 B.C.E./1938; Rao, Ng, & Pearson, 2010).

While belief in the benefits of early years learning (qimeng) is argued for in many Confucian educators' writings, learning through play is seldom encouraged in Confucian culture (Bai, 2005). Historically in 812, Han Yu a famous Chinese scholar asserted in his work *Explanation Upon Entering the Academy* that "Study excels with diligence and becomes neglected with play" (2009, p. 2). Chinese society is influenced by Confucian culture and therefore, a belief prevails that play is likely to impede children from excelling at their academic performance and it should be discouraged to a certain extent. However, many Confucius scholars (e.g., Wang Yangming, 1518/1963) agree that play is part of the characteristics of a child. Bai (2005) analysed ancient works from China and found that play is not completely missing in the daily life of children in ancient China as depicted in Confucius' writings. Nevertheless, while play may be noted in the life of young children, there is little doubt that in Confucian culture play is generally regarded as a factor contributing to failure of children's learning (Bai, 2005; Rao et al., 2010).

In general, Confucian educators tend to be negative about the relation between play and learning. The understanding of play that prevailed in ancient China seems to have persisted into present-day Chinese society and inevitably exerts an influence on Chinese early childhood education and care (ECEC). According to Tobin, Hsueh, & Karasawa (2009), in many Chinese preschools, play is usually utilised as a break between children's learning activities or a reward for children who behaved well and studied diligently. Although this seems to be changing (see Hu, Fan, LoCasale-Crouch, Chen, & Yang, 2016; National



Education Committee of the People's Republic of China [NECPRC], 1989), there is little evidence in the literature that demonstrates that play is integrated into the Chinese ECEC curriculum in ways which align with the way play is understood in English speaking countries.

### ***The National Curriculum and Challenges with Chinese Early Childhood Education***

Alongside the traditional Confucian culture, Chinese ECE reflects the influence of Western views about child learning and development (Zhu and Wang 2005; Zhu and Zhang 2008). Beginning in 1989, the Chinese government initiated ongoing reforms in the early childhood curriculum. The NECPRC (the former Ministry of Education) issued the Kindergarten Work Regulations and Procedure in 1989, with an emphasis on child-initiated play and the importance of free play for children. The Regulations (NECPRC, 1989) adopted a number of progressive early childhood theories and pedagogical practices from English speaking countries. However, it was found that the intended pedagogy did not match Chinese deep-rooted cultural traditions, and the EC teachers' understanding and implementation of teaching and learning in early years (Wang and Mao, 1996). To solve these issues, in 2001, a trial version of the Guidance for Kindergarten Education was released by Ministry of Education [MOE].

In contrast to the Regulations, the new Guidance considers the wide discrepancy between Western progressive theories, and Chinese social and cultural ecology (Zhu & Zhang, 2008). The Guidance (MOE, 2001) privileges children's free play and argues that play should be the main activity in kindergarten, which marks a significant shift from the traditional focus on academic learning deeply ingrained in Chinese society (Hammer & He, 2016). The document outlines five content areas for kindergarten children to learn including health, language, science, art and society, but does not describe these areas with the intention of focusing on academic learning. For example, science is introduced in the 2001 Guidance

(MOE) as a primary learning area, but there are no compulsory learning objectives for children to achieve in the early years. Instead, emphasis is placed on the creation of a science-rich environment and the implementation of science teaching in a contextualised way. In China, there are ‘guidance centres’ that aim to support young children in developing an interest in science phenomena that surround them, rather than the delivery of scientific knowledge (Oon, Hu, & Wei, 2019).

Current research shows that the shift from a teacher-dominated approach to a more child-centred approach has been clearly demonstrated in Chinese ECE curricula over the last decade, but the changes in teacher practice seem to be relatively slow (Hu et al., 2016). Studies reporting on Chinese early childhood teachers’ practice in the classrooms, indicate that while many teachers, tend to agree with the child-centredness approach at a philosophical level, they do not necessarily implement this in practice (Hu, 2015). For example, the majority of activities and programs in kindergarten are implemented in a whole group situation, through explicit teaching, especially in the rural areas of China (Hu & Roberts, 2013; Tobin et al., 2009).

According to Hu and Roberts (2013), despite this situation, free play is clearly advocated in the Guidance (MOE, 2001), and many ECE teachers in rural areas remained reluctant to give young children opportunities for free play, because they did not regard play as “pedagogically sound” teaching approach (p. 318). Hu (2015) observed teachers’ enacting practices in 105 classrooms from 16 kindergartens in an urban city of China, Hangzhou. He found that although free play was scheduled in all the classrooms, it was mainly the teachers who organised and led children’s free play due to their concerns about losing their teacher identity. Similar findings are also identified in the research into early childhood science education in China. Hammer and He (2016) found that Chinese teachers usually prepared a detailed plan for science activities within a strict time schedule, mainly aimed at helping

children develop relevant investigative skills of science rather than learning through play. Despite changes in policy towards child-initiated play in early childhood settings, the dominant mode of play pedagogy in Chinese ECE tends to fall into academic-oriented play (see Appendix 1), usually manifested in explicit teaching by the teacher. The wide discrepancy between ECE policy and actual practice has attracted a lot of public attention in China so that recently a Notice is issued regarding the management of the schoolification of early childhood (MOE, 2018). It is clearly stated in the Notice that all kindergartens are firmly prohibited from teaching young children any content knowledge that is outlined in the primary school curriculum.

### **Three Main Models of Play Pedagogy in Early Childhood Education**

Under the growing influence of cultural-historical theory, promoting children's learning and development through teacher mediation in play (i.e., play pedagogy) has been widely emphasised and valued in early childhood education in some places around the world (see Fler, 2017; Weisberg, Hirsh-Pasek, & Golinkoff, 2013; Wood, 2008). However, there have been different types of play pedagogy prevalent in ECE due to the socially and culturally constructed nature of play. There are three modes of play each used with different pedagogical intentions, including child-initiated play, academic-orientated play and adult-guided play (see Appendix 1 for discussion concerning these types of play pedagogy).

### **Conclusion**

When explaining the Australian and Chinese contexts, the defining characteristics of play pedagogy prevalent in their respective ECEC, to a large extent, align with the cultural mores and educational traditions that have been deeply ingrained in their respective society. For example, child-initiated play tends to have a dominant role in Australian early childhood science education, whereas in China, early childhood teachers seem to feel more comfortable when utilizing explicit teaching with science.

Here it must be emphasised that the contextual descriptions of the two countries concerning ECEC are largely based on empirical studies which provide little information on cultural backgrounds of participants. It seems there are few empirical studies that have focused explicitly on cultural aspects of early childhood teachers in China and Australia, much less on diverse cultural communities in relation to science teaching. Moreover, despite providing the cultural backgrounds of the participants, the potential influence of cultural heritage is seldom explored in relevant research (Rogoff, 2003). There seems to be very little understanding about the ways play pedagogy is used by Chinese heritage early childhood teachers working in Australia and the influence of their Chinese heritage as they determine their preferred pedagogical approaches when teaching science in ECEC in Australia. The next chapter will outline the cultural-historical theoretical focus, paying attention to the underlying principles that inform the study and the concept of the social situation of development.

## **Chapter 3: Theoretical Framework**

### **Introduction**

Grounded in cultural-historical theory (CHT), this chapter first explains three basic principles of CHT that are directly related to the topic of this research: a. the historical dimension; b. the process of development; c. the environment as a source of development. These principles provide a foundation for understanding the concept of the social situation of development (SSD) and Vygotsky's notion of culture pertinent to this study.

Lev Semyonovich Vygotsky established cultural-historical theory (CHT), which is also known as non-classical psychology (Kravtsov & Kravtsova, 2010; Veresov, 2010). In CHT, the social environment is conceptualised as a source of an individual's learning and development. The reciprocity between the social environment and the individual contributes to development of higher mental functions or conscious thought (Vygotsky, 1987). Vygotsky put forward the argument that the interaction between social, biological development and the environment are inseparable in development of the human mind. This differs from traditional psychology, where psychological processes, cognition and the environment are understood as separate or discrete entities. In these understandings, the social becomes secondary to biological factors in the development of the human mind (Rogoff, 2003; Veresov, 2010).

Vygotsky's interwoven system of concepts are influential in contemporary psychology because "his ideas provide a corrective to the tendency to isolate individuals from their sociocultural milieu" (Wertsch & Tulviste 1992, p. 554). The social origins of individual mental functioning are extensively emphasised in a number of concepts and principles of CHT (Veresov, 2010). Together, the individual concept and principles aim to provide understanding of the complex processes of human mind development. It is essential that all dimensions be understood as an indispensable part of the developmental process (Veresov,

2010). Each concept is closely interrelated, and all are situated in an overall theoretical framework.

### **Three Basic Principles of Cultural-Historical Theory**

#### ***The Historical Dimension***

The historical dimension of an individual's development is one of the key features of CHT. However, there usually exists a superficial understanding of history as simply identified as the past (Vygotsky, 1997). This understanding may contribute to "an impassible boundary between historical study and the study of present forms" (Vygotsky, 1997, p. 42). Influenced by this idea, investigating the study of past forms is used to understand and explain the phenomena that occur in the present (Vygotsky, 1997). However, the study of the past is not the intended purpose of including the historical dimensions in CHT. Rather, Vygotsky (1997) argued that "to study something historically means to study it in motion" (p. 43). This indicates that a historical study represents the whole process of development including all its phases, from the past forms to the present ones, thereby forming the basis of the theoretical understanding of development (Vygotsky, 1997). This is important to the positioning of the current study as the culture of Chinese immigrant early childhood teachers has a past and current dimension included. The Chinese heritage teachers learn about Australian culture and develop their own culture as they live and work in Australia, potentially moving through a process of change and transformation due to new learnings in new social situations.

#### ***The Process of Development***

From a cultural-historical perspective, on the one hand development can be seen as complete or 'dead' at one time (i.e. a result of the development), but on the other, the functions of the development that are completed still live at the same time and continue

moving together within the new stages of development (Vygotsky, 1997). As stated by Vygotsky (1997):

The fact that these functions died and live at one and the same time, move together with a living system in which they are included and were also fossilized allows us to find in them the indispensable *what* that interests us in the process of development.

This *what* must also lie at the base of the formula, of the method which we seek, must form its real basis and transform it into an analog of a true process. (p. 44)

Veresov (2014) argued instead of the higher mental functions per se under study, it is the dynamic process of their development that significantly features in the cultural-historical theoretical framework. Understanding principles and drawing on concepts originating from CHT enable the researcher to explore the dynamics of an individual's learning, and their changes through identifying the turning points that emerge from social interactions (Veresov, 2014). Therefore, understanding the current social environment from the Chinese immigrant early childhood teachers' perspectives when implementing the Australian curriculum and pedagogy is important for understanding their cultural and pedagogical development.

### ***Social Environment as a Source of Development***

The environment should not be considered as “a condition of development” which exists as a separate entity to facilitate the process of development (Vygotsky, 1994, p. 339). On the contrary, Vygotsky (1998) viewed the social environment as a source of development. However, it should be noted that the social environment is not “an automatic source of development, but relations and interactions in a given context are the source that enables a significant change in developmental path” (Nasciutti, Veresov, & de Aragão, 2016, p. 91). The relationship that exists between the individual and his or her environment should be taken into consideration when understanding the role of environment in development. The interaction between the environment and the individual is largely centred on the environment-

individual relationship, instead of the environment or the individual per se. This is consistent with Schutz's conception of the social world that is "something we have to modify by our activities and that modifies our activities" (2005, p. 73). Therefore, it is the mutual influence of the individual and the environment on each other that is a defining characteristic of the relation between the environment and the individual. Vygotsky (1994) stated this influence is less likely to rely solely on the nature of the situation itself, but it also involves the varying degree of the individual's understanding and awareness of the situation, and what they bring from their own history, culture and experience into the situation. This mutual influence can be further discussed through explaining the concept of the social situation of development (SSD) in the following section.

### **Social Situation of Development (SSD)**

We must admit that at the beginning of each age period, there develops a completely original, exclusive, single, and unique relation, specific to the given age, between the child and the reality, mainly the social reality, that surround him. We call this relation the social situation of development at the given age. (Vygotsky, 1998, p. 198)

Vygotsky used the social situation of development (SSD) to describe the initial state of an ongoing social relation between the individual and their social contexts at any developmental stage (Irvine, Davidson, Veresov, Adams, & Devi, 2015). Vygotsky's (1998) understanding of the SSD is focused on child development and he argued "the initial moment for all dynamic changes that occur in development during the given period" (p. 198) and therefore determined the developmental trajectory of an individual during a certain psychological age period. However, the focus in the current study is on adults, and according to Veresov (2016), within this definition there is a tendency to define individuals' developmental paths and reconstruction of higher mental functions from a long-term



perspective, thereby being referred to as “macro social situation of development” (Macro-SSD).

However, as outlined in the principles of CHT discussed earlier, it is the constantly changing nature of learning that characterises the developmental process of the human mind. An individual’s development does not usually make a leap forward, but rather, there are a series of “micro-dramas” and “micro-crises” which would contribute to the changes in a person’s learning and developmental path (Veresov, 2016, p. 133). As Veresov (2016) stated, these changes tend to be defined from a short-term perspective, and the micro-dramas and crises’ contribution to the reorganisation of the psychological system can be significant. Veresov goes on to suggest these crises form as “micro social situation of development” (Micro-SSD) and are not specific to the given age of the individual but are “mostly the result of changes in social environments as the [individual] is always part of a certain social situation” (2016, p, 133). The Micro-SSD de-emphasises the role of age and provides the opportunity to gain an understanding of the dynamics of human mind development through capturing micro-dramas and micro-crises embedded in the everyday life of individuals (Veresov, 2016). In relation to Chinese heritage teachers working in Australia, the micro and macro SSD contribute to understanding ways play pedagogy is used in science education by Chinese heritage teachers.

The use of SSD supports the analysis of an individual’s developmental trajectory that depends on the social interactions they are involved with, and consideration of the active influence of individuals on the interactions (Irvine et al., 2015). As Vygotsky (1994) stated, “the influence of environment on development, ..., also have to be assessed by taking the degree of understanding, awareness and insight of what is going on in the environment into account” (p. 346). Each individual’s experience of their social reality is unique, as the person brings their own historical experiences and who they are into a situation and in turn the social

situation influences the person. Roth and Jornet (2016) define the relationship between the environment and the individual as a transaction where both are indispensable, thereby emphasising the impossibility of separating individual and social environment in the development of the human mind. In the current study, the relation between Chinese heritage early childhood teachers and their environment depends on their change of context, namely the contextual shift from China to Australia and also on the degree to which the teachers become aware of, interpret, emotionally relate to their environment and the changes experienced within. Each individual has a different experience as they bring with them their own history and interact with the environment pertinent to their own SSD. Therefore, it is important to find out about the environmental influences on Chinese heritage teachers as they determine their preferred pedagogical approaches. Recognising the reciprocity between the environment and individuals is important to understanding the notion of culture within CHT.

### **The Notion of Culture in Cultural-Historical Theory**

“Culture creates special forms of behaviour, it modifies the activity of mental functions, it constructs new superstructures in the developing system of human behaviour” (Vygotsky, 1997, p. 18).

This quotation provides Vygotsky’s account of culture and suggests that culture plays a crucial role in the emergence and modification of an individual’s higher mental functions and processes. However, according to Wertsch and Tulviste (1992), Vygotsky’s “understanding of culture is shown to be derivative of his account of the “psychological tools” that mediate human mental functioning” (p. 548). This can be further demonstrated in his well-known general genetic law of cultural development of higher mental functions:

“Every function in the cultural development on the child appears on the stage twice, in two planes, first the social, then the psychological, first between people as an intermental category, then within the child as an intramental category” (Vygotsky, 1998, p. 106).

The law indicates that although humans may seem autonomous from their social contexts, they are inherently socially and culturally constructed through mediating intermental and intramental functioning with cultural tools (Wertsch & Tulviste, 1992). Although the notion of culture per se is not well developed or fully elaborated in Vygotsky's theory (Wertsch & Tulviste, 1992), the issue in the current study is understanding what influences Chinese heritage teachers' preferred pedagogical approaches for science education, specifically as these individuals are situated in a culture that they did not grow up in. Although Vygotsky does not develop his understanding of culture, contemporary researchers have concentrated on developing understandings of culture related to CHT (see Chen, Fu, & Zhao, 2014; Correa-Chávez & Rogoff, 2005; Rogoff, 2003).

Culture should be viewed as a dynamic process that individuals are actively involved with, instead of as a "a static social address of individuals" (Rogoff, 2003, p. 78). According to Rogoff (2003), the behaviour or thought of individuals who belong to a cultural community is frequently conceptualised as a static outcome of their cultural influence. Therefore, studies regarding culture have a tendency to explore the influence of culture on individuals through measuring some characteristics of culture and some characteristics of individuals to assess whether or not they correlate with each other (Rogoff, 2003). This is based on an unspoken assumption that culture is static and its influence on individuals is overly emphasised, but each individuals' contribution to culture is often ignored (Rogoff, 2003). However, Vygotsky (1981) stated that "Culture is the product of social life and human social activity. That is why just by raising the question of the cultural development of behaviour we are directly introducing the social plane of development" (p. 164). Through the process of historical development, culture can be constantly changing as a result of individuals constantly changing, transforming and creating cultural behaviours (Vygotsky, 1997). An example is migration, where immigrants bring their own culture to another country

in which they live and work, which in turn may enable the merging of their own and the local cultures into their own understanding.

### **Conclusion**

Overall, this chapter presented a brief outline of three main principles of cultural-historical theory and the concept of the social situation of development, all of which help to orient and guide this research project. The next chapter will introduce the methodological framing and methods used in this study.

## **Chapter 4: Methodology**

### **Introduction**

The aim of this chapter is to explain the methodology and research design employed in this study. The principles of cultural-historical theory are discussed first, on the basis of which methodological understanding related to the theory is further expanded. Specifically, a wholeness approach developed by Hedegaard and Fleer (2008), detailed in Hedegaard's (2012) model is used in this study as a concrete cultural-historical methodology. Second, the chapter details the research design for investigating Chinese heritage teachers' interpretation and implementation of play pedagogy while teaching young children science in Australian contexts. It involves several sections such as the selection and background information of participants, data collection, data analysis, trustworthiness and ethics.

### **Rationale for Cultural-Historical Methodology**

Finding a method is one of the most important tasks of the researcher. The method in such cases is simultaneously a prerequisite and product, a tool and a result of the research... The method must be adequate to the subject studied. (Vygotsky, 1997, p. 27)

Vygotsky's statement highlights that decisions about methodology are critical to the success of any research. The chosen method shapes every aspect of the research protocol and informs the researcher's way of thinking about the preparation stage, the data generation process, analysis, and the final presentation of the work. Hence, any rationale for selecting a particular methodology must be informed by a need to provide the most appropriate plan for addressing the research problem and answering the research questions (Merriam, 1998). The aim of this research project is to investigate how early childhood teachers of Chinese heritage, presently working in early years settings in Australia, interpret and implement play pedagogy in their science teaching. To fulfil this aim, two research questions are posed:

- In what ways is play pedagogy used in science education by Chinese heritage early childhood teachers, working in Australia?
- What influences early years teachers of Chinese heritage as they determine preferred pedagogical approaches for science education?

The following sections will focus on how a rationale is developed as a dialectic between the aim of this research and the defining features of cultural-historical research methodology. First of all, three basic principles of Vygotsky's cultural-historical theory (see Chapter 3) will be briefly discussed, the understanding of which can provide a foundation for the methodological design of this study based on its particular research aim.

### ***Basic Principles of Vygotsky's Cultural-Historical Theory as Applied to the Study***

First, Vygotsky highlighted the importance of the historical dimension of human development. Vygotsky (1997) argued that the historical study involves all the stages of development from the past to the present, during which particular emphasis is placed on the whole process of development instead of the result of development at a certain point. This is closely related to the second principle of cultural-historical theory as applied to this study. As Vygotsky (1997) stated, "any higher form of behavior not as a thing, but as a process..." (p. 68). Third, in Vygotsky's theory the social environment is not considered as an external factor that creates the conditions for human development (Vygotsky, 1994). On the contrary, Vygotsky (1998) viewed the environment as a source of development (see Chapter 3). Nasciutti, Veresov and de Aragão (2016) emphasised that it is the relations and interactions between the environment and individuals that enable the individual to experience a qualitative change in his or her developmental path, and therefore the role of environment as a source of development should not be viewed as an automatic. It is important to remember that when understanding the environment-individual relationship the two essential dimensions cannot be separated but are viewed in unity (Vygotsky, 1998).

The principles above, to a certain extent, demonstrate a cultural-historical understanding of learning and development, which is relevant to the specific aim of this research. In this study the potential influence of the Chinese culture and traditions is considered while investigating how play pedagogy within science education is conceptualised and implemented by Chinese heritage teachers. This consideration is primarily based upon an assumption that individuals who live in a shared community, engaging in the same types of cultural events and traditions are more likely to share some similarities in their learning, development and corresponding behaviours (Chen, Fu, & Zhao, 2014; Correa-Chávez & Rogoff, 2005; Hedegaard, 2008a). This research is framed by cultural-historical theory, and emphasis will be placed on development in motion, where understanding the influence of Chinese culture and traditions on Chinese heritage teachers will be considered as ongoing and constantly changing, particularly as the teachers interact within Australian early childhood contexts. Specifically, for Chinese heritage teachers presently working in Australia, the research will note their decision-making process for selecting certain pedagogies and how this is likely to be influenced by Australian early childhood policies and institutions. Furthermore, the relation between Chinese heritage teachers and their environment will be examined considering the change in the context that each teacher has experienced, namely the contextual shift from China to Australia, and each teacher's understanding, awareness and insight about what is different in their new environment. For example, the type of play pedagogy valued and advocated in Australian contexts, and how this pedagogy is interpreted and understood by Chinese heritage teachers.

### ***A Wholeness Approach***

On the basis of Vygotsky's cultural-historical theory, Hedegaard and Fleer (2008) have advanced his legacy to provide researchers with a methodological framework so that the complexity of the relationship between the environment and individuals can be better

conceptualised. This framework is referred to as a wholeness approach (Hedegaard, 2008b). A wholeness approach seeks to capture different perspectives embedded in the settings with which the individual interacts, thereby conceptualising the conditions and the individual's development as a whole across time and institutions (Fleer, 2008b; Hedegaard, 2008b). In the research framed by a wholeness approach, the development of an individual is conceptualised as a dialectic between the individual and his or her social situation.

### ***A Modified Hedegaard's Model***

Hedegaard (2012) developed an analytical model to better illustrate various institutions in which a person participates across society, in which different perspectives can be presented. In this model, the individual's activity can be interpreted from three different perspectives, including societal, institutional and individual perspective. The societal perspective, involves cultural, educational and economic conditions within a society, and includes structures and practices in various institutions created from societal demands (Hedegaard, 2012). The institutional perspective refers to institutional practices inherent in social institutions, including the conditions created for everyday activities (Hedegaard, 2012). The individual perspective in the model places particular importance on how an individual can be aware of, react to and understand his or her own social situation. During the process, individuals are not viewed as passive receivers of the social context but as active contributors to their own developmental path.

Hedegaard's (2012) original model has been adapted to suit the context of this study. The participants of this research have a different cultural background from those working in the Australian early childhood settings. The potential cultural influences within the day-care practice may inform the Chinese heritage teachers' practice. In this study the influences of Chinese culture and traditions on the teachers were garnered through each individual's perspective as they work in the Australian early childhood settings. The underlying



assumption is that it is necessary to understand an individual on the basis of his or her earlier experiences, yet it is also vital to take into consideration the new environment they are currently experiencing (Schutz, 2005).

## **Research Design**

This study is framed by cultural-historical methodology in which Vygotsky (1997) expressed a strong preference for qualitative research methods when examining the developmental process of any higher mental functions. This methodology is intended to generate an in-depth, multi-faceted understanding of a complex phenomenon. In the current study, the aim is to understand how an early childhood teacher's science teaching practice was shaped by cultural background, personal professional knowledge and professional context. This intention informed the selection of participants, the type of data to be collected and the approach to data analysis undertaken in this research.

## **Selection of Participants**

### ***Purposive Sampling***

“There's an old saying that you never really know your own language until you study another. It is the same with race and class” (Conley, 2000, pp. xi-xii).

As the quotation demonstrates, the cultural aspects of everyday life may be less visible to people who are familiar with the ways they have been living across generations, so that they tend to view their own cultural practices, traditions and values as normal or even natural (Perry, 2001). In other words, it would be easier for people who have experienced variations in cultures to become aware of their cultural origins. Rogoff (2003) stated that “to understand the cultural basis of human development in all communities---especially any that we are accustomed to---it is crucial to examine other ways of doing things” (p. 85). Based on this perspective and the specific research aim, purposive sampling was utilised in this study to identify appropriate participants who would best inform the research questions and

enhance understanding of the phenomenon under study (Bryman, 2016). Key criteria were used to ensure a homogeneous participant cohort sharing similar characteristics. These criteria include:

- **Early Childhood teachers of Chinese heritage:** It was essential that participants were early childhood teachers of Chinese heritage. To meet this criterion, participants must have completed their initial schooling in China and then completed their pre-service teacher education (e.g., Bachelor or Master degree) in Australia, specialising in early childhood education.
- **Teachers currently working in Early Childhood settings:** Participants needed to be presently working in an early year educational setting. This was an important criterion as it was critical for the researcher to investigate participants' understanding of play pedagogy in science education.
- **A range of educational settings:** A variety of early years settings were more likely to provide rich information about how specific considerations influence teachers' understandings and corresponding practice about play pedagogy in science education.

As Crouch and McKenzie (2006) assert, a large sample size, that is more than 20, may compromise the opportunity of getting close engagement with participants and generating intensive data. Therefore, a small sample size of six participant teachers was considered suitable for this research. This sample size aligns with the intentions and design of the research method, the criteria defining participant suitability, and the required emphasis on understanding the influences which shape preferred pedagogical practice.

### ***Recruitment Process***

As Bryman (2016) noted, gaining access to a social setting is likely to be one of the most difficult steps in qualitative research. In the process of recruiting participants, the researcher initially utilised her professional networks and then randomly contacted managers

or directors of a variety of centres to identify early childhood teachers within those settings who met the specific selection criteria. Flyers were displayed within these centres inviting educators to contact the researcher if they met the participant criteria and were willing to be involved in the study (See Appendix 4 for invitation flyers). A total of six early childhood teachers from five early years settings contacted the researcher via email and showed their willingness to participate in this study (See Table 4.1). Table 4.1 provides an overview of the educational and professional backgrounds of the Chinese heritage teachers who participated in this study.

**Table 4.1**

*The details of participant teachers in the research*

Name (pseudonym)	Child Care Centres /Preschools	Educational background in China	Educational background in Australia	Work experiences in Australia	Age group of children	Type of employee
<b>Leo (male)</b>	A	All initial schooling before Bachelor's degree	Bachelor in Early Childhood and Primary Education	1.5 years	3-5	Full time as a room leader  A Victorian (VIC) registered early childhood teacher
<b>Daisy (female)</b>	B	All initial schooling before Bachelor's degree	Bachelor in Early Childhood Education	10 years	3-5	Part-time as a language (Mandarin) support teacher  A VIC registered early childhood teacher

<b>Fiona (female)</b>	C	All initial schooling before Master's degree  Bachelor in Law	Master in Linguistics	7 years	2-3	Full time  A VIC registered early childhood teacher
<b>Cindy (female)</b>	C	All initial schooling before Bachelor's degree  The first two years' Bachelor in Early Childhood Education	The last two years' Bachelor in Early Childhood Education	2 years	2-3	Full time as a room leader  A VIC registered early childhood teacher
<b>Nancy (female)</b>	D	All initial schooling before Master's degree  Bachelor in History	Currently studying Master of Teaching in Early Childhood and Primary Education (the last semester)	3 months	3-4	Casual
<b>Ivy (female)</b>	E	All initial schooling before Master's degree  Bachelor in Arts, specialising in English Language and Culture	Master of Teaching in Early Childhood Education	2 years	3-5	Full time  A VIC registered early childhood teacher

## Data Collection

Using a methodology framed by cultural-historical theory, does not rely on triangulation as a strategy for improving research validity (Hedegaard, 2008b). Rather, the validity of cultural-historical research is closely associated with “how well the researcher can explicate the historical tradition of the practice and the preconditions that are anchored in the values that integrate and specify different perspectives” (Hedegaard, 2008b, p. 43). In this research, semi-structured interviews were selected to uncover different perspectives about historical traditional practice. The interview method produced a range of detailed information, and the rich data obtained allowed for careful analysis that revealed the unique features of the beliefs and intentions driving teacher practice.

### ***Semi-structured Interview***

The semi-structured interview was conducted with each participant and the duration of each interview was around one hour. The primary purpose of the interview was to gain an understanding about each individual participant’s pedagogical thinking and practice about play in science education, and how this thinking was potentially influenced by cultural heritage. According to Bryman (2016) the semi-structured interview is usually chosen in qualitative research because this approach enables researchers to have more freedom to frame and interrogate the relevant issues or events they seek to understand. Nevertheless, following a set of guiding questions ensures the researcher remains focused, gaining research participants’ perspectives on the chosen topic (Creswell, 2014). Practicing interview techniques also plays a crucial role in improving the quality of the interview (Merriam, 1998). Therefore, prior to the formal interview with participants, three pilot interviews were conducted with three individual educators who also met the selection criteria. This process enabled the researcher to develop her skills as an interviewer and informed a need to revise some questions to yield better data, and some adjustments were based on suggestions from the respondents. In addition, before asking a series of questions centred around the research

topic, several basic questions were asked first in relation to the participant's cultural and professional background (See Appendix 5 for all of the interview questions).

The final series of guiding questions were developed. Examples of the questions used in the interview include (See Appendix 5):

- *Nowadays, some people would say that it is not necessary to teach science to young children. What would you say to them?*
- *When you teach science, what is your main purpose for science teaching with young children?*
- *How would you describe your role in young children's learning of science?*
- *Some people would say that educators of Chinese heritage may tend to use a teacher-led activity to teach young children, instead of play-based learning. What would you say to them?*

Due to COVID-19, the interviews with participants were conducted during the lockdown period in Melbourne. All were conducted digitally via Zoom. The interviews were audio taped and later transcribed. Although in most interviews, English was used to communicate in conversation between the researcher and the participant, some participants tended to use their own mother tongue, namely Mandarin, to respond to the questions in relation to culture.

## **Data Analysis**

It is widely accepted that the organisation and reduction of the data record are fundamental to the data analysis procedure, on the basis of which the research questions can be answered and the research aim will be fulfilled (Bryman, 2016). In the reflection log written during and after the interview, the researcher noted down some significant participant responses, as well as the researcher's initial interpretation. This contributed to the interview transcription and the later analysis of the data using Hedegaard's (2008c) three interrelated

levels of interpretation: 1) common sense interpretation; 2) situated practice interpretation; 3) thematic level interpretation.

### ***Common Sense Interpretation***

Common sense interpretation mainly aims at noting down the researcher's first impression, comment and understanding in relation to the data. The first stage of analysis is centred upon a general interpretation of data, and therefore data at this stage can be illustrated with narrative description and no theoretical concepts are used (Hedegaard, 2008c). In this study, when reading through the interview transcript, the researcher added her understandings and relevant comments to the right-handed column of the transcript to conceptualise data at a common-sense level (see Appendix 6 for sample of transcript and common-sense interpretation).

### ***Situated Practice Interpretation***

Situated practice interpretation is the second stage of analysis, where the researcher begins to look for any conceptual patterns or basic categories which emerge from analysing the whole data set of each individual participant (Hedegaard, 2008c). The primary purpose of this interpretation was to further organise and reduce the common-sense level data based on certain thematic categories. As Hedegaard (2008c) explained, "unravelling the thematic areas is not an easy task..." (p. 59). The analysis process involved the researcher continuously formulating and reformulating the categories through examining the intertwining relationships between them. At the second stage the data were illustrated with narrative descriptions but in a more summarised way (see Appendix 7 for sample of situated practice interpretation).

### ***Thematic Level Interpretation***

The analysis on a thematic level was built on a relatively concrete interpretation above while the patterns and relations formulated at the third stage were more explicit and

generalised. According to Hedegaard (2008c), the category system at this stage can be conceptualised as “a dialectic between the aim of the research, the theoretical preconditions and the concrete material” (p. 61). The statement implies that the process of finding meaningful patterns within the data relies upon three factors that are dialectically interrelated. Each of these is important in formulating a thematic interpretation. For instance, new theoretical conceptual relations were developed around the key emerging issues concerning the specific aim of the research (see Appendix 8 for sample of thematic level interpretation).

### **Trustworthiness**

A defining characteristic of qualitative research is that the researcher functions as the primary instrument for data collection and analysis, that is, a human instrument (Merriam, 1998). As a result, the interpretation of the research can be limited as all data collected and analysed are inevitably be filtered through the researcher’s perspective, during which personal values and biases may interfere (Creswell, 2014). As Merriam argued (1998), “human instruments are as fallible as any other research instrument” (p. 20). Nevertheless, the subjectivity embedded in qualitative research should not be treated as being naturally deficient, but rather be presented as a key feature (Fleer, 2008a). It is important to note that cultural-historical research is based on its philosophical assumption that knowledge is not an objective entity but socially constructed through shared understanding (Vygotsky, 1987). In the process of collecting and analysing data, the researcher was sensitive to the possible personal values and biases that might influence the interpretation of participant’s perspectives. For example, the member checking technique was employed, to a certain extent, to avoid the misunderstanding between the researcher and participant.

### **Ethics**

Ethics approval was obtained from Monash University Human Research Ethics Committee (MUHREC) and the Department of Education and Training (DET) (See



Appendix 2 for ethics approval letters before conducting any aspects of data collection.

Communication with early childhood educators was initially through formal email which outlined detailed information about the nature of the research and the implications of participation.

Participation in this research was completely voluntary. No coercion or pressure was involved in the process of recruitment. If the participant was willing to participate in the study, then a consent form was signed (see Appendix 3 for consent form). If at any time a participant did not feel comfortable or did not wish to continue, they had the option to withdraw. The interview was scheduled at a time that was convenient for the teacher participant.

All collected data were stored as digital files and hard copy. Participant teachers have been assigned a pseudonym to ensure anonymity. Digital files were stored in secure places for example, password protected computers, hard drives, transportable devices, and Monash's Google apps. Hard copies were stored in secure locations for example, lockable filing cabinets at Monash University. Only the researcher and supervisors had access to primary data. All research data will be retained for five years after publication of the result. After this time all data in the form of digital files will be erased and all data stored in hard copy will be shredded.

## **Conclusion**

The chapter discussed both the methodology and research methods of this study. Specifically, the research design of this study is framed by a cultural-historical methodology that is influenced by concepts of cultural-historical theory. This chapter also explained how the methodology and theory are interrelated, thereby creating a holistic approach to understand the decision-making process Chinese heritage educators engaged with in regard to the use of play pedagogy in a cross-cultural context. In this study empirical data were

collected through semi-structured interviews and were later analysed using three levels of interpretation. The next chapter will present the main findings that emerged from this study in relation to the first research question.

## **Chapter 5: Chinese Heritage Teachers' Use of Play Pedagogy in Science Education**

### **Introduction**

This chapter presents the findings that emerged from this study in relation to the first research question: *In what ways is play pedagogy used in science education by Chinese heritage early childhood teachers, working in Australia?* Data demonstrated that all six participant teachers of Chinese heritage agreed a combination of teacher-led activities and children's play provided the best way to teach young children science. However, these two pedagogical approaches were not always equally balanced, and analysis suggests that one of these two approaches played a more dominant role in each teacher's practice. The chapter discusses this finding in detail, providing examples from the data to illustrate each teacher's opinions about science teaching and learning in early childhood. The chapter ends with a summary of the findings.

### **Overview of the Research Findings**

Data analysis identified that teachers often combined planned activities and children's play to produce pedagogical approaches to science education in early childhood.

There were two types of pedagogical approaches that repeatedly emerged in combination across the interview data:

- Teacher-led activity as a primary source of children's science learning, where children's play was intended as a basis or a medium for science teaching
- Child-initiated play as a primary source driving children's science learning, where teacher-led activity was intended to complement the learning potential of the play.

### **Combinations of Teachers' Planned Activities and Children's Play**

The questions used in the semi structured interviews prompted each participant to describe the pedagogical approaches they generally utilised to teach young children science.

Data suggested that all six participant teachers believed that teachers' planned activities should be combined with children's play to achieve the best learning results in relation to science. This thinking is illustrated in Leo's comment, "I feel like either teacher-led or child-led activity cannot achieve the most positive learning outcomes. So, I always try to find a balance between them". Cindy also stated, "It's like, a half-half balance of children-led and teacher-led experience".

Data analysis revealed that despite the teachers' agreement about the combination of the two pedagogical approaches, based on the practice they reported, each teacher seldom balanced their approach in line with the quotes above. On the contrary, each participant directly or indirectly expressed a particular preference for one approach, while the other was used to supplement their preferred approach. Two combinations of approaches repeatedly emerged across the interview data. These were:

- Teacher-led activity as a primary source of children's science learning, where children's play was intended to provide a basis, and a medium for the teaching.
- Child-initiated play as a primary source driving children's science learning, where teacher-led activity was intended to complement the learning potential of the play depending on specific situations.

These combinations appeared to be the preferred pedagogical approaches for science education used by the early childhood teachers in this study.

***Combination 1: Teacher-led activity as a Primary Source of Children's Science Learning***

The first combination was one where teachers relied heavily on children's play to inform their planning. As a teacher watched and interacted with the children, they gathered information which helped them to determine students' interests and learning needs. This information then informed how they planned a response in their teaching.

Leo, Daisy and Ivy indicated child-initiated play allowed them to obtain valuable information about children, which could form a basis for the design and implementation of science learning experiences. Leo explained, “When I plan an activity, of course, I need to know my children. If I don’t know my children well, then I can’t plan the activity in an understandable or approachable sequence. Children can’t understand it”. Leo believed that when activities were unsuccessful, it was the teacher’s own responsibility. He went on to say, “I’ve got some activities that are not that successful, but I think that’s my [responsibility], that is, the teacher’s responsibility”.

Daisy and Ivy gave a more detailed description of how their involvement in children’s play could contribute to understanding of children and therefore provide a basis for planned activities. As Ivy pointed out, “Normally, when in free play, we can make things fun. When I play with them, I can see more, and I can hear their voice a little bit more... We can get a lot of information from playing with children”. Ivy also mentioned there were a number of roles that the teacher could take on in child play and learning.

As an early childhood teacher, first I need to observe and notice the children’s interest, so it’s like an observer first. Like a researcher, I need to find what materials I can use and what activities I can do to extend the children’s interest in science. For example, what books we can use and what things we can make. I’m also an instructor, because once we have the planned experience for them, I need to implement it with the children. (Ivy)

For Daisy, Leo and Ivy, child-initiated play was usually viewed as an opportunity to help the teacher get to know their students better and this knowledge laid the foundations for their future teaching. Despite recognising the importance of child-initiated play, these participant teachers believed that it was mainly the teacher’s responsibility to introduce science knowledge and facts to young children, ultimately through planned activities.

**Teacher as Play Leader.** Once the teachers gathered the information required about the children's learning, they designed teacher led activities to respond to students' learning needs. In these activities, the teacher took the lead, initiating interactions and responding to children's observations and actions.

Daisy explained, "As a teacher, you not only need to listen to children, acting as a listener, a co-learner, a facilitator, you also need to take a teacher's responsibility". Daisy stressed the importance of the role of the teacher in a group activity because it was essential for the teacher to "talk through the whole experience and show them with what's happening". This view resonated with Leo's understanding of the teacher's role in science teaching, "If I don't show them the concept, they will never have a chance to know all these concepts".

While activities were led by the teachers, for these participants, the nature of the experience was still intended to be playful. Daisy, Ivy and Leo tended to utilise teacher-led activities to teach young children science, but all asserted the importance that these activities were designed and implemented in a playful and engaging way that best suited the needs of young children. Leo stated, "We can't isolate learning and play, and they should be combined all the time...I feel it's all interconnected...I feel like we're using play to make children to be more engaged in the activities we provide". Similarly, Daisy provided an example and discussed that using a "visual way of showing germs could let young children feel more surprised by this phenomenon so that they can learn it better" (see Appendix 6 for details). It is also clear from Ivy's response that,

Actually, even with teacher-led teaching, or teacher-led experiences, it still can be play-based, ...and it's still fun with structures. Sometimes making it fun or playful is not related to giving them instructions, but the way [how] you give the instructions, including the words we use and the tone we use. (Ivy)

Ivy used specific teaching examples to further explain her point. For example, Ivy noticed, “Some children were so interested in cars, and they would like to race their cars everywhere in the room and they started running”. This prompted Ivy to design and implement a science activity with children to help them understand the concept of speed (building a ramp and timing the descent) based on their interest in car racing. As shown in her response, “I want to let them know that there are many ways to play with the cars and not just to throw it everywhere. But we can sit down and build something with the car and do experiment[s]”. In this activity, Ivy encouraged children to use different numbers of blocks to build different ramps that varied in height, with the aim of letting children experience the difference in car speed due to the height of the ramp. She described, “If you put it [the car] on the lower ramp, it doesn’t work. It doesn’t go but put it on the three-block ramp, it goes really fast... There is speed because they’re interested in speed”. In addition, Ivy mentioned that children were also encouraged to “try with different vehicles like we have toy cars and toy aeroplanes”, even though “I didn’t tell them that maybe the shape of the wheels and the surface of the wheels can make the speed different too”.

The data showed these three teachers tended to use play as a medium for teaching, so that the teacher-led approach, and the content of teaching could be more engaging and understandable for the young children involved with the play.

**Incorporating Child-led ‘Elements’ into Teacher-led Activities.** Data indicated that for Leo, Daisy and Ivy, teacher-led activities did not mean the teacher would have absolute control over the children, but rather they emphasised that children’s perspectives were considered important when implementing an activity. According to Leo, “I won’t say I play a dominant role in the activity, because I always listen to what the children say...I will also follow their thinking and we kind of explore the concept together”. Leo stressed in his teaching practice he was inclined to actively encourage children to express their opinions on

the topic they were currently learning. He believed this approach supported young children to learn more effectively.

We will allow children to speak lots of their own opinions, sometimes they may make mistakes and we do love these mistakes. So, they will say something wrong, but through the experiment they will try to understand what is correct. (Leo)

Ivy mentioned, “I’m also a co-learner, ... Sometimes the children will ask follow-up questions and I learned from their questions, or I learn with them when we find the answer together”.

Data also indicated that all three teachers highlighted the difficulty involved in maintaining a balance between teacher-centredness and child-centredness when implementing teacher-led activities with the children. A representative comment from Leo was, “Sometimes the teacher will lead the learning, and for some parts children will lead. So basically, I find we are all struggling to find the perfect balance, and that’s the main point”. Ivy also expressed her concern about trying to find such a balance.

We are supposed to do things based on the children’s interests, but there are children who are not that interested in making art using fingers. When we plan something, we want all the children to participate, but on the other hand, I don’t want to force them to do it. I still don’t know the boundary. I think we need to find a boundary and I’m still finding a boundary I might need, including science teaching as well. I’m still thinking my own philosophy. (Ivy)

While teaching science mainly through teacher-led activities, these three teachers were more likely to incorporate child-led ‘elements’ into their teaching practice in order to achieve the best learning outcomes.



## ***Combination 2: Child-initiated Play as a Primary Source Driving Children's Science***

### ***Learning***

The second combination of teaching noted by participants was where child-initiated play was the primary source driving science learning. The teachers entered the play to pose questions, and provided further equipment in an effort to focus the children's observations and compliment the learning potential of the play.

Nancy, Cindy and Fiona placed strong emphasis on teacher involvement in child-initiated play. They believed it was part of their role to step in to promote children's learning alongside play.

I will pay attention to their play... It means I will listen to their conversation, and observe how they interact with their peers during the play. If it's necessary, even though they don't ask me directly, I will step in and to discuss something with them or to ask them some questions. (Nancy)

When noticing some children observing bugs, Nancy provided the magnifier for them and tried to attract children's attention to focus on the habitat of the bugs. Nancy's involvement tended to be influenced by her understanding of the teacher's role in children's play.

We should play the role that to help them explore the topics and to help them enrich their play experience... So, not only pure play, but they also learn from their play experience through providing some extra knowledge to their play. (Nancy)

**Teacher as Play Partner.** Fiona and Cindy highlighted the importance of taking on the role of a play partner in the children's play. Fiona explained, "From child perspective, they don't think science is about how the star moves in the sky this kind of thing. They think about why there's a sunset and there's a sunrise". As a result of such thinking Fiona tended to

act as an older play partner in the process of child-initiated play with young children so that she was able to “teach them one or two cool tricks”. This is mainly because she believed,

Children are more likely to learn from people they think who are fun...and they want things funny to happen. And if you don't teach that to them, they're going to do it themselves anyway. So, if you don't enjoy that way, they're going to find activities that they can enjoy. (Fiona)

The previous comment suggests that in child-initiated play, Fiona understood the learning characteristics of young children. Due to this thinking she preferred to follow the children's ideas which emerged from their play providing support in the moment. Cindy also emphasised her role as play partner.

I see myself as a play partner, so I'm not someone who started up and leave them there. I'm also not someone who would actually tell them how to play, but I'm there playing with them and try to be helpful. (Cindy)

Both Fiona and Cindy stressed that despite acting as a play partner, this did not mean they would intervene in the children's play all the time, but rather, they would make decisions according to the specific situation. One such time was when Cindy noticed that a small group of children were putting sand into a baking tray to make cupcakes. However, when they took the sand out of the tray, the sand was too dry to be moulded. Cindy decided to join in their play and suggested adding some water to the sand so the children could see how the sand changed.

### **Child-centredness the Key to Learning Opportunities Provided by the Teachers.**

Nancy, Cindy and Fiona maintained their early childhood teaching was child-centred because it was based largely on their daily observation, communication, and assessment of the children in their care. Cindy asserted, “At the end of the day, those activities are still because of them, and for them, and therefore they're still child-led experiences”.

This perspective is evident in the ‘small bugs’ activity Nancy used to illustrate her approach to science teaching. Nancy believed it was essential to teach children science knowledge about bugs and introduced the magnifying glass into an activity initiated by children who were looking at bugs. This supported the children to “find a difference between their own conception and scientific facts”. Nancy’s intention was that the science knowledge being explored in the activity would help the children build their capacity so they would continue to explore bugs during their own time. As she stated, this knowledge could “empower them to have control of their own learning”. Nancy also emphasised that the role of the teacher could be manifested in different ways, and therefore working with the children and introducing activities did not mean that she would force children to accept her ideas. Nancy said, “As opposed to teaching them as the authority, I encourage them to challenge the knowledge I teach them and also value their contribution to the lessons”.

Rather than intervening in children’s play, Cindy and Fiona tended to stress the importance of child-centredness by setting up various play stations so the children were able to freely explore their own ideas. The data indicated that Fiona intended to help young children develop an ability to learn on their own through intentionally creating an appropriate play-based learning environment. Fiona believed that in terms of planning, “of course, there will be like adult’s responsibility”. She tended to conceptualise the “adult’s responsibility” as arranging the classroom, which she believed could effectively contribute to the children’s autonomy in learning as well as their sense of independence.

In my experience, if you set up the classroom right, your job is already done 70%.

There’s right amount of resources in the room, not too much to overwhelm them, not too little to get them bored...So in that way, we’re trying to build up their independence... and they’re also in charge of their learning space, which we designed.

(Fiona)

For Cindy, data indicated that when she designed play stations, she was more likely to value the intention of the children over her own intentions. As Cindy described, “The children often surprise me with their play with their imagination so I don’t think my way is better”. Cindy believed, “the children are more creative than me”, and so she generally encouraged children to “do what they think is the best”. Cindy showed great interest in “watching how they play and how they interact with the resource I provide”.

The data illustrated that in Nancy’s practice child-centredness at times involved stepping in to work alongside children, while Cindy and Fiona demonstrated a clear distinction between the teacher’s responsibilities and the children’s space. They believed it was the teacher’s responsibility to intentionally set up a variety of play stations based on their knowledge of children, and it was essential to give children enough freedom to explore these spaces on their own, during which the children’s intention for play was considered a priority.

## **Conclusion**

The findings of this chapter showed that all the educators were of the opinion that a combination of teachers’ planned activities and children’s play can achieve the best learning results in relation to science. The data analysis further indicated that when combining planned activities and play, teachers seldom kept the two pedagogical approaches in balance. On the contrary, each teacher directly or indirectly expressed a particular preference for one approach, while drawing on the other to supplement their preferred approach. The next chapter will present findings in relation to the cultural influence on Chinese teachers’ decision-making about play pedagogy in early childhood science education.

## **Chapter 6: The Influences on Chinese Teachers' Decision-making about Pedagogy in Early Childhood Science Education**

### **Introduction**

This chapter presents findings related to the second research question: *What influences early years teachers of Chinese heritage as they determine preferred pedagogical approaches for science education?* The previous chapter explored Chinese heritage teachers' different preferences for pedagogical approaches to early childhood science education. The present chapter examines the influences that have shaped the pedagogical styles the teachers adopted while working in a cross-cultural context. Data analysis indicated each teacher's pedagogical preference for teaching science involved complex decisions, influenced by their cultural background, personal educational experience, and the social context of their workplace. These influences were based largely on each teacher's interpretation and conceptualisation of personal experiences, and therefore the influence of culture and educational experience varied significantly between the participants. Due to these differences in life experience, the teachers were likely to interpret and practice ways of teaching and learning differently. In the process of analysing the data, two key themes repeatedly emerged in teacher responses:

- Understanding of their own cultural and educational background
- Understanding of the role of cultural influence on pedagogy

In this chapter, these findings are described separately under each theme. However, the two themes tended to be inextricably interwoven and could not really be separated, especially when considering the influence of each theme on the teachers' pedagogical practice regarding science.

### **Overview of the Research Findings**

Data analysis identified two key themes in relation to the second research question. The first theme refers to the teachers' understanding of their own cultural and educational background, while the second theme refers to the teachers' understanding of the role that cultural influence has on pedagogy.

Theme 1: Teachers' understanding of their own cultural and educational background.

Three key sub-themes were identified in the data in relation to this first theme:

- The relationship between play and learning in traditional Chinese culture;
- The changing nature of Chinese culture in relation to education;
- The influence of teacher education in Australia.

Each sub-theme will be discussed in detail drawing on interview data.

Theme 2: Teachers' understanding of the role of cultural influence on pedagogy.

Three sub-themes repeatedly emerged across the interview data.

- The social context
- Institutional practices
- Personal pedagogical knowledge

Each of these sub themes will be further discussed by drawing on relevant data.

## **Theme1: Teachers' Understanding of Their Own Cultural and Educational Background**

### ***The Relationship between Play and Learning in Traditional Chinese Culture***

The findings showed a similarity in the ways that the teachers understood the play-learning relationship evident in traditional Chinese culture. All teachers claimed there seemed to be a dichotomy between play and learning in Chinese educational contexts, both in early childhood education and formal schooling. According to Leo, play and learning were seldom combined together in China, even in early childhood education. He stated, "Basically, when I was young, I can't remember much play in literacy or numeracy learning...the only play I

can remember is the physical activity”. Daisy also commented, “From a traditional Chinese perspective, play is clearly distinguished from learning. Chinese style learning is usually characterised by a learning style that is diligent, boring and full of repetition”. Nancy further argued, “In China, play and learning in early childhood is more likely to be separate and in conflict, like conflicting parts in children’s life”. These responses indicated there was a clear distinction between the idea of play and the intention of learning in Chinese culture. Play was also likely considered as a supplement to student learning. Fiona mentioned, “For play in learning, it’s break time. Even it’s just 10 minutes, we want to go to the playground to run around before coming back”. Nancy commented, “Children’s play time is always squeezed to the minimum so that more time can be spent on the so-called learning”.

The process of acquiring academic knowledge or practical skills appeared to be deeply embedded within the intentions of the Chinese education system.

By saying learning here, I mainly mean the academic learning. In the Chinese education system, we have a root of regarding learning only as the process to acquire academic knowledge or practical skills but ignoring the other parts of children’s development. (Nancy)

Data also revealed teacher-centredness was a predominant feature of Chinese-style teaching and learning.

The teacher is the information provider, and the student is the information receiver.

It’s like you’re pouring tea from a tea pot to a cup. In a way, it’s very effective, because you can get a lot of information through [the teacher] very quickly. However, I think the drawback is, it’s very difficult to really observe how much the other part [the student] has absorbed. (Fiona)

For Cindy, the contrast between play and formal learning was evident in her own life. Cindy spent her early childhood in the countryside with her grandparents and fondly

remembered how she played in nature. She explained the difference of being passive and attentive in school and the freedom of being outside. “Growing up in China, I remember lots of classes and how I learned was mainly teacher-led. So, teachers taught me something and we just stay there and listen”. In contrast, Cindy chose three keywords “nature, fun, and love” to describe her memory of the freedom to play in the countryside.

Because I grew up in the countryside, we spent a lot of time playing in nature, just watch how the trees grow and how the flowers blossom. And I remember running around in the countryside, not any cars or vehicles, but lots of animals and lots of plants. So, I remember being connected to nature when I was little. (Cindy)

All of the teachers in this study tended to describe education in traditional Chinese culture as a dichotomy between play and learning. Data also indicated that the Chinese style education was academic-oriented and teacher-centred.

### ***The Changing Nature of Chinese Culture in Relation to Education***

It was widely recognised by the Chinese heritage teachers, that education within the Chinese culture was not always static, but rather dynamic. When Leo discussed the relationship between play and learning in the Chinese education system, he emphasised his memories were grounded in the past. He explained, “Because I don’t know the contemporary context. I just remember my childhood..... it’s 20 years ago, and now could be different”.

Daisy stated it was not easy to have a general notion of the relationship between play and learning in Chinese culture because it seemed to be constantly changing, especially in early childhood education, “It’s hard to say, ... it should be dialectically conceptualised”.

Specifically, Daisy believed despite the division between play and learning in traditional Chinese culture, “more and more young generation in China, like us, also begin to realise the importance of play, resulting from obtaining more information from abroad, for example, play has a distinct advantage on its own”. Daisy went on to say, “I feel that our generation



tend to combine traditional Chinese learning style with the philosophy of play in Western culture together”.

There was a view that educational philosophy within the Chinese culture was in a process of change, but this process was extremely slow. Nancy stated, “In Chinese traditional culture, play is considered as something that prevents children from learning”. She mentioned that during current times, due to policy, Chinese early childhood education tried to incorporate play into the learning of young children to make the teaching more engaging. Despite such changes, Nancy was of the opinion that the main focus of early childhood education in China was on children’s academic learning and school readiness.

I believe the main purpose of this practice is still to deliver academic knowledge to children ... They think the children need to be more prepared to make better achievement in their future education, instead of providing children an environment to have fun and develop in a holistic way. (Nancy)

There was also the view that the choice of certain pedagogical approaches in a cultural community was likely to reflect the country’s own history and culture. Therefore, the style of education advocated by a cultural group may not always be fixed but change as the circumstances and cultural needs changed. Fiona believed such influence also extended to the ways in which cultural groups nurture their children.

I believe all of these [the educational differences between China and Australia] is the historical and cultural accumulation, and therefore there is no point in discussing which is better or worse. We only can say that with the influence of a certain culture, it may also influence how people in this cultural group nurture their children, which can vary due to cultural diversity. (Fiona)

Fiona compared the different attitudes towards authority that she experienced in China and in Australia, which she believed resulted from the accumulation of their respective history and culture.

Like China used to be a very agriculture-based country in her history. For example, if you don't listen to your parents' advice, then the crop will not grow. Then, the knowledge passed down from generation to generation, which is also the accumulation of culture. However, here in Australia it's more like business-based history and culture, and it requires you to keep exploring and challenge authority. Through this, the culture can be inherited and further developed. It is believed in its culture that it is essential to have autonomy, initiative and kind of exploration. (Fiona)

Fiona believed educational change tended to go in "waves" moving between control and freedom.

For example, when the education style gradually reaches one extreme that is quite free, then people would realise that the absolute freedom is not good, and then it starts to go back to a dogmatic approach or vice versa... Actually, in all education there exists a wave like this. (Fiona)

The data indicated teachers also believed educational styles in a particular culture would change accordingly with environmental needs, rather than remain permanently static. Fiona highlighted the world's increasing complexity and the popularity of Western education around the world.

As the pace of the modern life is very fast, we don't know what's gonna happen in the future. Against this background, actually the main purpose of our education is to help children to be well fitted into the constantly changing environment, to help them to adjust to the uncertainty. Hence, the dogmatism might be useless to handle this

situation, but rather, the abilities like autonomy and initiative can play a vital role in it. (Fiona)

It was evident most teachers recognised some change in Chinese cultural attitudes towards education, however this change was slow and was perhaps more attributed to the Western influence and global concerns.

### ***The Influence of Teacher Education in Australia***

The differences between the education systems of China and Australia became more obvious to the participants of Chinese heritage teachers as they completed their studies in Australia. Leo stated, “I learnt all the teacher education in Australia, so I’m okay with the pedagogical philosophy in Australia”. For Daisy, the educational experience in Australia promoted her awareness of critical thinking that significantly contributed to her understanding different pedagogical styles. Daisy felt this knowledge could lay the foundation for the development of her own personal philosophy about education, “I would not think that one approach is completely good, while the other one is completely bad. I am able to synthesise all the information after thoughtful reflection so that I can develop my own philosophy”.

The results also revealed that the Chinese heritage teachers believed the teacher education they received in Australia, helped to raise their awareness of the importance of play. Ivy commented that, “after learning their uni course in Australia, I think a lot of Chinese teachers can understand the importance of play”. Cindy did not realise she was actually learning while playing in nature with her friends during her childhood, until she completed four years of teacher education in an Australian university.

Having a lot of fun when I was little... I wasn’t aware of the learning until I learnt all about this in university. I understand more about how children learn, like they don’t learn through sitting but through hands-on experience. (Cindy)

Participant responses showed teacher education in Australia played a vital role in their understanding of Western play pedagogy, while further enhancing the understanding of their own personal educational experience in China. Nancy's teacher education and work experience in Australia enabled her to realise the features of Chinese-style teaching. This helped her to more clearly differentiate Chinese teaching from Western play pedagogy.

At that time, I wasn't aware of this, because we just grow up like this. But when I looked back to my own experience, I can see that there are a lot of restrictions. There are not many changes in the room setting, the arrangement, and the activities are not as diverse as the children are doing in my room now. (Nancy)

The Chinese heritage teachers in this study generally believed there existed a separation of play and learning in traditional Chinese culture, however at the same time, they noted Western influences and global concerns were slowly weakening this separation leading to some integration of play into children's learning. It was also believed their experience of teacher education in Australia helped them to better understand and distinguish Chinese and Western educational philosophies.

## **Theme 2: Teachers' Understanding of the Role of Cultural Influence on Pedagogy**

The data revealed there was a range of views about the influence of cultural background on decisions about pedagogical approaches used when teaching young children science. Some teachers believed the social or institutional context in which they worked exerted a stronger influence, while others recognised that their pedagogical decisions were influenced by a mix of their cultural background along with personal pedagogical knowledge.

### ***The Social Context***

Both Leo and Fiona believed the social context in which they were presently working seemed to play a more important role in their decision-making process rather than their cultural background. Leo stated, "education relies on the context ... I do think in China most

of our teaching is teacher-led or teacher focused”. Leo argued there was little point in discussing whether this approach was good or bad in its own right because, “it’s all based on its own social context”. For Leo, there were different expectations about young children’s learning and development in China which contrasted with those of Australia. As a consequence, different teaching strategies were used in each cultural context. Based on this understanding, Leo voiced his opinion that despite being an early childhood teacher of Chinese heritage, it was vital for him to utilise teaching strategies that could meet particular educational expectations in Australia, as he was currently teaching in Australia. Similarly, Fiona utilised a Chinese traditional idiom to express the rationale behind her use of certain pedagogy while working in Australia, that is “入乡随俗” (Do as the locals do). Below is her explanation of this idiom in her situation:

As far as the pedagogy is concerned, I think it is mainly my responsibility to get myself well fitted to the educational context here. This is mainly because I come to a different country as a foreigner and therefore it is necessary for me to learn how to teach as an early childhood teacher in Australia. (Fiona)

### ***Institutional Practices***

Ivy did not think her decision-making about the use of certain pedagogy was closely related to her cultural background, “It’s not that cultural background related...from what I’ve seen, it’s not always the case”. Rather she argued the centre’s vibe and policies exerted a stronger influence on her pedagogical decisions, along with the teaching philosophy of the centre’s director. To illustrate her point, during the interview Ivy described how she constantly changed her pedagogical practice in order to help young children learn in a seemingly better way. At the beginning of her teaching, because she did not want to be a strict teacher, she provided little structure for the children. By contrast, Ivy noted that the children in the director’s group had been given several rules to regulate their behaviour and

help them to develop good habits of playing together. After a period of time, she noticed how the children in the director's group were able to develop more complex play on their own as compared to the children in her own group. Ivy noted the children in the director's group were able to solve the problems that emerged from their play in a more comprehensive and complete way and she stated, "the difference in the two groups may result from the fact that the structure was built earlier so that later, children can better construct and enjoy their complex play". Based on this understanding, Ivy indicated that she decided to make her teaching more structured but at the same time she kept some degree of freedom for the children. According to Ivy, the comparison between her group and the director's group helped her to realise that structure in young children's education was not always detrimental to children's learning. On the contrary, when limited structure was introduced the final results might exceed the teacher's expectations. Ivy commented, "We do need a certain structure, especially at the beginning. Then, we can ease things up, we can make more open-ended things, and we can encourage more creative thinking in children". Ivy believed the atmosphere of the kindergarten and the educational philosophy of the director may have a greater impact on her teaching methods than her cultural background. She explained, "I actually got this idea from my director, and she's not Chinese. She's white Australian. So, it's not a Chinese thing to me. It's personal".

### ***Personal Pedagogical Knowledge***

Some participants challenged the assumption that a shared cultural background would influence all Chinese heritage teachers in the same way. Daisy tended to conceptualise cultural influence as personal for each teacher. In her view, despite a group of teachers having the same cultural heritage, each may have a different understanding of the same culture leading to a personal pedagogical philosophy. This thinking was also reflected in Cindy's comments, "It's unfair to think if you're a Chinese teacher, you must be good at

teacher-led activities... I don't think teachers from China are all controlling and disrespectful". Cindy claimed that while teachers of Chinese heritage may "need more training and resources to be taught about how to teach in a respectful way and how to be a play partner", this did not mean Chinese teachers only knew how to educate their students in a teacher-controlled way when working in Australia. She said, "I notice some wonderful kinder teachers from Chinese background, they're really into Reggio-inspired teaching and really providing play-based learning experience for children".

Data revealed that a teacher's cultural background potentially provided a different perspective on teaching. Daisy stated her Chinese background provided her "another possibility" about how to be a teacher. Daisy said "critical thinking" enabled her to realise which approach was "better in a particular situation". However, she did not think this thinking process was a typically Chinese trait, but rather a defining characteristic of all good teachers from different countries. Fiona also stressed, there were often challenges which required specific attention as she made decisions between her personal cultural experiences and the Western educational pedagogy she had learnt in Australia.

There were occasions when because of my background, I was like: Ok, that's not good, like my mom would never let me do that. On the other hand, I was thinking, what's the harm if they did that? Yes or No? Will they hurt other people? Yes or No? Will it cause some damage to the room? Yes or No? If all three of them were No, I might rethink it. Why not let them do that? (Fiona)

The differences in education style between two countries did prompt Fiona to frequently reflect on her pedagogical choice in the process of teaching. She provided a specific example to demonstrate how her cultural background was inextricably interwoven with the Western pedagogy she has learnt about in her practice:

If the children try to climb a tree, then in my Chinese self, I would be like: Okay, jump off the tree, or you got to hurt yourself; But in my Western teacher role, I would be like: Okay, let's put some cushions under the tree and let's see how high you can go. (Fiona)

The data indicated that cultural background may influence a teacher's pedagogical decisions, but such influence may vary from one teacher of Chinese heritage to the next. It could not be assumed Chinese heritage teachers would all be influenced by their cultural background in the same ways. The individual situation of different teachers, in particular their workplace context and their personal pedagogical knowledge also influenced their pedagogical choices.

## **Conclusion**

This chapter presented findings which explained how teachers' preferences for certain play pedagogy can be informed by various influences, including cultural background, personal educational experience and the social context of their workplace. These influences were interrelated in complex ways. How teachers of Chinese heritage realised, understood and responded to these influences ultimately played a significant role in determining the pedagogical approaches they adopted in their teaching. The next chapter will bring together all aspects of the research findings to give an overview and discuss the main findings of the research which are situated in the theoretical and empirical literature reviewed.



## Chapter 7: Discussion

### Introduction

Drawing on cultural-historical theory and relevant literature, this chapter is intended to further summarise and discuss the findings of this study pertinent to two research questions:

- *In what ways is play pedagogy used in science education by Chinese heritage early childhood teachers, working in Australia?*
- *What influences early years teachers of Chinese heritage as they determine preferred pedagogical approaches for science education?*

This chapter starts with summarising the common characteristics of the Chinese heritage teachers' use of play pedagogy. This is followed by discussing the influence of the social environment on individuals pertinent to play pedagogy. Then, a difference in Chinese heritage teachers' use of play pedagogy is presented, based on which the influence of individuals and the environment is discussed. It concludes with a brief summary.

### The Common Characteristics of Chinese Heritage Teachers' Use of Play Pedagogy in Australian Contexts

The findings revealed that the pedagogical approaches adopted by Chinese Heritage teachers fell into two main areas, the first being teacher-led activity where children's play was intended as a basis or a medium for science teaching. The second prominent pedagogical style saw child-initiated play as a primary source driving children's science learning, where teacher-led activity was intended to complement the learning potential of the play. Despite a difference in pedagogical styles, the Chinese heritage teachers also tended to share some common characteristics in their use of play pedagogy. Each characteristic will be elaborated further in the following section.

### *Providing a Play-based, Meaningful Context for Science Learning*

A key finding of the current study that contributes to the literature is that all teachers agreed that rote learning, a term or concept often related to science education, was not considered a useful approach to teaching science with young children. All participants (Leo, Daisy, Ivy, Nancy, Fiona, and Cindy) agreed that children's learning needed to be meaningful and each teacher recognised the importance of embedding learning in a context that was relevant to the children. The teachers' conception of science education resonates with Vygotsky's (1986) statement about concept formation, that "scientific concepts...just start their development, rather than finish it, at a moment when the child learns the term or word-meaning denoting the new concept" (p. 159) and therefore "direct teaching of concepts [to young children] is impossible and fruitless" (p. 150). It is recognised as a necessity that scientific concepts should be taught to young children in an authentic context pertinent to their day-to-day life experience, and mindlessly memorising the verbal factual information of the concept should be avoided (Hedges & Cullen, 2012; Karpov, 2003). There is clear evidence that when discussing science teaching the participants contextualised and made pedagogical decisions that were meaningful for the children. A representative example was provided by Ivy who explained that play pedagogy foregrounded her teaching. For example, when Ivy noticed a snail found outside aroused the interest of all the children, she read a book about snails with children and encouraged them to apply what they had learnt from the book to create better living conditions for the snail. Ivy then implemented a series of creative art experiences with the children. Some of these activities closely related to, and highlighted, the characteristics of snails, such as how to make a snail shell, a topic they had previously discussed (see Appendix 6 for details).

**Children's Interest as a Starting Point for Science Teaching.** The early childhood teachers (Leo, Daisy, Ivy, Nancy, Fiona, and Cindy) all reported that while implementing

pedagogical practices, they believed it was necessary for science teaching to be driven by the needs and interests of the children, rather than the needs and interests of the teacher and the curriculum. The teachers recognised that such interests might be expressed by children either directly through conversation about daily life or indirectly observed through the children's play. As Alexander and Grossnickle (2016) stated, becoming "vigilant observers of their students" (p. 203) is a necessary step for teachers to identify children's interests and gain insights into young children's thinking. In the current study, a number of examples were provided which illustrated how teachers actively attempted to notice and incorporate student interests into their teaching. Ivy's description of several children who showed an interest in car racing, prompted her to design a series of science experiments to help them better understand the concept of speed (e.g., building ramps in different heights and timing the descent). Nancy provided magnifiers for children to observe small bugs and discussed facts about bugs, following her observations of a small group of children who were interested in bugs. In these examples, the children's interest served as a starting point for science teaching. This finding is contrary to previous research that suggests, with regard to science learning, early childhood teachers place an emphasis on creating play-based environments equipped with rich science affordances (Fleer, 2009b; Fleer, Gomes, & March, 2014; Nayfeld, Brenneman, & Gelman, 2011). The participants of this study attached greater importance to children's science-related interests serving as a bridge between the children's free play and the teacher's recognised science teaching opportunities.

As interests spontaneously arose from the children's play and daily life, each teacher recognised opportunities to further support and extend children's thinking about science ideas. Such interests were promoted through experience in either a spontaneous or planned science activity. For the three teachers (Nancy, Fiona, Cindy) who utilised spontaneous activities to teach children science, they tended to be actively involved in children's free play

as “an older play partner” (Fiona) with the intention of “providing some extra knowledge to the [children’s] play” (Nancy) or “teach[ing] them one or two cool tricks” (Fiona). For example, Nancy tried to enrich children’s observations of bugs while playing outdoors by providing magnifying glasses and in a playful way introducing the scientific concept of habitat. Cindy intentionally joined in the sand play initiated by several children and offered water to the children asking them how they thought the sand would change when the water was added. Spontaneous child-initiated play seemed to be centrally positioned to promote children’s learning for the three teachers (Nancy, Fiona, Cindy). These teachers’ use of spontaneous situations occurring in children’s play adheres to the pedagogical approach advocated in the Australian ECE policies, for instance, the Early Years Learning Framework (EYLF) (Department of Education and Training [DET], 2019) and the Victorian Early Years Learning and Development Framework (VEYLDF) (Department of Education and Training [DET], Victoria, 2016), in which capitalising on spontaneous ‘teachable moments’ is defined as a critical pedagogical approach for responding to children’s spontaneous learning needs as they arise (see Chapter 2).

It was apparent that the Chinese heritage teachers were used to providing science learning opportunities oriented to the needs and interests of young children. It is not uncommon for teachers to take notice of and use children’s interest as part of curriculum in early childhood education, and the interest-based curriculum has been long established and well documented in many early childhood curricula around the world (Birbili, 2019; Hedges, Cullen, & Jordan, 2011). Teachers’ being responsive to children’s ideas and interests that arise from play is detailed in the Australian national Early Childhood Education (ECE) curriculum (i.e. the EYLF), and forms a critical basis for creating curriculum experiences (DET, 2019). Studies of the tradition that reference the use of the child interest in ECE indicate that many issues related to this tradition are well worth considering and include:

displaying a tendency to randomly select and recognise the children's interest (Birbili & Hedges, 2021); relating children's interest to their choice of activities (Hedges & Cooper, 2016); and raising the possibility of changing the direction of the children's interests when interpreting play from the teachers' perspective (Peter & Davis, 2011). Hedges et al (2011) suggested it is important for ECE teachers to interpret children's interest in a more conscious, analytical and thoughtful way. There is an established acknowledgement of using the child's interest and ways it can play a critical role in promoting children's learning in a meaningful context (Birbili & Hedges, 2021). In this study the teachers recognised the importance of interest-oriented science learning which influenced pedagogical practices that created meaningful environments for children to learn science.

### **The Importance of Play-based and Hands-on Learning Experience for Science**

**Teaching.** All of the Chinese teachers in the current study (Leo, Daisy, Ivy, Nancy, Fiona, and Cindy), emphasised the role of the children's interests in science education and believed that child-initiated play was an indispensable part of their pedagogical practice, particularly for showing or stimulating children's interest in science. As shown in each teacher's response (see Chapter 5 and 6), play provided opportunities for teachers to gain in-depth knowledge of each child's interest in and often understandings of science and this information served as a basis for planning and implementing their teaching. The inclusion of child-initiated play in the teachers' practice is consistent with providing a playful environment for children's learning in Australian national ECE framework, namely the EYLF, "Play is a context for learning that allows for the expression of personality and uniqueness [and] enhances dispositions such as curiosity and creativity" (DET, 2019, p. 10). Further, it has been found that child-initiated play in ECE is usually placed in a position where the child's interests and ideas are taken into consideration (Edward, Cutter-Mackenzie, Moore, & Boyd, 2017;

Grieshaber, 2010; Inan, Trundle, & Kantor, 2010). The results demonstrate that the prevailing view of child-initiated play seems to be supported by the participants in this study.

Apart from considering child-initiated play as a basis for science teaching, the Chinese heritage teachers stressed the necessity of designing and implementing science learning opportunities in play-based and engaging ways, either through spontaneous (Nancy, Fiona, Cindy) or pre-planned activities (Leo, Daisy, Ivy). However, in the context of English and Australian ECE, few teachers may be accustomed to taking advantage of spontaneous situations, joining in the play while at the same time scaffolding children's learning (Batchelar, 2016; Grieshaber, 2010; Siraj-Blatchford, Sylva, Muttock, Gilden, & Bell, 2002). In addition to spontaneous teaching, two teachers (Fiona, Cindy) in the current study stressed that various science-related play stations needed to be designed and arranged in ways which considered the ability of young children, as Fiona stated, "not too much to overwhelm them, not too little to get them bored". It was believed by these teachers that children's engagement in exploratory play fostered children's autonomy and independence in learning. This practice aligns with the description of traditional play-based experiences in ECE settings, "...environments are usually set up as areas of activities for children to self-select from - an environment developed through a long-standing commitment to play-based and child-centred practices..." (Birbili & Hedges, 2021, p. 8). As Grieshaber (2010) stated, there has been a commonly held belief among ECE teachers that child-initiated play is inherent in early childhood and usually viewed as a form of learning (see Chapter 2).

Three of the teachers (Leo, Daisy, Ivy) in this study preferred to help children learn science knowledge and skills through teacher-led activities, but they did not ignore the role of play in their teaching. As Ivy stressed, "even with teacher-led experiences, it still can be play-based, and it's still fun with structures". The teachers (Leo, Daisy, Ivy) argued that immersing children in a playful learning environment, enabled the children to be more

engaged in the activity designed and also anecdotally enhanced children's learning. Similar to Howard's (2010) statement, play is usually defined as activities that may amplify children's learning potential to reach its highest level.

Additionally, all of the teachers (Leo, Daisy, Ivy, Nancy, Fiona, and Cindy) placed less emphasis on children remembering specific scientific terminology. For the teachers who preferred teacher-planned activities to teach science, they were inclined to involve engaging hands-on experiences in their practice, with the intention of supporting and stimulating each child's cognitive development. Leo stated the importance in letting "every child experience what the concept is, instead of talking about the concept" and providing opportunities where students can "touch it, feel it, sense it and see it". For example, when teaching children about 'teeth health', Leo conducted a sequenced approach involving a tooth decay experiment with egg shells (see Appendix 6 for details). He stated this was important to enable the children to "visualise how the teeth go bad". He then used playdough and stuck this onto a model of teeth to help children consider "what would happen if you don't brush?" He also provided opportunities for children to practice "how to brush their teeth with the model". He then extended this learning to healthy eating through cooking and matching games. Likewise, instead of directly telling the children about the concept of bacteria, Daisy decided to conduct two scientific experiments in which children were able to "visualise" bacteria by leaving bread on the counter over a week to observe the changes, so the children were aware of the presence of bacteria (Appendix 6). The teachers' practice resonates with the statement by Chaiklin and Hedegaard (2009), "Facts alone are not sufficient. Children need some way to make sense of these facts" (p. 192). This finding is different from children learning through free play (Fleer, 2009b; Kuschner, 2007; Wood, 2008), as intentional teaching through planning play-based sessions was discussed in each interview, especially in relation to science teaching, and is therefore deemed important for the teachers in this study.

### ***The Critical Role of Teachers in Science Learning***

The analysis of data indicated, child-initiated play was an indispensable part of children's science learning, however, the Chinese heritage teachers highlighted the importance of the teacher's active involvement in children's play. For instance, Cindy described her role as "play partner" and at the same time emphasised she was "not someone who started up and leave them there". Further, Nancy argued "pure play" was less likely to help children learn about science knowledge from their play experiences unless the teacher intervened. When teaching children science through teacher-led experiences, the teachers (Leo, Daisy, Ivy) paid extra attention to their responsibility to share new knowledge, and concepts with the children. It was argued that such learning may be difficult if young children were expected to rely solely on their own experiences. The teachers' opinions, to a large extent, support Vygotsky's (1987) notion of the zone of proximal development (ZPD), whereby Vygotsky argued when the correct conditions are created for the child, instruction can move "ahead of development, pushing it further and eliciting new formations" (p. 198). For instruction to lead development, the teacher or more capable other needs to provide instruction that is based within the child's ZPD. The ZPD is therefore defined as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). The definition indicates the ZPD rests between what the child actually understands and what the child can potentially achieve with the help of a more capable other. It must be stressed that the child's ZPD needs appropriate pedagogical strategies and to be culturally situated (e.g., interaction, collaboration, and understanding of the cultural situation) and to be implemented by adults (Chaiklin, 2003).



There is clear evidence that despite the difference in teachers' pedagogical preferences, all participants in this study believed teacher guidance was indispensable for promoting children's learning in a play-based environment. The teachers' conception of their role in play-based learning is consistent with the pedagogical term "intentional teaching" (See chapter 2). For the teachers in this study, this marks a shift from traditional discourse in Australian ECE where free play has been privileged and teaching is usually marginalised or silenced under the influence of developmental theories (Grieshaber 2008, 2010; Leggett & Ford, 2013). Developmental theories have had a dominant role in ECE, such as those based on the work of Piaget (Shaffer, 1988) and Developmentally Appropriate Practice (DAP). These theories exert an influence on the way that early childhood practitioners view teaching (Grieshaber, 2008; Hedges, 2014; Kilderry, 2015; Lewis, Fler, & Hammer, 2019). For example, it is not uncommon for educators to believe that teachers should "take a back seat to children's development and learning...waiting for children to grow and learn on their own" (Grieshaber, 2008, p. 506-7). Similarly, Fler (2010, 2015a) argued that ECE teachers feel more comfortable taking a 'reactive' or 'passive' role in play-based programmes. According to Devi, Fler and Li (2018), teachers are more inclined to act as material providers and observers of children's interests in play. To a certain extent, the passive and reactive roles contribute to underestimating the significant role that ECE teachers contribute to children's learning and development (Batchelar, 2016). The teachers in this study tended to emphasise the importance of teacher guidance in play-based learning and they explained ways intentional teaching was embedded in their practice, in both spontaneous and pre-planned activities.

### **The Influence of the Environment on Individuals Pertinent to Play Pedagogy**

When responding to the use of play pedagogy in science teaching, all of the participants in the study (Leo, Daisy, Ivy, Nancy, Fiona, Cindy) claimed they experienced

few difficulties in integrating play with learning while teaching in an Australian context. Specifically, the teachers discussed their experience of their own Chinese style education as a dichotomy between play and learning, teacher-centredness and academic-oriented teaching. This description reflects the view of the relationship between play and learning in traditional Confucian culture (Bai, 2005; Hammer & He, 2016), and aligns with Biggs' (2001) summary of education styles in Confucian heritage countries (see Chapter 2). There have been significant differences in the understanding of play and learning relationships within Australia and China, particularly related to ECE (Chapter 2). However, all the teachers in this study stressed that the process of adaption and assimilating to the difference was not difficult, and it was mainly due to the teacher education they completed in Australia and the social context of their workplace. The teachers believed that having completed their undergraduate or postgraduate degree at an Australian university and working in a Victorian childcare centre made a major contribution to their understanding and practice of play pedagogy, and simultaneously contributed to their growing understanding of past learning experiences in China (see Chapter 6).

The teachers' description of their teaching practice related to science seems to be consistent with their understanding of the different pedagogical styles in China and Australia. The teachers explained they were able to use play pedagogy while teaching without any significant challenges. The teachers did not ignore the role of their involvement in play-based environments and therefore implemented some form of intentional teaching in their practice, either through spontaneous situations or pre-planned activities. The results of this study are not consistent with previous empirical evidence that ECE teachers in Australian and British contexts intend children to pick up 'something' about science on their own through exploring in playful and science-related environments (Edwards and Loveridge, 2011; Fler, 2015b; Fler et al, 2014).

The Chinese heritage teachers argued, their personal cultural background did not play a leading part in their decision making about pedagogical practice. It was further recognised that the social context of their workplace had exerted considerable influence on the pedagogical style they chose to adopt. For instance, both Leo and Fiona stressed the necessity for implementing the teaching approaches appropriate to particular educational expectations in Australia, as Fiona claimed, “Do as the locals do”. Likewise, Ivy stated it was the educational philosophy and practices of her workplace that played a more crucial role in determining her teaching style in contrast to her cultural background. Therefore, the results of this study provide clear evidence to show the significant influence of the social environment on Chinese heritage teachers’ adaption to play pedagogy. The research findings seem to be contrary to Hofstede’s (1986) assertion that living in a social environment different from the environment in which one grew up may further encourage individuals to think in their traditional cognitive ways, thus making it more difficult to learn new knowledge from the surrounding environment. However, Hofstede (1986) also emphasised the significant role of teacher education in changing the situation above, focusing on “learning about his/her own culture; getting intellectually and emotionally accustomed to the fact that in other societies, people learn in different ways” (p. 316). The influence of teacher education shown in participants’ responses (Chapter 6) seems to reflect the view of Hofstede. Therefore, it is reasonable to assume that teacher education plays a crucial role when discussing the influence of the social environment on immigrant teachers’ pedagogy.

In the research framed by cultural-historical theory, each individual is an indispensable part of the social situation, and the relationship between the environment and individual is never one-sided, but constantly and mutually changing (Vygotsky, 1994, 1998). According to Vygotsky (1994), when explaining the influence of the social environment on a person, the environment should not be treated as a separate entity that exists outside the

person. Instead, “the forces of the environment acquire a controlling significance...” (Vygotsky, 1998, p. 294). Here “the controlling significance” refers to the degree of how each individual becomes aware of, interprets, responds to, and even recreates the social situation they experience (Vygotsky, 1994). It is noteworthy that what the individuals bring from their own history, culture and experience, inevitably contributes to how they understand what is going on in the environment (Irvine et al., 2015). Veresov (2016) asserted, cultural-historical theory enables the person-environment relationship to be conceptualised from a different perspective in which environmental characteristics and personal characteristics are indivisibly united. The concept of the social situation of development is a theoretical concept that reflects the indivisible unity of social and individual in the development of the human mind (Chapter 3). From the viewpoint of cultural-historical theory, the study indicates the social situation exerted a strong influence on all of the Chinese teachers’ use of play pedagogy. The following section examines the influence of individuals on the environment.

### **A Difference in Chinese Heritage Teachers’ Use of Play Pedagogy**

The previous sections demonstrate that the common features of Chinese heritage teachers’ use of play pedagogy are, to a large extent, consistent with the implementation of play pedagogy prevalent in Australian ECE. At the same time, this consistency reflects the influence of the Australian social environment on these teachers. A further finding indicates that despite having a common cultural heritage and similar educational background, the teachers tended to teach children science using two different pedagogical approaches. It seems that the rationale behind the teachers’ different pedagogical choices lies in their different opinions about whether it is necessary for teachers to design and implement science activities based on specific science-related intentions. Some teachers preferred teacher-led activity to teach science with the intention of helping children make sense of science facts or skills through various hands-on science experiences. Leo stated, “All the learning should be

play-based, but all the play should have a meaning and should have a goal”. Specifically, before implementing a science activity, Leo usually set himself a science-related goal to pursue in the course of the activity, such as understanding certain science concepts (e.g., the teeth health, the formation of shadow, daytime and night-time), or practicing science inquiry skills (e.g., observing, recording, the use of relevant tools). Daisy indicated, play-based learning in Australian contexts should be intentionally implemented by teachers and not simply about letting children play on their own without any learning intentions involved. It is clear from the above description that Daisy and Leo had their own science-related intention in mind when implementing science activities with children. These intentions then appeared to present a challenge for each teacher in maintaining a balance between the children’s intentions and the teacher’s intentions for science learning. In contrast, by making use of child-initiated play to scaffold children’s learning about science, the other teachers (Nancy, Fiona, Cindy) were more inclined to follow the children’s ideas which arose from their play and provide spontaneous support. These teachers placed more importance on the intention of the children rather than their own intention, as Cindy emphasised, “watching how they play and how they interact with the resource I provide”.

### **The Influence of Individuals on the Environment Pertinent to Play Pedagogy**

The study indicates that all the Chinese heritage teachers emphasised the importance of the teachers’ guidance in children’s learning of scientific knowledge and skills in different ways in a play-based environment. The emphasis on content learning in science activities varied from one teacher to another, and the teachers’ different emphasis on content knowledge seemed to be significant as they discussed varied preference for pedagogical approaches to science. For example, a greater emphasis on children’s understanding of science knowledge and skills prompted some teachers (Leo, Daisy, Ivy) to adopt pre-planned activities to teach children science. The other teachers (Nancy, Fiona, Cindy) preferred to

capitalise on children's spontaneous ideas arising from play and to further promote their learning related to science in spontaneous situations. There has been debate about whether content knowledge should be taught to young children (see Fleer, 2011; Hakkarainen & Bredikyte, 2014; Hedges, 2014; Hammer & He, 2016). In recent years, there has been a push for promoting educational outcomes in ECE, which has prompted a shift from traditional child-initiated play to intentional, teacher-initiated activities in support of content learning (Wood, 2014). However, this transitional process poses a challenge to ECE teachers, who have been accustomed to utilising child-centred play programmes as a basis of their pedagogy, focusing on the children's intentions through their play (Lewis et al, 2019). Therefore, the historical and ideological influences prevalent, have contributed to the tension between the traditional dominance of child-initiated play pedagogy and the heightened expectations for teacher-led play pedagogy, especially for ECE teachers (Hedges, 2014). While the data demonstrated there were a range of views about the influence of cultural background on pedagogy it was clear that all agreed cultural influence did exist and could not be ignored. All of the participants in this study recognised their own personal cultural background exerted an influence on their decision making about teaching practices, albeit in two different ways.

Some teachers (Leo, Daisy) tended to view their cultural background as a positive influence because it enabled them to become aware of and thus make some change to what they saw as inefficient or inappropriate in the play-based learning prevailing in Australian ECE contexts. The teachers' own cultural heritage allowed them to conceptualise play pedagogy from an alternative perspective. As Daisy indicated, her Chinese background provided "another possibility" about how to be a teacher. Daisy explained, she chose to integrate certain elements of Chinese education into play pedagogy because she felt children's play in the centre at times seemed to be "too free". In a similar way, Leo claimed,

“Because of my Chinese background, I really have a higher expectation of young children”.

This higher expectation prompted him to incorporate more complex concepts (e.g., formation of shadow, teeth health) into science education and focus making science concepts more accessible to young children. Therefore, these two teachers tended to draw on what they saw as the advantages of a Chinese-style education and integrate these aspects into Western education, thereby teaching science through teacher-led activities.

The three other participants (Nancy, Fiona, Cindy) were less inclined to promote aspects of Chinese practice. Instead, it was demonstrated that having been taught in a teacher-centred approach for many years, had made some teachers aware of adverse effects on child development. The participants indicated they were more inclined to identify themselves with the Australian understanding of play pedagogy and at the same time were more conscious about the use of Chinese styles of teaching in their own teaching practice. Fiona described how her cultural background provided a heightened sensitivity to Australian styled pedagogy, enabling her to clearly consider the implications and make more informed pedagogical choices (see Chapter 6). Nancy stated, “Given my background, I will be more self-conscious or sensitive about the way I interact with children”. As reported by Nancy, during her own educational experience, the teacher was in full control of the classroom and she was not able to take charge of her own learning, and she wanted to avoid this happening with her own students. The experience directed Nancy to approach her teaching differently by “view[ing] children as an equal contributor”. Similarly, due to a contrast between free play and formal teaching in her own life, Cindy preferred to support children’s learning in a play-based environment. As she claimed, “Children can have fun while they can learn things through play. I’m trying my best to support them in this learning environment”. Therefore, the three teachers were more inclined to embrace Australian styled play pedagogy so as to avoid the

adverse effect of the Chinese style teaching they had experienced. These teachers preferred to teach science through child-initiated play.

It is clear from the evidence that although the participants of this study shared certain similarities in their cultural and educational background, they tended to adopt different play-based approaches for teaching science in Australian ECE contexts. The findings further indicate the complexity of a teacher's decision making about their pedagogical practice, whereby a range of influences should be taken into consideration (Fleer, 2009a; Lewis et al., 2019; Sorensen & Birkeland, 2020). According to Fleer (2009a), when examining teachers' pedagogical practice regarding science, extra attention should be paid to teachers' own educational beliefs and assumptions about young children's learning and development. Sorensen and Birkeland (2020) stressed that "kindergarten teachers are individuals that are educated and socialized to have specific pedagogical values and traditions" (p. 49) and therefore their varied difference in values, thoughts and experiences, could also exert an influence on their decision. It is argued that influenced by similar societal demands and expectations, each individual teacher needs to act independently and make their own pedagogical decisions appropriate to particular situations in their day-to-day practice (Sorensen & Birkeland, 2020).

As discussed earlier, the Chinese heritage teachers' use of play pedagogy in Australian settings, to a large extent, reflects the influence of the social environment on individuals. From a cultural-historical viewpoint, the individual is positioned as an active agent in their own social situation of development (Veresov, 2019). Hence, it should be noted that the social situation of individuals is not only influenced by the social situation in which they reside but is also significantly controlled by individuals themselves (Vygotsky, 1998). As indicated in this study, the ways that the Chinese heritage teachers utilised play pedagogy in their practice, reflects the influence of a social reality on a teacher's development, and at



the same time, foregrounds what the teacher brings to the social environment. It can be seen that despite having a common cultural and educational background, the difference in teachers' understanding of their personal heritage contributed to their different social situation of development pertinent to play pedagogy, and ultimately manifested in different pedagogical styles when teaching science to young children.

## **Conclusion**

The study indicates, not all the Chinese heritage teachers working in Australia adhered strictly to the pedagogical methods prevalent in Australian ECE, namely the dominance of child-initiated play pedagogy. However, they also did not completely adopt teacher-led approaches (e.g., direct instruction) that they had been taught in China. As shown in this research, the Chinese heritage teachers' use of play pedagogy cannot be fully explained by the influence of Australian social context. Likewise, the influence of teachers' personal cultural heritage is difficult to explain the findings that their use of play pedagogy was, to a large extent, consistent with the ECE policy and practice promoted in Australia. The next chapter will conclude the thesis by providing a summary of the study and considering potential areas for future study.

## Chapter 8: Conclusions

### Introduction

This chapter begins with presenting the research questions, and then summarising the main findings of the study in relation to the research questions. The contributions of the study are outlined in terms of the implications for the Australian early childhood sector. The chapter then discusses the limitations of this study and makes recommendations for future research. Finally, this chapter concludes the study with a brief summary.

### The Research Questions

This study aimed to explore how play pedagogy is interpreted and implemented by Chinese heritage early childhood (EC) teachers in the area of science education, and ways their personal cultural heritage influenced their pedagogical decisions. This section summarises the findings based on the following research questions.

- In what ways is play pedagogy used in science education by Chinese heritage early childhood teachers, working in Australia?
- What influences early years teachers of Chinese heritage as they determine preferred pedagogical approaches for science education?

### *Chinese Heritage Teachers' Use of Play Pedagogy in Early Childhood Science Education*

Research Question one was directed towards revealing Chinese heritage teachers' perspectives and their self-reported practice concerning the use of play pedagogy in early childhood science education.

**Two Different Pedagogical Styles of Teaching Young children Science.** The Chinese heritage teachers who participated in this study valued the teaching of science content knowledge and discussed a variety of teaching styles in their self-reported practice. The participants focused on promoting children's science learning within playful environments and also recognised the importance of teacher involvement in student learning

(see Chapter 7). The findings further revealed the pedagogies discussed by the Chinese heritage teachers indicated two main approaches (see Chapter 5). The first was characterised by teacher-led learning, where the teacher determined, and clearly defined, the science knowledge and skills the children would learn while at the same time also seriously considering the children's perspectives. The second featured child-initiated play, where the children's intentions framed science learning and opportunities for science teaching were directly related to the spontaneous science ideas arising from children's play.

### **Understanding Intentional Teaching: Using Pedagogy in a Play-based**

**Curriculum.** The findings demonstrated that all of the teachers in this study recognised the value of child-initiated play (i.e., free play) in early childhood education. All of the teachers also believed that relying solely on children's self-learning through play, may limit the potential for children's science learning and development and all were of the opinion that a combination of teachers' planned activities and children's play can achieve the best learning results in relation to science. Different teaching approaches became evident as teachers described how they responded to children's play in their planning and teaching for science learning.

All teachers described the importance of paying close attention to children's play and the day-to-day life experiences of the children, they also discussed the use of intentional teaching as a way of supporting children's science learning. For some teachers this meant planning additional playful activities aimed to help children make sense of the science concepts or skills related to their ideas and experiences. For example, based on her observation of children's limited hand washing, Daisy planned two scientific experiments about germs to enable the children to become aware of bacteria. It was Daisy's intention that these extra activities would support the children to understand the importance of washing their hands properly (see Appendix 6). Providing teacher-led activities in this way, the

teachers intended to afford more opportunities for the children to learn about science concepts and skills than would have been possible through child initiated play alone. For other teachers, being intentional was about deliberately positioning themselves as part of the children's play. These teachers often actively encouraged child-initiated play by setting up various play spaces to provide the children with the freedom to choose how they wanted to use resources and equipment and believed that such explorative play fostered children's independence and autonomy (Chapter 5). These teachers also discussed the importance of their own deliberate involvement in children's play at the appropriate time, as a way of enhancing potential science learning. For instance, Nancy explained that by involving herself in children's play she was able to "provide some extra knowledge to their play...and help them enrich their play experience" (Chapter 5). The ways the teachers in this study described their responses to children's play provided insights about how they were 'being intentional' in their teaching as they attempted to provide further opportunity for children's science learning. While approaches may have differed, it was clear all the participant teachers were making thoughtful, deliberate decisions about the input they felt they needed to make to enhance children's learning. Such decision making highlighted that attending to children's science learning was often a complex aspect of each teacher's work.

The Chinese heritage teachers' perspectives and self-reported practice regarding science teaching are, to a large extent, in line with the concept of intentional teaching presented in the Australian early childhood education (ECE) frameworks. The findings demonstrated that when teaching young children, the participants were "deliberate, purposeful and thoughtful in their decisions and action" (EYLF, DET, 2019, p. 17), having awareness of "whether, when and how to intervene in children's learning" (VEYLDF, DET, Victoria, 2016, p. 15). Furthermore, it seems all were able to make a distinction between rote learning (repetition of facts) prevalent in schools and intentional teaching advocated in ECE,

with an emphasis on the contextual understanding of science facts instead of the memorising (Chapter 7). However, how the teachers' described intentional teaching in their self-reported practice seems to provide some further insights about what it means to be 'intentional'.

Previous studies, indicate that many EC teachers show reluctance or unwillingness to implement intentional teaching in their practice, especially incorporating intentional teaching when spontaneous responses are deemed necessary (Batcherlar, 2016; Cherrington, 2018; Fler, 2009a; Grieshaber, 2008; Kilderry, 2015; McLaughlin, Aspden, & Snyder, 2016). For example, one significant finding of a five-year longitudinal study, the Effective Early Educational Experiences (E4Kids) developed in Australia are "the low level, across service types, of teaching behaviours that encourage or promote learning during play activities" (Tayler, 2016, p.7). However, in regard to early childhood science education, the participant teachers' awareness of the importance and use of intentional teaching in their practice, seem to be more visible than the results shown in previous research. It is found that in the Australian ECE contexts, teachers are inclined to teach science in an informal way using a discovery-based approach, based on a common belief that science knowledge is perceived as embedded in children's day-to-day experience leading to an expectation that children are bound to pick up 'something' about science on their own (Edwards and Loveridge, 2011; Fler, 2009a, 2015b). Internationally, there have been prevailing assumptions in the ECE of Nordic countries that free play can amplify young children's potential to learn science through exploration, whereas teacher-initiated activities may limit children's independence and autonomy in learning (Hammer & He, 2016; Sommer, 2015; Sorensen & Birkeland, 2020).

***The Influences on Chinese Heritage Teachers' Pedagogical Decisions in Science Education***

Research Question two was aimed at identifying the influences which determine the preferred pedagogical approaches of Chinese heritage teachers when teaching young children science in an Australian early years settings.

**The Social Influence on Chinese Heritage Teachers.** The findings revealed the Chinese heritage teachers recognised significant differences in the way the play and learning relationship is understood and ingrained in ECE contexts in Australia and China (see Chapter 2). The teachers stated being aware of the pedagogical differences between the two countries did not hinder or make it difficult for them to understand and utilise Australian styled play pedagogy in their practice. According to the teacher responses, the process of adaption was relatively smooth and their ability to assimilate difference was mainly due to the teacher education they received in Australia (i.e., the completion of an undergraduate or postgraduate degree in ECE), and the social context of their workplace. As a result, the teachers' expressed opinions, and demonstrated that the social environment where they resided and worked tended to exert a stronger influence on their decision-making about pedagogy in contrast to their personal cultural background. As Fiona stressed, "Do as the locals do" (Chapter 6). The Chinese heritage teachers in this study were willing and able to teach science within the play-based environments inherent in Australian ECE. The teachers had a positive attitude towards the concept of intentional teaching advocated by the early years curriculum.

**The Personal Influence on Chinese Heritage Teachers.** The outcomes of this study further indicated similarities and differences in the use of play pedagogy among the six Chinese heritage teachers working in Australian ECE contexts (Chapter 7). The teachers' self-reported practices indicate the similarities in their pedagogy were more likely influenced by the Australian social environment and culture in relation to ECE. By contrast, the teachers' different understandings of their cultural heritage (e.g., focusing on the advantages

or disadvantages of Chinese-style education), to a certain extent, contributed to the differences in their teaching styles. As shown in the findings, the teachers, who reported they implemented some parts of a Chinese-style education in conjunction with Australian based play pedagogy, believed they did so to address what they saw as inefficient pedagogy prevalent in the EC centre. For example, Daisy thought children's play, in the centre in which she worked, was "too free" at times. It seems that this understanding was ultimately manifested in how she used intentional teaching, i.e. to incorporate teacher-led activities to enhance children's science learning. In contrast, other teachers were more inclined to emphasise the disadvantages of Chinese-style education, for instance, teacher-centredness leading to too much control over children, so they preferred to pay greater attention to children's intention in their spontaneous teaching during child-initiated play.

**The Social Environment and Individual Teachers.** The influence of the social environment on individual teachers as presented in this study, may create the impression that the relation between person and situation is a straightforward, linear process. However, the relation of the environment to an individual, and an individual to the environment are only analysed as two separate processes to be "analytically distinct" (Jung, Korinek, & Straßheim, 2014, p. 399), but in practice they are closely intertwined and difficult to distinguish. This is also a defining characteristic of cultural-historical theory which formed the basis for this study. In this theory, the environmental characteristics and personal characteristics are indivisibly united when conceptualising the role of environment in psychological development (Vygotsky, 1994). Veresov (2016) asserted "there is no act of consciousness that would not be an act of being conscious of something" (p. 135). It is therefore understood that in this study, the social influence on Chinese heritage teachers includes what the teachers brought from their own history, culture and experience. At the same time, the Chinese teachers' understandings of their personal cultural heritage in a certain sense, is also related

to the social reality where they worked, studied and resided. Therefore, from a cultural-historical perspective, this study provides empirical evidence to support Rogoff's (2003) assertion that studies which explore the influence of culture on individuals should not be limited to simply measuring the cultural characteristics and individuals', and then correlating them. Instead, the contributions of individuals and cultural practices are essential to be conceptualised in a mutually defining processes.

### **Contributions of This Study**

This empirical study makes a contribution to discussions about EC teachers' perceptions and practice regarding the tensions between play and learning in Australian science education by presenting how play pedagogy is understood and utilised by Chinese heritage teachers. In doing so it has contributed to a greater awareness of the influence of cultural heritage when immigrant EC teachers make decisions about their pedagogical practice. Finally, despite being a small-scale study it has the potential to make a contribution to practising immigrant-born EC teachers by increasing their awareness of their personal cultural heritage for reflection and self-review whilst working in a cross-cultural context.

### **Implications of This Study**

This study has potential implications for the Australian early childhood sector. First, this empirical study adds support to the Australian research literature at a time when little attention has been paid to examining the influence of EC teachers' cultural heritage in relation to their pedagogy, despite there being a significant number of immigrant-born educators in the Australian ECE workforce. This study therefore calls for an increased awareness of the place of immigrant-born teachers in the Australian national statistical documents and relevant research. Secondly, this study found that the teacher education completed in Australia played a crucial role in helping immigrant-born teachers adapt to and assimilate the educational differences between Australia and China. In order to further



facilitate international teachers' adaption and assimilation into a new social-cultural context, it may be appropriate for teacher educators to consider how to encourage pre-service teachers to recognise and reflect on their cultural heritage, and the influence this has on practice. Further, the findings from Chinese heritage teachers' self-reported responses indicated that these teachers felt their own cultural background might not play a leading part in their pedagogical decisions regarding science teaching, but rather the social and institutional influences helped their decision making. Nevertheless, the influence of cultural heritage did seem to be part of the pedagogical styles discussed by the teachers.

### **Limitations of This Study**

The first limitation of this study is its size. Only six early childhood teachers participated. Although the data gathered are sufficient to claim a theoretical perspective (Yin, 2009), it is nevertheless a small-scale study. In addition, certain deliberate decisions were made about the criteria for selecting the participants of this study (Chapter 4). For example, all the teachers who participated have a Bachelor's degree and above in an ECEC-related field. It is possible that EC teachers with different levels of qualification may have contributed different data. Furthermore, due to COVID-19 restrictions and time constraints, one data collection method was employed in this study (i.e., semi-structured interview). The practical challenges meant that only Chinese heritage teachers' understandings and self-reported practice of play pedagogy were investigated in this study. Therefore, there is the possibility of a misalignment between teachers' stated beliefs and practice, and their actual practice (Batchelar, 2016; Blay & Ireson, 2009; Varol, 2012). This needs to be taken into consideration when using the results of this research.

### **Recommendations for Future Research**

According to the national 2016 Early Childhood Education and Care (ECEC) workforce census (DET, 2017), early childhood practitioners with a Bachelor's degree and

above accounted for a relatively small percentage (11.9%) of the ECEC workforce. Most teachers were qualified at the Certificate III or IV (38.0%) and the Advanced Diploma/Diploma (34.1%). This study was limited to a small number of EC teachers qualified at a Bachelor's degree and above. Therefore, continued research on developing a broader understanding of how play pedagogy is understood and used by the teachers of Chinese heritage, can be extended by increasing the scope to those holding a Certificate III and an Advanced Diploma. One further area for future research would be to extend the current study through observing international teachers' daily classroom practice, alongside inviting more participants into the study. Research which increases the type of data collection methods may help to further identify and enrich understandings of the cultural influence on teacher's pedagogy. Moreover, using a cultural-historical theoretical understanding of EC teachers' perspectives can be further extended to gain insights into their daily practices. In addition, the immigrant-born teachers with diverse cultural heritage could be explored, which may help to further identify whether the reciprocity between the social environment and individual teachers that is theorised in this study is visible in other contexts.

### **Concluding Words**

This study of Chinese heritage teachers' understanding of play pedagogy in Australian early childhood science education, began with the aim of developing an understanding of how play pedagogy is understood and implemented by the teachers of Chinese heritage. Drawing on cultural-historical theory, it was found that not all the Chinese heritage teachers working in Australia adhered to the pedagogical methods prevalent in Australian ECE, namely the child-initiated play pedagogy. However, they also did not completely adopt teacher-led approaches (e.g., direct instruction) that they had experienced in China. From this small scale, self-reported study, it was not possible to make a distinction between the different influences involved in the pedagogical decisions the teachers reported. The cultural-

historical view of the role of environment on immigrant early childhood teachers, as developed in this study, represents a contribution to the research literature and it may have the potential to empower immigrant-born early childhood practitioners by making explicit aspects of their personal cultural background on their practice that have previously been tacit or unarticulated. However, future research in this area is required as immigrant early childhood educators are an underrepresented group in the research literature and contribute on a large scale to our early childhood sector.

## References

- Alexander, P. A., & Grossnickle, E. M. (2016). Positioning interest and curiosity within a model of academic development. In K. R. Wentzel, & D. B. Miele (Eds.), *Handbook of motivation at school* (2<sup>nd</sup> ed., pp. 188–208). New York, NY: Routledge.
- Australian Bureau of Statistics. (2016). Australian census and migrants integrated dataset 2016 datacube-Victoria. Retrieved from <https://www.abs.gov.au/statistics/people/people-and-communities/understanding-migrant-outcomes-insights-australian-census-and-migrants-integrated-dataset-australia/latest-release#data-download>
- Bai, L. (2005). Children at play: A childhood beyond the Confucian shadow. *Childhood (Copenhagen, Denmark)*, 12(1), 9-32. <https://doi.org/10.1177/0907568205049890>
- Batchelar, S. M. S. (2016). *Intentional teaching in New Zealand early childhood education: Aspirations, decisions, and actions* [Doctoral dissertation, the University of Auckland]. <https://researchspace.auckland.ac.nz/bitstream/handle/2292/28107/whole.pdf?sequence=29&isAllowed=y>
- Biggs, J. B. (2001). Teaching across cultures. In F. Salili, C. -Y. Chiu, & Y. -Y. Hong (Eds.), *Student motivation: The culture and context of learning* (pp. 293-308). New York, NY: Kluwer Academic/Plenum Publishers.
- Birbili, M. (2019). Children's interests in the early years classroom: Views, practices and challenges. *Learning, Culture and Social Interaction*, 23, 1-13. <https://doi.org/10.1016/j.lcsi.2018.11.006>
- Birbili, M., & Hedges, H. (2021). Studying curriculum as culture: early childhood policy documents in Greece and New Zealand. *International Journal of Early Years Education*, 1–16. <https://doi.org/10.1080/09669760.2020.1866502>

- Blay, J. A., & Ireson, J. (2009). Pedagogical beliefs, activity choice and structure, and adult-child interaction in nursery classrooms. *Teaching and Teacher Education*, 25(8), 1105-1116. <https://doi.org/10.1016/j.tate.2009.03.009>
- Bryman, A. (2016). *Social research methods* (5th ed.). Oxford: Oxford University Press.
- Chaiklin, S. (2003). The Zone of Proximal Development in Vygotsky's analysis of learning and instruction. In A. Kozulin, B. Gindis, V. S. Ageyev, S. M. Miller, R. Pea, J. S. Brown, & C. Heath (Eds.), *Vygotsky's educational theory in cultural context* (pp. 39-64). Retrieved from <https://doi.org/10.1017/CBO9780511840975>.
- Chaiklin, S., & Hedegaard, M. (2009). Radical-local teaching and learning: A cultural-historical perspective on education and children's development. In M. Fler, M. Hedegaard, & J. Tudge (Eds.), *World yearbook of education 2009—Childhood studies and the impact of globalization: Policies and practices at global and local levels* (pp. 182–201). New York: Routledge.
- Chen, X., Fu, R., & Zhao, S. (2014). Culture and socialization. In J. E. Grusec & P. D. Hastings (Eds.), *Handbook of socialization* (pp. 451-471). Retrieved from <https://ebookcentral.proquest.com/lib/monash/reader.action?docID=1768753&ppg=471>
- Cherrington, S. (2018). Early childhood teachers' thinking and reflection: a model of current practice in New Zealand. *Early years (London, England)*, 38(3), 316-332. <https://doi.org/10.1080/09575146.2016.1259211>
- Confucius. (1938). *The analects of Confucius* (A.Waley, Trans.). New York, NY: Random House. (Original work published ca. 475 B.C.E.)
- Conley, D. (2000). *Honky*. Berkeley: University of California Press.

- Correa-Chávez, M., & Rogoff, B. (2005). Cultural research has transformed our ideas of cognitive development. *International Journal of Behavioral Development*, 29(3), 7-10.
- Creswell, J. W. (2014). *Research design : qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, Calif: SAGE Publications.
- Crouch, M., & McKenzie, H. (2006). The logic of small samples in interview-based qualitative research. *Social Science Information*, 45(4), 483-499.  
<https://doi.org/10.1177/0539018406069584>
- Department of Education and Training [DET]. (2019). *Belonging, being & becoming: The Early Years Learning Framework for Australia*. Retrieved from <https://www.dese.gov.au/national-quality-framework-early-childhood-education-and-care/resources/belonging-being-becoming-early-years-learning-framework-australia>.
- Department of Education and Training. (2011). 2010 National early childhood education and care workforce census. Retrieved from <https://www.dese.gov.au/key-official-documents-about-early-childhood/resources/2010-national-early-childhood-education-and-care-workforce-census>
- Department of Education and Training. (2014). 2013 National early childhood education and care workforce census. Retrieved from <https://www.dese.gov.au/key-official-documents-about-early-childhood/resources/2013-national-early-childhood-education-and-care-workforce-census-report>
- Department of Education and Training. (2017). 2016 National early childhood education and care workforce census. Retrieved from <https://www.dese.gov.au/key-official-documents-about-early-childhood/resources/2016-national-early-childhood-education-and-care-workforce-census-report>

- Department of Education and Training, Victoria. (2016). *Victorian early years learning and development framework: For all children from birth to eight years*. Retrieved from <https://www.education.vic.gov.au/Documents/childhood/providers/edcare/veyldframework.pdf>
- Devi, A., Fler, M., & Li, L. (2018). 'We set up a small world': preschool teachers' involvement in children's imaginative play. *International Journal of Early Years Education*, 26(3), 295-311. <https://doi.org/10.1080/09669760.2018.1452720>
- Duncan. (2009). *Intentional teaching*. Retrieved from <https://www.education.govt.nz/>.
- Edwards, S., & Cutter-Mackenzie, A. (2011). Environmentalising early childhood education curriculum through pedagogies of play. *Australasian Journal of Early Childhood*, 36(1), 51-59.
- Edwards, S., Cutter-Mackenzie, A., Moore, D., & Boyd, W. (2017). Finding the balance : A play-framework for play-based learning and intentional teaching in early childhood education. *Every Child*, 23(1), 14-15.
- Edwards, K., & Loveridge, J. (2011). The inside story: Looking into early childhood teachers' support of children's scientific learning. *Australasian Journal of Early Childhood*, 36(2), 28-35.
- Elsbeth, B., & Murray, J. (2018). Ready, steady, learn: School readiness and children's voices in English early childhood settings. *Education*, 3(13), 143-156.
- Fler, M. (2008a). Interpreting research protocols-the institutional perspective. In M. Hedegaard & M. Fler (Eds.), *Studying children: A cultural historical approach* (pp. 65-87). New York, NY: Open University Press.
- Fler, M. (2008b). Interpreting research protocols-the child's perspective. In M. Hedegaard & M. Fler (Eds.), *Studying children: A cultural historical approach* (pp. 88- 103). New York, NY: Open University Press.

- Fleer, M. (2009a). Supporting scientific conceptual consciousness or learning in 'a roundabout way' in play-based contexts. *International Journal of Science Education*, 31(8), 1069–1089. <https://doi.org/10.1080/09500690801953161>
- Fleer, M. (2009b). Understanding the dialectical relations between everyday concepts and scientific concepts within play-based programs. *Research in Science Education*, 39(2), 281-306. <https://doi.org/10.1007/s11165-008-9085-x>
- Fleer, M. (2010). *Early learning and development: Cultural-historical concepts in play*. Port Melbourne, Australia: Cambridge University Press.
- Fleer, M. (2011). 'Conceptual play': Foregrounding imagination and cognition during concept formation in early years education. *Contemporary Issues in Early Childhood*, 12(3), 224-240. <https://doi.org/10.2304/ciec.2011.12.3.224>
- Fleer, M. (2015a). Pedagogical positioning in play - teachers being inside and outside of children's imaginary play. *Early Child Development and Care*, 185(11-12), 1801-1814. <https://doi.org/10.1080/03004430.2015.1028393>
- Fleer, M. (2015b). *Science for children*. Melbourne, Australia: Cambridge University Press.
- Fleer, M. (2017). Scientific playworlds: a model of teaching science in play-based settings. *Research in Science Education*, 49(5), 1257-1278. <https://doi.org/10.1007/s11165-017-9653-z>
- Fleer, M. (2021). *Play in the early years* (3rd ed.). Port Melbourne, Australia: Cambridge University Press.
- Fleer, M., Gomes, J., & March, S. (2014). Science learning affordances in preschool environments. *Australasian Journal of Early Childhood*, 39(1), 38-48.
- Fleer, M., & Hoban, G. (2012). Using 'Slowmation' for intentional teaching in early childhood centres: Possibilities and imaginings. *Australasian Journal of Early Childhood*, 37(3), 61-70.



- Golebiowska, K., Boyle, A., Pennec, S., & Horvath, D. (2018). Immigrant-born workers and quality early childhood education and care in the Northern Territory, Australia. *International Journal of Training Research*, 16(2), 103-121.  
<https://doi.org/10.1080/14480220.2018.1444666>
- Greenfield, D. B., Jirout, J., Dominguez, X., Greenberg, A., Maier, M., & Fuccillo, J. (2009). Science in the preschool classroom: A programmatic research agenda to improve science readiness. *Early Education and Development*, 20(2), 238-264.  
<https://doi.org/10.1080/10409280802595441>
- Grieshaber, S. (2008). Interrupting stereotypes: Teaching and the education of young children. *Early Education and Development*, 19(3), 505-518.  
<https://doi.org/10.1080/10409280802068670>
- Grieshaber, S. (2010). Departures from tradition: The Early Years Learning Framework for Australia. *International Journal of Child Care and Education Policy (Seoul)*, 4(2), 33-44. <https://doi.org/10.1007/2288-6729-4-2-33>
- Hakkarainen, P., & Bredikyte, M. (2014). Understanding narrative as a key aspect of play. In L. Brooker, M. Blaise, & S. Edwards (Eds.), *SAGE handbook of play and learning in early childhood* (pp. 240-251). <https://doi.org/10.4135/9781473907850>
- Hammer, A. S. E., & He, M. (2016). Preschool teachers' approaches to science: a comparison of a Chinese and a Norwegian kindergarten. *European Early Childhood Education Research Journal*, 24(3), 450-464. <https://doi.org/10.1080/1350293X.2014.970850>
- Han, Y. (2009). *Explanation upon entering the academy by Han Yu* (X. Feng, Trans.). Retrieved from [http://tsoidug.org/Literary/Academy\\_Comp.pdf](http://tsoidug.org/Literary/Academy_Comp.pdf). (Original work published ca.812.)

- Hedegaard, M. (2008a). A cultural historical theory of children's development. In M. Hedegaard & M. Fleer (Eds.), *Studying children: A cultural-historical approach* (pp. 10- 29). New York, NY: Open University Press.
- Hedegaard, M. (2008b). Developing a dialectic approach to researching children's development. In M. Hedegaard & M. Fleer (Eds.), *Studying children: A cultural-historical approach* (pp. 30-45). New York, NY: Open University Press.
- Hedegaard, M. (2008c). Principles for interpreting research protocols. In M. Hedegaard & M. Fleer (Eds.), *Studying children: A cultural-historical approach* (pp. 46-64). New York, NY: Open University Press.
- Hedegaard, M. (2012). Analyzing children's learning and development in everyday settings from a cultural-historical wholeness approach. *Mind, Culture, and Activity*, 19(2), 127-138. <https://doi.org/10.1080/10749039.2012.665560>
- Hedegaard, M., & Fleer, M. (Eds.) (2008). *Studying children: A cultural-historical approach*. New York, NY: Open University Press.
- Hedges, H. (2014). Children's content learning in play provision: Competing tensions and future possibilities. In L. Brooker, M. Blaise, & S. Edwards (Eds.), *SAGE handbook of play and learning in early childhood* (pp. 192-203). London, United Kingdom: Sage Publications.
- Hedges, H., & Cooper, M. (2016). Inquiring minds: Theorizing children's interests. *Journal of Curriculum Studies*, 48(3), 303–322. <https://doi.org/10.1080/00220272.2015.1109711>
- Hedges, H., & Cullen, J. (2012). Participatory learning theories: a framework for early childhood pedagogy. *Early Child Development and Care*, 182(7), 921–940. <https://doi.org/10.1080/03004430.2011.597504>

- Hedges, H., Cullen, J. & Jordan, B. (2011) Early years curriculum: funds of knowledge as a conceptual framework for children's interests. *Journal of Curriculum Studies*, 43(2), 185-205, <https://doi.org/10.1080/00220272.2010.511275>
- Hofstede, G. (1986). Cultural differences in teaching and learning. *International Journal of Intercultural Relations*, 10(3), 301–320. [https://doi.org/10.1016/0147-1767\(86\)90015-5](https://doi.org/10.1016/0147-1767(86)90015-5)
- Howard, J. (2010). Making the most of play in the early years: The importance of children's perceptions. In P. Broadhead, J. Howard, & E. Wood (Eds.), *Play and learning in the early years: from research to practice* (pp. 137-150). Retrieved from <https://ebookcentral.proquest.com/lib/monash/detail.action?docID=537746>
- Hu, B. Y. (2015). Comparing cultural differences in two quality measures in Chinese kindergartens: the Early Childhood Environment Rating Scale-Revised and the Kindergarten Quality Rating System. *Compare*, 45(1), 94-117. <https://doi.org/10.1080/03057925.2013.841468>
- Hu, B. Y., Fan, X., LoCasale-Crouch, J., Chen, L., & Yang, N. (2016). Profiles of teacher-child interactions in Chinese kindergarten classrooms and the associated teacher and program features. *Early Childhood Research Quarterly*, 37, 58-68. <https://doi.org/10.1016/j.ecresq.2016.04.002>
- Hu, B. Y., & Roberts, S. K. (2013). A qualitative study of the current transformation to rural village early childhood in China: Retrospect and prospect. *International Journal of Educational Development*, 33(4), 316-324. <https://doi.org/10.1016/j.ijedudev.2012.04.006>
- Inan, H. Z., Trundle, K. C., & Kantor, R. (2010). Understanding natural sciences education in a Reggio Emilia-inspired preschool. *Journal of Research in Science Teaching*, 47(10), 1186-1208. <https://doi.org/10.1002/tea.20375>

- Irvine, S., Davidson, C., Veresov, N., Adams, M., & Devi, A. (2015). Lenses and lessons: Using three different research perspectives in early childhood education research. *Cultural-Historical Psychology, 11*(3), 75-85.  
<https://doi.org/10.17759/chp.2015110307>
- Jung, A., Korinek, R.-L., & Straßheim, H. (2014). Embedded expertise: A conceptual framework for reconstructing knowledge orders, their transformation and local specificities. *Innovation: The European Journal of Social Science Research, 27*(4), 398-419. <https://doi.org/10.1080/13511610.2014.892425>
- Karpov, Y. V. (2003). Vygotsky's doctrine of scientific concepts. In A. Kozulin, B. Gindis, V. S. Ageyev, & S. M. Miller (Eds.), *Vygotsky's educational theory in cultural context* (pp. 65–82). Cambridge University Press.  
<https://doi.org/10.1017/CBO9780511840975.005>
- Kilderry, A. (2015). The intensification of performativity in early childhood education. *Journal of Curriculum Studies, 47*(5), 633-652.  
<https://doi.org/10.1080/00220272.2015.1052850>
- Kozulin, A. (2003). Psychological tools and mediated learning. In A. Kozulin, B. Gindis, V. S. Ageyev, S. M. Miller, R. Pea, J. S. Brown, & C. Heath (Eds.), *Vygotsky's educational theory in cultural context* (pp. 15-38). Retrieved from <https://doi.org/10.1017/CBO9780511840975>.
- Kravtsov, G. G., & Kravtsova, E. E. (2010). Play in L.S. Vygotsky's nonclassical psychology. *Journal of Russian and East European Psychology, 48*(4), 25-41.  
<https://doi.org/10.2753/RPO1061-0405480403>
- Kuschner, D. (2007). Children's play in the journal, young children: An analysis of how it is portrayed and why it is valued. In D. J. Sluss & O.S. Jarrett (Eds), *Investigating play*

- in the 21st century: Play and culture studies* (pp. 55-69). Lanham, MD: University Press of America.
- Leggett, N., & Ford, M. (2013). A fine balance: Understanding the roles educators and children play as intentional teachers and intentional learners within the Early Years Learning Framework. *Australasian Journal of Early Childhood*, 38(4), 42-50.
- Lewis, R., Fler, M., & Hammer, M. (2019). Intentional teaching: Can early-childhood educators create the conditions for children's conceptual development when following a child-centred programme? *Australasian Journal of Early Childhood*, 44(1), 6–18.  
<https://doi.org/10.1177/1836939119841470>
- McLaughlin, T., Aspden, K., & Snyder, P. (2016). Intentional teaching as a pathway to equity in early childhood education: participation, quality, and equity. *New Zealand Journal of Educational Studies*, 51(2), 175-195. <https://doi.org/10.1007/s40841->
- Merriam, S. B. (1998). *Qualitative research and case study applications in education*. San Francisco: Jossey-Bass.
- Ministry of Education in People's Republic of China. (2001). *The Guidance for kindergarten education (trial version)*. Retrieved from  
<http://www.moe.edu.cn/edoas/website18/19/info692.htm>.
- Ministry of Education in People's Republic of China. (2018). *Notice on carrying out rectification of “primary-school-like” kindergartens*. Retrieved from  
[http://www.moe.gov.cn/srcsite/A06/s3327/201807/t20180713\\_342997.html](http://www.moe.gov.cn/srcsite/A06/s3327/201807/t20180713_342997.html).
- Nasciutti, F., Veresov, N., & de Aragão, A. (2016). The group as a source of development: Rethinking professional development in a collaborative perspective. *Outlines: Critical Practice Studies*, 17(1), 86–108.

- National Education Committee of the People's Republic of China. (1989). *Kindergarten work regulations and procedures*. Retrieved from <http://www.moe.gov.cn/edoas/website18/22/info7922.htm>.
- Nayfeld, I., Brenneman, K., & Gelman, R. (2011). Science in the classroom: Finding a balance between autonomous exploration and teacher-led instruction in preschool settings. *Early Education & Development*, 22(6), 970-988. <https://doi.org/10.1080/10409289.2010.507496>
- Oon, P.-T., Hu, B. Y., & Wei, B. (2019). Early childhood educators' attitudes toward science teaching in Chinese schools. *Australasian Journal of Early Childhood*, 44(4), 423-435. <https://doi.org/10.1177/1836939119870890>
- O'Sullivan, L., & Ring, E. (2018). Play as learning: Implications for educators and parents from findings of a national evaluation of school readiness in Ireland. *International Journal of Play*, 7(3), 266–289.
- Perry, P. (2001). White means never having to say you're ethnic. *Journal of Contemporary Ethnography*, 30, 56 – 91.
- Peters, S., & Davis, K. (2011). Fostering children's working theories: pedagogic issues and dilemmas in New Zealand. *Early Years (London, England)*, 31(1), 5–17. <https://doi.org/10.1080/09575146.2010.549107>
- Rao, N., Ng, S. S. N., & Pearson, E. (2010). Preschool pedagogy: A fusion of traditional Chinese beliefs and contemporary notions of appropriate practice. In C. K. K. Chan & N. Rao (Eds.), *Revisiting the Chinese learner: Changing contexts, changing education* (pp. 255–279). Springer Netherlands. <https://doi.org/10.1007/978-90-481-3840-19>
- Rogoff, B. (2003). *The cultural nature of human development*. Oxford: Oxford University Press.

- Roth, W. M., & Jornet, A. (2016). Perekhivanie in the light of the later Vygotsky's spinozist turn. *Mind, Culture, and Activity*, 23(4), 315-324.  
<https://doi.org/10.1080/10749039.2016.1186197>
- Schutz, A. (2005). *Hverdagslivets sociology*. Copenhagen: Hans Reitzel.
- Shaffer, D. R. (1988). *Social and personality development*. Pacific Grove, Calif: Brooks/Cole Pub.
- Siraj-Blatchford, I., Sylva, K., Muttock, S., Gilden, R., & Bell, D. (2002). *Researching effective pedagogy in the early years (REPEY)* (Research Report 356). Department for Education and Skills, Institute of Education, University of London, UK; Department of Educational Studies, University of Oxford, UK.  
<https://dera.ioe.ac.uk/4650/1/RR356.pdf>
- Sommer, D. (2015). Tidligt i skole eller legende læring? In J. Klitmøller & D. Sommer (Eds.), *Læring, dannelse og udvikling*. Copenhagen, Denmark: Hans Reitzels Forlag.
- Sorensen, H. V., & Birkeland, A. (2020). Children's explorative activities in kindergarten playgrounds: A case study in China and Norway. In M. Hedegaard & E. E. Ødegaard (Eds.), *Children's exploration and cultural formation* (pp. 47-63). Springer International Publishing AG.
- Taylor, C. (2016). *The E4Kids study: Assessing the effectiveness of Australian early childhood education and care programs: Overview of findings at 2016* (LP0990200). Retrieved from file:///C:/Users/sjia58/Downloads/E4Kids-Report-3.0\_WEB.pdf
- Thomas, L., Warren, E., & deVries, E. (2011). Play-based learning and intentional teaching in early childhood contexts. *Australasian Journal of Early Childhood*, 36(4), 69-75.  
<https://doi.org/10.1177/183693911103600410>
- Tobin, J. J., Hsueh, Y., & Karasawa, M. (2009). *Preschool in three cultures revisited: China, Japan and the United States*. Chicago: The University of Chicago Press.

- Varol, F. (2012). What they believe and what they do. *European Early Childhood Education Research Journal*, 1-12. <https://doi.org/10.1080/1350293x.2012.677309>
- Veresov, N. (2010). Introducing cultural-historical theory: Main concepts and principles of genetic research methodology. *Cultural-Historical Psychology*, 4, 83-90.
- Veresov, N. (2014). Refocusing the lens on development: towards genetic research methodology. In M. Fleer & A. Ridgway (Eds.), *Visual methodologies and digital tools for researching with young children* (pp. 129–149). Springer.
- Veresov, N. (2016). Perezhivanie as a phenomenon and a concept: Questions on clarification and methodological meditations. *Cultural-Historical Psychology*, 12(3), 129-148. <https://doi.org/10.17759/chp.2016120308>
- Veresov, N. (2019). Subjectivity and perezhivanie: Empirical and methodological challenges and opportunities. In F. G. Rey, A.M. Martinez & D. M. Goulart (Eds.), *Subjectivity within cultural-historical approach* (pp. 61–83). Springer Singapore. [https://doi.org/10.1007/978-981-13-3155-8\\_4](https://doi.org/10.1007/978-981-13-3155-8_4)
- Vygotsky, L. S. (1978). *Mind in society: The development of higher mental processes*. Harvard University Press.
- Vygotsky, L.S. (1981). The genesis of higher mental functions. In J.V. Wertsch (Ed.), *The concept of activity in Soviet psychology* (pp. 144-188). Armonk, NY: Sharpe.
- Vygotsky, L.S. (1986). *Thought and language*. Cambridge, MA: MIT Press.
- Vygotsky, L. S. (1987). *The collected works of L.S. Vygotsky (Vol. 1: Problems of general psychology)*. New York, NY: Plenum Press.
- Vygotsky, L. S. (1994). The problem of the environment. In R. v. d. Veer & J. Valsiner (Eds.), *The Vygotsky reader* (pp. 338-354). Oxford: Blackwell.
- Vygotsky, L. S. (1997). *The collected works of L. S. Vygotsky (Vol 4: The history of the development of higher mental functions)*. New York, NY: Plenum Press.



- Vygotsky, L. S. (1998). *The collected works of L.S. Vygotsky (Vol. 5: Child psychology)*. New York, NY: Plenum Press.
- Wang, J., & Mao, S. (1996). Culture and the kindergarten curriculum in the People's Republic of China. *Early Child Development and Care*, 123(1), 143-156.  
<https://doi.org/10.1080/0300443961230110>
- Wang, Y. -M. (1963). *Instructions for practical living and other Neo-Confucian writings by Wang Yang-Ming* (W.T.Chan, Trans.). New York, NY: Columbia University Press.  
(Original work published ca. 1518.)
- Weisberg, D. S., Hirsh-Pasek, K., & Golinkoff, R. M. (2013). Guided play: Where curricular goals meet a playful pedagogy. *Mind, brain and education*, 7(2), 104-112.  
<https://doi.org/10.1111/mbe.12015>
- Wertsch, J. V., & Tulviste, P. (1992). L.S. Vygotsky and contemporary developmental psychology. *Developmental Psychology*, 28(4), 548-557.
- Wood, E. (2008). Developing a pedagogy of play. In A. Anning, J. Cullen, & M. Fler (Eds.), *Early childhood education: society and culture* (2nd ed., pp. 27-38). SAGE Publication.
- Wood, E. (2014). The play-pedagogy interface in contemporary debates. In L. Brooker, M. Blaise, & S. Edwards (Eds.), *SAGE handbook of play and learning in early childhood* (pp. 145-156). London, United Kingdom: SAGE Publications.
- Yin, R. K. (2009). *Case study research: design and methods* (4th ed.). Thousand Oaks, Calif: Sage Publications.
- Zhang, W., & Birdsall, S. (2016). Analysing early childhood educators' science pedagogy through the lens of a pedagogical content knowing framework. *Australasian Journal of Early Childhood*, 41(2), 50-58.

- Zhu, J., & Wang, C. (2005). Contemporary early childhood education and research in China  
In B. Spodek & O. N. Saracho (Eds.), *International perspectives on research in Early  
Childhood Education* (pp. 55-77). Greenwich, Connecticut: Information Age  
Publishing.
- Zhu, J., & Zhang, J. (2008). Contemporary trends and developments in early childhood  
education in China. *Early Years*, 28(2), 173-182.

## Appendices

### Appendix 1: Three Main Models of Play Pedagogy in Early Childhood Education

Three main models of play pedagogy prevalent in early childhood education are discussed in terms of intentions, differences and associated tensions: child-initiated play (closest to free play), academic-oriented play, and adult-guided play.

#### *Child-initiated Play (Free Play)*

In free play, young children are given the freedom to drive their own learning and development through self-initiated activities. Such activities may entail making choices and decisions, showing and following their own interests, manipulating materials, and managing themselves and others (Fleer, 2010; Wood, 2014). As Grieshaber (2010) pointed out, fostering children's independence, autonomy and ownership are defining characteristics of child-initiated play. Nevertheless, it should be noted that free play is never absolutely free (Wood, 2014) as all child-initiated play is to some degree constrained by a number of situational factors such as cultural values, educational policies, and pedagogical views held by the professionals (Millei, 2012). Therefore, although young children are likely to have more freedom and choices in their free play, the kinds of equipment and materials provided, and the amount of time allowed for children to play, are still dependent upon contextual factors in early years settings.

In western countries, child-initiated play seems to be inherent in early childhood and is usually viewed as an integral part of children's development (Fleer, 2011; Grieshaber, 2010). A distinguishing feature of free play is the complexity and dynamics in its own right. The nature of this play can potentially spark young children's interest in the environment surrounding them and further promote their development (Edwards, Cutter-Mackenzie, Moore & Boyd, 2017). For instance, children have the freedom to make use of the resources and equipment that are accessible to them in different, and often unofficial ways (Edwards,

2017; Fler, 2009). Despite support being available from adults or peers, children are able to choose, and access varying degrees of support as required when solving problems. This is consistent with Wood's (2014) argument that children can "constantly adjust their actions and interactions to changing goals and circumstances" (p. 149). Therefore, child-initiated play is distinguished from other play types by the increased control children are given over their own play. In terms of early childhood science education, the creation of a science-rich environment has been shown to provide a critical role in enhancing young children's engagement with science through the use of child-initiated play. Inan, Trundle, and Kantor (2010) found in a Reggio Emilia-inspired preschool, that young children's enquiries into science and hands-on science-related activities can be initiated and supported in a materially rich play-based context. Likewise, in the research conducted by Fler, Gomes, and March (2014), found that early childhood professionals were inclined to focus on the provision of science activities through child-initiated play rather than specifically planned lessons for science teaching and when doing so provided children with access to science materials and equipment in the science play stations.

While the very nature of free play reveals and provides opportunity for children to develop their interests, such play does not always enable children to acquire the relevant knowledge and skills required by expected academic outcomes (Fler, 2010; Hakkarainen & Bredikyte, 2014; Weisberg, Hirsh-Pasek, & Golinkof, 2013). As Wood (2007) asserted, showing an interest in something alongside free play is not exactly equal to acquiring relevant knowledge and skills through meaningful engagement with play intentionally designed by teachers. This is consistent with the findings of Fler's (2009) research into science education in play-based programs. In this research, some early childhood teachers believed that children were able to learn science when engaging with the rich materials and equipment provided, thereby de-emphasising the role of the teacher. However, Fler (2009) argued that without

teachers' mediation in children's scientific play, free play within a rich science context may only enable children to develop their own science theories and understandings rather than achieve conceptual understanding aligned with accepted scientific thinking. The studies showed that without adult guidance young children's science learning may be limited. Hence, given structural considerations within educational settings, such as policy frameworks, school readiness, teachers' role and parents' expectations, the predominance of child-initiated play is to a certain extent being marginalized or even problematized in early childhood education at a theoretical level (Edwards & Cutter-Mackenzie, 2011; Fler, 2011; Grieshaber, 2010; Markstrom and Hallden, 2009). With the schoolification of early childhood, the focus tends to be on academic learning rather than learning through child-initiated play (Adams & Fler, 2016).

### ***Academic-oriented Play***

In recent years there has been a global push for delivering academic oriented outcomes in early childhood education (Fler, 2011; Hakkarainen & Bredikyte, 2014). As previously argued, this growing trend in academic learning has contributed to certain limitations on the use of free play in early years settings (Markstrom and Hallden, 2009). Play of this kind is mainly focused on learning objectives and curriculum goals, and valued as a vehicle for achieving expected learning outcomes. Hence, this type of play is called 'academic-oriented' play in this study. According to Fler (2015a), the greater focus on cognitive achievement of young children has been recognised to be likely to make early childhood programs become more academically oriented at the expense of play. As a result, it would seem that the increasing attention on academic outcomes is not fully embraced by early childhood professionals, concerned about making early years settings more school like (Hammer & He, 2016) and narrowing the diversity of children's play (Fler, 2015a).

Academic-oriented play appears to be more instructional in contrast to free play (Thomas, Warren, & deVries, 2011). The potential limitations of academic-oriented play primarily centre on the contrast between the spontaneity of children's "dynamic, imaginative flow of ideas and situated meanings" and teachers' "structured pedagogic interactions that aim towards achieving defined goals for development and learning" (Wood, 2014, p. 152). Children's spontaneous intention arising out of play may conflict with the pedagogical goal planned by teachers. In spite of its limitations, this academic mode of play (e.g., direct instruction) may be appropriate and efficient in certain contexts, for example, providing background information of play activities for children to explore later on their own, or teaching relevant skills and rules of games to children (Fleer, 2015b). However, as Holzman (2017) argued, academic-oriented play should be equally important as other play types, but it can be problematic when it becomes a dominant form of pedagogical play in early childhood education. This is mainly because in academic oriented play more attention is directed to the achievement of learning outcomes, during which children's intentions can be often marginalized or ignored (Hakkarainen & Bredikyte, 2014). This may reduce the spontaneity and imagination within the play, thereby losing certain benefits of the inherent complexities of children's play, such as the potential for higher mental development (Holzman, 2017). Take early childhood science education as an example. Esach and Fried (2005) asserted that the acquisition of scientific concepts should not be the only goal of science teaching in early years, suggesting that "there is room for mere looking, for mere paying attention to phenomena in the world. Such mere looking too is essential to science..." (p.320). Learning about science goes beyond the facts and concepts in early childhood, and academic-oriented play should not be the only type of play valued in early childhood education contexts.

As a result, the academic-oriented play in early years may include a combination of different types of play. This was demonstrated in Edwards and Cutter-Mackenzie's work

(2011), when teachers purposefully framed academic oriented play with children's free play, to help preschoolers build a depth of scientific knowledge about the structure of worms. However, in practice the combination of different play approaches appears to not be equally weighted while importance is attached to the achievement of specific learning goals (Hakkarainen, 2007). To better illustrate the combination of different play forms in academic-oriented play, a concept called 'playful learning' has emerged from associated research (Hirsh-Pasek, Golinkoff, Berk & Singer, 2009; van Oers, 2012). According to Hakkarainen & Bredikyte (2014), "often 'playful' means the addition of elements of play (game, toys, singing, role characters, etc.) to school lessons" (p. 249). Therefore, the use of playful learning is mainly aimed at integrating playful elements into formalised teaching so as to meet the characteristics of young children's learning through play and therefore achieve academic outcomes. It should be noted that given different policy frameworks that exist for early childhood education across different countries, the forms of academic-oriented play vary accordingly. As Wood (2014) stated, academic play needs to be defined and understood in specific socio-cultural contexts.

### ***Adult-Guided Play***

If child-initiated play and academic-oriented play can be seen as the two ends of a continuum of play pedagogy, then adult-guided play would be positioned in the middle of such a continuum (Weisberg et al., 2013). Adult guided play therefore shares some commonalities with both free play and academic oriented play. Specifically, adult-guided play can involve curriculum-focused learning experiences preplanned by teachers, and can also be positioned to take advantage of the spontaneous teachable moments occurring in children's free play to promote learning with teacher mediation (Grieshaber, 2010). This combination of adult-guided play and academic-oriented play creates opportunities where specific learning outcomes are likely to be achieved without compromising the complexities

of play activities (Fleer, 2011). Similarly, the overlap between adult-directed play and freely chosen play also helps direct the teacher's attention towards spontaneous teaching moments arising from child-initiated play, which might otherwise be overlooked (Grieshaber, 2010). Therefore, while child-initiated play and academic-oriented play may be placed on two opposite ends of a theoretical continuum (Edwards, 2017; Thomas, et al., 2011), with the mediation of adult-guided play, the three pedagogical play modes may complement each other and be dialectically related (Edwards & Cutter-Mackenzie, 2011; Wood, 2010). This means the different modes of play may not be mutually exclusive or incompatible. Instead, the organic combination of different play modes is likely to offer better potential for young children's learning and development. Unlike children's free play, adult-guided play is to some extent defined within policy-driven discourses (Wood, 2014). Therefore, it may be structured differently in different settings as a result of the varying degrees of understanding professionals hold about this type of play. This could be the result of different curriculum guidance across different countries. Hence, there have been a number of models of adult-guided play developed across various contexts, for instance, conceptual play (Fleer, 2011), playworlds (Lindqvist, 1996) and scientific playworlds (Fleer, 2017).

Drawing a distinction between adult-guided and academic-oriented play is more challenging. The two modes of play both place the teacher at the centre of the play pedagogy, as teachers are required to mediate play to meet learning objectives. Take science teaching as an example. Young children may develop their own theories and understandings about the materials and phenomena they come across in their free play, while with the intention of understanding science possibilities inherent in them, children do require teachers' scaffolding to achieve this. This is also consistent with the findings of research into early years science education (Edwards & Cutter-Mackenzie, 2011; Fleer, 2009; Nayfeld, Brenneman, & Gelman, 2011). But it is equally true that usually in the academically oriented play, the



achievement of teachers' aims may be prioritised over the intentions of children (Hedges, 2014). However, there are generally two types of play included in adult-guide play mode, namely teachers' preplanned play aimed at science concepts or facts, and spontaneous science teaching arising out of children's free play.

As an example of integrating different approaches, the model of teacher-guided play, named as Scientific Playworlds, was put forward by Fler (2017) to support science learning in the early years. In this model, the role of early childhood teachers is significantly foregrounded in a more proactive and cooperative way, different from the role in a passive academic-oriented play. Specifically, teachers are encouraged to create and share collective imaginary situations with children through building a problem-involved play narrative together. In the process of solving the problem, young children are given the opportunity to understand and utilise scientific concepts in a contextualised play narrative. A distinguishing feature of this approach is that play is utilized to support young children's concept formation within the play-based program. Spontaneous teachable moments are embedded in child-initiated play, with an emphasis on children's science-related interest arising from their play. Based on this model, teachers are encouraged to make full use of 'improvisation' to spontaneously create a supportive environment regarding children's interest to further promote their learning about science. As Duncan (2009) argued, the recognition and response to any and every opportunity in which children's learning can be developed and extended should be expected from an intentional teacher, "whether that learning be child-initiated, teacher-initiated, routine, planned or unexpected" (p. 1). Scientific Playworld is a model that integrates child and teacher-initiated play and learning into an organic whole, providing an opportunity for learning science in a playfully contextualised environment.

## **References:**

- Adams, M., & Fler, M. (2016). The relations between a 'push-down' and 'push-up' curriculum: A cultural-historical study of home-play pedagogy in the context of structured learning in international schools in Malaysia. *Contemporary Issues in Early Childhood*, 17(3), 328-342. <https://doi.org/10.1177/1463949116660955>
- Duncan. (2009). *Intentional teaching*. Retrieved from <https://www.education.govt.nz/>.
- Edwards, S. (2017). Play-based learning and intentional teaching: Forever different? *Australasian Journal of Early Childhood*, 42(2), 4-11. <https://doi.org/10.23965/AJEC.42.2.01>
- Edwards, S., & Cutter-Mackenzie, A. (2011). Environmentalising early childhood education curriculum through pedagogies of play. *Australasian Journal of Early Childhood*, 36(1), 51-59.
- Edwards, S., Cutter-Mackenzie, A., Moore, D., & Boyd, W. (2017). Finding the balance: A play-framework for play-based learning and intentional teaching in early childhood education. *Every Child*, 23(1), 14-15.
- Eshach, H., & Fried, M. N. (2005). Should science be taught in early childhood? *Journal of Science Education and Technology*, 14(3), 315-336. <https://doi.org/10.1007/s10956-005-7198-9>
- Fler, M. (2009). Understanding the dialectical relations between everyday concepts and scientific concepts within play-based programs. *Research in Science Education*, 39(2), 281-306. <https://doi.org/10.1007/s11165-008-9085-x>
- Fler, M. (2010). *Early learning and development: Cultural-historical concepts in play*. Port Melbourne, Australia: Cambridge University Press.
- Fler, M. (2011). 'Conceptual play': Foregrounding imagination and cognition during concept formation in early years education. *Contemporary Issues in Early Childhood*, 12(3), 224-240. <https://doi.org/10.2304/ciec.2011.12.3.224>

- Fleer, M. (2015a). Pedagogical positioning in play - teachers being inside and outside of children's imaginary play. *Early Child Development and Care*, 185(11-12), 1801-1814. <https://doi.org/10.1080/03004430.2015.1028393>
- Fleer, M. (2015b). *Science for children*. Melbourne, Australia: Cambridge University Press.
- Fleer, M. (2017). Scientific playworlds: a model of teaching science in play-based settings. *Research in Science Education*, 49(5), 1257-1278. <https://doi.org/10.1007/s11165-017-9653-z>
- Fleer, M., Gomes, J., & March, S. (2014). Science learning affordances in preschool environments. *Australasian Journal of Early Childhood*, 39(1), 38-48.
- Grieshaber, S. (2010). Departures from tradition: The Early Years Learning Framework for Australia. *International Journal of Child Care and Education Policy (Seoul)*, 4(2), 33-44. <https://doi.org/10.1007/2288-6729-4-2-33>
- Hakkarainen, P. (2007). Curriculum models of early childhood education. In R. Jakku-Sihvonen & H. Niemi (Eds.), *Education as societal contributor* (pp. 111-127). Frankfurt: Peter Lang.
- Hakkarainen, P., & Bredikyte, M. (2014). Understanding narrative as a key aspect of play. In L. Brooker, M. Blaise, & S. Edwards (Eds.), *SAGE handbook of play and learning in early childhood* (pp. 240-251). <https://doi.org/10.4135/9781473907850>
- Hammer, A. S. E., & He, M. (2016). Preschool teachers' approaches to science: a comparison of a Chinese and a Norwegian kindergarten. *European Early Childhood Education Research Journal*, 24(3), 450-464. <https://doi.org/10.1080/1350293X.2014.970850>
- Hedges, H. (2014). Children's content learning in play provision: Competing tensions and future possibilities. In L. Brooker, M. Blaise, & S. Edwards (Eds.), *SAGE handbook of play and learning in early childhood* (pp. 192-203). London, United Kingdom: Sage Publications.

- Hirsh-Pasek, K., Golinkoff, R. M., Berk, L. E., & Singer, D. (2009). *A mandate for playful learning in preschool: presenting the evidence*. New York, NY: Oxford University Press.
- Holzman, L. (2017). *Vygotsky at work and play* (2nd ed.). New York, NY: Routledge.
- Inan, H. Z., Trundle, K. C., & Kantor, R. (2010). Understanding natural sciences education in a Reggio Emilia-inspired preschool. *Journal of Research in Science Teaching*, 47(10), 1186-1208. <https://doi.org/10.1002/tea.20375>
- Lindqvist, G. (1996). The aesthetics of play: A didactic study of play and culture in preschools. *Early Years*, 17(1), 6-11. <https://doi.org/10.1080/0957514960170102>
- Markström, A. M., & Halldén, G. (2009). Children's strategies for agency in preschool. *Children & Society*, 23(2), 112-122. <https://doi.org/10.1111/j.1099-0860.2008.00161.x>
- Millei, Z. (2012). Thinking differently about guidance: power, children's autonomy and democratic environments. *Early Childhood Research*, 10(1), 31-39.
- Nayfeld, I., Brenneman, K., & Gelman, R. (2011). Science in the classroom: Finding a balance between autonomous exploration and teacher-led instruction in preschool settings. *Early Education & Development*, 22(6), 970-988. <https://doi.org/10.1080/10409289.2010.507496>
- Thomas, L., Warren, E., & deVries, E. (2011). Play-based learning and intentional teaching in early childhood contexts. *Australasian Journal of Early Childhood*, 36(4), 69-75. <https://doi.org/10.1177/183693911103600410>
- van Oers, B. (2012). Culture in play. In J. Valsiner (Ed.), *The Oxford handbook of culture and psychology* (pp. 936-956). New York, NY: Oxford University Press.

- Weisberg, D. S., Hirsh-Pasek, K., & Golinkoff, R. M. (2013). Guided play: Where curricular goals meet a playful pedagogy. *Mind, Brain and Education*, 7(2), 104-112.  
<https://doi.org/10.1111/mbe.12015>
- Wood, E. (2007). New directions in play: consensus or collision? *Education 3-13*, 35(4), 309-320. <https://doi.org/10.1080/03004270701602426>
- Wood, E. (2010). Developing integrated pedagogical approaches to play and learning. In P. Broadhead, J. Howard, & E. Wood (Eds.), *Play and learning in the early years: from research to practice* (pp. 19-34). Retrieved from <https://ebookcentral.proquest.com>.

## Appendix 2: Ethics Approval Certificates



### Monash University Human Research Ethics Committee

#### Approval Certificate

This is to certify that the project below was considered by the Monash University Human Research Ethics Committee. The Committee was satisfied that the proposal meets the requirements of the *National Statement on Ethical Conduct in Human Research* and has granted approval.

**Project ID:** 28296  
**Project Title:** Play Pedagogy in Science Education: Early childhood teachers of Chinese heritage in Australian contexts  
**Chief Investigator:** Dr Megan Adams  
**Approval Date:** 23/04/2021  
**Expiry Date:** 23/04/2026

**Terms of approval - failure to comply with the terms below is in breach of your approval and the *Australian Code for the Responsible Conduct of Research*.**

1. The Chief Investigator is responsible for ensuring that permission letters are obtained, if relevant, before any data collection can occur at the specified organisation.
2. Approval is only valid whilst you hold a position at Monash University.
3. It is responsibility of the Chief Investigator to ensure that all investigators are aware of the terms of approval and to ensure the project is conducted as approved by MUHREC.
4. You should notify MUHREC immediately of any serious or unexpected adverse effects on participants or unforeseen events affecting the ethical acceptability of the project.
5. The Explanatory Statement must be on Monash letterhead and the Monash University complaints clause must include your project number.
6. Amendments to approved projects including changes to personnel must not commence without written approval from MUHREC.
7. Annual Report - continued approval of this project is dependent on the submission of an Annual Report.
8. Final Report - should be provided at the conclusion of the project. MUHREC should be notified if the project is discontinued before the expected completion date.
9. Monitoring - project may be subject to an audit or any other form of monitoring by MUHREC at any time.
10. Retention and storage of data - The Chief Investigator is responsible for the storage and retention of the original data pertaining to the project for a minimum period of five years.

Kind Regards,

Professor Nip Thomson

Chair, MUHREC

CC: Ms Siyan Jiang, Dr Kathy Smith

#### List of approved documents:

Document Type	File Name	Date	Version
Supporting Documentation	The Interview Questions for the 1st interview	14/04/2021	2
Supporting Documentation	The Interview Questions for the 2nd interview	15/04/2021	2
Supporting Documentation	Invitation Letter_flyer for Early childhood settings	20/04/2021	3
Supporting Documentation	Invitation Letter_flyer for Early childhood educators and colleagues	20/04/2021	3
Consent Form	Consent Form	20/04/2021	3
Explanatory Statement	Explanatory Statement	21/04/2021	4



## Department of Education & Training

2 Treasury Place  
East Melbourne Victoria 3002  
Telephone: 03 9637 2000  
DX210083

Application number: 2021\_004418

Ms Siyan Jiang  
1/8 Hilltop Avenue  
CLAYTON 3168

Dear Ms Jiang

Thank you for your application of 26 March 2021 in which you requested permission to conduct research in Victorian early childhood settings for the research project titled *Play Pedagogy in Science Education: Early Childhood Teachers of Chinese Heritage in Australian Contexts*.


I am pleased to advise that your research proposal is approved in principle, subject to the following:

1. The research is conducted in accordance with the final documentation you provided to the Department of Education and Training.
2. Research is conducted in compliance with all COVID-19-related public health directions or orders.
3. Separate approval for the research is sought from site managers who will be the final decision-makers as to whether the research is to be conducted in their early childhood setting. It must be made clear to each site manager that you approach that their site's participation in the research is optional and is not a Department requirement. Principals should be provided with this approval letter and, if applicable, the letter of approval from a relevant and formally constituted Human Research Ethics Committee.
4. Recognition of the impact of research on site employees, including site managers and early childhood educators. For this reason, we require that you provide clear, up front advice to site managers that the research is estimated to require approximately two hours per participant, not inclusive of classroom observations.
5. Completion of the *School and Early Childhood Infection Prevention and Control During Coronavirus (COVID-19)* eLearning module if you will be attending an education setting. It is available at: <https://fuse.education.vic.gov.au/Resource/ByPin?Pin=L9C5ZK&SearchScope=All>
6. The project is commenced within 12 months of this approval letter and any extensions or variations to your study, including those requested by an ethics committee must be submitted to the Department of Education and Training for its consideration before you proceed.

7. You acknowledge the role of the Department of Education and Training in any publications arising from the research.
8. Approval by the Department does not signify endorsement of the project, its outcomes or recommendations, and does not imply that the Department endorses or supports the development or evaluation of a program or intervention as part of the research.
9. The Research Agreement conditions, which include the reporting requirements at the end of your study, are upheld.

Should you have further questions on this matter, please email the Performance and Evaluation Division ([research@education.vic.gov.au](mailto:research@education.vic.gov.au)) and quote your application number.

Yours sincerely



Director of Research  
Department of Education and Training

13/05/2021



## Appendix 3: Consent Form for Teachers



### CONSENT FORM

#### Early Childhood Educators of Chinese Heritage

**Project ID:** 28296

**Project title:** Play pedagogy in science education: Early childhood teachers of Chinese heritage in Australian contexts

**Chief Investigator:** Megan Adams

**Co-Investigator:** Kathy Smith

**Student:** Siyan Jiang

I have been asked to take part in the Monash University research project specified above. I have read and understood the Explanatory Statement and I hereby consent to participate in this project.

<b>I consent to the following:</b>	<b>Yes</b>	<b>No</b>
I agree to be interviewed twice by the researcher (for up to two hours in total)	<input type="checkbox"/>	<input type="checkbox"/>
I agree to allow the interviews to be audio-taped	<input type="checkbox"/>	<input type="checkbox"/>
I agree to take photographs of my teaching practice	<input type="checkbox"/>	<input type="checkbox"/>
I agree to be observed by the researcher for a maximum of four hours	<input type="checkbox"/>	<input type="checkbox"/>
The de-identified data can be used in thesis, book chapter, journal article, or conference proceedings	<input type="checkbox"/>	<input type="checkbox"/>

I understand that my participation is completely voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project, up until the end of the data collection phase, without being penalized or disadvantaged in any way.

**and**

I understand that any data that the researcher extracts from the interview for use in reports or published findings will not, under any circumstance, contain identifying names or characteristics.

**and**

I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any report on the project, or to any other party.

**and**

I understand that data from the interview and observation will be kept in secured storage and will be accessible only to the research team. I also understand that the data will be destroyed after a 5-year period unless I consent to it being used in future research.

Name of Participant

Participant Signature

Date

## Appendix 4: Invitation Letter-Flyer for Early Childhood Settings and Educators



**MONASH University**

### **Invitation to support recruitment of participants**

The title of the research is **Play pedagogy in science education: Early childhood teachers of Chinese heritage in Australian contexts.**

Dear (insert name of setting coordinator):

I am a student researcher from the Faculty of Education at Monash University. I am seeking your permission to contact Early Childhood Educators (ECE) in your setting to be involved in my study. I would like to interview ECE who are:

- *of Chinese heritage*
- *presently working in an Australian early years setting*
- *are working with children 3-5 years of age*

The main aim of the research is to explore how play pedagogy is understood and utilized in Chinese heritage teachers' science teaching practice and the potential influence of their cultural traditions and beliefs on their practice.

I am seeking your permission to place the attached flyer in your setting so that interested staff who fit the above criteria can contact me indicating their interest. If an educator agrees to participate, I will forward an explanatory statement and consent form to them.

If you agree, please contact me via the email address [siyan.jiang1@monash.edu](mailto:siyan.jiang1@monash.edu) or phone [0452450429](tel:0452450429)

Yours sincerely,  
Siyan Jiang

### **Flyer: Invitation to participate and support recruitment of participants**

The title of the research is **Play pedagogy in science education: Early childhood teachers of Chinese heritage in Australian contexts.**

Dear Educator:

I am a student researcher from the Faculty of Education at Monash University. I am seeking Early Childhood Educators who are:

- *of Chinese heritage*
- *presently working in an Australian early years setting*
- *are working with children 3-5 years of age*

The main aim of the research is to explore how play pedagogy is understood and utilized in Chinese heritage teachers' science teaching practice and the potential influence of their cultural traditions and beliefs on their practice.

If you are interested to participate, please contact me via email address [siyan.jiang1@monash.edu](mailto:siyan.jiang1@monash.edu) or phone [0452450429](tel:0452450429) and I will provide more details and include an explanatory statement and consent form.

I would also like to invite you to forward this invitation to any of your colleagues who fit the criteria. If they are interested to support the research, please get them to contact me on the above email or phone number.

Yours sincerely,  
Siyan Jiang

## Appendix 5: Example of Interview Questions

### Interview Questions

**Project:** Play pedagogy in science education: Early childhood teachers of Chinese heritage in Australian contexts

**Time of interview:**

**Date:**

**Place:**

**Interviewer:**

**Interviewee:**

*Before starting the interview, I may ask you some basic questions about your cultural and professional background*

*Could you please tell me your educational background that was completed in China?*

*Could you please tell me your educational background that was completed in Australia?*

*Did you ever work as an early childhood educator in China before?*

*How many years have you been working as an early childhood educator in Australia?*

*How long have you been working in the current centre?*

*Are you working as a full-time/part-time/casual educator in the centre?*

*Are you a registered early childhood teacher?*

*What age group are you currently teaching?*

*Generally speaking, how many children and educators in your room?*

### Interview questions:

1. Could you please use three keywords/brief sentences to describe your own experience about early childhood education when you were young?
2. Do you still remember what learning areas/subjects you have been taught in the early years?
3. Nowadays, some people would say that it is not necessary to teach science to young children. What would you say to them?
4. When you teach science, what is your main purpose for science teaching with young children?
5. What are the opportunities you've provided for children to engage with science?
6. How would you describe your role in young children's learning of science?

7. Some people would say that educators of Chinese heritage may tend to use a teacher-controlled/led activity to teach young children, instead of play-based learning. What would you say to them?
8. How would you describe the role of play in young children's learning and development in Chinese culture?
9. How would you describe the role of play in young children's learning and development in Australian context?
10. To what extent do you agree or disagree there exist big cultural differences in the importance of play in child development between the education systems of the two countries?
11. How would you describe the possible impact of your Chinese cultural background on your current use of play pedagogy, especially in science teaching?
12. Is there anything you'd like to talk about that we haven't yet discussed?

## Appendix 6: Sample of Transcript and Common-sense Interpretation

10:13  
Yeah, I do think like play and learning they are, they have some interconnection. So both can support each other, for example, because children can have most curiosity, most interest when they are playing. So that's what we use, I feel like we're using play to make children to be more engaged in the activities we provide. However, so for the learning, there are some goals and concepts that we are trying to achieve in our play. So all the play, so all that learning should be played-based, but all the play, should have a meaning and should have a goal. So that's how I feel it's all interconnected. We can't isolate learning and play, and it should be, it should be combined all the time. whenever we play, we provide an activity for children, we must remember what a goal is, like, normally, I do feel people, people provide play for a fun game with children. But people may forget what's the meaning behind this play? So I think that's the most important thing. So as a teacher, we have to remember, what is the meaning and what concepts I'm trying to teach children through this play. So when I have this intention, I will intentionally guide children to think to explore through the play.

Siyan Jiang 11:43  
So could you elaborate more about the statment that you think every play should have a goal or objective embedded in that? And could you please give me some examples of it?

12:06  
It depends on which area. For example, in my room, like we're focusing on five areas. The first one's social and emotional. The second one, the literacy, language and literacy. The third one is the STEM learning so I will provide science activity, math activity, or engineering, the STEM activities. And the fourth one is creative arts. And the last one is the physical activities. Whenever I provide activity, I will think which area I'm going to teach them. For example, if I'm going to teach them about the social and emotional skills, includes some, like for example, the self regulation of emotion, and other aspects in the social and emotion. For example, I've used the visual cards to teach children about their different emotions, but I want to know why I'm going to teach them emotions. So I want them to know, they can calm themselves down, they understand what their emotions are. So they can use some like a calming-down strategy to help them to have a better, a more healthy emotion. So, that's why when I show the visual cards I will combine with other calming down strategies like taking a deep breath, doing some meditation and yeah, so, when we do the meditation with you guys, so, I know my my purpose is. My purpose is to help them to have a better emotion, you know. For other areas as well, like for the science activity. So, basically, we are trying to sometimes I may focus on the inquiry skills, whether they can do the good observation whether they can use tools or they can do some recording their inquiry skills, or what I may just try to teach them about certain concepts like we said before, like about the teeth, so, children can know, their teeth will lose when they are around the age and their teeth may become damaged if they don't eat properly. So, yeah, so, I think how I set a goal, it should be based on, I should think, which areas are provided and focused on. Secondly, it should be based on the activity. So it should be based on the area that I want to teach and find a very specific, like I said, emotion, I want to try to teach them the calming down skills. So I will just find one very specific teaching area, it cannot be too general for me, I feel you have to find one very particular goal, then you set up the activities to achieve that goal.

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Transcribed by <https://otter.ai>



A table of summarising each participant's one typical science-related activity

Participant & The topic of activity	Where it comes from	The features & the contents	The pedagogical reasoning behind it
Leo Teeth health	<p><i>"If we don't provide them with any experiences of science, then they know nothing about science knowledge"</i></p> <p>There are mainly five learning areas that Leo usually focused on in his room: 1. Social and emotional skills; 2. Literary; 3. STEM learning; 4. Creative arts; 5. Physical activities</p>	<p>This whole project lasted for one month in which three different activities were implemented in a logical sequence, including:</p> <ol style="list-style-type: none"> <li>1. <u>What are the teeth?</u> A teeth model was created to show children the good and bad teeth; A tooth decay experiment with egg shells was conducted to explain the reasons behind teeth damage.</li> <li>2. <u>How to brush our teeth?</u> Stick playdough to the teeth model to show children what would happen if they don't brush their teeth; Use the teeth model to show children how to brush teeth appropriately.</li> <li>3. <u>The healthy and unhealthy food</u> Food toys are used to help children distinguish healthy food for unhealthy one through matching and cooking games.</li> </ol>	<p><i>"For young children, most of them can learn them better when they can visualise it or provide something which is tangible. Like they can touch it, feel it, sense it and see it"</i></p> <p><i>"Using these kinds of things, they can be involved in it to let every child experience what the concept is instead of talking about what that concept is, ... I want them to see why it is like that, instead of just talking, telling them or simply showing them a video"</i></p> <p><i>"I don't mind whether they can fully understand what our activity is and what the concept is"</i></p>
Daisy Making germs visible	<p><i>"When they wash hands, you observe them, they just turn the tap on, put their fingers there, and then turn the tap off and then they go. They don't wash them properly"</i></p> <p><i>"That's why I teach them those concepts and they learn that: I do need to wash my hands properly"</i></p>	<p>Two activities were implemented with children to visualise germs and realise the importance of washing hands</p> <ol style="list-style-type: none"> <li>1. <u>Bread with germs</u> Prepared two pieces of bread: one piece was fully touched by children's hands; the other one remained intact.  Put each of them into a resealable plastic bag, got labelled and stuck to the wall  Observed the change of the bread throughout a week  Based on the experiment outcome, children were taught: <i>"if you don't wash your hands properly, the germs would be growing in your tummy and then you're going to get sick"</i></li> </ol>	<p><i>"I don't teach science and I can't even say it as teaching. Because I don't do science experiments only for science, like learning science concepts. I did those things only because I know I'll support them for better life"</i></p> <p><i>"It's more like the way you show them, the way you're thinking. Like, they practice their observation, they practice how to ask questions and they show their curiosity in learning different things... It's not just like you teach them concepts they need to learn"</i></p>

		<p>2. <u>Glitter as 'visible' germs</u> Glitter was given to children and during the process, they were free to use their hands with glitter to touch anything, like high-five.</p> <p>Explain to children that like the glitter, "germs can get transferred from one person to another and that's how we get sick".</p>	
Fiona Butterfly	<i>"The kindergartners really enjoyed butterflies so we started to do a little project with butterfly"</i>	<p>A sequence of activities was implemented with children:</p> <ol style="list-style-type: none"> <li>1. Taught children how to draw and make a butterfly</li> <li>2. Taught children about the life cycle of butterfly</li> <li>3. Used relevant materials to make a tree and cocoons with children, and stuck all the cocoons to the tree</li> <li>4. Used the calendar and counting skills to help children learn how long it takes to evolve from cocoon into butterfly</li> <li>5. Wrapped lots of toilet paper around the children and pretended that they were a butterfly that comes out of its cocoon.</li> </ol>	<p><i>"I rarely separate science from other things I'm teaching, normally run a whole programme with everything involved"</i></p> <p><i>"First of all, the goal was to let children understand the life cycle of butterfly, the importance of nutrition and temperature"</i></p> <p><i>"I was also expecting them to be respectful to all kinds of living creature no matter how small and how gentle they are"</i></p> <p><i>"And also, there's lots of teamwork for them to work together... negotiation with each other"</i></p> <p><i>"I think for kinder children, it's still a bit hard to understand so we're very specific about the information we're giving. We just say, when the sun's out, and it's nice and warm, and the butterfly will hatch from the cocoon... So, during winter time, the butterfly won't hatch because it's too cold outside. So, we're trying to make it simple to understand"</i></p>
Cindy Sensory needs	<i>"We try to support children with various</i>	Two activities were implemented with children to satisfy their sensory needs:	<i>"Most importantly, they remember having fun. It's a great science experiment because it's</i>



	<p><i>activities to meet their sensory needs"</i></p> <p><i>"All children are currently very interested in colours"</i></p>	<ol style="list-style-type: none"> <li>1. Colour mixing: Several paints were provided for children to mix any two colours together with their hands to possibly create a new colour</li> <li>2. A mixture of cornflour and water (called oobleck): Oobleck has very interesting texture-if you slowly dip into it like a liquid, but if you squeeze it, it will feel solid. It has lots of fun when children explore this different texture.</li> </ol>	<p><i>really fun. They learn something through having fun. I think that's the best way"</i></p> <p><i>"Because young children are not yet there to understand or process more complex concepts, the science experiments we teach them or they're learning, are rather simple and pretty straightforward"</i></p> <p><i>"I think they are learning science itself, alongside with social interaction, language development, and emotion regulation, all that kinds of things"</i></p>
<p>Nancy</p> <p>Small bugs</p>	<p><i>"A group of children were very interested in bugs and they asked me to read the book about bugs to them"</i></p>	<ol style="list-style-type: none"> <li>1. Read the book about bugs to children</li> <li>2. Provided magnifier for children to observe small bugs and their habitat in the backyard when they're playing</li> <li>3. During the observation, encouraged children to apply what they learnt from the book to recognise the bugs, their body parts and habitat.</li> </ol>	<p><i>"Even though they may not make the best use of the magnifier because they feel curious about this new tool, I will say it's more important to raise their awareness of using a tool"</i></p> <p><i>"Except for the scientific facts about the bugs, I hope them to develop a more positive attitudes towards science and to recognise that science ...not just learn knowledge from the book, but they can actually apply them in their daily life"</i></p> <p><i>"And I also want encourage them to develop the skills to observe, predict, compare, and also to collaborate with others when they are doing this activity. So, it's not only about the knowledge, but more about their attitudes and their essential skills, which are important for science learning"</i></p>
<p>Ivy</p> <p>Snail</p>	<p><i>"A girl brought a snail from her home to</i></p>	<p>A sequence of activities was implemented with children and it lasted for three to four weeks:</p>	<p><i>"I think science is everywhere. If the children have the interest, you can always</i></p>

	<p><i>the kinder and all the other children were so interested and they were asking questions about the snail and tried to feed it"</i></p>	<ol style="list-style-type: none"> <li>1. Borrowed a book about snail from library and read it with children together in a group</li> <li>2. After knowing certain science knowledge about snail, the children helped to create a better living condition for the snail: put leaves in the snail tank, keep the tank moist at all times, and do not leave the tank in direct sunlight</li> <li>3. The snail art: Used relevant materials to make children's own snails. E.g., how to roll a stripe of paper to make the shell of snail</li> <li>4. After learning snail likes to attach to things, children went to collect sticks and leaves from the yard. First, they attached the snail to the leave and then attached the leave to the stick.</li> </ol>	<p><i>extend it in the science direction. Like, you don't have to do something for science only but it actually comes up naturally"</i></p> <p><i>"Apart from addressing children's interest, sometimes it's more about learning new concepts...Concept learning is very important in early childhood"</i></p> <p><i>"In all our science experiences and activities, it is also related to other areas. In early childhood, it's always multi-disciplinary"</i></p>
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## Appendix 7: Sample of Situated Practice Interpretation

### A profile of each participant in relation to cultural influence on their pedagogy

#### Participant Leo: “I think education relies on the context”

According to Leo, play and learning was seldom combined together but clearly separated in Chinese educational context, no matter how young the child is. As he stated, “I can’t remember much play in literacy or numeracy learning...the only play I can remember is the physical activity”. Nevertheless, Leo stressed that his opinion about the relationship between play and learning in Chinese culture was based solely on his own growing and learning experience in China, and therefore the status quo was likely to be different from what he conceptualised based on the past. Even though Leo believed that there existed marked differences between the early childhood education systems of China and Australia, he barely experienced any difficulties resulting from cultural difference. From his perspective, this could be mainly due to the teacher education that he completed in Australia. For example, “I learnt all the teacher education in Australia, so I’m okay with the pedagogical philosophy in Australia”. Apart from this, Leo stated that “education relies on the context”. In terms of teacher-led approach, despite the fact that “I do think in China most of our teaching is teacher-led or teacher focused”, Leo asserted that there was little point in discussing whether this approach was good or bad in its own right because “it’s all based on its own social context”. Specifically, In China there were different expectations about young children’s development and learning in contrast to Australia, based on which different teaching strategies would be used correspondingly. Given this opinion, Leo maintained that in spite of an early childhood teacher of Chinese heritage, it was vital for him to utilise teaching strategies that could meet the educational expectation in Australia when he was currently working in Australia, that is, play-based learning.

#### “Because of my Chinese background, I really have a higher expectation of young children”

On the basis of his educational experience in China and the teacher education in Australia, Leo pointed out that Chinese children were likely to learn more advanced knowledge compared with children in Australia, especially in early years and primary education. Here the knowledge seems to be closely related to academic learning. As far as Leo is concerned, it is the difference in teaching content that exerted a strong influence on him. For instance, “I kind of feel like young children have the ability to learn more, so I will try to incorporate more complex concepts to early childhood education compared to the teachers who don’t have Chinese background”. Leo viewed it as an advantage of his cultural background because having a higher expectation of young children enabled him to “do the planning better and to provide a better learning experience, and a better science learning experience”. Take science education as an example. As mentioned earlier (see Table 1), science was one of the five main learning areas in Leo’s classroom and therefore science activities were implemented with children on a regular basis in his practice. In addition, “I won’t limit my teaching to some simple ones... Maybe some science concepts are too complex for them, but you can still provide this learning opportunity for them. You can simplify and adjust it to their level, instead of thinking: Oh, they cannot do it”.

#### Participant Daisy: The combination of Chinese-style teaching and Western play pedagogy can produce the optimal outcome

Daisy stated that it was not easy to have a general notion what the play and learning relationship was in Chinese culture because it seemed to be constantly changing, especially in early childhood education. Therefore, this relationship should be conceptualised dialectically. For example, from a traditional Chinese perspective, play was clearly distinguished from learning, and Chinese style learning was usually characterised by diligence, persistence, and repetition. However, resulting from absorbing lots of information across countries, more and more young generation in China began to realise the importance of play. For instance, play tended to have a distinct advantage in its own right. Therefore, Daisy argued that “I feel like that our generation tend to combine traditional Chinese learning style with the philosophy of play in Western culture together”. Even though Daisy was still trying to figure out the best way to combine them, she believed that Chinese background did provide her “another possibility that how to be a teacher” and therefore she considered it as an advantage. As she asserted, “This is mainly because I have the opportunity to experience two different cultures, and through critical thinking I can realise which approach is better in a particular situation”. In terms of critical thinking, Daisy demonstrated that it is the training during teacher education in Australia that contributed significantly to her understanding of the two different pedagogy in her practice. She said, “I would not think that one approach is completely good, while the other one is completely bad. I am able to synthesise all the information after thoughtful reflection so that I can develop my own philosophy”.

*It's not a typically Chinese trait but any good teachers from different countries will have “an invisible pocket”*

According to Daisy, working in Australia as an educator of Chinese heritage did offer a unique opportunity for her to critically reflect the Chinese-style education that she experienced from an early age, for instance, comparing it to what she learnt in Australian teacher training course. However, she did not think that it was a typically Chinese trait, but rather a defining characteristic of all the good teachers from different countries to a certain degree. A good teacher was defined by Daisy as the one who had ‘an invisible pocket’ in which a great wealth of knowledge, skills and resources pertinent to teaching and learning was stored. The most important thing is that the teacher was able to know when it was the best timing to take certain things out of the ‘pocket’ to help young children learn. As Daisy said, “It’s not like I planned to let a child learn ABC today so I have to teach ABC. Probably that’s not the best learning time for the child to learn ABC today”. Therefore, she believed that the most invaluable thing in a teacher’s ‘invisible pocket’ was to “find the best timing for each child to learn different things”. Daisy tended to conceptualise the cultural influence on teachers as a personal thing. It means that despite the fact that a group of teachers may have a same cultural heritage, they were likely to possess different understandings of the same culture, thereby developing their own personal pedagogical philosophy.

**Participant Fiona:** *The choice of a certain pedagogical approach in a country reflects its history and culture*

Fiona stated that the prevalence of a certain type of pedagogical approach in a particular country is “the accumulation of its own history and culture, and therefore there is no point in discussing which one is better or worse”. She made a comparison regarding the different attitudes towards authority between China and Australia. On the basis of Fiona’s response, China used to be an agriculture-based country in its long history and the knowledge generally



passed down from generation to generation, and therefore people tended to have a blind faith in authority. On the contrary, Australia was a country with a history of adventure and exploration, and therefore it required people to keep exploring and keep challenging authority. Fiona argued that the diversity of cultures was likely to “influence the way how people in a particular cultural group choose to nurture their children”. On the other hand, Fiona believed that “from an educational history perspective, the trajectory of each country’s education history usually has its own wave”. In other words, she did not think the style of education a country supported would always be fixed, but would change at any time as the circumstances and educational needs change.

*“Do as the locals do”*

Although the difference in the education styles of the two countries was recognised by Fiona, she also utilised a Chinese traditional idiom to express the rationale behind her use of certain pedagogy while working in Australia, that is “入乡随俗” (Do as the locals do). Below is her explanation of this idiom: “As far as the pedagogy is concerned, I think it is mainly my responsibility to get myself well fitted to the educational context here. This is mainly because I come to a different country as a foreigner and therefore it is necessary for me to learn how to teach as an early childhood teacher in Australia”. But at the same time, Fiona stressed that it is inevitable that she would add a bit of her own colour to the pedagogy she used since she could not deny the influence of her past learning experience on her current teaching style. This can be illustrated further in the following section.

*My Chinese background seems to let me think twice about the pedagogy I would use to teach children*

*“There was time because of my background, I was like: Ok, that’s not good, like my mom would never let me do that. On the other hand, I was thinking, what’s the harm if they did that? Yes or No? Will they hurt other people? Yes or No? Will it cause some damage to the room? Yes or No? If all three of them were No, I might rethink it. Why not let them do that?”*

The scenario above was shared by Fiona to illustrate how self-reflection worked on a regular basis in her practice, influenced by her own personal growing experience. Furthermore, she gave a specific example to demonstrate how her cultural background was interwoven with the Western pedagogy she learnt: “If the children try to climb a tree, then in my Chinese self, I would be like: Okay, jump off the tree, or you got to hurt yourself; But in my Western teacher role, I would be like: Okay, let’s put some cushions under the tree and let’s see how high you can go”. It is clear from Fiona’s description that the difference of culture did prompt her to frequently reflect on herself in the process of teaching.

**Participant Cindy:** *“Having a lot of fun when I was little... I wasn’t aware of the learning until I learnt all about this in University*

Cindy agreed that teacher-centredness was a predominant feature of Chinese teaching and as a student “we just sit there and listen”. However, because she got a lot of enjoyment in her own early childhood memory and for example she utilised three keywords to describe this memory: nature, fun and love, she did not pay special attention to how the Chinese-style teaching might affect her decision-making about pedagogy. As she said, “I never thought about that before”. On the contrary, she did intend to help the children in her classroom to “have fun while learning things through play” as what she had experienced at an early age. It is noteworthy that Cindy

did not realise she was actually learning while playing in nature with her friends every day, until she completed four years of teacher training in Australian university and two years of work experience in a play-based centre. For example, “I understand more about how children learn, like they don’t learn through sitting but through hands-on experience”.

*“It’s unfair to think if you’re a Chinese teacher, you must be good at teacher-led activities... I don’t think teachers from China are all controlling and disrespectful”*

From the viewpoint of Cindy, her Chinese background enabled her to “build a positive relationship with children from the same background”, thereby being viewed as an advantage in Australian contexts. She claimed that the educators of Chinese heritage may “need more training and resources to be taught about how to teach in a respectful way and how to be a play partner”. However, it does not mean that Chinese teachers only knew how to educate their students in a teacher-controlled way. For instance, “I notice some wonderful kinder teachers from Chinese background, they’re really into Reggio-inspired teaching and really providing play-based learning experience for children”.

**Participant Nancy:** *“In Chinese traditional culture, play is considered as something that prevents children from learning”*

For Nancy, Chinese-style education was generally characterised by teacher-centredness, restriction, and the dichotomy between play and learning. She demonstrated that “children’s play time is always squeezed to the minimum so that more time can be spent on the so-called learning”. It should be emphasised that in Nancy’s view, the learning here was particularly related to the process of acquiring academic knowledge or practical skills, namely academic learning, which was deeply rooted in Chinese education system. Nancy mentioned that nowadays Chinese early childhood education tried to incorporate play into the learning of young children to make the teaching more engaging. Nonetheless, she is of the opinion that “the main purpose of this practice is still to deliver academic knowledge to children based on adults...instead of providing children an environment to have fun and develop in a holistic way”. In other words, its main focus was still on children’s academic learning so as to help children be better prepared for future education. In addition, similar to other participants it is Nancy’s teacher education and work experience in Australia that enabled her to realise the features of Chinese-style teaching and differentiate it from Western play pedagogy.

*“Given my background, I will be more self-conscious or sensitive about the way I interact with children”*

Nancy demonstrated that having been taught in a teacher-centred approach for many years caused her to be well aware of its adverse effect on child development. Resulting from it, she did not want the children she taught to experience what she had experienced in her early childhood. As she pointed out, “I can avoid delivering the same message to them as my teacher did to me”. Therefore, in her practice she always reminded herself to reflect on what she said to children and what she did with them. For instance, when she grew up, it is always the teacher that was in full control of the classroom so that she could not take charge of her own learning. As opposed to her past experience, it is stated that “I always remind myself to value children’s responses and view them as an equal contributor when teaching and interacting with them, instead of being the authority in the classroom”.

**Participant Ivy:** *“It’s not that cultural background related...from what I’ve seen, it’s not always the case”*

According to Ivy, the comparison between her group and the director’s group helped her to realise the structure in young children’s education was not always a bad thing. Rather, if it was used properly, then the final results might exceed our expectations. As she demonstrated, “we do need a certain structure, especially at the beginning. Then, we can ease things up, we can make more open-ended things, and we can encourage more creative thinking in children”. Therefore, on the basis of her own personal experience, Nancy did not think that her decision-making about the use of certain pedagogy was closely related to her cultural background. In Nancy’s case, she argued that the centre’s vibe and policy exerted a strong influence on her decision, the director’s teaching philosophy in particular.



## Appendix 8: Sample of Thematic Level Interpretation

### Findings 1 第二部分 Theme 修改思路及写作进程

✓ 概括两个 subthemes.

- Combination 1 :  
第1个 subtheme — play as a basis

✓ the 1st theme : play serves as a basis

✓ the 2nd theme : Teacher-led experiences can still be play-based

sequence : Ivy — Leo — Daisy

✓ the 3rd theme : Incorporating child-led elements into teacher-led activities

- Combination 2 :

✓ the 1st theme : Teachers' involvement plays an essential role in child-initiated play

✓ the 2nd theme : child-centredness is the key to any teaching opportunities provided by teachers.



## Findings (二) 整理思路

• 3 themes

Theme 1 : Teachers' understanding of their own cultural and educational background

△ Leo: 1/ play and learning was seldom combined

2/ this understanding of this relationship can be dynamic and an ongoing process.

3/ the influence of teacher education in Australia

4/ higher expectation of young children

→ 1/ teaching schema on a regular basis  
2/ not limit to simple ones

play

learning