Mathematics achievement levels and learning experiences of migrant children: Perspectives of teachers and teaching in Chinese urban schools

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B.A., M.Ed.

This thesis is submitted in total fulfillment of the requirements of the degree of Doctor of Philosophy

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DECLARATION

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Date: 15/09/2015
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ABSTRACT

In response to the growing importance attached to educational quality and equity, school systems around the world are under increasing pressure to improve students’ achievement outcomes. One such context is China where, despite government efforts, many migrant children in urban schools continue to be excluded from access to public education. To understand this situation, this study reviews the current state of education for internal migrant children in urban China, with the aim of teasing out its ramifications for pedagogic equity expressed as performance outcomes.

This study adopts a mixed-method approach through quantitative and qualitative elements to elicit data from teachers and students. Two types of schools (public and private) are compared to investigate migrant children’s learning experiences and educational outcomes. In the first stage of this study, students’ achievement data is investigated in relation to the differences between public and private schools, along with related predictors of mathematics achievement. In the second stage, surveys of teachers and students are used to examine their attitudes to the current educational situation for migrant students. In the third stage, teachers’ interviews are conducted to provide teachers’ perspectives on migrant children’s education, and the challenges influencing their practice in the classroom. In the fourth stage, the analysis of classroom observations provides a comprehensive understanding of teaching practices and students’ learning experiences.

Through the comparison of teachers’ perceptions of and classroom practices with migrant children in public and private schools, this study shows that the learning experiences of migrant students in the two types of schools is significantly different. Extrapolations from the relevant performance levels of migrant children segregated in private schools exhibits an increasing gap in their achievement outcomes, compared to their counterparts attending public schools. Moreover, migrant students in public schools show more positive interactions with teachers and classmates than private school students. Disparities also exist in the quality of classroom teaching practices
between public and private schools. The findings of the study, in relation to the differences in teachers’ perceptions of and practices with migrant children, help to explain the achievement gap for migrant students between the two types of schools.

This study concludes that the Chinese government's current policy of migrant segregation does not effectively deliver high quality education to migrant children in private schools in comparison to public schools. The disparities in the present migrant school structure remain a formidable barrier to the advancement of educational outcomes for migrant students. Therefore, the study findings support the goal of school integration, not school segregation, as an important policy for the Chinese government if progress is to be made towards improving the quality of education nationwide. The implications of the educational differences between public and private schools are discussed, with an aim to encourage Chinese policy makers to recognise that reform of the segregation patterns for migrant students in the urban educational system is imperative.
Chapter 1

Introduction

1.1 Introduction

In many developing countries such as China, India, Indonesia and Brazil, recent economic development has led to rapid urbanisation. Referred to as 'internal migration' or 'rural-urban migration', millions of rural families have migrated to urban areas seeking education and employment opportunities (Deshingkar & Akter, 2009). Within the Chinese context, this equates to approximately 35 million migrant children requiring education in urban settings (All China Women's Federation, 2013). In some metropolitan cities, migrant children constitute a growing and significant proportion of the total number of school-aged children in urban schools (e.g. 46.24% in Shanghai; and 47.68% in Zhejiang province) (Duan & Yang, 2008), requiring Chinese urban schools to serve increasing numbers of children with highly diverse socioeconomic backgrounds in the coming decades (Chan, 2014).

Most countries have recognised that providing access to high quality educational institutions for migrants is of paramount importance in order to sustain economic development (Chiswick & DebBurman, 2004). However, an accumulating body of scholarly literature has addressed Chinese internal migrant students’ learning environments in urban schools, due to traditional rural-urban disparities and institutional barriers (Feng, Zuo, & Ruan, 2002). Nevertheless, in most studies, migrant students have been investigated as if they were one homogeneous group. This perspective simplifies and distorts the deeper issues.

In recent years the demographic backgrounds of Chinese migrant children have diversified significantly, particularly with regard to Socioeconomic Status\(^1\) (SES). This diversification has resulted in some migrant students now studying in public

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\(^1\) Socioeconomic Status (SES) refers to parental SES which is calculated as a combined measure of parental education and parental occupation (Lim & Gemici, 2011). More details are elaborated in Section 3.6.1 of Chapter 3.
schools, while many others remain segregated in private migrant schools\(^2\) (Lu & Zhou, 2013).

To understand how migrant children adapt in both public and private schools, the Theory of Segmented Assimilation is used (Portes & Zhou, 1993; Zhou, 1997). This theory notes that the degree of assimilation for migrants depends on their national origin, socioeconomic status, family social and financial resources, and the context of reception in the destination cities (Zhou, 1997). The theory posits that rather than a ‘straight-line’ course, multiple pathways usually emerge so that assimilation is segmented within various migrant groups (Portes & Zhou, 1993). One of the migrant groups might replicate acculturation and parallel integration into the middle-class; a second group may move in the opposite direction towards permanent poverty and assimilation into the underclass; while a third group might make use of their rapid economic advancement by deliberately preserving the migrant community's values. More details of this theory are addressed in Chapter 2 (Section 2.3 Segmented Assimilation Theory).

In China the education of rural-urban migrant children remains segregated, with most attending private schools, while migrant students with high SES have mainly become integrated with urban students in public schools. School segregation and its influence on school outcomes for migrant children has been found to have a negative role as a mechanism for segmented assimilation in the context of Chinese internal migration (Lai et al., 2014; Liu & Jacob, 2013). School segregation has caused an increasing gap in school outcomes, as well as differing assimilation patterns between migrant students in private and public schools (Lu & Zhou, 2013). This study documents the consequences resulting from the segregation of children into these two school systems by examining their experience of schooling in the domain of mathematics.

\(^2\) In this study, a private migrant school is also called a private school/migrant school. This type of school is established solely for migrant children who have no access to public school. Public school in this study refers to the school enrolling both migrant children and local urban children. More details of the two types of school can be seen in Section 1.2.2 of Chapter 1.
Given that a test-oriented education system is still prevalent in China, an analysis of the predictors of school test outcomes is critical if Chinese educational policy makers are to understand more accurately the factors which are essential in determining student academic success. Migrant children’s school outcomes are influenced by various individual, parental and social factors. To provide policy makers with a more balanced interpretation of current empirical studies in order to enhance migrant students’ school outcomes, this study identifies factors related to school quality which can influence student achievement, both in private and public schools.

1.2 Urbanisation and education for Chinese migrant children

In this introductory chapter, three fundamental elements of this study of migrant children’s education are discussed. First, the context and background for the study is explained through a brief overview of research in relevant areas in China. Secondly, a thorough examination of the current state of migrant students’ education in China leads to the key research question about their education in Chinese primary schools. Then, on the basis of this key question, a number of associated sub-questions are identified. Thirdly, the potential significance of the research and implications for the practice of teaching migrant students are discussed.

1.2.1 Population of migrant children

Over the past century, across the world, many urban areas have experienced dramatic growth in population. Urbanisation has increased across the Western world since the 1950s, but since then has also started to take hold in developing countries. According to the United Nations, the year 2007 witnessed a turning point in that for the first time in human history more than 50% of the world’s population was living in cities. By 2050, it is predicted that the urbanised population will be 64.1% and 85.9% of the developing and developed world respectively (Agrawal, Rakwal, & Sarkar, 2014). The rapid escalation of economic development in China has prompted a large number of rural residents to seek better education and employment opportunities in urban areas. According to the National Bureau of Statistics of China (2011), the migrant population refers to people who have left their rural region and who have worked in
urban areas for more than six months continuously; their children who were brought into urban schools for transient education are called internal migrant children or rural-urban migrant children. The total migrant population of China was 221 million in 2010, which has doubled since the year 2000 (Table 1).

Table 1 Migrant Population in the Year 2000-2010 (Million)

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>101</td>
<td>147</td>
<td>221</td>
</tr>
<tr>
<td>Percentage</td>
<td>8.19%</td>
<td>11.27%</td>
<td>16.53%</td>
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1.2.2 Education policy for Chinese migrant children

There is one feature of internal migration which distinguishes China from many other countries. With economic development and social change, Chinese society has experienced a transformation. For 5000 years of history, a polarising tradition has maintained a rigorous control of residence for rural people. However, more recently these controls have been relaxed so that rural people can easily reside in urban areas. Historically there existed a dualistic class system which divided rural and urban areas socio-structurally, thereby rigidly separating Chinese people into agricultural and non-agricultural groups. In the latest ‘National New-type Urbanization Plan (2014-2020)’, the Chinese government has predicted that 60 percent of its people will be living in cities by 2020 and that China intends to grant 100 million rural-urban migrants what is called ‘urban household designation’ (National People’s Congress, 2014). Because of the deliberate structural orientation of government policy, migrant children have usually been segregated from urban mainstream culture and schools. However, as the process of urbanisation has continued, it is clear that rural-urban migrant people have become the largest social class, both distinct and separated from 'rural' and 'urban' people (Wei & Hou, 2010).

Government policy has become more flexible in recognising the plight of these migrants. Historically, the household registration system has inhibited migrant people from obtaining equal resources in terms of welfare, employment, and public goods, in
comparison to urban residents. Chinese migrant children were classified as being ‘out-of-district’ children seeking education in urban public schools, making it virtually impossible for them to transfer into some urban schools. Also, urban public schools were only allocated resources for urban children within the school district - those who held the non-agricultural registration status. This being so, migrant children’s educational funding remained allocated to their family’s rural homes, even though their parents had migrated to an urban area. Consequently, the resulting shortage of educational funds in urban areas has undermined the capacity of the local educational authorities to accommodate all students, migrant and urban. Some urban public schools occasionally recruit migrant children, on the condition that they can pay extra tuition fees (Goodburn, 2009). Nevertheless, for the majority of migrant children who hold the agricultural household registration, fewer opportunities are available for enrolment in public schools than for urban children (Li, 2011; Xia, 2006). To address these challenges, private migrant schools were established to provide educational opportunities for migrant children, without the limitation of household registration and expensive school admission, but at the expense of being ‘quite frankly in miserable condition’ as well as having ‘poor equipment, and few qualified teachers’(Xia, 2006, p. 39).

Given efforts made during the last decade, the Chinese government has gradually taken measures to ameliorate the problems which surround the integration of migrant children in urban areas. Several regulations and laws have been promulgated to guarantee access to urban public schools for migrant children. Furthermore, the latest official State Council ‘Opinions on Further Promotion of the Reform of Household Registration System (2014)’ states that there is no difference between rural and urban residence, and moreover, that rural-urban migrant people are encouraged to live in urban areas. This policy implies that Chinese urban schools may be expected to serve greater numbers of migrant children in the coming decades. Already, in some cities, such as Beijing and Shanghai, the proportion of migrant children enrolling in public schools has grown to more than 50 percent of the total enrolments (Wang, 2009).

Within some urban settings, the local Ministries of Education have instituted policies
to improve the quality of migrant schools by arranging a standard curriculum and pedagogical approach for all schools. For example, in Shanghai urban schools, the ‘Curriculum Guides for Primary and Secondary Schools in Shanghai’ have been published in each academic year since 2004 (MoE, 2014). These documents stipulate that all of the schools within Shanghai districts are arranged with the same schedule of teaching subjects, textbooks, teaching time, and students’ out-of-class activities. Moreover, all of the students in Shanghai schools, either migrant or non-migrant, are required to speak the official language (Mandarin) (Qi & Tang, 2011); and complete nine years of compulsory education.

Despite these improvements, the general problem of educational inequality persists and scholars are now addressing the evidence which contrasts migrant students’ learning environments in private schools with public schools. The Chinese government has recognised that providing access to high quality mathematics education for these migrants is of paramount importance for the nation to sustain economic development (Chiswick & DebBurman, 2004; Huang & Li, 2009; Ma, 1999). Improved school outcomes in mathematics for migrant children are essential for their upward mobility and opportunities for future success (Bankston, 2004; Levels, Dronkers, & Kraaykamp, 2008). Therefore, this study examines the mathematics achievement levels and learning experiences of migrant students between the two school types, in order to provide policy-makers, migrant families and schools with recommendations.

1.2.3 Teacher perceptions and teaching practices for Chinese migrant children

Teachers’ perceptions towards migrant students have been found to be closely linked to students’ characteristics (Van den Bergh et al., 2010). As a result of Chinese education policies, migrant children with relatively high SES tend to enrol in public schools, while their low SES peers have no choice but to enrol in private schools. In terms of students’ educational outcomes, significant differences have been found between private and public schools. Migrant students in public schools attain higher scores than those in private schools in terms of psychological well-being, academic
achievement, and urban cultural adaption (Chen & Feng, 2013; Tao et al., 2004).

In addition to differences in student learning outcomes, teachers in these schools are also differentially entitled due to the position system (bianzhi) that allows different entitlements based on the government policy. This system differentially determines teachers’ social welfare entitlements based on their employment in either public or private schools (Hu & Szente, 2010). Public school teachers are categorised as holding permanent, authorised positions that provide the teachers with ‘five social insurances’, including medical, pension, unemployment, occupational injury, and maternity insurance, as well as ‘one fund’ of housing provident funding in urban areas. In contrast, private school teachers are generally in temporary, contract positions and have no related social welfare (Liu, Qiao, & Ding, 2005). For teachers in migrant schools, the stark differences in teachers’ working conditions in comparison to public schools have a vital impact on the perceived quality of education that teachers believe can be provided for migrant students.

There is also evidence that migrant parents consider education as the sole responsibility of schools and teachers, and therefore, that there is less parental involvement among migrant students in urban schools in comparison to non-migrant parents (Xie, 2007). Due to migrant parents’ working conditions, these parents have been found to engage less frequently in formal, work-oriented academic learning activities. This lack of parents’ involvement leads many urban teachers to believe that migrant parents’ ‘quality’ of education is low and to consider it as the cause of their children’s poor education (Goodburn, 2009).

Comparisons between migrant children and urban children in relation to the degree of satisfaction with their school have shown that migrant children are generally less satisfied than urban children (Li et al., 2008). Differences have been found in terms of their relationships with teachers, as well as in academic achievement (Qian & Smyth, 2008). Relationships between teachers and migrant students, and between peers, have been found to affect the school performance and classroom behaviours of migrant students (Cheng et al., 2013). Some migrant students in public schools feel that school
is fun, the teachers are motivating, and their classmates are encouraging; whereas those in private schools generally believe that school is a boring place, the teachers are unfair, their classmates are depressing, and school days are uninspiring (Chen, Wang, & Wang, 2009; Wu, 2012).

Despite government support for migrant children, the performance disparities between those children who are segregated in private schools and those who are not, are significant, but insufficiently understood. Little is known about the learning experience of migrant children in private schools in comparison to students in public schools. It is therefore important to investigate the learning experiences of these migrant students and their teachers’ teaching practices.

1.3 Research questions

In order to better understand the educational experiences of migrant children in Chinese urban schools, this study begins with a comparative investigation of achievement levels in mathematics in private and public schools. Then the learning experiences of migrant children in both types of Chinese urban schools are compared. This data is then used to inform an investigation into how to better support migrant children’s education and how to improve academic outcomes in both types of school. The aim of this study is to establish recommendations for educational institutions, policy-makers and migrant families in order to improve education for migrant children in Chinese cities. The main research question is formulated as follows:

*How does school type influence Chinese migrant students’ mathematics education?*

In order to answer this key question, the following research questions are designed on the basis of an extensive literature review, as well as the purpose and specific objectives of the study:

1. *What are the differences in the mathematics achievement levels of these children between migrant and public schools?*
2. What are the differences in teachers’ perceptions of these children between migrant and public schools?

3. What are the differences in teaching quality between migrant and public schools?

4. What are the differences in students’ learning experiences between migrant and public schools?

The study was conducted in primary mathematics classes in private migrant schools and public schools in Shanghai, China. The first sub-question investigates migrant students’ mathematics achievement levels. The investigation examines the mathematics achievement levels of migrant children in comparison to urban children, and the predictors of mathematics achievement for these children.

The second sub-question explores public and private school teachers’ perceptions of their current practice with migrant students. It includes a comparison of teachers’ perceptions of migrant students’ current education and the educational challenges that teachers encounter with these children. To answer the third sub-question, classroom observations were undertaken to examine teaching quality in private and public schools. Also, in response to sub-question 4, the classroom practices in terms of teacher-student and student-student interaction were observed in the classrooms of primary schools in Shanghai, China.

1.4 Significance of the study

This study addresses important questions that arise as a result of urbanisation in Chinese cities. An accumulating body of scholarly literature addresses Chinese migrant students’ disadvantaged learning environments in urban schools, due to traditional rural-urban disparities and institutional barriers (Feng et al., 2002). Providing access to high quality educational institutions for these migrants is of paramount importance in order to sustain economic development (Chiswick & DebBurman, 2004). However, as approximately 35 million migrant children require
education in urban settings, and moreover, because Chinese urban schools are expected to serve increasing numbers of children with highly diverse socioeconomic backgrounds in the coming decades, the current study will provide valuable recommendations about how to accommodate these children within better learning environments.

Secondly, this study provides findings which have important implications for Chinese policy makers and educational institutions. The current education policy for migrant students results in an unequal allocation of educational resources between private and public schools. Moreover, the differential policy in relation to the educational resources allocated for teachers may also have an influence on teachers’ motivation for teaching migrant children. With a better understanding of the challenges for their practice, urban teachers may be able to improve teaching quality and thereby enhance migrant students’ learning experiences.

Thirdly, the present study investigates migrant students’ education at the primary school level in the city of Shanghai. This study illuminates the need for further research using broader populations and different cultural contexts to enhance the generalizability of the findings. In addition, reports of Chinese migrant children’s learning experiences may have implications for other Asian countries where rural-urban migrant students are educated in urban schools.

1.5 Organisation of the study

This dissertation is organised into eight chapters. Chapter One introduces the study, describing the educational backgrounds of Chinese migrant students, and includes background information on Chinese education in general, the objectives of the research, the potential significance of the research, and the organization of the study. Chapter Two reviews the academic literature in relation to the learning experiences of migrant children in urban settings. An overview is provided of migrant children’s education in international contexts and in the Chinese urban context. This chapter also
discusses the relationship between teachers’ perceptions and classroom practices, and their influence on the education of migrant children.

Chapter Three reports the research aims and questions and an outline of the design of the quantitative and qualitative components of the study. The research methodology includes the research location, sampling technique, research instruments, the data collection procedures and data analysis. Both quantitative and qualitative investigations were employed at on-site locations in the City of Shanghai in China. It is envisaged that multiple data sources will improve the reliability and validity of the research.

Chapter Four describes the results of the analysis of mathematics achievement levels of migrant children. The chapter describes the mathematics achievement levels of migrant children in relation to gender, length of residence and school type. This chapter also compares the predictors related to migrant children’s mathematics achievement in public and private schools.

Chapter Five reports the results of an analysis of teachers’ perceptions of education for migrant children. This chapter examines teachers' perceptions of the current educational situation for migrant children in China and their reported perceptions of and practice with teaching migrant children is compared between public and private schools. Teachers’ practice with migrant students is also examined through students’ perceptions. Further, educational challenges for teachers are investigated and compared between public and private schools.

Chapters Six and Seven address the results of the analysis of teaching quality and classroom interactions in the two types of schools using classroom observations. Chapter Six compares teaching quality in the two types of classrooms, while Chapter Seven examines the classroom environment and teachers' practices in two classrooms. Additionally, a case study of the learning experiences of two migrant children in a typical school day is described and discussed.
Chapter Eight interprets the quantitative and qualitative results. This chapter reviews the study and summarises its major findings in relation to Chinese migrant children’s education. Additionally, some limitations are outlined and implications are offered for future research in the field of migrant children’s education.

1.6 Summary
In this chapter the background information relevant to this study has been explored. An overview of the study has been undertaken and the general issues related to the provision of education for migrant children in the Chinese context have been introduced. Considerable literature exists in China which reveals that the education of rural-urban migrant children in urban settings remains segregated, provided predominantly by private migrant schools, while some students with high SES have become integrated with urban students in public schools. The significance of the study has also been addressed in this chapter. Through the investigation of education for migrant students in Chinese urban schools, it is hoped that a better understanding of the current situation will be gained. This study has the potential to address the inequality in educational outcomes between public and private schools, and to highlight important implications for reforming the current segregation policy for migrant students.

The next chapter elaborates on the issues related to the education of migrant students through a review of scholarly books, research articles, and other relevant sources, providing a critical review of the literature on migrant children’s education in the Chinese context.
Chapter 2

Literature Review

2.1 Overview

The increasing numbers of migrant children in Chinese urban schools has resulted in a diverse student population and has brought challenges to urban schools, educators and migrant families. Due to differential educational policies, some migrant students with high socioeconomic status (SES) study in public schools, while a large proportion of migrant students with low SES are segregated in private schools.

In order to better understand migrant students’ education in the Chinese context, this chapter begins with a description of educational policies for migrant students in other countries that may provide insights for Chinese policy makers, families and schools. In the second section, using a critical review of the literature related to migrant children’s assimilation patterns, the Segmented Assimilation Theory is introduced and its application for understanding migrant children’s education in Chinese institutions is discussed. Further, the third section of this chapter addresses Chinese culture and its relationship to educational beliefs and academic achievement. The fourth section focuses on possible factors that might influence students’ mathematics achievement, including students’ characteristics, parents’ background and school quality. School factors are examined specifically in relation to teachers’ perceptions, teaching quality and classroom interactions. The final section of the chapter summarises the literature and explores its implications for the design of the current study.

2.2 Internal migration policies and migrant children’s education

Internal migration from rural areas to cities is a global phenomenon affecting both developed and developing countries. Reviewing educational policy for migrant children in other countries will help to inform this study by taking into account the complexities of each educational context and carefully weighing up the similarities and differences. By discussing internal migration and the various policy positions on educational systems for migrant children, this section aims to provide contrasting
views and to explore some of the implications in relation to common migration issues. Through an investigation of the history of social development in both developed and developing countries, it will become evident that the process of urbanisation has changed social structures.

The majority of the countries examined, both developed and developing, have witnessed an increase in population movement in that rural people have migrated to urban areas for better employment, housing, education, and social welfare. Over the last century developed countries such as the United States of America (USA), the United Kingdom (UK), Australia, Canada, and most European countries have experienced a greater proportion of people living in the cities, while a smaller percentage of people reside in rural areas. Similarly, in this century, developing countries such as China, Brazil, Indonesia, and India, have been undergoing a similar change of social structure in line with developed countries.

The situation during the process of urbanisation is different in each country, however, as most of the countries have taken different approaches to rural-urban migration at the policy level. Nevertheless, the experience in most of these countries provides opportunities for cross learning when investigating the situation for the rural-urban migrant people in the Chinese context. The policies related to the education of migrant children in developed and developing countries have been examined by scholars providing interesting insights on rural-urban internal mobility, patterns of urban educational development and implications for the education of rural-urban migrant children. Some countries (e.g. USA and Australia) have implemented a positive policy on internal migrant movement that has positively encouraged the educational policy of combining migrant children with local non-migrant children, whereas other countries have shown a negative attitude towards migrant children’s education in urban areas (e.g. China and India).

Developed countries such as the USA have taken measures to accommodate migrant children within urban public educational systems. However, educational policies for internal migration have changed across different stages of the urbanisation process.
The first half of last century witnessed a segregation policy among migrant populations in the USA. Metropolitan development since the 1920s produced a socio-economic polarisation between central city and suburban areas. Segregation of migrant children created a variety of non-public schools, which were operated by church authorities (Chemerinsky, 2002). In the larger metropolitan areas higher proportions of migrant children were excluded from public schools and studied in non-public schools (Orfield et al., 1997). The Civil Rights Movement of the 1950s and 1960s helped to publicise the segregation inequities for migrant children. In 1954, the U.S. Supreme Court in Brown v. Board of Education unanimously declared that separate facilities were inherently unequal and unconstitutional for migrant and non-migrant children. Since then, the U.S. Department of Education has reformed education policy for migrant children. For example, the ‘No Child Left Behind Act’ (2001) launched Charter schools and facilitated an ongoing evaluation of school quality. This innovative law aimed to give disadvantaged children such as migrant children the opportunity to access better education and also helped migrant parents to make the best possible choice for their children. The urban public schools improved the quality of education for migrant children, through providing good school environments, equipping them well, and staffing them with well-trained teachers. The urban-community schools also attempted to involve migrant parents in the decisions about school policies and educational practices (Havighurst, 1967).

Other developed countries have also experienced policy changes in relation to education for migrant children. Policies in recent decades have generally shown a positive attitude towards migrant children’s education. Current educational policy in the UK and Australia focuses on migrant education with the central feature of providing a high-quality education for all students, including migrant students, within mainstream schools (Vertovec, 2007). These educational policies for migrant children strive to identify and support the diverse needs of these students, so that students are able to fully engage with the content and standards defined in the school curriculum.
In contrast to developed countries such as the USA, developing countries such as India, Indonesia and China have implemented different policies for accommodating rural-urban migrant children. In India, nearly one-third of the population have migrated in the last decade. However, local government has tended to view migration mainly as an exploitative process and has been very reluctant to acknowledge its more positive aspects (Deshingkar & Akter, 2009). Although not stated explicitly, many rural and urban development programmes have aimed to control migration (Kundu, 2003). The government has a range of policies that indirectly work against migrants. For example, people who are classified as ‘Below the Poverty Line (BPL)’ are entitled to subsidised food, education, healthcare and a range of other benefits. However, the proof of BPL status is a ‘ration’ card that is issued on the basis of place of residence and cannot be used to claim benefits in another village, town or city. This system, to some degree, limits the rights of migrant people whose household residence is registered elsewhere. The BPL policy is similar to the household registration system in China. In China, the household system between rural and urban areas classifies Chinese people into agricultural and non-agricultural groups. The process of urbanisation has meant that rural-urban migrant people have become the largest social group distinct from either rural or urban people. These migrant people in China have been excluded from equal rights for social benefits in urban areas because the household registration system has allocated the funding of social welfare to the rural government where migrants’ household were registered, even if these migrants have resided in urban areas for many years. Correspondingly, migrant children’s educational funding is allocated to their family’s rural homes, although their parents might have migrated to an urban area. As a result, due to the policy of household residence, both migrant groups in China and India remain socially and economically excluded from the wider benefits of economic growth in their destination cities such as access to employment, housing and education.

The education system in India has provided limited access to state owned schools (public schools) for internal migrant children. As a result, some migrant students with
relatively high SES have been sent to private or semi-public schools, whereas others with low SES have only been able to access private unaided schools serving children from ‘notified’ slum areas (Tooley, Dixon, & Gomathi, 2007). It was found that at the state level, extensive regulations govern all aspects of a school’s management, but none of these privately recognised schools met all of these regulations (Tooley & Dixon, 2005). This type of school is similar to private migrant schools in China. Chinese migrant schools provide educational opportunities for migrant children, without the limitation of household registration and expensive school admission fees. However, these schools are quite frankly in miserable condition, as well as having poor equipment and few qualified teachers (Goodburn, 2009), due to the limited school funding provided by the government. For the majority of migrant children with the agricultural household registration in China, fewer opportunities are available for public school enrolment than for urban non-migrant children (Li, 2012).

Educational opportunities for migrant students in India have improved in recent years. The call for equal access to education for all students has resulted in an active dialogue between government, academics and civil society (Deshingkar & Akter, 2009). One of the improvements for migrant students’ education is the involvement of Non-Government Organizations (NGOs) who work to allow students to receive basic education. It is reported that by 2009, 142 NGO’s, 714 worksite schools, and 480 seasonal hostels across the 22 districts have been established in India to run hostel schools and bridging courses for migrant children.

Similar to the educational policies for migrant students in India and China, the children of migrants in other developing countries such as Indonesia have had limited access to urban schools in the city. Batbaatar et al. (2005) studied the segregation policy for Indonesian migration and found that these policies have serious consequences for the educational performance of migrant children. Migrant children continue to be marginalised, especially those in low SES migrant families. For migrant parents, getting their children into urban schools was one of the biggest problems they faced immediately after moving into urban areas (Noveria, 2013). Even
if their children enter urban schools, there are still serious concerns about schools’ capacities as there is evidence of teachers’ lack of support for migrant children who are struggling to adapt to their new schools and urban environment (Ordonez, Kasaju, & Seshadri, 1998).

Despite sharing some similarities with India and Indonesia, educational challenges and internal migration policies distinguish China from many other countries. First of all, China’s domestic migrant population has demonstrated the greatest increase in comparison to other countries with approximately 221 million migrants in 2010 (NBSC, 2011). In addition, due to the inflexible household registration system, migrant people are inhibited from obtaining equal allocation of resources in welfare, employment and public goods (Goodburn, 2009). Chinese migrant children are classified as being out-of-district for obtaining urban public education (Xia, 2006). Also, urban public schools are only allocated resources for urban children who hold the non-agricultural registration status within the school district (Wei & Hou, 2010). Consequently, the resulting shortage of educational funds in urban areas undermines the capacity of local educational authorities to accommodate all students, migrant and non-migrant.

Some urban public schools recruit migrant children if they can meet the tuition fee requirements (Goodburn, 2009). As a result, it seems that migrant families with a higher SES are more likely to be enrolled in urban public schools. Nevertheless, for the majority of migrant children with the agricultural household registration, private schools provide their educational opportunities as they cannot all arrange admission to public schools (Li, 2012). Generally, comparative studies have found that migrant children in public schools perform at a higher level than children in private schools in terms of psychological well-being, school performance, and urban cultural adaption (Chen & Feng, 2013; Tao, Xu, Zhang, Gu, & Hong, 2004).

The disparity between the resources allocated for migrant workers and their children and their urban counterparts could be interpreted as a deliberate government policy to discourage migration to the cities (Wei & Hou, 2010). However, the Chinese
government has gradually taken measures to resolve the issues of integration of migrant children in urban areas. Several regulations and laws have been promulgated to improve the admission opportunities for migrant children accessing urban public schools. The latest State Council officially issued ‘Opinions on Further Promotion of the Reform of Household Registration System’ and stated that there is no difference between the rural and urban residence, and moreover, that rural-urban migrant people are encouraged to live in urban areas (China Council, 2014). The latest plan of household registration reform aims to grant urban household designation to 100 million migrants by 2020, however, despite these reforms, 200 million migrant people will remain excluded; roughly two-thirds of all migrants from city-resident status (Li & Shi, 2014). This means Chinese urban schools will be expected to serve greater numbers of rural-urban migrant children, with highly diverse socioeconomic backgrounds in the coming decades (Causey, Thomas, & Armento, 2000). According to recent statistics, the proportion of migrant children enrolling in public schools has grown to about 60 percent of the children in Beijing, the Capital of China (Chen & Feng, 2013; Wang, 2009).

To summarise, internal migration is a major global issue of this century. Many developing countries such as India, Indonesia, and China have been experiencing some of the largest population movements in history. Similarities were found among these countries demonstrating that rural-urban migrant children are disadvantaged and generally have limited access to urban schools and therefore a resulting inequality of educational quality. In these developing countries, segregated education for migrant children in urban public schools has been implemented. As a result, private schools and unaided poor schools have played vital roles in providing educational opportunities for migrant children in the urban areas of these countries. To deal with the various challenges in accommodating migrant children and in providing for their educational rights, developed countries such as the USA have provided guidance to Chinese policy makers, schools and migrant families through the implantation of
positive policies for educational integration, sufficient educational funding, and flexible household registration.

The current educational situation for migrant children in both developed and developing countries has resulted in different assimilation outcomes. Research on the assimilation patterns of migrant students exhibits diverse processes of sociocultural integration and consequent disparate outcomes leading some groups to gravitate towards mainstream lifestyles, while others segregate in poverty and low socioeconomic status (Portes & Zhou, 1993). Scholars in western countries have used the theoretical framework of segmented assimilation to understand the assimilation patterns of migrant children. In the next section, the Segmented Assimilation Theory is introduced to provide an understanding of assimilation patterns of migrant students in Chinese educational institutions.

2.3 Segmented Assimilation Theory

For the larger part of this century, research related to assimilation has dominated much of the sociological literature on migrant adaptation (Li, Zou, & Wang, 2009; Lu & Zhou, 2013). The central assumption is that there is a natural process by which diverse ethnic groups come to share a common culture and gain equal access to social opportunity (Zhou, 1997). Some scholars have emphasised that language and cultural familiarity may lead to increased assimilation (Berry, 2001; Portes, Parker, & Cobas, 1980), while other scholars believe that lingering discrimination and institutional barriers to employment and other opportunities may block complete assimilation (Lone, 2013).

According to Segmented Assimilation Theory, the degree of assimilation depends on the migrants’ national origins, socioeconomic status, family social and financial resources, and the context of reception in the destination cities (Zhou, 1997). It has been noted that rather than a ‘straight-line’ course, multiple pathways have emerged so that migrant assimilation is segmented within various migrant groups (Portes & Zhou, 1993). Portes and Zhou (1993) have illustrated three possible patterns of adaptation that are most likely to occur among contemporary migrants. These paths
include conventional upward assimilation, downward assimilation, and ‘selective acculturation’.

*One of them replicates the time-honored portrayal of growing acculturation and parallel integration into the white middle-class; a second leads straight into the opposite direction to permanent poverty and assimilation into the underclass; still a third associates rapid economic advancement with deliberate preservation of the immigrant community's values and tight solidarity (p. 82).*

![Segmented assimilation theory diagram](image)

The theory refers to these divergent destinies from distinct patterns of adaptation as ‘segmented assimilation’. Therefore, the theoretical question of ‘what makes some migrant groups susceptible to downward mobility and how to assist them to escape this undesirable route’ is important to investigate. Existing literature considers the variability of assimilation through three main approaches: (1) by migrant group (Farley & Alba, 2002; Hirschman, 2001; Portes & Rumbaut, 2001; Waldinger & Feliciano, 2004), (2) by native group to migrants (Bankston & Zhou, 1997), and (3) by individual variation among migrants (Bankston & Zhou, 1995; Portes & Rumbaut, 2001, 1996; Zhou, 2001). In the next section, the factors influencing the assimilation of migrant populations are explored.
2.3.1 Factors influencing the assimilation of migrant populations

Segmented assimilation research focuses on identifying the contextual, structural, and cultural variables that lead to various paths of assimilation. One of the major assimilation indicators emphasised by Segmented Assimilation Theory is the social context in which migrants are received (Portes & Fernández-Kelly, 2008). In the USA, many migrant families still settle in poor, inner-city neighbourhoods and their children attend poorly performing, low teaching quality, and highly segregated inner city schools (Suarez-Orozco & Suarez-Orozco, 2001; Waldinger, 2001). The environment in such schools is thought to put young migrants at higher risk of acculturating into adverse environments among their non-migrant peers (Hirschman, 2001; Portes & Rumbaut, 2001; Portes & Zhou, 1993). As Portes and Rumbaut (2001) state:

[A major] challenge confronting children of immigrants is that the social context they encounter in American schools and neighborhoods may promote a set of undesirable outcomes such as dropping out of school, joining youth gangs, or participating in the drug subculture (p.59).

Other scholars argue for the importance of structural factors including racial status, family socioeconomic background, and destination of residence (Alba & Nee, 1997; Coleman et. al., 1966; Porte, 1997). The significance of SES has a direct implication for the adaptation outcomes of migrant children. Migrant children from middle-class backgrounds have been able to benefit from financially secure families, good schools, supportive organizations, and safe neighbourhoods which ensure them better life chances (Lareau, 2000). In contrast, children with poorly educated and unskilled parents, often find themselves growing up in a generally disruptive social environment such as underprivileged neighbourhoods, poor schools, violence and drugs (Porte, 1997). These children suffer from the inequitable distribution of educational resources, which seriously curtails their chances of success in life (Davis, 1993; Jencks & Mayer, 1990).
The influence of schools and social class on the assimilation of migrant children was reported by Coleman and associates (1966) who found that children do better if they attend schools where classmates are predominantly from higher socioeconomic backgrounds. Factors such as school quality, curriculum, classroom composition, and student-teacher relationships within schools were used to explain these better school outcomes (Hao & Pong 2008). For example, segregated schools for migrants are much more likely to have overcrowded classrooms, and to employ teachers with low teaching quality (Darling-Hammond & Post 2000). Migrant students in these segregated schools tend to perform less well and are more likely to drop out of school, and to engage in risky behaviours (Wells & Crain 1994). In contrast, for migrant children attending schools with a large proportion of white students, higher achievement levels, higher self-confidence, and better social competence are found (Postmes & Branscombe 2002). These results have prompted scholars to advocate for the integration of migrant and non-migrant students in the school setting rather than for segregation (Schofield, 1995).

2.3.2 Theory application in different social contexts

Segmented Assimilation Theory has been applied in many different social contexts. This theory was originally developed as a theoretical response to the challenges of American immigration. Since the Immigration Act in 1965 the USA has experienced a period of mass immigration. The earlier immigrants were mainly European, whereas today’s immigrants are primarily from Asia and Latin America. Segmented Assimilation Theory has been a popular explanation for the diverse experiences of assimilation among immigrants (Xie & Greenman, 2011). It was found that the divergent outcomes of assimilation for immigrant children depended on both their parents and schools (Lu & Zhou, 2013), as follows:

Some children would achieve upward assimilation as a result of their parents’ high socioeconomic status and favorable context of reception, eventually integrating into the White middle-class mainstream. In contrast, children whose immigrant parents lack resources and who are exposed to inner-city
neighborhoods would experience downward assimilation to the underclass, stagnant at the bottom of society. A third group may combine upward mobility with traditional cultural values (p4).

It has been found that the children of earlier European immigrants achieved higher social and economic status due to the existence of more cultural and linguistic similarities to the American middle class, in comparison to Asian immigrants (Greenman & Xie, 2008; Rumbaut, 1997; Zhou, 1997). However, USA civil rights legislation has protected Asian immigrant children from downward mobility through affording these children opportunities for advancement in mainstream institutions. For example, it is enshrined in law that immigrant students are entitled to free public education from kindergarten through to year twelve (Fernandez-Kelly & Curran, 2001). Therefore, few empirical researchers in the United States have found evidence of downward assimilation, even among children of low-income immigrant parents (Foner, 2005; Kasinitz et al., 2002).

The implications for the important role of social context, therefore, are often discussed in relation to the specific local social context in which immigrants are embedded (Xie & Greenman, 2011). Applying Segmented Assimilation Theory to European countries, Alba (2005) presented evidence of French immigrants and found that these immigrants experienced a trajectory of disengagement from school, troubles with police, and unemployment. Despite these migrants not acculturating into a native urban under-class, it is very similar to the type of ‘downward assimilation’ posited by Segmented Assimilation Theory.

The assimilation theory has also been applied to Chinese internal migrants. In China, due to the substantial structural barriers, school segregation is regarded as an important mechanism for the process of assimilation of migrant children (Wei & Hou, 2008). Some migrant children can enter mainstream educational institutions (public schools), whereas many have endured significant segregation in private schools. Specifically, migrant children with low SES in urban settings remain segregated predominantly in private schools, while migrant students with high SES have mainly
become integrated with urban students in public schools (Lai et. al, 2014). The theory is that public schools offer superior connections to the mainstream and better educational resources that launch migrant children on a path toward upward assimilation. In contrast, segregation of migrant children in private schools has tended to increase their contact with an unfavourable school environment and a disadvantaged population, subsequently slowing or even halting the upward assimilation process.

Chinese society is stratified and diverse in the rural-urban migrant groups. Given migrants’ own diverse socioeconomic backgrounds, migrant students in public schools usually settle in high-SES communities, while others in private schools tend to live in low-SES communities. Lu and Zhou (2013) selected Beijing migrant children as participants to investigate migrant family background and school factors in relation to students’ academic achievement. Their study documented the disparities in the two domains of academic achievement and loneliness between migrant students in private schools and public schools. The results revealed the negative role of school segregation as a mechanism for downward assimilation in the context of Chinese internal migration. However, the data collected for this study was restricted to one city. Whether the findings would be replicated in other large cities with a high concentration of migrants is unknown.

The literature reviewed in this section has investigated segmented assimilation processes and the outcomes of assimilation patterns that help to explain the assimilation of Chinese migrant children. Migrant children have diversified in recent decades so that some are able to attend urban public schools while others are segregated into substandard migrant schools (Guo, 2002; Lu & Zhou. 2013). Since substantial structural barriers ensure that a large proportion of Chinese migrant children are kept segregated in low-quality private schools, it is necessary to explore whether the consequences of inequitable public school placements are similar to those predicted by studies on segmented assimilation in western countries. However, it is also undeniable that China has a distinct culture and social context that may influence
the educational outcomes and assimilation patterns of migrant children. In the next section, Chinese culture and education and migrant children’s academic achievement are discussed. Attention is given to studies related to the education of migrant children in urban areas including public and private provision of primary education.

2.4 Chinese culture, education, and academic achievement

Education is a culturally specific social activity which is constructed through the inclusion of social, cultural, and political dimensions (Leonard, 2008). It is of significance to explore the impact of cultural and social factors on Chinese educational beliefs, as China has a unique culture. In this section, education is addressed in relation to Chinese culture, and how this culture has influenced the educational beliefs of Chinese individuals, families, and schools. Secondly, mathematics education and students’ achievement in China are discussed in relation to social factors.

2.4.1 Chinese culture and educational beliefs

Chinese culture is different from most other cultures in the world (especially from western cultures). Most social values in China have been derived from Confucianism, Taoism, and Buddhism (Wong, 2011) which have influenced and formed Chinese educational philosophy (Li, 2004). Academic achievement is thought to be each Chinese student’s most important pursuit and is viewed as an indispensable path to success for Chinese individuals, families and schools (Stevenson et al., 1990). To reach a high achievement level, individual involvement and commitment to education is highly valued and stressed rather than each student’s talent. From a Confucian perspective, one of the major reasons for a student not achieving a desired learning outcome is his/her lack of effort (Wong & Song, 2008).

Children's academic achievement is a central concern for Chinese families. Once their child enters primary school, Chinese parents mobilise themselves to assist their child and to provide an environment conducive to academic achievement (Stevenson et al., 1990). These parents are motivated to provide educational resources for their children, in order to support them to reach a higher achievement level. Parents are generally
very interested in their child's academic performance, and therefore, set high standards for their child's achievement. In describing the basis of children's academic achievement, Chinese parents stress the importance of hard work to a great degree. Comparative studies of western and Asian parents found that Chinese parents more frequently engage children in formal, work-oriented academic learning activities, and are more likely to be involved in hands-on guidance of children's learning (Luo, Tamis-LeMonda, & Song, 2013). The educational beliefs of Chinese parents influence their children with regard to educational motivation. Compared to students in other countries, Chinese students more strongly endorse individual oriented achievement motivation, self-direction and mastery approach goals (Liem & Nie, 2008).

Both rural and urban Chinese families spend a large proportion of their human and economic resources on children’s education (Wang, Li, & Li, 2014; Zhao & Singh, 2011). It has been shown that the majority of Chinese migrant families strive to seek educational opportunities for their children in urban schools, even if the educational cost is much higher in urban areas (Wei & Hou, 2010). For these migrant parents, the teaching quality in urban schools is considered to be better than the schools in their rural hometown (Liu & Jacob, 2013).

Besides individual efforts and family involvement, a high quality school education is also highly valued, in order to support Chinese children for academic success. Students and teachers are subjected to excessive pressure to perform well in highly competitive examinations. Confucian values in education generally view students as being typically passive. In classroom practice, Chinese teachers generally control classroom instruction for the whole class, and use a large number of prepared questions with students, whereas students are given little time to manage their own activities (Leung, 2001). Memorisation of mathematics facts through practice of mathematics skills is also emphasised in the Chinese context (Phuong-Mai, Terlouw, & Pilot, 2005). Thus, Chinese students’ achievement is often considered to be related to memorisation rather than understanding of the knowledge delivered by school teachers (Tran, 2013).
The pursuit of educational success reveals that a utilitarian purpose for education dominates Chinese parents’ educational beliefs. For example, candidates who achieved excellence in the national examination designed by Imperial China were able to serve as administrative officials in the imperial bureaucracy since the seventh century (Liu, 2007). For current school students, better academic achievement implies more opportunities to obtain qualifications or professional status, leading to a greater likelihood of getting a good job and having a high social status.

Chinese urbanisation also requires a large amount of workers in the fields of science, technology, engineering and mathematics. Correspondingly, these teaching subjects, such as mathematics at the primary school level, are of great importance to Chinese families and schools. Mathematics is a core subject in the Chinese curriculum for primary education (years 1-9). Success in mathematics education not only provides opportunities for individuals to be competitive in future employment, but also boosts the development of science and technology for the nation. However, mathematics education inequality and achievement differences have been found between students in different types of schools. In the next section, the specific context of Chinese mathematics education and students’ mathematics achievement is addressed.

2.4.2 Mathematics education and achievement of Chinese migrant students

Chinese educational culture places great value on good quality mathematics education, as mathematics achievement plays a very important role in examinations for school recruitment for Chinese students. Chinese mathematics achievement has been investigated from an international perspective in recent decades due to Chinese students’ success in global tests such as Programme for International Student Assessment (PISA) (Loveless, 2014; Sellar & Lingard, 2013). Some studies have attributed the mathematics achievement of Chinese students to the Fundamental Guiding Principles of Mathematics Education in China that strengthen the idea of ‘Two Basics’ (2001) including basic knowledge and basic skills (Chen & Stevenson, 1995). These two basic emphases guide the teaching of primary mathematics which aims to consolidate a foundation for students’ secondary and higher education.
However, other studies have criticised China’s rigorous examination-oriented primary education in mathematics, which focuses on memorisation and test scores, rather than on developing well-rounded individuals (Leung, 2006). Mathematics educational reform has attempted to promote a revised school mathematics curriculum and to reflect a more holistic approach to education. However, the goals of the new curriculum are still not reflected in the examination system, and therefore, the reformers’ educational beliefs frequently conflict with teacher, student and parental goals where test scores have life-long consequences.

Besides the comparison of Chinese mathematics achievement in an international context, it is also of value to consider China’s geographical, cultural and socio-economic conditions which lead to mathematics education varying greatly between rural and urban areas. Disparities in access to mathematics education between rural and urban areas are a major cause of educational inequality in China (Qian & Smyth, 2008; Sicular et al., 2007). Also, even within urban schools, mathematics educational disparities between public schools and private migrant schools have shown sharp increases (Liu & Jacob, 2013). Following the large-scale movement of the Chinese rural population to the cities, the central government has stipulated that all migrant children have the right to attend a public school in the city. However, public schools effectively reject these children by setting high thresholds such as school fees and exam results or by requesting an urban household registration (Wei & Hou, 2009). As discussed in Section 2.2, since the 1990s private entrepreneurs have provided an alternative for migrant children and have established private schools that offer schooling to migrant children for lower fees. However, this system contributes to the segregation between urban and migrant children. Private migrant schools often have poor mathematics teaching quality, provide school certificates of limited value and sometimes do not comply with safety regulations (Goodburn, 2008).

Many scholars have examined how racial and socioeconomic segregation contribute to the differences in mathematics achievement among students (Agirdag, Avermaet, & Houtte, 2013; Rumberger & Palardy, 2005). In terms of Chinese migrant children,
there have been no national studies that compare mathematics achievement in this way. In many public schools, the mathematics achievement of migrant students has been excluded from the total sample of evaluation of school teaching outcomes. For the Program for International Student Assessment (PISA), migrant students were not selected to represent the sample of public schools in Shanghai (Sellar & Lingard, 2013). The few studies that have focused on migrant children’s mathematics achievement within a limited region (e.g. one city) indicate that migrant children in public schools perform better than migrant students in private schools (Guo, 2011; Lai et al., 2014).

As outlined in this section, Confucian values have formed the distinct educational beliefs of Chinese individuals, families, and schools. Most families believe that providing a good mathematics education is essential in order to enhance students’ mathematics outcomes. The factors influencing mathematics achievement have been interpreted from different perspectives such as policy, school, family, and at the individual level. The next section employs an exploratory framework that considers students’ characteristics, parent’s background and school type as factors that might be related to the mathematics achievement difference between students in public and private schools. Attention is given to the few Chinese studies related to the education of migrant children in urban areas that have examined the public and private provision of primary education.

2.5 Factors influencing students’ mathematics achievement

There are many factors that might influence the mathematics achievement levels of migrant students in urban schools. To understand these factors, research papers related to student factors, their parents’ background and related school factors will be examined (See Figure 2). Attention is given to studies related to the education of migrant children in urban areas that have examined the public and private provision of primary education. Student characteristics in relation to mathematics achievement levels include the variables of gender, length of residence in urban areas, sibling numbers, and preschool attendance. Parents’ background is examined in relation to
education and employment backgrounds. School factors are elaborated in terms of teachers’ perceptions and teaching quality.

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<tr>
<th>Student characteristics</th>
<th>Parents’ background</th>
<th>School quality</th>
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<tbody>
<tr>
<td>(e.g., Gender, Length of residence, Sibling number, Preschool attendance)</td>
<td>(e.g., Educational level, Employment income)</td>
<td>(e.g., school type, Teachers’ perceptions, Teaching quality, Classroom Interaction)</td>
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Mathematics Achievement

Figure 2 Framework of Factors Related to Mathematics Achievement

### 2.5.1 Student characteristics and mathematics achievement levels

Previous studies have investigated student characteristics in relation to mathematics achievement levels including the variables of gender, length of residence in urban areas, sibling numbers, and preschool attendance (Else-Quest, Hyde, & Linn, 2010; Moon, Kang, & An, 2009). Research on the gender gap in migrant student school performance is not conclusive. However, an increasing number of studies have attributed the gender gap to changing socio-cultural factors such as family’s and schools’ influence rather than immutable biological differences (Hyde & Mertz, 2009). Educational beliefs in many eastern countries (e.g. China) place more emphasis on students’ efforts rather than their innate ability (Lu, 2012), and as a result, there may be less gender bias in these nations with respect to mathematics education. Some Chinese studies reveal that girls outperform boys throughout primary and middle school and have a more positive school experience and exert more effort in their mathematics education than boys (Lai, 2010). Among migrant children in particular, girls participate more actively in school activities and talk about school life to parents with a higher frequency (Xie, 2007). Female migrant children are also
better at establishing congenial relationships with teachers and classmates and display more positive academic behaviours than their male counterparts (Li et al., 2009). Other studies suggest that migrant girls perform less well in mathematics than boys, but that this difference is not statistically significant (Chen & Feng, 2013).

Migrant children’s length of residence in urban areas has previously been found to be a significant predictor for their achievement (Moon et al., 2009). The duration of residence in a new environment can contribute to a greater assimilation of the local norms and values (Keene, Bader, & Ailshire, 2013). According to the Segmented Assimilation Theory (See Section 2.3), divergent assimilation outcomes have been observed for migrant children. Some children achieve upward assimilation as a result of their parents’ high socioeconomic status and favourable context, eventually integrating into the middle-class mainstream, whereas children whose parents lack resources and who are exposed to inner-city neighbourhoods may experience downward assimilation to the underclass, stagnant at the bottom of society (Lu & Zhou, 2013).

As a result, the more protracted a student's stay in urban public schools, the more beneficial the performance outcomes in mathematics, while the specific grade level in which a student is situated during his/her time of residency can also impact positively on mathematics performance. Migrant children from educationally disadvantaged places of origin benefit significantly from exposure to 'richer' schooling environments and the longer their length of stay in such environments, the greater the level of improvement in their academic performance. Conversely, migrant children in poorly resourced private schools may experience a widening achievement gap in relation to their public school counterparts, as their length of residence in urban areas increases (Lai et al., 2012, 2014).

Other variables such as preschool education have also been found to benefit the educational attainment of students in later elementary school (Templea & Reynolds, 2007). There is an ever-growing emphasis worldwide on increasing access to early childhood care and education programs and generating high-quality educational
experiences for children, especially those from low-income families (Cortázar, 2015). Large-scale public preschool programs have shown substantial impacts on children's learning (Cascio & Schanzenbach, 2013; Yoshikawa et al., 2013). For low-income families, the early educational programs which have increased the amount of time mothers and children spend together on activities such as literacy and numeracy, have improved children's test performance as late as eighth grade (Cascio & Schanzenbach, 2013). In contrast, the lack of preparation for elementary education in urban preschools was found to be the main obstacle for migrant children (Tsujita, 2013).

Sibling numbers has been found a negative association with the educational attainment of students in European countries (Van Eijck & de Graaf, 1995), indicating that students with fewer siblings appear to be advantaged in many aspects of school performance (Siegler et al., 2012). In China, the one-child policy has resulted in large numbers of one-child households and these children enjoy significantly improved opportunities for education, in comparison to children inside multiple-child households (Lee, 2012).

Therefore, the research evidence reveals that many factors (gender, length of residence, pre-school education and number of siblings) are related to students’ mathematics achievement. However, these variables have not been examined together in relation to the mathematics achievement of migrant children in the Chinese context and so further investigation is required.

2.5.2 Parents’ background and mathematics achievement levels

Alongside factors related to students’ characteristics, other variables such as parents’ demographic factors (parents’ education and income) have been found to be significant in relation to students’ mathematics achievement (Davis-Kean, 2005; Dincer & Uysal, 2010; Engin-Demir, 2009). Parental education, especially mother’s education has been found to be an important factor in predicting students’ academic achievement (Altschul, 2012; Wu, Palinkas, & He, 2010). However, other evidence suggests that these factors do not appear to matter for migrant children’s school performance (Lu, 2007).
It has been suggested that a lower socioeconomic status of students’ parents is related to an undervaluing of their child's education in western culture (Vellymalay, 2012). However, according to Confucian values (see Section 2.4.1), children's academic achievement is a central concern for Chinese families (Stevenson et al., 1990). These parents are motivated to provide educational resources for their children, in order to support them to reach a higher achievement level. Nevertheless, it seems that while parents might be interested in school education they are not always able to be involved. Due to migrant parents’ working conditions, these parents less frequently engage children in formal, work-oriented academic learning activities.

Chinese research positions migrant students as ‘an at-risk, disadvantaged group for potential school failure given their lack of residence status and lower socioeconomic status’ (Guo, 2011, p. 123). Some studies have compared the employment attainment and wage differentials between rural migrants and urban locals. Compared with urban parents, rural migrant parents suffer occupational level discrimination resulting in a wage gap in urban areas (Cheng, Guo, Hugo, & Yuan, 2013). This may disadvantage students’ school performance because migrant children from families with the lower household incomes have been found to have a lower mathematics achievement level than those from families with higher incomes (Guo, 2011). Others have identified that parents’ background significantly determines school selection for migrant children, among which mother’s education level has been found to be positively related to the likelihood of public school enrolment (Chen & Feng, 2013).

Migrant students’ characteristics and their parents’ background have been found to be possible predictors for their mathematics achievement. Other variables such as school type in terms of segregated and non-segregated schools have been found to be a factor that may influence students’ academic achievement (Agirdag et al., 2013; Sikkink & Emerson, 2008). Differences were found in terms of school infrastructure, students’ experience and teachers’ working conditions between school types (Garcia, 2008; Rumberger & Palardy, 2005). Among these varying factors, teachers’ perceptions and practice are crucial in determining students’ educational experience (Susuwele-Banda,
There is much evidence acknowledging the significance of teachers’ roles in teaching students in urban schools through classroom interactions and pedagogical practices (Cho & Reich, 2008; Hiebert & Grouws, 2007; Rubie-Davies, 2007). In order to better understand the relationship between school quality and students’ mathematics achievement, teachers’ perceptions towards migrant children and their practices in classrooms in Chinese educational settings are addressed in the following section.

2.6 School teaching effectiveness and students’ mathematics achievement

For more than a decade, empirical studies examining the relationship between teaching quality and educational outcomes have shown that teaching quality makes an important difference in students’ learning, achievement and their life chances of success (Hart & Teeter, 2002; Hill, Rowan, & Ball, 2005; Ngware & Ndirangu, 2005). Therefore, investigation of teaching quality is critical in order to understand the students’ school experiences and outcomes (Darling-Hammond, 1997; Lindsay, Breen, & Jenkins, 2002; Shirley, 2006).

2.6.1 Measurement of teaching effectiveness

While concerns for school quality and student achievement have been studied in many countries around the world, the call to improve achievement has been answered with vastly different initiatives in different policy contexts. Multiple measures and tools have been developed that when taken together can provide an accurate and reliable picture of school teaching effectiveness. Teaching is complex so single measures hardly capture the complete picture of a teacher's impact on students’ school outcomes. Some research programs, such as ‘Measures of Effective Teaching’ project in the USA (2009); ‘Core Research Program’ in Singapore (2004); and ‘Systemic Implications of Pedagogy and Assessment’ in Australia (2004) have been designed to understand what effective teachers do and help to improve the ways teachers may gain insight into their practice. These projects include both cross-sectional and longitudinal measures, enabling higher level modelling and triangulation across large-scale data sets.

The Measures of Effective Teaching (MET) project (2009) in the USA employed
multiple measures and tools for investigating teaching quality. This project built and tested measures of effective teaching in order to find out how evaluation methods could best be used to inform teachers about the skills that might make them most effective. Moreover, the project gave teachers different tools to assist them to be successful and to improve student achievement in public schools across the United States. These tools include five critical aspects that the research has measured: 1. Student achievement gains on state standardised assessments and supplemental assessments designed to measure higher-order conceptual thinking; 2. Classroom observations and teacher reflections; 3. Teachers’ content knowledge for teaching; 4. Student perceptions of the classroom instructional environment; and 5. Teachers’ perceptions of working conditions and instructional support at their schools. Each measurement area has specific goals and research instruments to collect data (see Table 2).

Table 2 Framework of Measures of Effective Teaching Project

<table>
<thead>
<tr>
<th>Measurement areas</th>
<th>Goal</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Student achievement</td>
<td>Measure how well students have learned in the state standards</td>
<td>State standardised assessments and supplemental assessments</td>
</tr>
<tr>
<td>2. Classroom observations and teacher reflections</td>
<td>Help school leaders assess teaching effectiveness</td>
<td>Framework for Teaching for Classroom Observations</td>
</tr>
<tr>
<td>3. Teachers’ pedagogical content knowledge</td>
<td>Gauge teachers’ understanding of teaching strategies</td>
<td>The Content Knowledge for Teaching (CKT) test</td>
</tr>
<tr>
<td>4. Student perceptions</td>
<td>Understand and improve student conditions</td>
<td>The Tripod Student Perception Survey</td>
</tr>
<tr>
<td>5. Teachers’ perceptions</td>
<td>Understand and improve teaching conditions</td>
<td>Teaching &amp; Learning Conditions Survey</td>
</tr>
</tbody>
</table>

Similarly, the Singapore Centre for Research in Pedagogy and Practice (CRPP, 2004) has also provided multiple measures and tools to investigate teaching quality. This
research program was designed to provide comprehensive multidisciplinary evidence for Singaporean educational policy and practice. As such, it draws upon both qualitative and quantitative methods, ranging from large scale survey work, evaluation of student performance, and analysis of demographic and achievement data to qualitative observation and discourse analysis.

The Singapore program (see Table 3) consists of six distinct research areas including institutional, demographic, and pedagogical factors contributing to three facets of educational success: students' performance on examinations, their performance on extended project-style tasks, and their life/learning pathways. The data from these projects has provided a solid evidence base for curriculum, teacher development and assessment policy developments.

Table 3 Framework of CRPP Core Research Program

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Student database</td>
<td>Identify demographic and institutional factors contributing to examination performance.</td>
</tr>
<tr>
<td>2. Pedagogical practices and student outcomes</td>
<td>Examine how school-, classroom-, and student-level factors contribute to individual differences in academic achievement.</td>
</tr>
<tr>
<td>3. Classroom observations</td>
<td>Develop, pilot, refine and implement a coding scheme that reliably and validly captures important features of classroom teaching and learning activities across various curriculum domains.</td>
</tr>
<tr>
<td>4. Classroom interactional analysis</td>
<td>Analyse the details of classroom interactions, using qualitative techniques drawn from discourse and interaction analyses.</td>
</tr>
<tr>
<td>5. Assessment and student performance</td>
<td>Examine the quality of the teachers' assessment tasks/assignments and the quality of students' work including day-to-day class work, homework, major assignments/projects, and tests.</td>
</tr>
<tr>
<td>6. Institutional experiences, attainments and goals</td>
<td>Describe, categorise, and model typical and atypical pathways that students take in their transition through the educational system and labour market.</td>
</tr>
</tbody>
</table>

Both of these frameworks from the USA and Singapore include school, classroom and student level factors that have implications for further studies. Examples of school-
level factors are school culture, collegiality and cooperation among staff, and opportunities for professional development (Busher & Saran, 2013; Roorda et al., 2011); examples of classroom-level factors are pedagogical practices, classroom environment, and opportunity to learn (Fasse & Kolodner, 2013; Fisher, 2009; Fraser, 2012); and examples of student-level factors are students’ motivation, use of metacognitive strategies, and engagement in academic tasks (Berger & Karabenick, 2011; Haapasalo, Välimaa, & Kannas, 2010).

Both of the frameworks from the USA and Singapore elaborate the relationship between classroom pedagogy, assessment and student performance in comprehensive approaches. The multiple measures and tools in the two models provide teachers with results and feedback to help develop their practice. Since multiple measures have been used to help school leaders understand how teaching contributes to student success, validation of these results from the perspective of students’ and teachers’ perceptions, and the third party of research observers is designed. By evaluating multiple aspects of teaching, instructors and school principals can potentially create better professional development programs that promote proven techniques and practices to help students achieve better school outcomes.

In NSW, Australia, a research-based model of Quality Teaching (hereafter referred to as the QT) has been designed for teachers to assist them to understand and analyse teaching practices that take place in classrooms, with the aim of improving pedagogy and hence student learning (NSW Department of Education and Training [NSWDET], 2003). This Quality Teaching model is based on a sound research understanding of how teaching and school improvement can promote improved student learning outcomes (Ladwig & King, 2003). The elements of this pedagogical model can be applied across all years of schooling (K–12), and all curriculum areas. In a rigorous attempt at system-wide pedagogical reform (Amosa et al., 2007; Griffiths et al., 2007), the QT model of pedagogy is framed within three dimensions of Intellectual Quality, Quality Learning Environment, and Significance (see Table 4). The first dimension of Intellectual Quality refers to pedagogy that is focused on producing deep
understanding of important, substantive concepts, skills and ideas. Such pedagogy treats knowledge as something that requires active construction and requires students to engage in higher-order thinking and to communicate substantively about what they are learning. The second dimension of Quality Learning Environment refers to pedagogy that creates classrooms where students and teachers work productively in an environment clearly focused on learning. Such pedagogy sets high and explicit expectations and develops positive relationships between teachers and students and among students. The third dimension of Significance refers to pedagogy that helps make learning more meaningful and important to students. This type of pedagogy draws clear connections with students’ prior knowledge and identities, with contexts outside of the classroom, and with multiple ways of knowing or cultural perspectives.

Table 4 Dimensions of Teaching Quality by NSW DET (2003)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intellectual Quality</td>
<td>Deep knowledge; deep understanding; problematic knowledge; higher-order thinking; metalanguage and substantive communication</td>
</tr>
<tr>
<td>Quality Learning Environment</td>
<td>Explicit quality criteria; engagement; high expectations; social support; students’ self-regulation, and student direction</td>
</tr>
<tr>
<td>Significance</td>
<td>Background knowledge; cultural knowledge; knowledge integration; inclusivity; connectedness and narrative</td>
</tr>
</tbody>
</table>

This QT Model has been designed to cater for a wide variety of student and teacher individual differences. That is, across all individual differences teachers take into account in their teaching, and across all the different styles and approaches to teaching, this model identifies generic qualities of pedagogy that have been successfully applied in a range of school contexts and are shown to lead to improved student learning (Amosa et al., 2007; Gore, Williams, & Ladwig, 2006).

Using a variety of measurement techniques, many studies have collectively measured both in-class instructional practices, employing direct observation techniques and
indirect survey instruments, and the quality of in-class assessment practices, from samples of assessment tasks employed by teachers in the USA (Lee & Smith, 1993; Lee & Smith, 1995; Newmann, Mark, & Gamoran, 1996; Newmann & Associates, 1996; Newmann, Lopez & Bryk, 1998), in Singapore (Fan & Zhu, 2007; Yeo & Zhu, 2005), in Australia (Gore, Ladwig, Lingard, Luke et al, 2001), and in other contexts such as Swiss and German mathematics classrooms (Klieme, Pauli, & Reusser, 2009). Most studies have parallel elements to those detailed in the Quality Teaching model, for example, ‘supportive classroom environments’ from the USA which is most closely related to the ‘quality learning environment’ dimension in Australia. These models have been examined in the forms of descriptive, cross-sectional, and longitudinal analysis of the relationship between pedagogy and student outcomes.

All in all, in order to understand the comprehensive picture of school teaching effectiveness, the models introduced in this section have investigated factors related to students’ prior achievement, students’ social backgrounds and several school level demographic and pedagogical variables. In particular, the QT model (2003) has been designed to support the NSW government’s commitment to the principles of social justice and equity, including the commitment to delivering equitable student outcomes. If the goals of quality schooling are to be reached, it is imperative that all students and especially those who have been disadvantaged are systematically exposed to a better teaching quality. Therefore, having a comprehensive measurement tool for understanding quality teaching is vital, when investigating students’ school learning experiences.

2.6.2 Teachers’ perceptions and students’ achievement

Many scholars have argued that successful integration of students within schools largely depends on the willingness of school staff to support all children socially and academically in educational settings. Therefore, understanding teachers’ perceptions of the educational situation for migrant children in urban schools is crucial for the successful implementation of better teaching quality for migrant children.

Teachers’ ‘perceptions’ have been studied in different circumstances and with various
definitions. Based on its literal meaning, perception is the act or the effect of perceiving and insight or intuition gained by perceiving (Schacter et. al., 2011). In the present study, teachers’ perceptions are defined as an individual’s understandings and views, referring to teachers’ opinions in the areas of (a) personal attitudes about migrant students’ educational inclusion policy, and (b) migrant students’ school performance.

A large number of studies have reported on investigations of school performance and pedagogical practices in primary schools (Hiebert & Grouws, 2007; Mercer, 2010; Rubie-Davies, 2007), and have found that teachers’ perceptions are a key issue affecting patterns of teacher-student interaction and discourse. Teachers’ perceptions of students are closely linked to the teaching strategies that they apply in order to cope with the challenges within a classroom of diverse students (Jussim & Harber, 2005; Song, 2006). Further, the pedagogical approaches that teachers implement subsequently shape the learning environment and impact on students’ motivation and their school outcomes (Dunne & Gazeley, 2008; Van den Bergh, Denessen, Hornstra, Voeten, & Holland, 2010). Research suggests that teacher’s ability to manage the quality of classroom interaction plays a central role in improving the quality of teaching and learning, particularly in contexts where learning resources and teacher training are limited (Hardman, et al. 2008).

With regard to teachers’ perceptions and practice, three aspects will be considered in this section. First, teachers’ perceptions and the factors influencing their perceptions and practice are examined, with special attention to the Chinese context. Second, the relationship between teaching quality and academic achievement of students is addressed. In the third sub-section, the learning experience of students in relation to the classroom interactions between teachers and students is discussed.

International research into the attitudes of teachers working with migrant students points out that teachers utilise different practices in dealing with the social exclusion of migrant children, despite working in what is considered to be an integrated school environment (Cho & Reich, 2008; Devine, 2005). Although many schools can
facilitate a supportive environment including instructional materials, additional time, and specific guidelines, teachers’ feelings of doubt and helplessness often result in frustration about migrant students’ ability to keep up with grade-level content alongside non-migrant students (Lam, Ho, & Wong, 2012). Similarly, Chinese studies have indicated that many urban teachers react more or less automatically according to the stereotype that migrant children are ‘out of control’, ‘difficult to teach’, and have ‘low academic achievement’ (Goodburn, 2009).

Research indicates that teachers’ perceptions of migrant students’ education may be influenced by at least three types of variables: teachers’ backgrounds, the current teaching situation and students’ characteristics (Hsieh, Hsieh, Ostrosky, & McCollum, 2012; Tejada, del Pino, Tatar, & Sayáns, 2012; Van den Bergh et al., 2010). With regard to teachers’ backgrounds, variables such as pre-service or in-service training and teaching experience have been shown to be related to teachers’ perceptions of socio-cultural diversity and migrant students’ education (Diuguid, 2009; Gao & Mager, 2011; García, Arias, Murri, & Serna, 2010). With respect to the current teaching situation, variables including professional support (Kumar & Hamer, 2013; Malinen, Savolainen, & Xu, 2012; Murtagh & Francis, 2012) and their relationship with students’ parents (Baquedano-López, Alexander, & Hernandez, 2013; Li, 2012) have been shown to influence teachers’ perceptions of migrant students’ education. The characteristics of students have also been shown to have different effects on teachers’ perceptions (Van den Bergh et al., 2010).

Specifically in the Chinese context, migrant students’ poor performance has been attributed to the students having less intelligence and fewer promising prospects for their school careers (Dunne & Gazeley, 2008). In terms of students’ performance between public and private schools, significant differences have been found, in that migrant students in public schools perform better than children in private schools in terms of psychological well-being, school performance, and urban cultural adaption (Chen & Feng, 2013; Lai et al., 2012; Tao et al., 2004).

Based on the difference in funding between the two school types, teachers in these
schools have different entitlements based on the position system (*bianzhi*) that is instituted by the government. This system differentially determines teachers’ social welfare between those employed in public schools and those in private schools (Hu & Szente, 2010). Public school teachers hold permanent, authorised positions that provide the teachers with ‘five social insurances’, including medical, pension, unemployment, occupational injury, and maternity insurance, as well as ‘one fund’ of housing provident funding in urban areas. In contrast, migrant school teachers are generally in temporary, contract positions and have no related social welfare (Liu, Qiao, & Ding, 2005). In addition to teachers’ differential social welfare between the two types of schools, other educational resources related to schools are also affected according to the government policy of education allocation.

For teachers in private schools, the stark differences in teachers’ working conditions and migrant students’ characteristics in comparison to public schools, may have a vital impact on the perceived quality of education that teachers believe can be provided for these children. Challenges associated with teaching migrant children have been found to be different between teachers in public and private schools. For teachers in integrated public schools, there are concerns that accepting migrant children into their classrooms may affect the overall educational quality (Goodburn, 2009). Moreover, a classroom with students from highly diverse backgrounds requires these teachers to have a higher capacity to develop curriculum facilitating the integration of students’ culture (Zhao, 2011). However, the Chinese educational system of combined collective teaching often minimises the importance of individual students’ needs, meaning that teachers in public schools often have an incapacity to modify teaching content and to balance the requirements for all children, both migrant and non-migrant (Liu & Jacob, 2013).

Moreover, it is generally accepted by most teachers that frequent contact between migrant parents and teachers provides stronger support for migrant children and therefore reduces negative acculturation strategies, such as segregation and exclusion (Vezzali, Giovannini, & Capozza, 2012). However, there is evidence that migrant
parents consider education as the sole responsibility of schools and teachers, and therefore, there is less parental involvement among migrant students in urban schools in comparison to non-migrant parents (Xie, 2007). As discussed in Section 2.4.1 and in Section 2.5.2, Confucian values have shaped the Chinese parents’ educational beliefs which place children’s academic achievement as a central concern (Stevenson et al., 1990). These parents are motivated to provide educational resources for their children, in order to support them to reach a higher achievement level. However, parents are more likely to attribute their children’s academic success to their school education rather than the parents’ involvement. Moreover, due to migrant parents’ working conditions, these parents engage less frequently in formal, work-oriented academic learning activities. This lack of parental involvement leads many urban teachers to believe that migrant parents’ educational quality is low and to consider it as the cause of their children’s poor education (Goodburn, 2009).

It is assumed that the differences in terms of teachers’ background, current working conditions and migrant students’ characteristics between public and private schools may have a significant impact on teachers’ perceptions of the educational situation for migrant children. Further, due to the various gaps between public and private schools, teachers’ perceptions of migrant children’s education in private schools may be less positive than teachers in urban public schools. Teachers’ perceptions towards students have been found to be closely linked to the teaching strategies that they apply and the pedagogical approaches that teachers have implemented (Jussim & Harber, 2005; Song, 2006; Dunne & Gazeley, 2008; Van den Bergh, Denessen, Hornstra, Voeten, & Holland, 2010). Therefore, teaching quality in terms of classroom pedagogy is an important factor to be investigated, based on an understanding of teachers’ perceptions of migrant students’ education.

Among the multiple measures related to teaching quality that have been discussed in Section 2.6.1, classroom teaching has been identified as having one of the most beneficial and direct influences on student learning. Research on pedagogic efficacy has shown that classroom processes are also a crucial source of variation in assuring
students’ learning quality (Kyriakides & Creemers, 2008; Rubie-Davies, Blatchford, Webster, Koutsoubou, & Bassett, 2010). Also in the classroom, educational interactions between teachers and students play a central role in improving the quality of teaching and learning (Hardman, et al. 2008).

Since school systems around the world have been put under considerable pressure to improve student achievement, new approaches to educational quality have been designed to investigate the learning processes that occur during classroom interactions (Griffiths, Amosa, Ladwig, & Gore, 2007; Hanushek & Rivkin, 2006; Wenglinsky, 2004). The next section begins to investigate classroom practice through a focus on the learning experience of students.

2.6.3 Classroom interactions and learning experiences of students

International research into classroom discourse shows that in its prototypical form teacher-led recitation consists of three moves. The three moves discourse format typically includes—initiation (often via a teacher question), student response, and teacher evaluation, and has been commonly referred to as ‘IRE’ or ‘IRF’ (Mehan, 1979). An initiation, usually in the form of a teacher question, a response in which a student attempts to answer the question, and a follow-up move of feedback, in which the teacher provides some form of follow-up (very often in the form of an evaluation) to the student’s response (Sinclair & Coulthard, 1992; Alexander, 2000). This is the most dominant framework of classroom interactions: Initiation, Response and Feedback (IRF) (Sinclair & Coulthard, 1975). Although such conventional teacher-questioning practices based on this discourse format have been criticised (e.g., Lemke, 1990), scholars have accorded it a certain functionality that is consistent with educational goals (Newman, Griffin, & Cole, 1989; Hardman et al., 2003). The IRF pattern of teacher-student interaction is of interest to many researchers (Hardman et al, 2003; Abd Kadir & Hardman, 2007; Vaish, 2008; Wedin, 2009). One aspect of the extension and improvement of the three-part exchange structure is known as ‘triadic dialogue’ (Lemke, 1990). This discourse format not only uses the structure of IRE/IRF—initiation, student response, and teacher evaluation, but also displays the
IRE in the follow-up move of the initiation-response-follow-up format of teaching exchange, when examining the whole interaction process (Chin, 2006; Humphrey et al., 2006). This means that the exchanges between teacher and students are viewed as an interactive process, rather than a stable circle of initiation, response, and teacher evaluation.

When investigating teaching and learning in a classroom setting, a primary source of information for teacher-student interactions comes from teacher talk. As the processes and transactions involved in the construction of meanings are mediated through language, the important role of verbal discourse in meaning-making by students and its significance for teaching and learning, classroom discourse and interaction has been the subject of interest of several researchers (e.g., Cazden, 2001; Edwards & Mercer, 1987; Edwards & Westgate, 1994). The findings reveal that the prevalence of teacher explanation and recitation has dominated the classroom, limiting the opportunities for student participation in classroom discourse and the development of higher order thinking (Abd Kadir & Hardman, 2007; Hardman, Abd-Kadir, & Smith, 2008; Vaish, 2008).

Other studies have investigated the school environment in relation to social situations existing at school that are associated with students’ performance, such as teacher support, relationships between teacher and students, and students’ peer relations at school (Basch, 2010; Currie et al., 2008; Gådin & Hammarström, 2005). Maintaining a supportive teacher–student relationship has been found to be helpful in establishing a successful social and emotional learning environment (Jennings & Greenberg, 2009). Perceptions of a caring, supportive relationship with the teacher and a positive classroom environment have been related to students’ school satisfaction (Baker 1999; Libbey 2004). Although not conclusive, results seem to indicate a link between externalising behavioural problems and poor student-teacher relationships (Hughes, et al. 2008; Roorda, Koomen, Spilt, & Oort, 2011).

The research indicating that improving students’ academic achievement through developing a good classroom environment and teacher-student relationships has
implications for investigating migrant students (Liu & Jacob, 2014; Lai et. al., 2014). The comparisons of school satisfaction between migrant and urban children have shown that migrant children are generally less satisfied than urban students (Li et. al., 2008). A difference has also been found in terms of relationships with teachers, as well as academic achievement between migrant students in public and private schools (Q, et al. 2008; L, et al. 2008). The relationship between teachers and students has been found to affect the school performance and classroom behaviours of migrant students (Cheng, et al. 2007). Some migrant students in public schools feel that school is fun, the teachers are motivating, and their classmates are encouraging; whereas migrant students in private schools generally believe that school is a boring place, the teachers are unfair, their classmates are depressing, and the school days are uninspiring (Chen, Wang, & Wang, 2009; Wu, 2012).

A considerable literature has shown that the preconditions required to improve the quality of students’ learning experience have revealed that interventions can be developed to enhance student satisfaction with their school learning experience. Within the Chinese political context, recent studies have shown that there exist pedagogic inequities which characterise the differences between the performance outcomes of migrant children in public schools on the one hand, and migrant children in private schools on the other (Lai et al., 2014; Yang, Huang, & Liu, 2014). Despite government support for migrant children, the performance disparities between those children who are segregated in private schools and those who are not are significant, but are insufficiently understood. Little is known about the learning experience of migrant children in private schools in comparison to students in public schools. It is therefore important to investigate the learning experiences of these migrant students and the teaching practices of their teachers so that educators can understand and improve support for migrant children’s education in Chinese urban schools.

2.7 Summary

This literature review has considered research in four areas: educational policies for migrant children in different social contexts; Segmented Assimilation Theory and its
application; Chinese culture, mathematics education, and academic achievement of migrant children; and factors of students’ characteristics, parents’ background and school types in terms of teachers’ perceptions, classroom practices, and learning experiences of students. Several conclusions can be drawn from this review.

Internal migration and the educational challenges for migrant students are significant global issues. Many countries are experiencing large migration movements and have met with different challenges in accommodating migrant children, despite the educational context varying from country to country. The theoretical perspective of Segmented Assimilation Theory discussed in this chapter is relevant to help to understand the assimilation patterns of Chinese migrant children. In recent years Chinese policy has resulted in the placement of migrant children of higher SES into urban public schools of advantage, while migrant students of lower SES tend to be segregated in private schools. However, this theory stresses the interaction between assimilation and social contexts, especially family and community resources, while the role of school segregation in assimilation outcomes has not been explicitly examined in relation to the theory. Therefore, the theory needs to be adapted to the Chinese setting in which migrant students face different institutional contexts. Nevertheless, most previous studies have investigated migrant students as if they were one homogeneous group. This perspective is myopic, and both simplifies and distorts the deeper issues. In recent years the demographic backgrounds of Chinese migrant children have diversified significantly, particularly with regard to socioeconomic status.

Studies of mathematics achievement have provided insights into school comparisons and indicate that the achievement gap between students in public and private schools persists. Studies on predictors of achievement have highlighted students’ characteristics, students’ parents and school type. As evidenced from studies of migrant children’s education in the Chinese context, a difference has been found in terms of educational resources and mathematics achievement between school types. Comparative studies of school type have revealed that a higher migrant family income
increases the likelihood of attending public schools, postulating that differences in family background may explain part of the achievement gap between school types. Nonetheless, there is no consensus on the predictors of whether and how school teachers’ perceptions, teaching quality and classroom practice determine mathematics achievement of migrant students. In particular, the prediction of mathematics achievement levels of migrant students between public and private schools requires further investigation.

Many scholars have argued that successful integration of migrant children largely depends on the willingness of school staff to support all children socially and academically in urban educational settings. However, the importance of urban teachers in contributing to migrant children’s education is often neglected and underestimated. Little is known about Chinese urban teachers’ perceptions toward migrant children and the implementation of their practices with these children in urban schools. Therefore, understanding teachers’ perceptions of the current educational situation of migrant children in urban schools is crucial for the successful implementation of better support for migrant children.

A considerable literature has elucidated the preconditions required to improve the quality of the learning experience of primary school students, in order to enhance student satisfaction with their learning experience within schools. However, it is surprising that there are few studies investigating the classroom experiences of Chinese migrant children. Little is known about the learning experiences of migrant children in migrant schools in comparison to students in public schools. As a result, it is important to investigate the classroom practices and learning experiences of these students and their implications for educators in order to understand and improve the support for migrant children’s education.

Therefore, this research project has been undertaken to investigate the learning experiences of migrant children in urban schools. The main purpose of the research is to compare and contrast the mathematics achievements of migrant students and related factors in public and private schools at the primary educational level. The
following chapter describes the research methodology including research location, sampling technique, research instruments, data collection and data analysis.
Chapter 3
Research Methodology

3.1 Chapter overview

In Chapter Two, an examination of the current scholarly literature has provided a review of migrant children’s education in both international and national contexts. This review also examined the recent literature in the field of migrant students’ mathematics education which clearly indicated the importance of: balancing educational resources to narrow the achievement gap between migrant and non-migrant students in urban educational systems; developing urban teachers’ positive perceptions of the current educational situation for migrant students; and creating a safe and supportive learning environment through effective teacher-student interactions, where migrant students’ learning experiences are promoted.

Based on good practices derived from the literature, a conceptual framework for the study design was developed. Following this, Chapter Three describes the rationale for the research methodology and conceptual framework. The research questions are connected with the themes built on the conceptual framework. Research design, research sites, and the development of data measurement instruments are discussed. Three types of data collection were used to enhance research reliability and validity: teacher and student surveys, in-depth teacher interviews and classroom observations. This chapter also details the various methods of data collection employed in the study, and the corresponding research data collection and analysis techniques. Ethical considerations pertaining to data collection and the techniques used for the analysis of data are also described.

3.2 The rationale of the methodology

Although the terms ‘quantitative’ and ‘qualitative’ are in common general usage in contemporary society, they are somewhat difficult to define as research methodologies (Wiersma & Jurs, 2005; Wiersma, 2000). Quantitative research is ‘a type of educational research in which the researcher decides what to study, asks
specific questions, collects numeric (numbered) data from participants, analyses these
data using statistics, and conducts the inquiry in an unbiased and objective manner’
(Creswell, 2005, p.39). On the other hand, qualitative research is ‘a type of research in
which the researcher relies on the views of participants, asks broad questions, collects
data consisting largely of words (or text) from participants, describes and analyses
these words for themes, and conducts the inquiry in a subjective manner’ (Creswell,
2005, p. 39). Wiersma (2000: 14) clarifies further that in regard to the presentation of
data, qualitative research relies heavily on narrative description, while quantitative
research relies on statistical results.

It is clear that both quantitative and qualitative research methods have advantages
when attempting to attain valid and reliable research outcomes. The two methods
provide specific techniques and strategies by which researchers are guided in data
collection procedures and data analysis. In line with this, quantitative and qualitative
methods are both valuable depending on the purpose of the study and therefore have
relevance and suitable characteristics for the improvement of education (Creswell,
2005). It should be recognised too that the biases inherent in any single method can be
diminished in mixed method studies. As a result, the practice of triangulation from
various data sources aiming to seek convergence across qualitative and quantitative
methods has been developed and applied in many studies (Li, Marquart & Zercher,
2000; Creswell, 2005). The strengths and weaknesses of each method may be
compensated for and a more complete understanding of the phenomena in question
may result.

In this study, a mixed method design was employed including three sources of data
(test scores, survey, interview and observation). In order to validate the findings,
triangulation improves the clarity and precision of the study among the four types of
data. This design consists of two phases, first collecting quantitative data (test scores and
survey) and then collecting qualitative data (interview and observation) to help explain or
elaborate on the quantitative results. The rationale for this approach is that the
quantitative data and results provide a general picture of the research problem, while
more analysis, specifically through qualitative data collection is needed to refine, extend, or explain the general picture (Creswell & Plano Clark, 2007).

### 3.3 Development of the conceptual framework

A summary of the key themes and the underlying concepts, derived from the literature, are listed in Table 5.

Table 5 Key Themes and Underlying Concepts Extracted from the Literature

<table>
<thead>
<tr>
<th>Key Themes</th>
<th>Underlying Concepts</th>
</tr>
</thead>
</table>
| A. Mathematics achievement levels | - Mathematics achievement gap  
- Factors influencing mathematics achievement  
  1. Student’s characteristics (*Gender, Length of residence, Sibling number and Preschool attendance*)  
  2. Parents’ background (*Educational level, and Employment income*)  
  3. School quality (*Teachers’ perceptions, Teaching quality, and Classroom Interaction*) |
| B. Teachers’ perceptions | - Difference in teachers’ perceptions  
- Factors influencing teachers’ perceptions  
  1. Teachers’ working conditions  
  2. Migrant students’ characteristics  
  3. Parents’ school involvement |
| C. Teaching quality | - Pedagogy focused on deep understanding of substantive concepts, skills or ideas.  
- Pedagogy that enables classroom learning environments focused on learning  
- Pedagogy that meaningfully connects students with the intellectual demands of their work |
| D. Classroom Interaction | - Dominant investigation of Initiation, Response and Feedback (IRF)  
- Triadic dialogue of discourse analysis  
- Teacher’s talk  
- Learning environment  
  1. Physical environment  
  2. Relationship between teacher and students, and between peers. |

The conceptual framework for this study builds upon the literature discussed in sections 2.5.1 to 2.5.3 in Chapter Two. A number of key themes were extracted from the literature in relation to the main research focus of this study, which is the
exploration of the mathematics education of migrant students in the Chinese primary education system.

Three key research questions were formed incorporating the themes and concepts listed. In order to investigate the mathematics education of migrant students in primary educational institutions in China, the main research question of this project is: What are the mathematics achievement levels and learning experiences of migrant children from the perspectives of teachers and teaching in Chinese urban schools?

1. Theme A (Mathematics achievement levels) formed the questions:

   *The differences in mathematics achievement levels of migrant children between migrant schools and public schools*: What are the mathematics achievement levels of migrant children in comparison to urban children? What are the predictors of mathematics achievement of migrant children?

2. Theme B (Teachers’ perceptions) formed the questions:

   *The differences in teachers’ perceptions of migrant children’s education between public and private schools*: What are teachers’ perceptions of migrant children’s education in urban schools? What are the educational challenges that teachers encounter in practice with migrant children?

3. Theme C (Teaching quality) and Theme D (Classroom Interaction) were combined to form the questions:

   *The differences in teacher practice between public and private schools*: What is the quality of classroom teaching in the two types of schools? What is the teacher’s practice in the classroom in the two types of schools? What is the learning experience of migrant students in the two types of schools?

It is clear from the key research questions that the focus of the investigation is on mathematics achievement and the associated learning experiences of migrant students at primary school levels. The objective of this study is to compare the differences between public and private schools through investigating the learning experiences of
migrant children, with an aim to encourage policy makers to consider the need for reform of the segregation patterns for Chinese migrant students.

3.4 Research design

The anticipated connections between the research questions and the methodology that produced the primary data to answer these questions are shown in Table 6.

Table 6 Research Questions and Their Relation to Methodology

<table>
<thead>
<tr>
<th>Questions</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What are the differences in the mathematics achievement levels of these children between migrant and public schools?</td>
<td>• Analysis of students’ test scores</td>
</tr>
<tr>
<td>(1) What are the mathematics achievement levels of migrant children in comparison to urban children?</td>
<td></td>
</tr>
<tr>
<td>(2) What are the predictors of mathematics achievement of migrant children?</td>
<td></td>
</tr>
<tr>
<td>2. What are the differences in teachers’ perceptions of these children between migrant and public schools?</td>
<td>• Analysis of teacher’s Questionnaire</td>
</tr>
<tr>
<td>(1) What are teachers’ perceptions of migrant children’s education in urban schools?</td>
<td>• Analysis of student Self-Questionnaire</td>
</tr>
<tr>
<td>(2) What are the educational challenges that teachers encounter in practice with migrant children?</td>
<td>• Interviews with school teachers</td>
</tr>
<tr>
<td>3. What are the differences in teaching quality between migrant and public schools?</td>
<td>• Observation of school environment, and classroom interactions</td>
</tr>
<tr>
<td>(1) What is the quality of classroom teaching in the two types of schools?</td>
<td></td>
</tr>
<tr>
<td>(2) What is the teacher practice in the classroom in the two types of schools?</td>
<td></td>
</tr>
<tr>
<td>4. What are the differences in students’ learning experiences between migrant and public schools?</td>
<td>• Observation of school environment, and classroom interactions</td>
</tr>
<tr>
<td>(1) What is the teacher practice in the classroom in the two types of schools?</td>
<td>• Analysis of student Self-Questionnaire</td>
</tr>
<tr>
<td>(2) What is the learning experience of migrant students in the two types of schools?</td>
<td></td>
</tr>
</tbody>
</table>
After identifying the main focus points of this research, a plan was developed for the study design. Three key research questions were designed on the basis of an extensive literature review, and the specific objectives of the study.

In order to address the three main questions, this study was designed employing a mixed method approach. Four research phases were designed to answer the three research questions (See Table 7). In the first phase, quantitative methods were used to collect migrant children’s demographic data and mathematics test scores. The second phase explored teachers’ perceptions of the current educational situation for migrant children by employing a survey. Then, on the basis of the results of the quantitative studies, qualitative methods were employed to interview and observe teachers’ practice with migrant students in classrooms.

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Research Phase</th>
<th>Sampling</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question one</td>
<td>Phase 1</td>
<td>1808 Students</td>
<td>Quantitative Score database</td>
</tr>
<tr>
<td>Mathematics Achievement levels</td>
<td>Phase 2</td>
<td>215 Teachers</td>
<td>Quantitative Survey</td>
</tr>
<tr>
<td></td>
<td>Phase 3</td>
<td>7 Teachers</td>
<td>Qualitative Interview</td>
</tr>
<tr>
<td>Question three</td>
<td>Phase 4</td>
<td>8 classrooms</td>
<td>Qualitative Observation</td>
</tr>
</tbody>
</table>

3.4.1 Research sites

Participant schools were located in the city of Shanghai, China. In Figure 3, the area in red is the urban central business district (CBD) and most people with a high socioeconomic status live in these 9 districts, while the grey and green parts are the suburbs in which most migrant workers and their families reside. In this study, Jiading
district, northwest of Shanghai, was chosen as the participant area. There are several reasons for this site selection. First, this district is representative of the average level of Chinese internal migrant population (Wong & Song, 2008). In this district, many factories have been established, such as car production companies and many other types of industrial development, and the area has attracted many people from rural areas to work and live. Secondly, as the researcher lives in this area, the selection of the most accessible subjects in this district is in alignment with convenience sampling. Therefore, it is the least costly to the researcher, in terms of time, effort and money.

Figure 3 Source: Administrative Division of Shanghai Map (2014)

In alignment with central government policy, the current education system in Shanghai enables migrant children to study in two kinds of primary schools: public schools and private migrant schools. As mentioned before, public schools were established by the government for the majority of local urban children and have qualified teachers, good environmental facilities and adequate funds (Li et al., 2010). In this type of school, migrant children study together with local urban children (Yuan, Fang, Liu, & Li, 2009). However, without a local urban household registration designation, migrant children can only temporarily enrol in public schools as transient students. In contrast, private migrant schools have been established specifically for migrant children by migrants themselves in response to the increasing demand for
schooling among growing numbers of migrant children in the city. These schools are located in migrant communities, and the students are typically from families that have moved from rural areas in various regions (Chen, Wang, & Wang, 2007).

3.4.2 Instruments

In order to improve the reliability of this study, triangulation techniques (Mathison, 1988) have been applied in the research design by using several data collection methods including survey, interviews, and observations. The data and evidence collected using these various methods will be used to answer the research questions. The individual steps in data collection and analysis were monitored and evaluated continuously so that consistency in decision-making was maintained throughout the process of the research (Merriam, 1998). Specifically, five types of data were collected in this study, including children’s mathematics test scores, teachers’ surveys, students’ surveys, teachers’ interviews, and classroom observations. The following section describes the development of each instrument with reference to the research questions.

(1) Mathematics test scores

The mathematics test scores were collected from the final semester examination of participant primary schools. The semester examination is organised by the local Ministry of Education and is used to evaluate school outcomes and teaching quality within the district. All of the schools within the district are compulsorily required to participate in the test by the local education authority. The pen and paper test was developed separately for each grade level by the local Ministry of Education. The mathematics test across the grade levels aligns with the regional curriculum standards in Shanghai, consisting of three main sections: numbers and computing (20%), concepts comprehension (40%) and problem solving (40%). The mathematics test score scale is 0-100 points. The full score of the mathematics test is 100 points, and students are required to complete the test in 60 minutes. To assess students’ mastery of mathematics, a score of 60 points or above is the level required to pass the exam, and a score below 60 points means failure in the exam; whereas a score of 80 points
or above is designated the excellent level in each grade.

(2) Teacher survey

In the second phase of this study, both teacher and student surveys were conducted in an attempt to investigate teachers’ and students’ perceptions towards educational practices in urban schools. A teacher survey aimed to gather information from a relatively large group of teachers about their attitudes to migrant students’ current educational situation. Multiple resources were used to develop the ‘Urban Teachers’ Perceptions of Current Educational Situation of Migrant Students Questionnaire’ employed in this study, which included previous studies, feedback from field experts and a pilot study. Major themes of the questionnaire were first developed using studies by Song (2006) and Diuguid (2010) both of which focused on the belief that today’s teachers are challenged by students’ diverse backgrounds. Song’s (2006) study was conducted in an urban educational institution to examine urban teachers’ beliefs in relation to teaching, learning, and students. In Song’s study, the survey questions used examined teachers’ understanding of children in poverty, and from minority language and ethnic backgrounds. In addition, the focus of Diuguid’s (2010) survey was on exploring teachers’ awareness, preparedness, and attitudes relating to students with high poverty and diversity. Items from both surveys were adapted to fit the current study. A draft of the questionnaire was developed in both Chinese and English, based on the themes drawn from the literature. In particular, Likert scale questions on teachers’ perceptions of the current educational situation were adapted from Song’s (2006) study. Field experts (two professors in the field of education who work in Chinese universities) reviewed the questionnaire and provided additional feedback. Both of these researchers have high levels of competence in the Chinese and English languages. The revised Chinese version of the questionnaire was piloted with 30 teachers who work with migrant children in Chinese urban schools.

As a result of the pilot, a total of 22 (including both positively and negatively worded) items were finalised to measure each individual’s general perceptions of the current educational situation for migrant students (See Appendix 5: Teacher Survey). These
items covered teachers’ attitudes and willingness towards teaching migrant children, teachers’ readiness to work with migrant students, and implementation strategies. Survey respondents rated the items on a five-point Likert scale ranging from ‘agree’ to ‘disagree’, with three defined as ‘neutral’ (1= disagree, 5= agree). Cronbach’s alpha coefficient was calculated for the current study sample to examine internal consistency reliability and the coefficient for the 22-item scale was 0.80. A reliability score of 0.70 or higher is normally regarded as acceptable (Streiner, Norman, & Cairney, 2014), and therefore, the teacher survey instrument of this study demonstrated good internal reliability. The sum of the individual scores was used as a measure of teachers’ overall perceptions, with higher scores representing more positive perceptions. These items were preceded by general questions regarding teachers’ demographics including age, gender, school type, educational level, years of teaching experience and teaching years with migrant students.

(3) Student survey
A student survey was designed based on the ‘Students’ Descriptions Questionnaire (SDQ-III)’ revised from Marsh (2003), which consisted of thirteen subscales including verbal, academic, physical appearance, peer relations, mathematics, and general esteem. Considering students’ young age and literacy levels in primary schools, this study revised the items into six categories to investigate migrant students’ attitudes towards urban education and school life (See Appendix 6: Student Survey). The 50 items included mathematics (10 items), parents (10 items), emotions (5 items), schools (5 items), teachers (15 items) and peers (5 items). The total time for answering the survey questions was approximately 20 minutes for each student. All of the 50 items were rated on a five point Likert scale to obtain varying degrees of answers including disagree, mostly disagree, neutral, mostly agree, and agree (code from 1-5). The higher score indicated more positive perceptions of urban school experience by the migrant students. A pilot study was conducted before the formal survey for migrant participants. Cronbach’s alpha coefficient calculated for the current study sample to examine the internal reliability and the coefficient for the 50-item
scale of the whole survey was 0.82. A reliability score of 0.70 or higher is normally regarded as acceptable (Streiner et al., 2014), and therefore, the student survey instrument of this study had an acceptable internal reliability.

(4) Teachers’ interview protocol

Following the questionnaire related to teachers’ perceptions of the current educational situation of migrant children, this study adopted a purposive sampling technique for the semi-structured interview design in the third phase. The open-ended design of the questions aims to provide more opportunities for informants to explain the issues being explored. Close-ended questions are designed to promote the accuracy and content validity of the information provided.

An interview protocol (Appendix 7: Teacher Interview Protocol) was designed to understand teachers’ attitudes, experiences and practice with migrant students in urban schools. The interview questions related to teachers’ perceptions and practice with migrant children were adapted from the framework of Cervantez’s (2008) study. In Cervantez’s (2008) study, teachers and their expectations were found to impact on migrant students’ academic achievement. The first part of the interview protocol included interview questions about teachers’ perceptions of students’ performance such as ‘how would you describe your students’ academic performance?’ The second part of the interview focused on teachers’ educational practices with migrant students in urban schools. The final part of the interview describes the educational challenges experienced by the teachers, as they work to educate migrant children.

(5) Classroom observation protocol

Observation is defined as ‘a method of generating data which involved the researcher immersing himself/herself in a research setting, and systematically observing dimensions of that setting, interaction relationships, actions, events and so on, within it’ (Mason, 1996, p.60, cited in Gass & Mackey, 2007, p.165). In this study, data from classroom observation was collected with the aim of gaining a better understanding of teachers’ and students’ interactions in the classrooms. Moreover, classroom
observations were conducted in both migrant schools and public schools, in order to validate the results of teachers’ surveys and interviews, as well as students’ surveys. In each type of school, four teachers participated in the classroom observations. The observations were video-taped after permission from teachers and students was granted.

The observational protocol was developed from the framework of ‘Quality teaching in NSW public schools: A classroom practice guide’ (2003) and the ‘Singapore Pedagogy Coding Scheme’ (2004). The assessment of overall teaching quality aligned with ‘Quality teaching in NSW public schools: A classroom practice guide’ (NSW DET, 2003). The Classroom Practice Guide includes three dimensions of Intellectual Quality, Quality Learning Environment, and Significance. Each dimension includes six elements which can be coded from 1-5. The total score for each dimension is 30, and the total overall score is 90. Intellectual Quality consists of six elements, including deep knowledge; deep understanding; problematic knowledge; higher-order thinking; metalanguage and substantive communication. Quality Learning Environment consists of explicit quality criteria; engagement; high expectations; social support; students’ self-regulation, and student direction. The third dimension of Significance includes background knowledge; cultural knowledge; knowledge integration; inclusivity; connectedness and narrative.

A second observation protocol (Appendix 8: Classroom Observation Protocol) was revised from the Singapore Pedagogy Coding Scheme (2004), which covers key curriculum areas, including pedagogical interactions, task framing, class environment and pedagogical knowledge. The observation protocol consists of three parts. The first part includes the background information about the classroom such as the date and observational time, teachers for each class, the physical environment of the classroom and the seating arrangements, the teaching materials and tools, the category of teacher’s talk, and phase of occurrence. The second and third parts of the observational protocol record the interactions between teacher and students, and between students.
Teacher’s talk includes: organizational talk; regulatory talk; curriculum content talk; S-T interaction talk; and student discussion talk. The amount of time (in percentages) was calculated for each category. Coding of the phase of occurrence was conducted in terms of types of phase and percentage of occurrence, including whole-class teacher-fronted; T-S interaction; small group work; and individual seatwork. Coding of the classroom cognitive interaction was conducted in terms of interaction frequency and type. The S-T interactions refer to three types of interaction: Initiation, Response, and Feedback. Also, the coding of emotional interactions was conducted in terms of frequency of Positive preventive; Negative preventive; Positive reactive; and Negative reactive types. More details of the coding analysis are described in Section 3.6.2 (Analysis of qualitative data).

3.5 Data collection
Data collection in this study was conducted by the researcher. After approval from the University of Newcastle Human Research Ethics Committee (H-2012-0355), the researcher contacted the Ministry of Education, Shanghai China for permission to conduct the data collection. To ensure that the data collected was relevant and would answer the key questions of the study, it was important to select the population and sample in a purposeful way (Chromy, 2006; Patton, 1990). The next section provides details on how the researcher selected the population and the sample in this study.

3.5.1 Sampling
In alignment with the National Bureau of Statistics of China (2011), this study defines migrant workers as people who have left their rural regions with their agricultural household registration and who have worked in urban areas for more than six months continuously; their children who were brought into urban schools for transient education are called migrant workers' children (migrant children).

Participant schools were located in the city of Shanghai, China. According to ‘Shanghai educational blueprint for migrant children’ (2013), there are 159 migrant schools mainly distributed in the suburbs of Shanghai (e.g. 13 migrant schools in Minhang; 19 in Songjiang; and 15 in Jiading district). By 2010, 162 public schools
have been permitted to recruit migrant children. As described in section 3.4.1, participating schools from one district of Shanghai were selected. The two types of schools for migrant children in urban areas include: segregated migrant children’s schools (migrant schools) and public integrated schools (public schools).

The first phase of the study used students’ mathematics test scores to compare the school outcomes of migrant students between migrant schools and public schools. There is no national test for primary schools, but common mathematics tests are carried out among some schools in the district. In order to better assess students’ performance in mathematics, 15 migrant schools and 12 public schools in the selected district that teach the same curriculum in a similar manner were invited to participate in the study. Subsequently, four primary schools agreed to participate in the first phase of test score data collection and analysis. The same mathematics tests were conducted in all of these primary schools as their final examination of the semester. Besides the test scores, demographic information of participant students was also collected from the students' school enrolment databases provided by the participating schools. In the total sample of 1808 students, 839 were migrant children. Of the participant migrant students, 478 attended migrant schools (57%), and 361 attended public schools (43%). The participant students in each of the years 2-5 are similar in number (year 2, 31.6%; year 3, 25.1%; year 4, 22.6%; and year 5, 20.7%). The age of participant students varied from 8 (year 2) to 11 years old (year 5) on average.

In the second phase of the teacher survey, the sample involved purposive samplings to target representative groups in order to be able to generalise to the wider population. Teachers who teach mathematics subjects in Shanghai primary schools (integrated public schools and migrant schools) formed the population of the teacher survey. Six schools located in the selected district of Shanghai were selected; a 30% sample of the total population in the selected district (Ministry of Education, 2012). Selection of schools was based on a multi-phase cluster sampling method, and then a random sampling method (Foeler, 2009). The schools were organised into a migrant school cluster (about 50% of the total schools) and public schools cluster (50%). Individual
schools were subsequently selected from each cluster randomly.

Finally, 12 schools agreed to participate in the survey. These elementary schools ranged in size from 12 to 60 classrooms. School principals and participant teachers were informed of the purpose, methods and eligibility criteria for the study. A total of 220 teachers were invited to participate, 217 teachers returned questionnaires (98.6% return rate), and 215 were completed. Since it was not possible to ascertain if participants’ unanswered questions were due to carelessness or to a conscious omission, a decision was made to use only the data from complete surveys. Correspondingly, migrant students were invited from migrant schools and public schools. In total 61 migrant children from migrant and public schools participated in the survey. 65% of migrant children (n=40) studied in public schools and 35% of them (n=21) were from migrant schools. Taking into consideration students’ understanding of the survey questions, students from grade 4 (n=30) and 5 (n=31) were invited.

In the teacher interview phase, all survey respondents were invited to participate in a follow up interview. Seven of the 215 teachers agreed to participate in the interview. The seven teachers included five teachers in public schools and two teachers in migrant schools. Each participant was designated with a code (P1, P2, P3, P4, P5 in public schools; M1, M2 in migrant schools).

In the observation phase, participant teachers were purposively selected. Purposive sampling refers to deliberate selection of individuals for participation in a study (Silverman, 2001). Two types of schools were investigated in terms of segregated migrant schools and integrated public schools. Eight of the 215 teachers (in the survey) agreed to participate in the observations. Four teachers in each school type were observed in their mathematics classes. Each classroom was observed on four separate occasions. In total, thirty-two lessons were observed and recorded (audio and video). The present analyses drew on data from a total of 913 students (51% female, 49% male) in 38 mathematics classes (4 migrant classrooms and 19 public classrooms) in years 2-5. The students’ mean age varied from 8-11 years.
Further, in order to compare the classroom experiences of migrant children, one classroom was selected from each type of school purposively. The sampling was selected based on a strict control of participant background (SES, gender, age, achievement level, length of residence in urban areas) in order to eliminate the influence of these variables on classroom interactions. In each of two participant classrooms, one migrant student was selected respectively for observation in a public and a migrant classroom, with the aim of assessing the quality of their classroom activities and interactions. In the public school classroom, Lily (alias) was selected as a participant for observation, while Lucy (alias) was the participant for observation in the migrant school classroom. Lily and Lucy were both studying in year 4 (11 years old, female). Lily and Lucy share similar individual backgrounds as follows: Both of them are migrant children who migrated to urban schools at the beginning of year 1; they both migrated from the same province of Anhui; have one sibling, and have parents who work in a factory. Moreover, the two migrant students attained similar achievement levels in mathematics in the phase one test. This sample represented the median level of mathematics achievement and family background of the whole classroom. Meanwhile, the background of participant urban teachers was also similar in that the teachers’ were aged between 20 and 25 years old, female, and both held bachelor degrees.

3.5.2 Data collection procedures
The first phase collected students’ mathematics achievement data to compare the outcomes of migrant students between migrant schools and public schools. The researcher contacted the Ministry of Education in the chosen district of Shanghai before implementing data collection. The educational office provided the de-identified data of students’ mathematics test scores and demographic information of students, including Household Registration System designation (either Agricultural or non-Agricultural), gender, age, length of residence in urban areas and parents’ socioeconomic status in terms of education and occupation. The data was collected from four elementary schools in Shanghai between January to March 2013. All participant students were children enrolled in years 2 to 5 respectively. In order to
eliminate the difference between central and peripheral districts in Shanghai, all of the participant schools were selected within one of the suburban districts. Also, the contact information of potential participant schools was sought for the invitation of school principals to participate in next phase of the study.

The teacher survey was tested through a pilot study among 30 teachers who worked with migrant children in Chinese urban schools. Some words and phrases of the survey questions were corrected by pilot teachers in order to avoid any confusion in the survey. The pilot teachers also made suggestions for altering the survey structure, statement format and quantity of the survey questions. The comments and suggestions of these urban teachers resulted in changes for the final survey. The researchers made contact with the principals of each primary public school and private migrant school in the district. After their permission was given, the surveys in hard copy were sent to all the mathematics teachers simultaneously with the informed consent letter. The researcher supplied the school with a specific mailbox for teachers to submit their signed consent forms and completed surveys. Teachers who participated in the survey were invited from public schools and migrant schools in Shanghai China from November to December 2012.

An anonymous survey of migrant children was conducted after gaining permission from school teachers and the students’ parents. Migrant students were provided with a hard copy of the survey in an arranged classroom after school. The researcher conducted the survey and provided support for migrant children who studied in the lower grade levels. In total, 61 migrant students participated in the student survey including 40 migrant children who studied in public schools and 21 from migrant schools.

The researcher also obtained school principal permission to enter into schools to conduct teacher interviews. One school administrator was asked to distribute the invitation to teachers in order to gain consent to participate in the study. After gaining teacher permission, participant teachers were asked to respond to questions about their
perceptions and teaching experience with migrant children. Each interview lasted for approximately 45 minutes and the interview session was conducted face to face. The interview session was audio-recorded and participants were invited to review the interview transcripts.

The final phase was a schedule of classroom observations. The researcher explained the study to the participant teachers and students, including her role as a non-participant observer, and the purpose of the audio and video recordings. For the classroom observations, participants were required to conduct their normal mathematics lessons. The lessons were conducted in the classroom and all interactions between students and the teacher were video-recorded. The observation time in each class was approximately 45 minutes.

3.6 Data analysis

The research data included the score databases, survey, audio recordings of, and/or the field-notes taken during interview and observation observations. Transcriptions of all the data, including hard copy, the audio recordings, field-notes and photographs were stored in a laptop issued by the university to the researcher. The laptop was password-protected, and all the electronic data were subsequently erased from the original sources after being transferred. All of the transcripts, field-notes, and other documents were carefully de-identified by, for example, replacing the names of the teachers with codes.

3.6.1 Data analysis of student academic achievement
Quantitative data in this study consisted of three types of data: students’ test scores, teacher surveys and student surveys. Student testing was conducted to investigate whether there were any differences in the mathematics achievement levels of migrant students in comparison to urban non-migrant students. Teacher survey data was used to examine teachers’ perceptions of the current educational situation for migrant students. Student survey data was analysed to determine the nature of students’ learning experiences in urban schools.
Students’ demographic variables were also recorded and included school type, sibling numbers, length of residence in urban areas, gender, preschool attendance, and parental socioeconomic status. The specific demographic analysis and predictors in relation to mathematics achievement are discussed below. Table 8 displays definitions of these explanatory variables. In this phase, the study examined the differences in mathematics test scores between public schools and migrant schools in terms of the achievement levels, indicated by the ‘fail’ and ‘pass’ rate using t-tests. In addition, students’ demographic information with respect to their family background was compared and contrasted through the use of a Chi-square test.

Table 8 Definitions of the Explanatory Variables Used to Predict Public School Attendance

<table>
<thead>
<tr>
<th>Variables</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parents education</td>
<td>A six-level ordinal variable measuring the educational qualification of the father (mother)</td>
</tr>
<tr>
<td></td>
<td>0= “No education”, 1= “Primary school education”, 2= “Junior school education”, 3= “Senior school education”, 4= “Three-year diploma”, 5= “Bachelor or above”.</td>
</tr>
<tr>
<td>Parents occupation</td>
<td>A variable measuring the occupation type of migrant parents</td>
</tr>
<tr>
<td></td>
<td>0= “government officer”, 1= “state-managed company”, 2= “small service business”/“factory worker”, 3= “farm”, 4= “no job”.</td>
</tr>
<tr>
<td>Preschool attendance</td>
<td>A binary variable set</td>
</tr>
<tr>
<td></td>
<td>0= “migrant children have not attended preschool education” 1= “migrant children have attended preschool education”</td>
</tr>
<tr>
<td>Academic achievements levels</td>
<td>A three-level ordinal variable measuring the academic achievements</td>
</tr>
<tr>
<td></td>
<td>1= “Fail”, 2= “Pass”, 3= “Excellent”.</td>
</tr>
<tr>
<td>Length of residence in urban areas</td>
<td>A variable measuring the period of time that the migrant child has been resident in the city</td>
</tr>
<tr>
<td></td>
<td>1 = “less than 2 years”, 2= “2-5 years”, 3= “5-8 years”, 4= “more than 8 years”.</td>
</tr>
<tr>
<td>Gender</td>
<td>A binary variable set</td>
</tr>
<tr>
<td></td>
<td>0= “female students” 1= “male students”</td>
</tr>
<tr>
<td>Sibling numbers</td>
<td>A variable measuring the number of siblings</td>
</tr>
<tr>
<td></td>
<td>0= “no sibling”, 1= “1 sibling”, 2= “2 siblings”, 3= “more than 3 siblings”.</td>
</tr>
</tbody>
</table>

Note: Measure of parental education (coded by 0–5) and parental occupation (coded by 0–4), is by the highest education completed by both parents with the highest occupation held by both parents (Lim & Gemici, 2011).
This first phase of the achievement analysis also used multivariate regression to examine the factors related to migrant students’ mathematics achievement levels. This study used a two-step approach to establish the following model. Literature has shown that access to public schools is the key factor determining the quality of education that migrant children receive (Chen & Feng, 2012; Lai et al., 2012). Moreover, the variables of parents’ background and students’ characteristics have been found to be significantly related to public school selection (Chen & Feng, 2012). Therefore, the first step examined the effects of parents’ and students’ background variables on school selection through logistic regression. Model 1 was as follows:

\[ X_{ims} = Y_0 + Y_1 M_i + Y_2 S_i + E \]

where \( X_{ims} \) is the binary dummy variable for public school selection for migrant students, equal to 0 if migrant student \( i \) is enrolled in a migrant school and 1 if in a public school. \( M_i \) is the control vector of parents’ background (parents’ education and occupation), and \( S_i \) is a vector of migrant students’ variables (student’s gender, length of urban residence, preschool attendance and sibling numbers). Other factors that may also affect school selection but are unobservable factors are included in \( E \).

Further, after analysing the determinants of public school selection, the manner in which student and family characteristics, and school type predict migrant students’ achievement was investigated. It was assumed that both students’ background and school factors contribute to academic achievement of migrant children (Lai et al., 2014). Therefore the second step of the analysis aimed to explain mathematics achievement levels in relation to students’ characteristics, parents’ background and school type. Based on Lai’s model of predicting migrant children’s achievement, this study extended the prediction in a comparative way between migrant students in

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3 Parental background refers to parental SES which is calculated as a combined measure of parental education (coded by 0–5) and parental occupation (coded by 0–4), by multiplying the highest education completed by both parents with the highest occupation held by both parents (Lim and Gemici, 2011). This step results in the range of 0 to 20, where 0 is the lowest SES and 20 is the highest SES category. The SES scores were then divided into quartiles (1 is the bottom quartile, and 4 is the top quartile).
migrant schools and public schools. Model 2 was adopted as follows:

\[ Y_{ix} = \beta_0 + \beta_1 X_i + \beta_2 S_i + \beta_3 M_i + E_{ix} \]

where \( Y_i \) is the mathematics achievement of migrant students \( i \) in school \( x \). \( X_i \) is a dummy variable for the type of school equal to 0 if migrant student \( i \) is enrolled in a migrant school and 1 if in a public school. \( S_i \) is a vector of migrant students’ variables and \( M_i \) is the vector of their parents’ variables as in Model 1. Other factors that may also affect the mathematics outcome are included in \( E_{ix} \). The significance of parameter vectors \( \beta_1, \beta_2, \) and \( \beta_3 \) respectively gauge the statistical significance of factor \( X_i \) (school), \( S_i \) (student), and \( M_i \) (parent) in predicting student achievement.

3.6.2 Data analysis of teacher and student survey

The data from the teacher survey was analysed using the following statistical methods. Descriptive statistics were provided for all items and all scales. The Statistical Package for Social Science (V17) was used for all analyses. Differences between school type and teacher’s gender were investigated by applying independent t-tests. Differences between teacher’s age and teaching years were determined using one-way ANOVA for each of the obtained scale scores as a dependent variable, and using gender (male, female), and school type (1 public school, 2 private migrant school) as the independent variable. Mean scores and standard deviations were used to describe teachers’ awareness, attitudes, and practices. Moreover, the differences in teachers’ perceptions of migrant students’ education between the two types of schools were also compared through the analysis of the t-test.

The data from the student surveys was analysed using the following statistical methods. Mean scores and standard deviations were used to describe the levels of students’ perceptions and attitudes towards their school life. Differences in terms of students’ perceptions of schools, teachers, parents and peers between school types were investigated by applying independent t-tests which used school type (1 public
school, and 2 private migrant school) as the independent variable.

3.6.3 Data analysis of teacher’s interview

In qualitative research, coding is a process that segments data in order to extract meaning from it. It is, however, not an alternative to ‘analysis’ nor is it analogous to ‘developing conceptual schemes’ (Coffey & Atkinson, 1996, p. 27). Coding simplifies or reduces, as well as complicates, data (p.30). It incorporates both ‘decontextualisation and recontextualisation’ of data by first segmenting it into categories and then placing each segment into a new context to form new concepts or questions (p. 31). Coffey and Atkinson (1996) have suggested three methods for initiating and pursuing coding. First, extract some essential characteristics of the data and use these as codes. Second, coding can be commenced with a predefined list of codes, developed from the theory, concepts, hypotheses to be tested, or from the previous literature. Third, codes can also emerge from the research questions. These three methods have also been suggested by Tesch (1990, p. 141) in regard to generating the criteria for data organization.

Generally, the analysis of the interview data involved the following steps: transcribing the interviews; reading the transcripts to identify categories; testing the tentative categories; using final categories to code all responses; and tallying coded responses (Glatthorn & Joyner, 2005). In order to create data from the recorded interviews with teachers, the researcher transcribed the interviews, and then translated the interviews into English. Finally the researcher made grammatical corrections while remaining ‘respectful of the content and the intended meaning of the participants’ words’ (Furderich, 1995, p32, cited in Seidman, 2006). After the transcription was completed, the researcher gave the transcripts to the teachers for them to confirm and amend details if necessary.

The next step involved reading and marking the transcripts. After reading and indicating interesting passages in the interviews, the researcher developed tentative
labels by considering the following question: ‘Is there a word within the passage itself that suggests a category into which the passage might fit?’ Then the researcher re-examined the tentative categories to determine the links. During the coding process, the researcher also revised the initial coding categories to determine whether they had been identified in the interview transcripts. The initial coding categories for the teacher interviews were developed from the theory, concepts, hypotheses, and previous literature, which is also aligned with the research questions. In the teacher interview phase, the initial coding categories included three main dimensions: (1) Teacher’s perceptions of the current educational situation for migrant students; (2) Migrant parents’ background, migrant students’ low achievement and school educational resources allocation as challenges for urban children; and (3) Significant differences between teachers in migrant schools and public schools. To check for accuracy, the researcher also referred to the audiotape. Final categories were then established. Moreover, the quotations of participants that were selected for use were those most representative of the teachers’ perspectives being reported.

3.6.4 Data analysis of classroom observations

Empirical literature on classroom features was analysed in order to determine appropriate ways in which to observe the ‘quality’ of teaching at two levels (See Table 9). The first level of observation involves observing in a time-sampled format, the discrete activities and behaviours of teachers with all the students. Teaching quality was examined at the classroom level in terms of teacher-initiated efforts to improve students' achievement outcomes (e.g., instruction, evaluative feedback), and teacher-initiated efforts at promoting an appropriate emotional climate in the classroom (e.g., positive emotional climate, classroom management). The second level of observation involved observing the discrete activities and behaviours of teachers with a target child in order to describe what takes place in primary classrooms, with regard to the dimensions of teacher interactions with a target child (e.g., sensitivity), as well as the student’s response to the whole class.
Table 9 Analysis Level of Classroom Observation

<table>
<thead>
<tr>
<th>Level</th>
<th>Sample</th>
<th>Analysis content</th>
<th>Main themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>First level</td>
<td>Classroom whole sample</td>
<td>Discrete activities and behaviours of teachers with all the students</td>
<td>Teaching quality</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Instruction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Emotional climate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Classroom management</td>
</tr>
<tr>
<td>Second level</td>
<td>A target child</td>
<td>Discrete activities and behaviours of teachers with a target child</td>
<td>Classroom interactions</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Student’s response to the whole class</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Teacher’s response to the student</td>
</tr>
</tbody>
</table>

There is much emphasis on using standardized and validated research instruments. For one thing, it enables comparisons of results across different studies both nationally and internationally (Laake, Olsen, & Benestad, 2007). For another, the use of validated instruments increases the certainty with which the instruments accurately reflect what they are supposed to measure (Gjersing, Caplehorn, & Clausen, 2010). An instrument was needed for the implementation of this study in China. There was no appropriate instruments available in China. Thus this is the first study to apply these models in the Chinese context.

The analysis of classroom observations is based on the ‘Singapore Pedagogy Coding Scheme’ (2004). This program covers key curriculum areas, including pedagogical interactions and the class environment. The main analysis involves investigating migrant children’s classroom interactions, and describing how they behave in the classroom. The coding framework documents the different types of interactions between teachers and students, and different types of classroom activities and social interactions, such as teacher’s questioning, students’ responses, and individual student activities.

The Quality Teaching Model is also a research-based model has been designed for teachers to assist them to understand and analyse teaching practices that take place in classrooms, with the aim of improving pedagogy and hence student learning. This
Quality Teaching model is based on a sound research understanding of how teaching and school improvement can promote improved student learning outcomes (Ladwig & King, 2003). The elements of this pedagogical model can be applied across all years of schooling (K–12), and all curriculum areas.

In this study, the two coding schemes have been used to understand teachers’ practices and to help to improve our understanding and insight into their practice. It should be noted that these two coding schemes have emerged from both cross-sectional and longitudinal studies enabling higher level modelling and triangulation across large-scale data sets. In addition, research programs were designed to provide comprehensive multidisciplinary evidence for educational policy and practice.

After the final observation of each teacher conducting a classroom lesson, the researcher reviewed the observation notes and video transcripts. All 32 lessons observed were fully transcribed. As discussed in Section 3.4.2, the classroom observation data was analysed at different levels. The data from the lesson transcripts involving teaching quality were analysed in two ways. The first level of analysis sought to identify and compare the frequency of interactions within the classroom, the phase of occurrence, and the percentage of teacher’s talk. Coding of teacher talk was conducted through calculating the duration of each type of talk. Five types of teacher talk were identified: organizational talk; regulatory talk; curriculum content talk; S-T interaction talk; and student discussion talk. The amount of time as a percentage was calculated for each category. Coding the phase of occurrence was conducted in terms of the types of phase and percentage of occurrence, including whole-class teacher-fronted; T-S interaction; small group work; and individual seatwork. The amount of time as a percentage was also calculated for each category. Coding of classroom cognitive interaction was conducted in terms of the interaction frequency and type. The T-S interactions refer to three types of interaction: Initiation, Response, and Feedback (IRF). Also, the coding of emotional interactions was conducted in terms of the frequency of Positive Preventive; Negative Preventive; Positive Reactive; and Negative Reactive types. The second level of analysis sought to identify the themes.
and processes of interactions between the two types of schools. Illustrative examples were chosen to represent teacher and student interactions, and interactions between students from the video transcripts.

Assessments of overall teaching quality were made using the framework of teaching quality as described by the ‘Quality teaching in NSW public schools: A classroom practice guide’ (NSW DET, 2003). The classroom practice guide includes three dimensions: Intellectual Quality, Quality Learning Environment, and Significance. Each of the three dimensions is measured using six descriptors which are scored on a scale of 1 – 5. The total score for each element is 30, and the total score for all the elements is 90. The analysis of interaction between the two types of classrooms was measured in a quantitative method. For example, the frequency of classroom interactions, initiation, feedback, rewards and punishment was calculated and compared between the two types of schools. The mean scores on each dimension and the total scores for the three dimensions were used to calculate a score for each dimension. T-tests were used to compare the differences between the two types of schools. In addition, some examples and scenarios of classroom activities from the transcript video are included as illustrative of each dimension.

Following the assessment of overall teaching quality in public schools and migrant schools, a case study was implemented in one classroom in each type of school to specifically describe teacher and student practices. This study observed public and migrant classrooms to describe classroom activities and student-teacher interactions involving one child per classroom. Each classroom was observed four times for 35 minutes starting at the beginning of the school day. Time samplings of activities, teacher behaviours, and child behaviours, as well as interactions and the details of the classroom environment were obtained.

The analysis of classroom observations is based on the ‘Singapore Pedagogy Coding Scheme’ (2004). This program covers key curriculum areas, including pedagogical interactions and the class environment. The main analysis involves investigating
migrant children’s classroom interactions, and describing how they behave in the classroom. The coding framework is displayed in Table 10 and documents the different types of interactions between teachers and students, and different types of classroom activities and social interactions, such as the teacher questioning, students’ responses, and individual student activities.

Table 10 Coding Framework of Classroom Observation

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Classroom environment</td>
<td>1.1 Seat arrangement</td>
</tr>
<tr>
<td></td>
<td>1.2 Teacher’s walking routes</td>
</tr>
<tr>
<td>2. Frequency of classroom</td>
<td>2.1 Interaction with teacher</td>
</tr>
<tr>
<td>interactions</td>
<td>2.1.1 Hands up</td>
</tr>
<tr>
<td>(Quantitative)</td>
<td>2.1.2 Being Asked</td>
</tr>
<tr>
<td></td>
<td>2.2 Interaction with students</td>
</tr>
<tr>
<td>3. Classroom interaction</td>
<td>3.1 Interaction with teacher</td>
</tr>
<tr>
<td>(Qualitative)</td>
<td>3.1.1 Teacher’s initiation and reaction</td>
</tr>
<tr>
<td></td>
<td>3.1.2 Participant student’s response</td>
</tr>
<tr>
<td></td>
<td>3.2 Interaction with students</td>
</tr>
<tr>
<td></td>
<td>3.2.1 Classmates’ initiation and reaction</td>
</tr>
<tr>
<td></td>
<td>3.2.2 Participant student’s response</td>
</tr>
</tbody>
</table>

During the process of the final analysis of each teacher’s teaching in the case study, we used the instruments and framework of teaching evaluation based on the classroom observation protocols (See Appendix 8: Classroom Observation Protocol). The selected observation notes and video transcriptions were examined to provide an overall picture of the results of the classroom observation. The analysis theme in the case study included the classroom environment and the teachers’ instruction, with the images, examples of transcript scenarios, and narrative language used to support the argument. In addition, descriptive and narrative languages, pictures, examples, and conversations are also used to describe and interpret the teaching and interactional process during each class. The method of video capture and review designed for the classroom observation and analysis seeks to demystify effective teaching practices in
the classroom and, in turn, provide insights into teacher evaluation and professional development. The results of the observations are used in conjunction with data from the interviews and teacher’s surveys.

3.7 Reliability and validity

3.7.1 Quantitative data

Researchers can employ several approaches to determine the reliability of an instrument (Creswell, 2006). In this study, when designing the questionnaire, the development of each question was well informed based on the extensive literature review. In addition, a pilot study was carried out to maximise the reliability and validity of the information obtained from the questionnaire. The responses from the pilot study were used to amend individual questions or sets of items in the final form of the questionnaire. The reliability of each scale developed in the questionnaire was calculated using Cronbach’s Alpha coefficient (Berends, 2006). The criterion of an acceptable scale reliability being at least 0.7 was adopted (Garson, 2012).

In addition, content validity is often determined by asking experts to make judgements (Berends, 2006) in relation to specific question wording, general layout and question ordering. For the purpose of this study, to address content validity, the questionnaire was checked by Chinese experts and educators. The questionnaire was developed in English and later translated into Chinese. After getting feedback from the experts, revisions were integrated into the final form of the questionnaire.

3.7.2 Qualitative data

Qualitative research also uses strategies to help establish credibility and consistency. Strategies are proposed to enhance the internal validity such as triangulation, member checks, peer review, and field notes (Merriam, 2009). Triangulation is the most well-known strategy. Multiple sources of data can be compared and the findings cross-checked to obtain consistent and dependable data. In this study, by using three methods, survey, interview and observation, triangulation was built into the design of
the study and the analysis of the data. The content of the teachers’ interviews in this study was compared between their responses to the survey, as well as their observed classroom practices to establish validity of the findings. Furthermore, the analysis of the interviews was followed by observation of classroom practices, in order to achieve a richer and fuller understanding of these teachers’ perceptions and practices.

Member checks were also introduced in an effort to strengthen the design of the current study. A member check involves the researcher soliciting participants’ views on the credibility of findings and interpretations (Maxwell, 1996). In the present study, member checks involved providing copies of the interview transcript to all participants. They were asked whether they felt the preliminary interpretation was accurate or whether there were any additional changes that the participants wanted to make. This approach can provide a researcher with corrections to the transcript, or even further elaborations as an informant reflects on what the researcher has asked the interviewees.

Peer review was also used to improve the rigour of the study. This approach helped to ensure that themes generated from qualitative data were validated by at least two researchers who have no bias. In the study the researcher invited experts to participate, including two supervisors, a Professor and a lecturer with a PhD who was experienced in education research in China.

Field notes were also used in this study by the researcher. The immediate field notes were recorded about the settings of the interviews and observations. The period immediately after an interview and observation is a critical time of reflection and elaboration. It is a time of quality control to guarantee that the data obtained will be useful, reliable and authentic (Kvale & Brinkman, 2009).

3.8 Ethical considerations

Before conducting the research, approval was sought from the Human Research Ethics Committee at the University of Newcastle. Following responses by the
researcher to the committee, ethics approval was granted by the University of Newcastle Human Research Committee with approval number H-2012-0355. The approval letter is shown in Appendix I.

Ethical issues such as privacy, confidentiality and anonymity were considered throughout the research (Marshall & Rossman, 2011). Creswell (2009) has elaborated on the ethical issues of research in five parts in terms of the research problem, research purpose and questions, data collection, data analysis and interpretation, and documenting the research in writing. This study considers the ethics issues in each specific situation.

In the first phase, the researcher obtained the mathematics achievement scores from the database of primary students after permission from the Ministry of Education in the district. Information regarding students’ names and school names were replaced with numbers to de-identify the data.

In addition, consent forms were sent to teachers before conducting the survey of teachers’ expectations which included an explanation of the research purpose and processes, ensuring participants’ rights to be fully informed of the nature of this study. Moreover, this study is anonymous and participants were not required to write their names on the surveys, with the exception of the agreement to participate in the following qualitative study where they were asked to leave an email address. Survey questionnaires were then designed by the researcher. In order to refine the survey instruments and procedures, a pilot project was conducted (Creswell, 2009).

In the final phase, qualitative methods of interview and observation were conducted respectively. The purpose of qualitative research is to explore and describe people’s environment and experiences in a natural way, acknowledging that the participant’s willingness to share their opinions may depend on the relationship and power between participants and researchers (Orb, Eisenhauer, & Wynaden, 2001). For researchers, on the one hand, it is crucial to build sufficient trust to be able to effectively question
participants for rich data. On the other hand, it is important to also maintain sufficient distance from participants to encourage honest responses (Guillemin & Heggen, 2009). The researcher in this study engaged in preliminary visits to teachers in primary schools and explored possible collaborative research relationships. Moreover, the researcher explained the proposed research procedures and the strategies planned for data collection before the case study. The consent process should be based on mutual understanding of the project objectives between the participant and researcher (Guillemin & Heggen, 2009).

3.9 Summary

In this chapter the methodological framework for this research project has been elaborated. The research methodology has been discussed with reference to research sites, sampling techniques, research instruments, procedures of data collection and data analysis. Both quantitative and qualitative approaches to the research question have been undertaken: the quantitative approach involved the use of surveys as a means of data collection while the qualitative approach included the use of interviews and observations to gain deeper information from a subset of the research participants. The conceptual framework for investigating migrant students’ education in Chinese urban public schools and migrant schools has been elucidated and the decision to use mixed methods designed to investigate teaching quality has been supported with a justification for each part. The choices of academic achievement, teacher survey, semi-structured interview and classroom observation have been described in detail as well as the reasons for the selection. It was envisaged that the multiple data sources would improve the reliability and validity of the research.

The next chapter presents the results of the data analysis for the first phase of the current study. The aim of Chapter Four is to investigate the mathematics achievement levels of migrant children, and the predictors of achievement in relation to school type, sibling numbers, length of residence in urban areas, gender, preschool attendance, and parental socioeconomic status.
Chapter 4

Results and Findings: Mathematics Achievement Levels of Migrant Children

4.1 Chapter overview

In this chapter the mathematics achievement levels of migrant children based on their examination scores is discussed. The chapter is divided into three sections. The first section describes the demographic information of participant children. The second section of the chapter addresses the findings that are based on the first research questions of this study: 1. What are the differences in the mathematics achievement levels of migrant children between public and private schools? The sub-questions are: 1) What are the mathematics achievement levels of migrant children between school types by grade level and gender? 2) Which variables related to students’ and parents’ demographic backgrounds (sibling numbers, preschool attendance, gender, and length of residence in urban areas and parental SES) predict mathematics achievement of migrant children by school type? To answer these questions, SPSS 19.0 is employed to analyse the mathematics achievement levels of migrant children in comparison to urban students, in terms of gender, student status, grade, length of residence in urban areas and school type. In addition, the predictors (related to students’ and parents’ demographic) of mathematics achievement of migrant children is investigated. The third section summarises the findings and provides a conclusion for this chapter.

4.2 Demographic information of participants

In this study, the two types of schools for migrant children in urban areas are private migrant children’s schools (migrant or private schools) and public integrated schools (public schools). As the educational system in public schools is mainly designed to serve urban children with non-agricultural household registration, migrant schools are solely for rural-urban migrant children in urban areas. In this chapter, the demographic information of participants in this study includes: gender and grade level
of participants, length of residence in urban areas, parents’ occupation and educational background, and the number of siblings for each child in the study.

In the study sample of 1808 children, there were 839 children in registered agricultural households (migrant children) and 969 children who held non-agricultural registration (urban children), accounting for 46.4% and 53.6% of the sample, respectively. In total, 478 students in private schools and 1330 children in public schools participated in the study. Based on the school types and household residence types of students, the participants were categorised into three types: migrant children in private schools (26.4%, n=478), migrant children in public schools (20%, n=361) and urban children in public schools (53.6%, n=969). Table 11 shows the number of students in each grade level. Year 2 consisted of 571 children (31.6% of the total); 454 children in Year 3 (25.1%); 408 children (22.6%) in Year 4; and 375 (20.7%) in Year 5.

Table 11 Descriptive Statistics of Participants in Each Grade

<table>
<thead>
<tr>
<th>Grade</th>
<th>Private school Migrant children</th>
<th>Public school Migrant children</th>
<th>Urban children</th>
<th>N (Total)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2</td>
<td>174</td>
<td>122</td>
<td>275</td>
<td>571</td>
<td>31.6</td>
</tr>
<tr>
<td>Year 3</td>
<td>104</td>
<td>89</td>
<td>261</td>
<td>454</td>
<td>25.1</td>
</tr>
<tr>
<td>Year 4</td>
<td>108</td>
<td>70</td>
<td>230</td>
<td>408</td>
<td>22.6</td>
</tr>
<tr>
<td>Year 5</td>
<td>92</td>
<td>80</td>
<td>203</td>
<td>375</td>
<td>20.7</td>
</tr>
<tr>
<td>Total</td>
<td>478</td>
<td>361</td>
<td>969</td>
<td>1808</td>
<td>100.0</td>
</tr>
</tbody>
</table>

In terms of gender, 1048 boys (58.2%) and 760 girls (41.8%) participated in the study. The number of boys and girls is displayed in Table 12. For each type of student, the number of boys was a little more than that of girls. In private schools, there were 278 male students (15.4%) and 200 female migrant children (11.1%). In public schools, 203 boys and 158 girls were migrant children, and 567 boys and 402 girls were urban children.
Table 12 Descriptive Statistics of Participants’ Gender

<table>
<thead>
<tr>
<th>Schools</th>
<th>Students</th>
<th>Boy (N)</th>
<th>Boy (%)</th>
<th>Girl (N)</th>
<th>Girl (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private school</td>
<td>Migrant children</td>
<td>278</td>
<td>15.4%</td>
<td>200</td>
<td>11.1%</td>
</tr>
<tr>
<td>Public school</td>
<td>Migrant children</td>
<td>203</td>
<td>11.2%</td>
<td>158</td>
<td>8.7%</td>
</tr>
<tr>
<td>Total</td>
<td>Urban children</td>
<td>567</td>
<td>31.4%</td>
<td>402</td>
<td>22.2%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1048</td>
<td>58.0%</td>
<td>760</td>
<td>42.0%</td>
</tr>
</tbody>
</table>

Table 13 summarises the demographic statistics allowing for a comparison to be made between the background variables for migrant children attending urban and migrant schools. A statistically significant difference was found between the occupational distribution of parents and school type ($\chi^2$ (4, N=839) = 302.66, p< .001), and between parents’ educational qualifications and school type ($\chi^2$ (4, N=839) = 139.45, p< .001). The majority of migrant children’s parents in private schools were only junior school graduates (55.6%). In contrast, public school parents had a higher percentage (23.3%) with a college degree or three-year diploma.

Table 13 Parent’s Background of Migrant Children: Summary Statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Private school</th>
<th>Public school</th>
<th>$\chi^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td>302.66***</td>
</tr>
<tr>
<td>No job</td>
<td>3.1%</td>
<td>1.1%</td>
<td></td>
</tr>
<tr>
<td>Factory workers</td>
<td>50.2%</td>
<td>19.1%</td>
<td></td>
</tr>
<tr>
<td>Small service business</td>
<td>36.2%</td>
<td>11.4%</td>
<td></td>
</tr>
<tr>
<td>State-managed company</td>
<td>9.6%</td>
<td>63.2%</td>
<td></td>
</tr>
<tr>
<td>Government officials</td>
<td>.8%</td>
<td>5.3%</td>
<td></td>
</tr>
<tr>
<td>Education background</td>
<td></td>
<td></td>
<td>139.45***</td>
</tr>
<tr>
<td>Primary school education</td>
<td>11.3%</td>
<td>7.8%</td>
<td></td>
</tr>
<tr>
<td>Junior school education</td>
<td>55.6%</td>
<td>30.2%</td>
<td></td>
</tr>
<tr>
<td>Senior school education</td>
<td>32.6%</td>
<td>38.8%</td>
<td></td>
</tr>
<tr>
<td>Three-year diploma</td>
<td>.4%</td>
<td>20.5%</td>
<td></td>
</tr>
<tr>
<td>Bachelor Degree</td>
<td>.0%</td>
<td>2.8%</td>
<td></td>
</tr>
</tbody>
</table>

Note. *p < .05. **p < .01. ***p < .001.

Table 14 details the background variables of the migrant children in the study. The majority of migrant students in public schools (72.9%) had migrated for more than 8
years which was a higher percentage than their counterparts in private schools (20.7%). All of the migrant children in public schools had attended kindergarten, and only a small percentage of children in private schools had no preschool education (5%). Most migrant children in public schools had no siblings (85.9%), whereas the students in private schools generally had a higher number of siblings. A statistically significant difference was also found between categories of students’ sibling numbers and school type: ($\chi^2 (3, N=839) = 127.04, p< .001$), as well as between the preschool attendance and school type ($\chi^2 (1, N=839) = 18.66, p< .001$).

Table 14 Background Variables of Migrant Children: Summary Statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Private school</th>
<th>Public school</th>
<th>$\chi^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of residence in urban</td>
<td></td>
<td></td>
<td>264.27***</td>
</tr>
<tr>
<td>Less than 2 years</td>
<td>19.0%</td>
<td>5.0%</td>
<td></td>
</tr>
<tr>
<td>2-5 years</td>
<td>44.8%</td>
<td>6.9%</td>
<td></td>
</tr>
<tr>
<td>5-8 years</td>
<td>15.5%</td>
<td>15.2%</td>
<td></td>
</tr>
<tr>
<td>8 years above</td>
<td>20.7%</td>
<td>72.9%</td>
<td></td>
</tr>
<tr>
<td>Preschool education</td>
<td></td>
<td></td>
<td>18.66***</td>
</tr>
<tr>
<td>Attended kindergarten</td>
<td>95.0%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>Sibling number</td>
<td></td>
<td></td>
<td>127.04***</td>
</tr>
<tr>
<td>0 sibling</td>
<td>49.4%</td>
<td>85.9%</td>
<td></td>
</tr>
<tr>
<td>1 sibling</td>
<td>28.7%</td>
<td>11.4%</td>
<td></td>
</tr>
<tr>
<td>2-3 siblings</td>
<td>18.4%</td>
<td>2.8%</td>
<td></td>
</tr>
<tr>
<td>3 siblings above</td>
<td>3.6%</td>
<td>.0%</td>
<td></td>
</tr>
</tbody>
</table>

Note. *p < .05. **p < .01. ***p < .001.

4.3 Results of mathematics achievement levels analysis

In this section, the mathematics achievement levels of migrant and urban children are displayed, including the average levels of mathematics test scores, the rate of ‘excellent’, ‘passing’ and ‘not passing’ in mathematics achievement, mathematics achievement levels by length of residence in urban areas, gender differences of participant children, the association between students’ individual characteristics, and finally a regression analysis of mathematics achievement and related factors.

In years 2-5, the mathematics test used for this study aligns with the regional
curriculum standards in Shanghai, consisting of three main sections: numbers and computing (20%), concepts comprehension (40%) and problem solving (40%). The math test score scale is 0-100 points. To assess students’ mastery of mathematics, a score of 60 points or above is the level required to pass the exam, below 60 points means failure in the exam, whereas 80 points or above is the excellent level in each grade. Each grade level adopts a different mathematics test suitable for the age level of the students. Demographic information of participant students was also collected from the students’ school enrolment databases provided by the participating schools, including parent’s occupation, parent’s education, students’ length of residence in the urban areas, preschool attendance, and sibling numbers.

4.3.1 The mathematics test scores of migrant and urban children

The mathematics achievement levels of migrant school students, migrant children in public schools and urban children in public schools were compared. Across years 2-5, the mean levels of children’s mathematics scores varied. Among the three types of students, urban children in public schools achieved the highest level of test scores in years 2-5, followed by migrant children in public schools, although the achievement gap was very small. However, migrant children in private schools achieved the lowest mathematics achievement levels, and the achievement gap was larger.

Figure 4 clearly shows that migrant children and urban children in public schools achieved a similar mathematics achievement level in years 2-5, but migrant school students lagged behind. In addition, the mathematics achievement gap increased with higher grade levels. Specifically, private school children in year 2 scored an average grade of 86.6 points, while migrant children in public schools achieved a higher average level of 94.4 points. Urban children in public schools performed at the slightly higher average level of 94.7 points. In year 3, urban children achieved a higher average level (0.15 points) than that of migrant children in public schools. However, migrant children in private schools scored an average (78.5 points). In year 4, the achievement gap was as large as 14.5 points between migrant children in private schools (77.5 points) and in public schools (91.9 points), but the gap was only
0.4 points between urban and migrant children in public schools. Similarly, year 5 private school students performed at the average level of 69.5 points, while migrant children and urban children in public schools averaged 89.7 points and 91 points respectively.

Figure 4 Mathematics Test Score in Grade 2-5 in Three Types of Children

4.3.2 The rate of excellent, passing and not passing

In addition to calculating the average level of scores, Chinese primary schools are often evaluated on students’ performance using the passing rate and the excellent rate. As discussed in Chapter 3, the test score range was from 0 to 100 points. In each grade, the ‘not passing’ rate refers to the percentage of failed students who achieved below 60 points divided by the total numbers of students (failed rate= failed number/ total number). In addition, the excellent rate refers to the percentage of students who achieved 80 points or above divided by the total number of students in each grade (excellent rate= excellent number/ total number).

The excellent rate and not passing rate were employed to investigate students’ mathematics achievements across all of the grades. Generally, in private schools the failure rate increased as the grade increased, but the excellent rate decreased as the student’s grade level went up (see Figure 5). Specifically, in year 2, the failure rate (below 60 points) on the mathematics test was only 3.5%, but it increased to 9.6% in
year 3, then 13.9% in year 4 and as large as 30.4% in year 5. Meanwhile, the excellent rate (above 80 points) decreased as the year level increased, as can be seen in year 2, the excellent rate is 85.1%, 60.6% in year 3, 58.3% in year 4 and 52.2% in year 5.

In contrast to the private schools, in public schools the failure rate was much lower than that in private schools (See Figure 6). Moreover, the excellent rate of students’ mathematics test scores was much higher than that in migrant schools. In year 2 and year 3, no student failed the examination (scores below 60 points), and the excellent rate (scores above 80 points) of participant children was as high as 98.2% and 98.6% respectively in public schools. In year 4, the failure rate was as low as 0.7% and it increased to 3.9% in year 5. Meanwhile, the excellent rate decreased steadily to 96% in year 4 and 86.2% in year 5.
Through the comparison of the failure rate in the two types of school, Figure 7 displays how the public schools had only a small steady increase of the failure rate from year 2 to year 5. However, there was a sharp increase of failure rate from year 2 to year 5 in private schools. Although both types of schools increased in failure rate as the grade increased, there was a far greater increase in the failure rate in migrant schools than in public schools. Moreover, the gap in the failure rate between the two types of schools was small in year 2, but in year 3 and year 4, the gap became gradually larger. Further, the gap in the failure rate increased sharply in year 5.

![Figure 7 Failure Rate in Public and Private School](image)

As students’ mathematics test scores were categorised into three types (excellent, passing, not passing), a Chi-Square test was employed to test the difference in the achievement categories among the three types of students (migrant students in private schools, migrant students in public schools, and urban children in public schools). The results showed that there was a statistically significant difference between the categories of mathematics achievement and student type: $\chi^2 (4, N=1808) = 307.9$, $p<.005$. Further, the multiple comparisons among student type were investigated and the results indicated that there was a statistically significant difference in mathematics achievement between private school students and urban children, and migrant students between public and private schools ($p< .005$). However, there was no statistically significant difference in mathematics achievement between migrant and urban children in public school ($p>.005$).
4.3.3 Mathematics achievement levels by the length of residence in urban areas

In this section, migrant children’s test scores were analysed in relation to their length of residence in urban areas. As noted earlier, the categories of length of residence were classified as follows: 2 years or below, 2-5 years, 5-8 years and 8 years or above. A comparison was made between migrant children in public and private schools. Generally, within each type of school, the mathematics achievement levels of students fluctuated across different categories of residence time in years 2-5. However, the comparison between the two types of schools indicated that children in private schools had lower achievement levels than children in public schools in years 2-5. More importantly, the achievement gap was larger, as the residence time increased. Migrant children in private schools who had migrated to urban areas for 2 years or less or for 2-5 years had only a small achievement gap (less than 6 points) in comparison to migrant children in public schools. However, the mathematics achievement gap was larger between migrant children who had migrated for 5-8 years and 8 years or above in years 2-5. The achievement gap was 13 points in year 2, but increased to 30 points in year 3, 40 points in year 4 and as large as 42 points in year 5 between the two types of school among migrant children who had migrated for 8 years or above. In other words, the gap in mathematics achievement between the two types of migrant children increased as their migration time increased (See Figure 8).

Further, based on the mathematics scores as reported in the categories of excellent, passing and not passing, a Chi-Square test was employed to test the difference in achievement categories among the four categories of residence time. The results found that there was a statistically significant difference between the categories of length of residence of migrant children and their achievements levels: \( \chi^2 (6, N=1808) = 71.6, p<0.005 \).
4.3.4 The relationship between mathematics achievement levels and gender

Gender differences between migrant and urban children were compared. The analysis uses four categories: 480 male migrant children, 359 female migrant children, 567 urban boys, and 402 urban girls. In terms of gender and achievement levels, boys generally achieved higher test scores than girls in years 2 and 3, but year 4 and 5 boys scored lower on the mathematics test than did girls. Specifically, year 2 boys’ mean test score of 90.3 points was a little higher than girls (89.5 points), with an achievement gap of 0.8 points. Year 3 boys outperformed girls with an achievement gap of 3.6 points. However, year 4 boys fell behind girls by 1.3 points on average, and boys were lower than girls by 5.5 points in year 5. The results indicated that boys may perform better in the early years, but gradually the girls caught up and outperformed
the boys as the grade level increased.

An analysis of data from urban children showed that girls always performed a little better than boys in mathematics test scores in years 2-5, but the achievement gap was not large (See Table 15). In year 2, the mathematics achievement gap was only 0.1 points, 0.2 points in year 3, and 0.4 points in year 5. A T-test was employed to examine the gender differences between urban children in years 2-5, but the results indicated that there was no statistically significant differences between boys and girls (p>0.005).

Table 15 Descriptive Statistics by Migrant Children’s Gender

<table>
<thead>
<tr>
<th>Grade</th>
<th>Gender</th>
<th>Migrant children</th>
<th>Urban children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>N</td>
</tr>
<tr>
<td>Year 2</td>
<td>boy</td>
<td>90.3</td>
<td>8.9</td>
</tr>
<tr>
<td></td>
<td>girl</td>
<td>89.5</td>
<td>9.7</td>
</tr>
<tr>
<td>Year 3</td>
<td>boy</td>
<td>87.7</td>
<td>13.6</td>
</tr>
<tr>
<td></td>
<td>girl</td>
<td>84.1</td>
<td>13.5</td>
</tr>
<tr>
<td>Year 4</td>
<td>boy</td>
<td>82.7</td>
<td>15.8</td>
</tr>
<tr>
<td></td>
<td>girl</td>
<td>84.0</td>
<td>15.4</td>
</tr>
<tr>
<td>Year 5</td>
<td>boy</td>
<td>76.4</td>
<td>26.1</td>
</tr>
<tr>
<td></td>
<td>girl</td>
<td>81.9</td>
<td>21.3</td>
</tr>
</tbody>
</table>

Subsequently, the four groups of students were compared together in relation to their mathematics achievement. The results showed that in year 2 and year 3, urban girls performed best, followed by the urban boys, and then male migrant children, and then female migrant children. But in year 4 and year 5, the ranking changed as the urban girls performed best, followed by the urban boys, female migrant children and then their male counterparts.

Further, a Chi-Square test was employed to examine the differences between gender types. Based on student’s gender and status, four categories of student were employed including male migrant children, female migrant children, male urban children and female urban children. The mathematics scores were transformed into excellent, passing and not passing categories. The results found that there was a statistically significant difference among students’ gender types: $\chi^2 (8, N=1808) = 151.3$, $p<0.005$. 92
Multiple comparisons were employed to test the differences in mathematics test scores among the four types. The results showed that there was a statistically significant difference between migrant and urban boys (p< .005), and between boys and urban girls (p< .005), but there was no statistically significant difference between migrant boys and girls (p>.005). In addition, there was a statistically significant difference between migrant girls and urban boys (p<.005), and between migrant girls and urban girls (p<.005). There was no statistically significant difference between urban girls and boys (p>.005).

4.3.5 Analysis of Factors related to Mathematics Achievement Levels

In this section, regression analysis is employed to investigate the association between the mathematics achievement categories and the variables representing parents’ qualifications, parents’ occupation types, students’ sibling numbers and whether students had attended preschool education. In this chapter, parental SES is calculated as a combined measure of parental education (coded by 0-5) and parental occupation (coded by 0-4), by multiplying the highest education completed by both parents with the highest occupation held by both parents (Lim & Gemici, 2011). This equation results in a score with a range of 0 to 20, where 0 is the lowest SES and 20 is the highest SES. The SES scores are then divided into quartiles (1 is the bottom quartile (0-5), and 4 is the top quartile (16-20)).

In both types of school (private and public), parental SES was significantly positively correlated with migrant student achievement (p < .01). Student sibling numbers were negatively associated with migrant student achievement (p < .01). Unlike the public school sample, for migrant children in private schools, the length of residence in urban areas (−.556**) was significantly negatively related to student mathematics achievement (Table 16).
Table 16 Correlations Results

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Math scores</td>
<td>--</td>
<td>.200**</td>
<td>-.720**</td>
<td>-.556**</td>
</tr>
<tr>
<td>2. Parental SES</td>
<td>.295**</td>
<td>--</td>
<td>-.243**</td>
<td>-.101*</td>
</tr>
<tr>
<td>3. Sibling numbers</td>
<td>-.172**</td>
<td>-.333**</td>
<td>--</td>
<td>.510**</td>
</tr>
<tr>
<td>4. Length of residence in urban areas</td>
<td>.085</td>
<td>.207**</td>
<td>-.331**</td>
<td>--</td>
</tr>
</tbody>
</table>

Note: Correlations of migrant students (n=478) in private schools are above the diagonal; The correlations of public school students (n=361) are below the diagonal. *p < .05. **p < .01.

Logistic regression analysis was conducted to determine the background variables which were related to public school selection for migrant children including parental SES, sibling numbers, and length of residence in urban areas (Table 17).

Table 17 Logistic Regression Results (Model 1)

<table>
<thead>
<tr>
<th></th>
<th>β</th>
<th>S.E</th>
<th>Wals</th>
<th>Exp β</th>
</tr>
</thead>
<tbody>
<tr>
<td>SES</td>
<td>1.212**</td>
<td>.142</td>
<td>72.900</td>
<td>3.361</td>
</tr>
<tr>
<td>Length of residence in urban areas</td>
<td>1.347**</td>
<td>.112</td>
<td>144.069</td>
<td>3.846</td>
</tr>
<tr>
<td>Sibling numbers</td>
<td>-1.242**</td>
<td>.168</td>
<td>54.765</td>
<td>.289</td>
</tr>
<tr>
<td>Constant</td>
<td>-5.532</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. R^2 (Cox & Snell) = .498; R^2 (Nagelkerke) = .668. N=839. *p < .05. **p < .01.

For the total sample, three predictors (parental SES, sibling numbers, and length of residence) of public school selection were entered in model 1 (p < .01). The probability of entering into public schools increased for migrant children as their parents’ SES and length of residence in urban areas increased.

Further, factors predicting migrant student mathematics achievement were investigated for the whole sample (Table 18). Student characteristics (sibling numbers, preschool attendance, and length of residence in urban areas), parent SES and school type were found to be significant contributors to student mathematics achievement (R^2 = .51, F (5, 833) = 176.48, p < .01). Subsequently, a regression analysis was conducted between the samples of students in public and private schools separately.
Table 18 Regression Results for Mathematics Achievement (Model 2)

<table>
<thead>
<tr>
<th></th>
<th>Total sample (N= 839)</th>
<th>Migrant students in private schools (N=478)</th>
<th>Migrant students in public schools (N=361)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE</td>
<td>Beta</td>
</tr>
<tr>
<td>SES</td>
<td>.068</td>
<td>.195</td>
<td>.116**</td>
</tr>
<tr>
<td>SN</td>
<td>-.358</td>
<td>.018</td>
<td>-.445**</td>
</tr>
<tr>
<td>LR</td>
<td>-.164</td>
<td>.023</td>
<td>-.289**</td>
</tr>
<tr>
<td>PA</td>
<td>.759</td>
<td>.017</td>
<td>.202**</td>
</tr>
<tr>
<td>ST</td>
<td>.265</td>
<td>.094</td>
<td>.209**</td>
</tr>
</tbody>
</table>

Note. For total, $R^2 = .514$; for migrant students in private schools, $R^2 = .587$; for migrant students in public schools, $R^2 = .074$. C: Constant. SES: Socioeconomic Status. LR: Length of residence in urban. SN: Sibling Numbers. PA: Preschool Attendance. ST: School Type. *p < .05. **p < .01.

For migrant students in private schools, sibling numbers and length of residence in urban areas were significant negative determinants of mathematics achievement, indicating that after controlling for other variables in the model, migrant children in private schools with more siblings and who had migrated to the urban area for a longer length of time were more likely to have lower mathematics achievement. Preschool attendance and parental SES had significant positive weights predicting mathematics achievement ($R^2 = .59$, $F (4, 473) = 167.97$, $p < .01$). For public school samples, parental SES was the only significant positive indicator predicting mathematics achievement ($R^2 = .07$, $F (3, 357) = 9.51$, $p < .01$).

4.4 Summary and conclusion

In response to the research questions, this chapter investigates migrant children’s mathematics achievement, and compares the factors related to this achievement in both public and private schools. A gap in mathematics achievement is found between the two types of schools, and test results indicate that significant disparities exist in the demographic backgrounds of the respective students and their parents. With respect to the total sample, factors pertinent to student achievement outcomes in mathematics include school type, sibling numbers, length of residence in urban areas, preschool attendance, and parental socioeconomic status. The results of the analyses conducted in this chapter are summarised below.
(1) Significant differences were found in the family backgrounds of the migrant children in private schools in comparison to the urban children. Also, there were significant differences in the family backgrounds of migrant children in private schools in comparison to migrant children in public schools, including parents’ occupations and educational qualifications. Public school parents had a higher percentage with a college degree or three-year diploma than their counterparts in private schools.

(2) Besides family background, a significant difference was found between the mathematics achievement levels of students by school type. The results indicate that migrant children in private schools fell behind in mathematics in comparison to migrant children in public schools. But migrant children in public schools achieved at similar levels to urban children.

(3) Gender did not emerge as a statistically significant category among children in the same school type. But in general, girls attained slightly better mathematics achievement levels than boys in primary school.

(4) The length of students’ residence in urban areas was found to have a relationship with the achievement levels of migrant children. However, this variable affected migrant children positively in public schools, while negatively in private schools. In other words, the achievement gap between the two types of schools was larger as their migration time increased.

(5) The grade level of migrant children was found to be significantly related to migrant children’s achievement. There was a significant difference in the mathematics achievement levels among different grade levels. Among all the children in this sample, the general trend was that the failure rate increased as grade level increased, whereas the excellent rate of migrant children decreased, as the grade level increased. However, the investigation of failure rate, passing rate and excellent rate, showed a steadily increasing failure rate for public school students’, while the failure rate for
migrant students rose sharply from years 2 to 5.

(6) Differences were found in the relationships between selected predictors and mathematics achievement. With respect to the private school sample, four factors pertinent to student achievement outcomes in mathematics were found to be significant (sibling numbers, length of residence in urban areas, preschool attendance, parental socioeconomic status), while the only significant predictor of mathematics achievement for the public school sample was found to be parental socioeconomic status.

In conclusion, this chapter examined the mathematics achievement levels of migrant children in comparison to urban children, and the predictors of these children’s mathematics achievement. Overall, the results indicated that there was a significant difference in students’ backgrounds and mathematics achievement levels between school types. School type in this chapter has been found to be an important factor in determining mathematics achievement. In the next chapter school teachers’ opinions about migrant children’s performance in the two types of schools is investigated and an analysis of this data will be presented.
Chapter 5

Teachers’ Perceptions of Migrant Students’ Education

5.1 Chapter overview

Results reported in Chapter 4 revealed that the mathematics achievement levels of migrant children vary considerably between public and private schools. School factors, including teachers and teaching quality, become a critical issue for investigating migrant children’s learning experiences. Student’s learning experiences are largely influenced by the degree of willingness of school staff to support all children socially and academically in educational settings (Liu & Jacob, 2013). Therefore, the objective of this chapter is to describe teachers’ perceptions of migrant children’s current educational situation in both public and private schools, and to investigate differences in teachers’ perceptions between school types. The research question addressed here is: ‘What are the differences in teachers’ perceptions of migrant children between public and private schools?’ The sub-questions are: (1) What are the differences in teacher’s perceptions of the current educational situation for migrant children in public and private schools? (2) How does school type influence Chinese teachers’ perceptions of the current educational situation for migrant students?

In this chapter teachers’ perceptions of migrant children’s education in current Chinese urban schools is discussed. The chapter is divided into four sections. The first section describes the demographic information of participant teachers who participated in the surveys and interviews. The second section of this chapter details the analysis of findings from the teacher survey and interviews, through a comparison of teacher perceptions between public and private schools. Section three provides the demographic information of students who participated in the survey and the findings of the survey. In the final section of this chapter the analysis findings are summarised.

5.2 Demographic information of participant teachers

All teachers (n=215) who participated in the study by completing the survey worked in 12 elementary schools in a metropolitan city in East China. The elementary schools
ranged in size from 12 to 60 classrooms. School principals and participant teachers were informed of the purpose, methods and eligibility criteria for the study. A total of 220 teachers were invited to participate, 217 teachers returned questionnaires (98.6% return rate), but only 215 were completed. Since it was not possible to ascertain if participants’ unanswered questions were due to carelessness or a conscious omission, a decision was made to use only the data from complete surveys. Table 19 shows the demographic characteristics of the study sample between public and private schools. Among the total sample of 215 urban teachers, 173 (80.5%) were female teachers. Approximately 67.9% were public school teachers (n=146). Most public school teachers held a bachelor’s degree; generally higher educational qualifications than the private school teachers. In addition, public school teachers had more years of experience working with migrant children in comparison to private schools (34.4% teachers in public schools had more than 10 years, as opposed to 27.5% in private schools). The majority of the participant teachers were between 30-39 years old (52.09%), and approximately 20% were aged 20-29 and 40-49 respectively.

Table 19 Participants’ Demographics in the Survey

<table>
<thead>
<tr>
<th>School types</th>
<th>Public schools</th>
<th>Private schools</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>146 (67.9%)</td>
<td>69 (32.1%)</td>
</tr>
<tr>
<td>Education Qualification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postgraduate</td>
<td>1 (0.6%)</td>
<td>0</td>
</tr>
<tr>
<td>Bachelor</td>
<td>129 (88.4%)</td>
<td>31 (44.9%)</td>
</tr>
<tr>
<td>Three-year diploma</td>
<td>16 (11.0%)</td>
<td>38 (55.1%)</td>
</tr>
<tr>
<td>Years of experience working with migrant children</td>
<td>50 (34.4%)</td>
<td>19 (27.5%)</td>
</tr>
<tr>
<td>10 years +</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-10 years</td>
<td>61 (41.6%)</td>
<td>28 (40.6%)</td>
</tr>
<tr>
<td>Below 3 years</td>
<td>35 (24.0%)</td>
<td>22 (31.9%)</td>
</tr>
</tbody>
</table>

All survey respondents were invited to participate in a follow up interview, however, only seven of the 215 teachers agreed. The seven teachers included five teachers in public schools and two teachers in private schools. Each participant was designated with a code (P1, P2, P3, P4, P5 in public schools; M1, M2 in migrant schools) (See Table 20). The two migrant school teachers held a diploma qualification, while the public school teachers had bachelor degrees or above. The public school teachers had a longer length of urban residence than migrant school teachers.
<table>
<thead>
<tr>
<th>Teacher</th>
<th>Gender</th>
<th>Grade level</th>
<th>Educational level</th>
<th>Permanent position</th>
<th>Age/Urban residence (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public schools</td>
<td>P1</td>
<td>F</td>
<td>4</td>
<td>Bachelor</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>P2</td>
<td>F</td>
<td>3</td>
<td>Bachelor</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>P3</td>
<td>F</td>
<td>5</td>
<td>Master</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>P4</td>
<td>M</td>
<td>2</td>
<td>Bachelor</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>P5</td>
<td>F</td>
<td>4</td>
<td>Bachelor</td>
<td>YES</td>
</tr>
<tr>
<td>Migrant schools</td>
<td>M1</td>
<td>F</td>
<td>4</td>
<td>Diploma</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>M2</td>
<td>F</td>
<td>3</td>
<td>Diploma</td>
<td>NO</td>
</tr>
</tbody>
</table>

5.3 Results: Teachers’ perceptions of education for migrant children

Results are presented in response to the two research questions: (1) What are the differences in teacher’s perceptions of the current educational situation for migrant children in public and private schools? and (2) How does school type influence Chinese teachers’ perceptions of the current educational situation for migrant students? Descriptive statistics (means, standard deviations) were calculated to describe participants’ responses. As detailed in section 3.4.2 in Chapter 3, the teacher’s survey consisted of 22 items. A t-test was used to compare the difference in teachers’ perceptions between teachers in public and private schools, using the average of the responses to the 22 items as a general measure of teachers’ perceptions of the current educational situation. Further, teachers’ interviews were categorised into thematic categories in order to gain in-depth knowledge of the differences in teachers’ perceptions.

5.3.1 Teachers’ perceptions of the current educational situation for migrant students

Firstly, summary statistics were calculated for each of the 22-item measures of perceptions of the current educational situation of migrant children. Average ratings for each item across participants are reported. As shown in Table 21, participants’ overall average rating was 2.83 (1= disagree, 5= agree), indicating a slightly positive attitude toward the current educational situation for migrant children.
Overall, a visual inspection of item scores indicates that items related to teachers’ practice with migrant students tend to be rated positively. Items related to teachers’
professional support for the current educational situation tend to be rated more negatively. When individual statements are examined, it appears that participants indicate that they are willing to work with migrant students in urban schools (M=3.49) and report that migrant children and urban children are treated fairly in their classrooms (M=4.20). Their responses indicate that migrant students are responded to with positive actions by participant teachers, such as observing migrant students’ performance (M=3.36) and giving the opportunity to migrant children to ask and answer questions (M=3.64). However, teachers responded that they have had few opportunities to attend pre-service training (M=1.57) and in-service training (M=1.56) to improve their skills and knowledge for instructing migrant students included in their classrooms.

5.3.2 Difference of teachers’ perceptions between migrant schools and public schools

To determine if there are any significant differences in teachers’ perceptions of the current educational situation for migrant children between the public school teachers and migrant school teachers, a t-test was conducted on each of the 22 items and the total mean scores. The 22 items contributing to the ‘teachers’ perceptions of education’ scale were combined into a scale score for each school type. Mean scale scores showed that teachers from public schools (M=2.90) scored higher in terms of their perceptions of migrant children’s education than private school teachers (M=2.81). Using a t-test of the scale scores, a statistically significant difference was found between teachers in public and private schools in terms of their perceptions towards the current educational situation for migrant children (t= 3.8, df= 213, p< .001).

T-test results also showed a significant difference between teachers in public and private schools (5 of the 22 survey items) (see Table 22). Public school teachers showed significantly stronger support on the following four items: item 8 ‘My pre-service teacher education has prepared me to work in the educational environment’;
item 13 ‘I treat every student the same in my class’; item 17 ‘My school implements a good education programme for migrant children’; item 20 of ‘I would like to give the opportunity to migrant children to ask and answer questions in classroom’ (p< .01). However, private school teachers showed significantly stronger support for item 5 ‘There are many discipline problems in settings with higher concentrations of migrant children’ (M = 3.05) than the public school teachers (M = 2.51).

Table 22 Difference in Teachers’ Perceptions between Public and Private Schools

<table>
<thead>
<tr>
<th>Items</th>
<th>Private school (N=59)</th>
<th>Public school (N=146)</th>
<th>P (**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.66</td>
<td>2.88</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2.29</td>
<td>2.38</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3.08</td>
<td>3.06</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1.60</td>
<td>1.52</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3.05</td>
<td>2.51</td>
<td>0.00**</td>
</tr>
<tr>
<td>6</td>
<td>2.23</td>
<td>2.57</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>3.23</td>
<td>3.35</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1.44</td>
<td>1.86</td>
<td>0.00**</td>
</tr>
<tr>
<td>9</td>
<td>1.51</td>
<td>1.72</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>1.50</td>
<td>1.68</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>3.50</td>
<td>3.55</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>3.18</td>
<td>3.29</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>4.01</td>
<td>4.59</td>
<td>0.00**</td>
</tr>
<tr>
<td>14</td>
<td>3.18</td>
<td>3.04</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>2.96</td>
<td>3.12</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>3.52</td>
<td>3.43</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>2.09</td>
<td>1.68</td>
<td>0.00**</td>
</tr>
<tr>
<td>18</td>
<td>3.34</td>
<td>3.41</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>3.03</td>
<td>3.10</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>3.42</td>
<td>4.10</td>
<td>0.00**</td>
</tr>
<tr>
<td>21</td>
<td>4.07</td>
<td>4.22</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>2.92</td>
<td>2.68</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>2.81</td>
<td>2.90</td>
<td>0.00**</td>
</tr>
</tbody>
</table>

5.3.3 Influence of school type on teachers’ perceptions

Following completion of the survey, seven teachers agreed to participate in an interview: five public school teachers and two private school teachers. Four out of the five teachers in public schools clearly appreciated the enthusiasm that migrant children brought to their classes and believed that classroom settings including migrant children and non-migrant children do benefit both groups.
Definitely, it should be equal for every child to accept education in public schools. If migrant and urban children are separate in the school, or in the different type of schools, no teacher wants to teach migrant children. In my opinion, migrant children should be arranged equally in numbers in each classroom.

One teacher in a public school maintained a neutral attitude toward the education of migrant children. In contrast, the two teachers interviewed in private schools recommended that migrant students should be educated in separate classrooms. They believed that the poor learning skills and low achievement levels of migrant students in private schools made it almost impossible to integrate them with urban children as these children have not been prepared with good school readiness for primary education. One teacher in a private school (M1) believed that the gap between migrant and urban students can never be closed:

*I observed the classrooms in public schools many times and realised that it was really hard for me to apply their teaching methods to our class. Migrant children in our school lack basic skills, so we cannot carry out their (public schools) curriculum and pedagogy directly and effectively. Therefore, it is better for migrant children to be separated to accept education.*

Teachers in private schools also indicated a lack of opportunity for pre-service and in-service professional training in dealing with the growing population of migrant children effectively. As the two teachers in private schools described, one of the challenges is that most migrant students are ‘shy, sensitive, and less confident’ at the beginning of their enrolment into urban schools. Another teacher in a public school believed ‘it is difficult to meet the special needs of migrant children, such as low achievement, and slow learning approach’ (P3).

Moreover, teachers in both public and private schools also believed that migrant parents neglected students’ education, and reported lower frequency of parental involvement with students’ homework, school activities, and cooperation with school teachers. ‘Migrant parents seldom make contact with teachers’ (P2) and ‘many parents showed (they were) indifferent and impatient to the teachers’ invitations to participate
in school activities’ (M2). In addition, ‘migrant parents devote little attention to their students’ learning process, whereas the test score is the only indicator of children’s learning development, instead of highlighting (the value of) critical thinking about the world’ (P4). Additionally, teachers in private schools report more difficulties in communicating with migrant parents. Some migrant parents are, ‘simply impetuous (abuse teacher with bad words or physical conflict) when in contact with teachers in private schools’ (M2). Especially when migrant students’ academic achievement falls behind, ‘teachers are worried to report children’s test scores to migrant parents’, as these migrant parents might ‘attribute the children’s failure in achievement completely to the teachers’ incompetence’ (M1).

The unequal educational resources between school types also affected teachers’ enthusiasm for the current educational situation for migrant children. Urban teachers’ social benefits in these two types of schools largely depend on the household registration system and permanent authorisation policy. The system categorises teachers in private schools as ‘contract teachers’ or ‘supplied teachers’ with no entitlement for urban social welfare causing these teachers to have a lack of career security and stability. One teacher elaborated, ‘I do not expect my son/daughter as a migrant child to study in a private school in future’ (M1). Therefore, these teachers revealed that their working conditions in private schools impeded their positive perceptions toward migrant students’ current educational situation in urban schools.

Urban teachers have also faced various challenges that have influenced their perceptions and practice with migrant students’ education in urban schools. Lack of professional support, insufficient parental involvement, as well as teacher’s working conditions, have been found to be major problems for teachers in both private schools and urban schools and improvements would be necessary in order to better support the education of migrant students in Chinese urban schools.

5.4 Results: Migrant students’ perceptions of education in urban schools

In this section, the learning experiences of migrant students are examined from the perspective of migrant students. The analysis of the results of students’ surveys
includes two parts: Migrant children’s demographic information and their perceptions of urban school life.

5.4.1 Demographic information of participant students

In total 61 migrant children from migrant and public schools participated in the survey, with 36 females and 25 males. 65% of the migrant children (n=40) studied in public schools and 35% (n=21) were from migrant schools. Among these students, 39.3% of them (n=24) migrated to the urban schools before kindergarten so these migrant children attended preschool education in urban areas. 32.8% of migrant children (n=20) migrated to the urban schools at year 1, while 27.9% of them (n=17) migrated after year 1. The participant students were drawn from years 4 to 5. Among them, each grade had a similar number of migrant children (30 students in year 4 and 31 students in year 5).

5.4.2 Results: Migrant children’s perceptions of school life

Results of students’ perceptions of mathematics education are displayed in Table 23.

<table>
<thead>
<tr>
<th>Mathematics education</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is not necessary to study mathematics.</td>
<td>4.75</td>
<td>0.77</td>
</tr>
<tr>
<td>I have never been very excited about mathematics.</td>
<td>4.39</td>
<td>1.12</td>
</tr>
<tr>
<td>I have trouble understanding anything of mathematics.</td>
<td>4.02</td>
<td>1.32</td>
</tr>
<tr>
<td>I could never achieve academic honours in mathematics, even if I worked harder.</td>
<td>3.72</td>
<td>1.52</td>
</tr>
<tr>
<td>I am gifted in mathematics.</td>
<td>2.77</td>
<td>1.23</td>
</tr>
<tr>
<td>I spend a lot of time doing mathematics after class.</td>
<td>2.43</td>
<td>1.30</td>
</tr>
<tr>
<td>Mathematics is one of my best subjects.</td>
<td>1.79</td>
<td>0.86</td>
</tr>
<tr>
<td>Mathematics is important for my future employment.</td>
<td>1.57</td>
<td>0.96</td>
</tr>
<tr>
<td>I will succeed in mathematics.</td>
<td>1.44</td>
<td>0.87</td>
</tr>
<tr>
<td>I have to develop the basic skills in mathematics.</td>
<td>1.23</td>
<td>0.53</td>
</tr>
</tbody>
</table>

Among the participant migrant children, most of them agreed that mathematics was an important subject (mean 1.79; SD .859; range 1-5) and would be essential for their future life (mean 1.57; SD .957; range 1-5). Although migrant children have high expectations for their future success in mathematics (mean 1.44; SD .866), few migrant students spent time doing mathematics after school (mean 2.43; SD 1.29).
There was no significant difference between migrant students’ attitudes towards mathematics and school type (p>.05), or between students’ genders (p>.05).

Results of students’ perceptions of their emotions are displayed in Table 24. Most migrant children ‘felt happy after migration to the urban school’ (mean 1.59; SD 1.02), but many migrant children confessed that they felt pressure from school and life in urban schools (mean 3.43; SD 1.7), compared to experiencing little stress in their former schools in their rural hometowns (mean 2.3; SD 1.4). There was no statistically significant difference between migrant students’ emotions and the type of school (p>.05), or between students’ gender (p>.05).

Table 24 Results of Students’ Perceptions of Their Emotion

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I worry a lot about academic achievement since I moved to the city for education.</td>
<td>3.43</td>
<td>1.73</td>
</tr>
<tr>
<td>I tend to be highly-strung, tense, and restless since I came to the city.</td>
<td>2.90</td>
<td>1.50</td>
</tr>
<tr>
<td>I hardly ever felt depressed before I came to the city.</td>
<td>2.30</td>
<td>1.43</td>
</tr>
<tr>
<td>I am usually pretty calm and relaxed.</td>
<td>2.08</td>
<td>1.22</td>
</tr>
<tr>
<td>I am happy most of the time to be living in urban areas.</td>
<td>1.59</td>
<td>1.02</td>
</tr>
</tbody>
</table>

Results of students’ perceptions of urban schools are displayed in Table 25. The majority of migrant children were satisfied with the urban schools (mean 2.89; SD 1.7). These children believed that the current school was better than their former school in their hometown (mean 2.16; SD 1.56). Most of the migrant children liked to speak Mandarin at school (mean 4.49; SD 1.27). Only a few migrant children just wanted to finish compulsory education (mean 4.44; SD 1.23).

Table 25 Results of Students’ Perceptions of Urban Schools

<table>
<thead>
<tr>
<th>School</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I do not want to speak Mandarin Chinese at school.</td>
<td>4.49</td>
<td>1.27</td>
</tr>
<tr>
<td>I want to drop out before high school.</td>
<td>4.44</td>
<td>1.23</td>
</tr>
<tr>
<td>I am proud of studying in this school.</td>
<td>2.89</td>
<td>1.70</td>
</tr>
<tr>
<td>I don’t think school is important for my future life.</td>
<td>2.72</td>
<td>1.97</td>
</tr>
<tr>
<td>I think my school is better than those in my hometown.</td>
<td>2.16</td>
<td>1.56</td>
</tr>
</tbody>
</table>
The majority of migrant students had stable and close friends at school and could establish good relationships with classmates (mean 3.93, SD 1.6). In addition, most of the migrant children were willing to make friends with urban children (mean 1.52, SD .868), but fewer migrant children indicated that they would like to make friends with children from rural regions (mean 2.79; SD 1.7). No statistically significant difference was found in migrant students’ peer relationships between school types (p>.05), or between students’ genders (p>.05).

Table 26 Results of Students’ Perceptions of Peer Relationship

<table>
<thead>
<tr>
<th>Peer relationship</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I never seem to have much in common with urban children.</td>
<td>4.08</td>
<td>1.38</td>
</tr>
<tr>
<td>I have few friends that I can really count on at school.</td>
<td>3.93</td>
<td>1.61</td>
</tr>
<tr>
<td>I prefer to make friends who are also migrant students.</td>
<td>2.79</td>
<td>1.70</td>
</tr>
<tr>
<td>I enjoy making friends with urban children.</td>
<td>1.52</td>
<td>0.87</td>
</tr>
<tr>
<td>Most of my classmates are friendly to me.</td>
<td>1.48</td>
<td>1.09</td>
</tr>
</tbody>
</table>

Results of students’ perceptions of school practice with teachers are displayed in Table 27. The majority of migrant children held a positive attitude towards urban teachers and believed that urban teachers liked them (mean 2.18; SD 1.2). In practice, most migrant children stated that teachers praised their achievements (mean 1.84; SD 1.09); ask and answer questions (mean 1.95; SD 1.2), teachers’ encouragement of cooperation with urban children (mean 1.74; SD 1.2) and teachers’ patience towards them (mean 1.89; SD 1.3). Moreover, most of the migrant children stated that their teachers treated each student fairly in the classroom and that they responded to the teachers’ practices positively (mean 1.28; SD 0.8). They agreed that school teachers could identify their difficulties in mathematics (mean 1.93; SD 1.35) and helped them to catch up with others (mean 1.3; SD .76). No significant difference in migrant students’ attitudes towards schools and teachers was found between school types (p>.05), or between students’ gender (p>.05).
Table 27 Results of Students’ Perceptions of School Practice with Teachers

<table>
<thead>
<tr>
<th>School teachers practice</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>My mathematics teacher often speaks a dialect that I cannot understand.</td>
<td>4.51</td>
<td>1.12</td>
</tr>
<tr>
<td>My mathematics teacher is disappointed with my study.</td>
<td>4.16</td>
<td>1.34</td>
</tr>
<tr>
<td>My mathematics teacher often punishes me.</td>
<td>3.79</td>
<td>1.51</td>
</tr>
<tr>
<td>My mathematics teacher invites my parents to participate in school activities.</td>
<td>2.67</td>
<td>1.57</td>
</tr>
<tr>
<td>My mathematics teacher often praises me in the classroom.</td>
<td>2.39</td>
<td>1.26</td>
</tr>
<tr>
<td>My mathematics teacher likes me.</td>
<td>2.18</td>
<td>1.22</td>
</tr>
<tr>
<td>My mathematics teacher often asks me to answer questions in the classroom.</td>
<td>1.95</td>
<td>1.22</td>
</tr>
<tr>
<td>My mathematics teacher notices if I have trouble learning something.</td>
<td>1.93</td>
<td>1.35</td>
</tr>
<tr>
<td>My mathematics teacher is patient with my questions.</td>
<td>1.89</td>
<td>1.32</td>
</tr>
<tr>
<td>My mathematics teacher encourages me to cooperate with urban children in groups.</td>
<td>1.74</td>
<td>1.18</td>
</tr>
<tr>
<td>My mathematics teacher believes I can study mathematics well.</td>
<td>1.57</td>
<td>0.97</td>
</tr>
<tr>
<td>My mathematics teacher often encourages me to catch up when I am behind.</td>
<td>1.31</td>
<td>0.77</td>
</tr>
<tr>
<td>My mathematics teacher treats everyone fairly in the classroom.</td>
<td>1.28</td>
<td>0.80</td>
</tr>
<tr>
<td>My mathematics teacher expects everyone to work hard.</td>
<td>1.15</td>
<td>0.65</td>
</tr>
</tbody>
</table>

5.5 Summary

In response to the research questions, this chapter examined teachers’ perceptions of the current situation for Chinese migrant children’s education. In addition to teachers’ perceptions, migrant students’ perceptions of urban education have also been discussed in terms of school type, gender and grade level. The results indicate that teachers in private schools have less positive attitudes towards the current educational situation of migrant children than public school teachers. In contrast, migrant students showed a more optimistic attitude towards their study and life in urban schools, and no difference was found between the migrant students in the two types of schools. Various challenges have emerged for urban teachers that have influenced their perceptions of migrant students’ education in urban schools. Lower achievement levels of migrant students, the lack of professional support, insufficient parental involvement, as well as teachers’ working conditions have been found to be the major
problems influencing teachers’ perceptions of the current educational situation in urban schools.

In terms of students’ perceptions of their urban school life, most migrant children were generally satisfied with urban schools. Moreover, this study indicates that migrant children in primary schools are optimistic about their current education and life in urban schools, regardless of school type, gender or grade level.

In conclusion, through survey and interview data analysis, it was determined that teachers in public and private schools had different perceptions of the educational situation for children. Further, teachers’ classroom practice with migrant children in urban schools is investigated. In order to investigate teachers’ perceptions of and practices with migrant children’s performance in public and private schools in detail, classroom observations were conducted in the two types of schools. The analysis of this observational data is presented in the next chapter.
Chapter 6

Classroom Teaching Quality

6.1 Chapter overview

In the previous chapter, teachers’ perceptions of migrant children’s current educational situation in urban schools were investigated. The analysis found that most teachers in both public and private schools have positive attitudes toward migrant children generally. However, a significant difference was found in terms of teachers’ perceptions between public and private schools. Private school teachers had less positive perceptions towards the students’ current educational situation than did teachers in public schools.

In this chapter, teachers’ practices with migrant students will be investigated through observation of teacher-student interactions in order to compare the teaching quality between public and private schools. The classroom observation analysis focuses on one of the key research questions for this study: 1. What are the differences in teaching quality between migrant and public schools? This chapter is divided into two sections. The first section describes the participant demographic information. The second section compares teaching quality between migrant schools and public schools.

6.2 Demographic information of participants

Two types of schools are investigated in this chapter: public and private schools. Four mathematics teachers in each school type were observed. Each classroom was observed four times. In total thirty-two lessons were observed and recorded (audio and video). Table 28 displays demographic information related to the participant teachers. In the public schools, the teachers generally had more experience than those in the private schools. In addition, the public school teachers generally had higher educational qualifications than private school teachers.
Table 28 Demographic Information of Participants

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Teaching Experience (in yrs)</th>
<th>Gender</th>
<th>Education Degree</th>
<th>Grade level</th>
</tr>
</thead>
<tbody>
<tr>
<td>m1</td>
<td>3-5</td>
<td>Female</td>
<td>Bachelor</td>
<td>P4</td>
</tr>
<tr>
<td>m2</td>
<td>0-3</td>
<td>Female</td>
<td>Diploma</td>
<td>P4</td>
</tr>
<tr>
<td>m3</td>
<td>5-10</td>
<td>Female</td>
<td>Diploma</td>
<td>P5</td>
</tr>
<tr>
<td>m4</td>
<td>5-10</td>
<td>Female</td>
<td>Bachelor</td>
<td>P4</td>
</tr>
<tr>
<td>p1</td>
<td>5-10</td>
<td>Female</td>
<td>Bachelor</td>
<td>P2</td>
</tr>
<tr>
<td>p2</td>
<td>3-5</td>
<td>Female</td>
<td>Bachelor</td>
<td>P2</td>
</tr>
<tr>
<td>p3</td>
<td>10-15</td>
<td>Female</td>
<td>Bachelor</td>
<td>P4</td>
</tr>
<tr>
<td>p4</td>
<td>10-15</td>
<td>Male</td>
<td>Bachelor</td>
<td>P5</td>
</tr>
</tbody>
</table>

6.3 Analysis of observed teaching quality

Teaching quality is a critical determinant of students’ experiences and school outcomes. Assessments of teaching quality in this study were collected from observations of teachers’ practice with students in classrooms. As described in section 3.4.2 in Chapter 3, this study employed the framework described in ‘Quality teaching in NSW public schools: A classroom practice guide’ (NSW DET, 2003) to investigate teaching quality in classrooms within public and private schools. This guide was developed in NSW, Australia to support school leaders and teachers in their implementation of pedagogy in relation to classroom practice. For the purpose of this guide, the term classroom practice is used to include learning activities, lessons, sequences of lessons, units and/or modules of work.

The NSW Quality Teaching Model is comprised of three dimensions. Each dimension includes six elements which can be scored from 1-5. The total maximum score for each dimension is 30, and the total score for all three dimensions is 90. The first dimension, intellectual quality, consists of six elements, including deep knowledge; deep understanding; problematic knowledge; higher-order thinking; metalanguage and substantive communication. The second dimension, quality learning environment, consists of explicit quality criteria; engagement; high expectations; social support; students’ self-regulation, and student direction. The third dimension, significance, includes background knowledge; cultural knowledge; knowledge integration; inclusivity; connectedness and narrative. Further details related to the framework have
been explained in Section 3.4.2, Chapter 3.

This section examines each of the eighteen elements of the NSW Quality Teaching Model to compare pedagogy and to measure the quality of teaching. Mean scores for groups of teachers in public and private schools are used to rate each element of teaching quality. A t-test is used in this section to compare the teaching quality between the two types of schools as determined by coding the elements of the NSW Quality Teaching model, resulting in a total score for each dimension and an overall total. Table 29 shows that the mean score for the coding of teaching in public schools (43) was significantly higher than that for migrant schools (27.5). The three dimensions of intellectual quality, quality learning environment, and significance in public schools were each higher than in private schools respectively. An independent t-test showed that the difference in teaching quality between public and private schools was statistically significant (t = -6.421, df = 10, p < .005, one-tailed). The detail for each dimension is elaborated in the following sections.

Table 29 Scores of Three Dimensions of Teaching Quality Model

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Private schools</th>
<th>Public schools</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Mean</td>
</tr>
<tr>
<td>Intellectual quality</td>
<td>37</td>
<td>9.25</td>
</tr>
<tr>
<td>Quality learning environment</td>
<td>35</td>
<td>8.75</td>
</tr>
<tr>
<td>Significance</td>
<td>38</td>
<td>9.5</td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
<td>27.5</td>
</tr>
</tbody>
</table>

6.3.1 Intellectual quality

The dimension of Intellectual Quality refers to pedagogy that focuses on producing deep understanding of important, substantive concepts, skills and ideas. Such pedagogy treats knowledge as something that requires active construction and requires students to engage in higher-order thinking and to communicate substantively about what they are learning.

Table 30 displays the scores on the Intellectual Quality dimension for each participant teacher. Generally, the scores of each element for teaching in private schools were
lower than for the teaching observed in public schools, indicating that on this scale, the Intellectual Quality of teaching in public schools was better in general than in private schools. In the following section, the various elements of Intellectual Quality, as described in the NSW Quality Teaching Model are compared between the two types of schools.

Table 30 Scores of Elements of Intellectual Quality Dimension

<table>
<thead>
<tr>
<th>Element</th>
<th>m1</th>
<th>m2</th>
<th>m3</th>
<th>m4</th>
<th>mean</th>
<th>p1</th>
<th>p2</th>
<th>p3</th>
<th>p4</th>
<th>mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep knowledge</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1.5</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1.75</td>
</tr>
<tr>
<td>Deep understanding</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Problematic knowledge</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1.75</td>
</tr>
<tr>
<td>Higher-order thinking</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1.5</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Metalanguage</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1.75</td>
</tr>
<tr>
<td>Substantive communication</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2.25</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2.75</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>8</td>
<td>9</td>
<td>8</td>
<td>9.25</td>
<td>17</td>
<td>15</td>
<td>15</td>
<td>9</td>
<td>14</td>
</tr>
</tbody>
</table>

In both types of schools, some key concepts and ideas were mentioned or were covered by the teacher or students. However, grasp of concepts and problem solving abilities of students in private schools occurred at a more superficial level. For most students in private schools, understanding of concepts was shallow during most of the lesson, with one or two minor exceptions occurring when teachers illustrated the concepts with examples and deep explanations. Moreover, in private schools, students primarily demonstrated lower-order thinking, although at some point during the lesson, some students performed higher-order thinking. In public schools, students primarily demonstrated routine lower-order thinking for the majority of the lesson. However, there was at least one significant question or activity which lead most students to perform some higher-order thinking during each lesson. This mostly occurred when teachers had prepared challenging work so that students constructed their knowledge and developed their higher-order thinking skills by means of solving a real problem.
Two mathematics classes, one in each of the private and public schools were compared, with teachers teaching the same content related to ‘percentages’ (Table 31). For the migrant school lesson, all of the learning processes focused on lower-order thinking with intensive training and practice, finally leading the students to increase their speed of solving problems mechanically. In contrast, the activities in the public school indicated that the teacher provided opportunities for students to perform higher-order thinking.

Table 31 Examples of Teaching in Public and Private Schools

<table>
<thead>
<tr>
<th>Private school</th>
<th>Public school</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activities: The majority of private school students could read and write the percentage symbols correctly and could also convert percentages to decimals and fractions. After students achieved these goals, the teachers asked students to repeat the practice of writing the percentage symbol, as well as the exercise of percentage conversion.</td>
<td>Activities: The teacher asked students to bring in materials such as milk bottles, juice bottles, and other product stickers that were related to percentages. Students were organised into groups to share their opinions and to discuss the content of the product stickers.</td>
</tr>
</tbody>
</table>

The dimension of Intellectual Quality was also evident with regard to the element of substantive communication between teacher and students. Firstly, the occurrences of teacher and students interaction in public and private schools were examined. Table 32 shows the types of phase and percentage of occurrence in both public and private schools. The frequency and percentage of communication occurrence was higher in public schools than in private schools. In the public school the dominant phases were teacher-student interactions so that on average more than half of the teaching time in the class was spent in interactional patterns (57.5%). In private schools, the dominant phases were whole class lecture (32.30%) and individual seatwork (38.57%), which were similar in the percentage of teaching time given to them. However, an extremely small percentage of time was spent on students’ group work (1.18%) in private schools, which indicated that migrant students had less interactional opportunities with their classmates, in comparison to students in public schools (11.58%).
Table 32 Types of Interaction and Percentage of Occurrence

<table>
<thead>
<tr>
<th>Types</th>
<th>Private schools</th>
<th>Public schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>whole-class teacher-fronted</td>
<td>32.30%</td>
<td>13.87%</td>
</tr>
<tr>
<td>T-S interaction</td>
<td>27.95%</td>
<td>57.50%</td>
</tr>
<tr>
<td>small group work</td>
<td>1.18%</td>
<td>11.58%</td>
</tr>
<tr>
<td>individual seatwork</td>
<td>38.57%</td>
<td>17.05%</td>
</tr>
</tbody>
</table>

In summary, this section has investigated the first dimension of the NSW Quality Teaching model that focuses on teacher’s pedagogy for producing deep understanding of important, substantive concepts, skills and ideas. The intellectual quality observed in public schools was generally higher than in private schools. Differences were found between school types in that the grasp of concepts and problem solving in private schools occurred at a more superficial level than in public schools. For most students in private schools, understanding of concepts was shallow during most of the lesson, and moreover, private schools students primarily demonstrated lower-order thinking throughout most of the lesson. Furthermore, substantive communication was investigated in terms of types of interaction and percentage of occurrence in both public and private schools. Results indicated that the frequency and percentage of communication occurrence was higher in public schools than in private schools.

6.3.2 Quality Learning Environment

Quality Learning Environment in the Quality Teaching model refers to pedagogy that creates classrooms where students and teachers work productively in an environment clearly focused on learning. Such pedagogy sets high and explicit expectations and develops positive relationships between teachers and students and among students.

Table 33 shows the scores of the Quality Learning Environment element for each participant teacher in public and private schools. Generally, the scores for each element in private schools were found to be lower than in public schools. In the following section, the different elements of the Quality Learning Environment are compared between the two types of schools.
Table 33 Scores of Quality Learning Environment

<table>
<thead>
<tr>
<th></th>
<th>m1</th>
<th>m2</th>
<th>m3</th>
<th>m4</th>
<th>mean</th>
<th>p1</th>
<th>p2</th>
<th>p3</th>
<th>p4</th>
<th>mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explicit quality criteria</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2.25</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2.75</td>
</tr>
<tr>
<td>Engagement</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1.75</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2.75</td>
</tr>
<tr>
<td>High expectations</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2.75</td>
</tr>
<tr>
<td>Social support</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1.75</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2.75</td>
</tr>
<tr>
<td>Students’ self-regulation</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1.75</td>
</tr>
<tr>
<td>Student direction</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1.75</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>7</td>
<td>9</td>
<td>9</td>
<td>8.75</td>
<td>16</td>
<td>16</td>
<td>10</td>
<td>16</td>
<td>14.5</td>
</tr>
</tbody>
</table>

First, the quality learning environment in terms of classroom interactions between teacher and students will be discussed. Table 34 presents the frequency of teacher-student interaction revealing that public schools (556) generally had more interactions than private schools (195).

Table 34 Frequency of Classroom Interaction

<table>
<thead>
<tr>
<th>School type</th>
<th>T-S interaction Times (IR/IRF)</th>
<th>Teacher’s feedback Times (IRF)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Teachers</td>
<td></td>
</tr>
<tr>
<td>Private schools</td>
<td>m01</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>m02</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>m03</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>m04</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>195</td>
</tr>
<tr>
<td>Public schools</td>
<td>p1</td>
<td>121</td>
</tr>
<tr>
<td></td>
<td>p2</td>
<td>114</td>
</tr>
<tr>
<td></td>
<td>p3</td>
<td>169</td>
</tr>
<tr>
<td></td>
<td>p4</td>
<td>152</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>556</td>
</tr>
</tbody>
</table>

Initiation, response and feedback (IRF) was used to investigate teacher and students’ interaction in detail. Specifically, the teacher and student interaction, IR (initiation and
response) refers to the teacher and students’ interaction in which teachers initiate an interaction and then students respond to the questions. IRF refers to the situation in which the teachers initiate an interaction, students respond to the questions, then teachers give feedback on the students’ responses. Table 7 demonstrates that a higher percentage of public school teachers provide feedback to students’ answers (n=204, 37.0%), whereas the percentage of teachers’ feedback was lower (n=41, 21.0%) in private schools.

Firstly, the type of teacher questioning was investigated. Table 35 displays the frequency and types of questions in private schools and public schools. It was found that teachers generally initiated a higher frequency of questions to students in public schools than in private school teachers. In private schools, the majority of the questions teachers asked students were in the form of closed questions (84%, n=164), such as ‘what is 2*3*6?’ , that students were only required to answer with the correct answer. In contrast, more open questions were asked in public schools (32%, n=178) than in private schools (16%, n=31), such as ‘how do you solve the problem?’ or ‘what do you think of this table?’

Table 35 Frequency and Types of Questions

<table>
<thead>
<tr>
<th>Question type</th>
<th>private school</th>
<th>public school</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Open question</td>
<td>16%</td>
<td>31</td>
</tr>
<tr>
<td>Closed question</td>
<td>84%</td>
<td>164</td>
</tr>
</tbody>
</table>

Additionally, no evidence of student initiation was found in private schools. In private schools, the dominant phases of teaching were whole class lecture (32.30%) directed by teachers. Similarly in public schools, low student direction was found. Although students did exercise some control over some aspects of the lesson (choice, time, pace, assessment), their control was minimal or trivial. In public schools the dominant phases of teaching were teacher-student interactions, so that on average more than half of the teaching time in the class was spent on interactional patterns (57.5%).
However, when the study focused on teacher-student interactions, almost all of the initiations were directed by teachers rather than by students in both types of schools.

Secondly, during the process of examining classroom interactions, students’ responses to teachers were described. Students’ willingness psychologically and behaviourally to participate in routine school activities included answering questions, and following teachers' directions in class. Generally, in private schools, students were only engaged sporadically. Most students either appeared apathetic and indifferent or were only occasionally active in carrying out assigned activities. The majority of the classes were directed by the teachers, therefore students were observed to be taking notes, listening to teachers’ instructions and answering teachers’ questions. Some students did not engage the class effectively. Their behaviours were clearly off-task including chatting and sleeping. In contrast, public school students displayed more engagement than private school students. Most students were seriously engaged in parts of the lesson. For example, students were more likely to be organised into small groups and to be participating in student-directed learning. Teachers created many group activities to explore specific topics and required students to create a plan, and to solve the problem through discussing, debating, and asking questions.

Specifically, students’ responses to challenging questions were investigated and compared between the two types of schools. In public schools, the opportunity to engage in challenging work was greater than in private schools. The majority of the teachers provided at least one challenging question at the end of class and asked students to think about the question after class. Many students in public schools participated in challenging work during at least half of the lesson. For the majority of the time, students were able to solve problems and thus met teachers’ expectations. The example of p2, a teacher in a public school, demonstrates how students were engaged in the challenging work:

*Teacher:* Based on the Multiplication Table we have learned today, now we have four numbers: 1, 2, 5, 8, how do you use them once and get 24?

*Students discuss in groups for about 1 minute.*

*Teacher:* Can anyone work this out? (Stop for 5 seconds) If not, I will give you one of the
answers.
Students: No. No. We can do it by ourselves.
Teacher: AA, you answer it, please.
Student AA: 5+1=6, 8/2=4, 6*4=24.
Other students: Wow; he is amazing. Great job.
Teacher: Yes, let us give him applause. Does anyone have another solution? I believe you guys can do it. Think a bit more.
Student BB: 8-2=6, 5-1=4, 4*6=24
Teacher: Good. You win a star for your group. Congratulations.
Student CC: 2*5=10, 10+1=11, 11+8=19, 19+5=24.
Other students: No, she is wrong. She used 5 twice.
Teachers: Yes, that is right. You guys did a good job. Could we have another way to work it out?
Students: Yes, I can. Let me think.
Students began to have group discussion again, and at this time, the lesson ended.

In contrast, in private schools most teachers provided little challenging work for students. As a result, most of the time, teachers provided students with an exercise closely aligned to basic concepts and simple problem solving procedures. On the other hand, even when teachers did provide an opportunity for challenging work, no students, or only a few, participated. Few students showed interest in participating in these activities. Most students in the classroom appeared to be indifferent (kept silent) to the teaching content. The following scenario, selected from a year 5 classroom in a private school, demonstrates the typical classroom situation which occurred when teachers provided challenging work for students:

Teacher: I have asked all of you to think about the question in the exercise book. Now let us have a look together.
Students open the exercise book.
Teacher: Does anyone know how to solve the problem?
Students: (Silent…)
Teacher stopped for 10 seconds, and still no one raised their hands...
Teacher: OK, I will read the question first.
Students: (mostly silent...) Some students (Ming and Jing) begin to raise their hands.
Teacher: Ming, please.
Student: (1-70%)/(1-20%)
Teacher: Yes, you are right. But what if I change a little bit of the question, for example….how do you solve the problem then?
Students: (Silent…)
Teacher: All right, I will explain the question in such a situation and help you to solve it. The first step is ‘we suppose the project as a whole unit 1, and then…
Students Ming and Jing put their hands up again.
Teacher: Still only two students know the answer!?
Students: (Silent…)
Teacher: OK. Tell me ‘how much percentage is 5 greater than 2’
Students: (Silent…)
Teacher: Oh, my dear god, you do not even know such a simple answer.
Students: (5-2)/2*100
Teacher: That is all right. Now that we know the first step, what is the percentage of ‘2 less than 5’?
Students: (Silent…)
Teacher: You do not know again. Oh, I do not want to talk anymore. You guys do not know anything! Anything! You respond to a simple question so slowly.
Students: (Silent…)
Teacher: It is the same as “What is ‘5 more than 2’?” Understand? It should be (5-2)/5*100
Students: (5-2)/5*100
Teacher: That is it. Oh, we have used half of the lesson to solve the problem. Let us stop it. We have to continue the new teaching content.

From this scenario, it is clear that most students did not participate in the challenging work when teachers provided the opportunity for them. They did not understand clearly the meaning of ‘how much is A greater than B in percentage’. Therefore, when the concept was applied the students could not comprehend the teacher’s intention at all. The students’ reaction to the challenging work disappointed the teacher because they did not meet the teacher’s expectations. In the following week, our observations found that this teacher did not provide any further challenging activities for migrant students.

Besides teacher and student interactions, classroom interactions among students were examined. In private schools, student interaction often occurred in groups of students seated near each other. As discussed earlier, the seating arrangements were often allocated according to students’ academic achievement, with some groups composed of high achieving students, while other groups consisted entirely of students with low achievement. As a result, when the teachers conducted group discussions or explorations on specific topics, the high achievement group often produced valuable
findings, whereas the low achievement group had nothing to report. Generally the gap between groups in terms of interaction quality was large in private schools. In contrast, many public schools employed flexible grouping clusters. Each group was made up of students with high and low achievement, and the group leader was the student whose academic achievement was highest, regardless of whether the student was migrant or non-migrant. The classroom observation demonstrated that, for the majority of the time, each group made an equitable contribution to the solution of the problem. Students’ desire to participate in group discussions and interactions was strong.

Thirdly, teachers’ feedback to students was examined. A higher percentage of public school teachers provided feedback on students’ answers (n=204, 37.0%) than private counterparts (n=41, 21.0%). The majority of teachers’ feedback included teachers’ encouragement of students’ responses (e.g. ‘Good answer; You set a good example to us’), and initiation of deeper understanding of the questions (e.g. ‘Can you explain how you solve this problem?’). In addition, teachers’ feedback in terms of social support to students in the classrooms of both public and private schools was examined. Social support in this study refers to teachers in the classroom encouraging students to work hard and providing individual care, attention and help. For migrant students who were sensitive to their migrant identity in urban schools, teachers’ social support was extremely important. For example, Lee (alias – a female migrant student in a public school) was a new migrant student and behaved shyly during teacher and student interactions. Whenever she put her hand up to answer questions, she appeared disappointed (facial expression) to teachers if she was not given the opportunity to answer the question. After school, she often counted the stars she had obtained during the lesson and compared herself to other classmates. The participant teacher in her class identified this issue and responded to her with positive support such as giving her more opportunities to ask and answer questions and by encouraging talk and feedback. The encouragement from teachers appeared to build her confidence and make academic success more attainable.

In private schools, social support was mixed, with both undermining and supportive
behaviours and comments observed. As shown in Table 36, the frequencies of teachers’ reward and punishment were calculated and the total frequencies for four teachers’ in each type of school were displayed and compared. The frequency of punishment was much higher than the frequency of rewards in private schools, indicating teachers’ less positive social support to migrant children in the classroom. In contrast, the frequency of rewards in public schools (73) was higher than in private schools (2). In public schools, social support was neutral or mildly positive. While no undermining behaviours were observed, supportive behaviours or comments were directed at those students most engaged in the lesson, rather than those students who were more reluctant.

In terms of frequency, both types of schoolteachers rewarded and punished students in the classroom (See Table 36). However, the frequency of rewards in public schools was higher than in migrant schools. In contrast, the frequency of punishment was higher in private school classrooms than in public schools. In private schools, few students demonstrated autonomy and initiative in regulating their own behaviour. Teachers devoted more time to disciplining and regulating student behaviour than to teaching and learning. In public schools, some students demonstrated autonomy and initiative in regulating their own behaviour, but there was still substantial interruption to the lesson for disciplinary and/or regulatory matters, as an attempt to avert poor behaviour, correct past behaviour or as an immediate reaction to poor student behaviour.

Table 36 Frequency of Reward and Punishment

<table>
<thead>
<tr>
<th></th>
<th>Teacher 1</th>
<th>Teacher 2</th>
<th>Teacher 3</th>
<th>Teacher 4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>reward</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private schools</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Public schools</td>
<td>19</td>
<td>9</td>
<td>27</td>
<td>18</td>
<td>73</td>
</tr>
<tr>
<td>punishment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private schools</td>
<td>8</td>
<td>4</td>
<td>19</td>
<td>14</td>
<td>45</td>
</tr>
<tr>
<td>Public schools</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>12</td>
<td>21</td>
</tr>
</tbody>
</table>
In public schools, the teachers usually initiated competition between groups of students. For example, during the class, the teachers rewarded the groups in which students performed well, with phrases such as ‘I want to praise the third group who all sit straight’; ‘The first group finishes the quickest’; or ‘Now, the best performance group is the fourth group, so I will give them a star’. In contrast, private school teachers preferred to praise individual students who behaved well. For example, when Sally answered the teacher’s question correctly, the teacher said: ‘She explains clearly and sets a good example to all of us’. In regards to a boy who had completed his homework to an excellent standard, the teacher praised him in the class and said: ‘Yesterday, Yang was very careful and diligent when he did his homework, because he used a ruler to draw the lines, which is clean and tidy’.

On the other hand, in both schools teachers showed regulatory behaviours towards children’s poor behaviours such as chatting, fighting or distraction in the classroom. In private schools, students often received punishment from teachers, such as being asked to stand up. Moreover, in both types of schools, students were required to obey classroom rules, such as students must ‘answer questions in a loud voice, boys in particular’, ‘sit straight during the whole class’, and ‘keep silent when the teacher talks’. The following two scenarios demonstrate the negative social support for students from teachers in private schools.

**Scenario 1**

*T:* Louder, please.
*S:* xxx
*T:* Much louder, I cannot hear you.
*S:* xxx
*T:* Are you a man? Cannot you speak loudly?
*S:* Xxx
*T:* You are not a boy. You cannot even speak as loud as girls. I will ask a girl and show you how she speaks loudly. Sit down.

Scenario 1 demonstrates the existence among some primary teachers of a clear and stable definition on gender, that is, that boys’ voices should be louder than girls’
voices. If some boys were in low voice, the teacher compared their voices to the girls.

**Scenario 2**

S: Ming, you answer this question.
T: Xxx
S: I cannot hear you.
T: Xxx.
S: Then?
T: All right. Come to the front. Cannot you see with the glasses?
S: ......
T: Come here. What is wrong with you?
S: Xxx.
T: Speak it loudly to other students
S: Xxx.
T: Loudly.
S: Xxx.
T: Tell me what is “16/4”?
S: ......
T: Other students tell him.
Others: 4
T: Yes, so 4/2=?
S: 8
T: What???? 4/2=8?
Other students: 2
T: Yep. How do you say 4/2=8?
S: 2
T: Oh My God. You scared me. All right. Go back to your seat. (The teacher with disappointment)
The boy went back (with a relaxed breath).

In summary, this section has explored the elements of the Quality Learning Environment as described by the Quality Teaching model in public and private schools. The analysis found that the quality of the learning environment in public schools was generally higher than in private schools. With regard to teacher and students’ interactions, teachers in public schools initiated more interactivity in the classroom, and gave more feedback to students’ responses than teachers in migrant schools. Students’ responses to teachers were also different between public and
private schools. In conclusion, public school teachers provided a more positive learning environment for their students than migrant school teachers.

6.3.3 Significance

Significance is the third dimension in the Quality Teaching model and refers to pedagogy that helps make learning more meaningful and important to students. Such pedagogy draws clear connections with students’ prior knowledge and identities, with contexts outside of the classroom, and with multiple ways of knowing and cultural perspectives. Table 37 shows the scores on the Significance dimension of each participant teacher in private schools and public schools. Generally, the scores for each element in this dimension for the teaching in private schools were lower than for the teaching in public schools, indicating that the teaching rated more highly on the Significance dimension in public schools than in private schools. In the following section, the various elements of the significance dimension are compared between the two types of schools.

<table>
<thead>
<tr>
<th></th>
<th>m1</th>
<th>m2</th>
<th>m3</th>
<th>m4</th>
<th>mean</th>
<th>p1</th>
<th>p2</th>
<th>p3</th>
<th>p4</th>
<th>mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background knowledge</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2.75</td>
</tr>
<tr>
<td>Cultural knowledge</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1.5</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Knowledge integration</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1.5</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2.75</td>
</tr>
<tr>
<td>Inclusivity</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td>Connectedness</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1.5</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Narrative</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>6</td>
<td>11</td>
<td>8</td>
<td>9.5</td>
<td>16</td>
<td>17</td>
<td>10</td>
<td>15</td>
<td>14.5</td>
</tr>
</tbody>
</table>

When considering the element of inclusivity, the mean score for teaching in the private schools (mean=1) was lower than for teaching in the public schools (mean=2.5). Some students were observed to be excluded by the teachers, or to exclude themselves, from lesson activities. From the analysis of classroom
observations in private schools, the frequency of ‘ask and answer question’ for students whose seats were arranged in the last three rows of the classroom was zero. These migrant students were never given the opportunity to answer questions or to participate in interactive communication with their teachers.

The score for inclusivity in public schools was much higher than in private schools. Students from all groups (migrant and non-migrant students) were included in most aspects of the lesson. Students were often arranged in different groups for group activities. Each group of 5-8 students included both migrant and urban students. Teachers in public schools endeavoured to give equal opportunities to all students, both migrant and non-migrant, and it was found that ‘ask and answer question’ opportunities for the majority of the students were evenly distributed.

Furthermore, the element of student background knowledge in both public and private schools was examined. Student background knowledge was mentioned or elicited by most teachers in public schools as they tried to understand what students already knew about the content and how well they might learn new information. In order to gauge the knowledge and skills that students had before teaching new content, teachers in public schools chose a variety of methods to assess students’ prior knowledge and skills. In particular, migrant students who were new students in urban schools were given special attention in relation to their background knowledge. Most teachers used direct measures of students’ capabilities upon entering a course or program such as portfolios, pre-tests, and/or face-to-face interviews.

However, in private schools students’ background knowledge was generally lacking and not connected to the substance of the lesson. Teachers normally followed their teaching plans and did not change to adjust for students’ background knowledge. For example, in one classroom in a private school, the teacher perceived that the three new students had mastered the Multiplication Table before the course, but these students could not answer the questions during the review phase. Private school teachers then continued with the new content of ‘Cal 24’ and these three students were thus left behind their other classmates during the whole lesson. In contrast, in public
schools, students’ background knowledge was connected to the substance of the lesson, and there were more connections to out of school background knowledge.

The element of cultural knowledge refers to knowledge relating to prevailing norms, practices, beliefs and values related to a student’s background. For urban schools in this study, the gap between Chinese rural and urban culture may have aroused the greatest concern. For migrant students who migrated from rural areas, their teachers were mainly urban people with urban beliefs and values, as well as urban teaching approaches. In many classes, it was observed that the cultural knowledge mentioned in the classroom and discussed between teacher and students, referred to museums and science and technology halls that many rural-urban migrant children had never visited. In addition, Chinese culture was also discussed in urban classrooms. However, in both public and private schools, some cultural knowledge was connected to the teaching content in a superficial manner that may influence migrant children in an implicit way. In textbooks, for example, there are some examples and questions related to cultural knowledge, such as the connection between Chinese traditional festivals (Dragon Boating Day or Mid-Autumn Day) when children were learning about calendars. Most teachers in both types of schools demonstrated and explained the date of specific Chinese festivals to students. However, in the majority of the situations, these teachers just focused on the dates of the Chinese festivals, without extending the knowledge related to Chinese culture at all.

A lesson about ‘probability’ serves as a good example (see Figure 9). In this lesson the teachers illustrated the probability of real life events using pictures. Many students had no related knowledge or experience of the earth’s rotation in the initial question. As a result, the teachers had to connect the concept of probability to this universal phenomenon. However, the majority of the teachers just told the students it is a fact that it is certain that ‘The earth rotates every day’ and ‘The sun rises from the East’. No teacher explained the fact or extended the topic beyond the focus on the concept of probability.
Besides the inclusivity of students in the classroom, the dimension of Significance focuses on pedagogy that helps make learning more meaningful and important to students. Generally, participant teachers in both types of schools focused on curriculum instruction and the majority of the time was spent on knowledge related to the teaching topic. However, when this study penetrated into the phases of the whole lessons, differences were found between the two types of the classrooms. In public school classrooms, the teacher clearly communicated the instructional purpose of the lesson, including where it was situated within broader learning, and explained the procedures and directions clearly. In addition, the teacher’s explanation of content was well scaffolded, clear and accurate, and connected with students’ knowledge and experience. During the explanation of content, the teacher invited student intellectual engagement. The teacher’s spoken and written language was clear and correct and the teachers used vocabulary appropriate to the students’ ages and interests. For example, at the beginning of the lesson, the teacher said, ‘Today we will learn about percentages, so let us read about it’. In the course of the presentation of content, the teacher asked students: ‘Can anyone think of an example of percentage in daily life?’; or the teacher said: ‘Who would like to explain this percentage of the sticker to us?’;
then the teacher stated, ‘By the end of today’s lesson, you’re all going to be able to remember how to read, write and solve the problem of probability’.

Another example taken from a public school demonstrates how the teacher connected each phase of the lesson effectively. The teacher started with a review of the knowledge that had been already been learnt and gauged students’ ability to master the new content. After the review, new teaching content was introduced based on students’ previous experience and then extended into more challenging knowledge. After the new content teaching, an exercise was provided to students to consolidate the new content. Finally, the teacher summarised the new content based on students’ learning experiences and performance. Overall, some meaningful connections were made between topics and subject areas by the teacher and students during the lesson.

The instruction of teacher p2 was as follows:

**Stage 1 Review (5 minutes)**
Firstly, to begin the class, the teacher asked students ‘what is the height of the teacher?’ by using ‘metre’ and ‘centimetre’ that had already been learned before.
The students discussed and answered the question about “‘metre’ and ‘centimetre’”.
The teacher helped students to review the concept of ‘metre’ and ‘centimetre’

**Stage 2 New content (20 minutes)**
The teacher introduced the new concept of ‘decimetre’ and ‘millimetre’.
Firstly, the teacher explained the concept and then asked students to identify the ‘decimetre’ and ‘millimetre’ scale on the ruler (4 minutes).
Then, students used the ruler and pictures to compare the concept of ‘decimetre’ and ‘millimetre’.
After that, students were asked to describe their pencil-box, books and other stationery by using ‘decimetre’ and ‘millimetre’ (5 minutes).
Later, after students understood the concept, the teacher introduced the relationship between ‘metre’, ‘decimetre’, ‘centimetre’ and millimetre.
1 metre=10 decimetres=100 centimetres=1000 millimetres (6 minutes)
The teacher used the tools (ruler) to identify the relationship between scales, through the discussion within the group. Each group reported group discussion results (5 minutes).

**Stage 3 Exercise and extension (8 minutes)**
Students began to use the textbooks to practice the exercises (3 minutes)
The teacher checked students’ exercises, and explained each question through ask and answer question with students (2 minutes).
Moreover, students were encouraged to recognise the scales of objectives in their daily life,
such as the length of a milk bottle, piano, school desk and chair. Students could either estimate the length or measure by hand in the classrooms (3 minutes)

Stage 4 End of the class (2 minutes).
The learning content of scale concept was summarised again and the class ended.

In private schools, the teacher’s explanation of directions and procedures was clarified, however, the teacher’s vocabulary was limited, making some students confused. In comparison to the teacher in public schools, the teacher’s instructions and explanations of problem solving consisted of too much monologue, with no invitation to the students for intellectual engagement. Even during the process of teacher and student interaction, it was usually evident that the teacher was dominating the process and few students could participate in the interaction. One private school scenario in which the teacher and students solved the questions in the textbook follows:

Teacher: Here is the question. The worker spent 4.5 hours to complete 80 machine parts, so how many machine parts will the worker complete for 6 hours? Guys, what should we do first to solve this problem?
Students: …… (silent)
Teacher: We should calculate how many machine parts the worker completes each hour. Right?
Students: …… (silent). Few students agreed and made a sound ‘Hmm’.
Teacher: Yes, we should calculate how many machine parts does the worker complete each hour, but how to calculate it?
Students: …… (silent)
Teacher: Yang, you have a try.
Student Yang: …… (silent)
Teacher: Can anyone work it out?
Students: …… (silent)
Teacher: The worker spent 4.5 hours to complete 80 machine parts, and how many machine parts does the worker complete each hour?
Students: …… (silent)
Teacher: It should be calculated ‘80/4.5=?’ Right? That is the result of ‘how many machine parts does the worker complete each hour’. What about if the worker worked for 6 hours? 1 hour complete ‘80/4.5=?’, so 6 hours?
Students: …… (silent)
Teacher: 6 hours complete ‘(80/4.5) * 6 =?’ Right?
Students: …… (silent). Few students agreed and made a sound ‘Hmm’.
Teacher: Remember, the order should be from left to right, when we calculate the equation.
Students began to write down the equation in their notebook. Few students made a sound ‘Hmm’.
The teacher still followed the pattern above for the next question.
Moreover, the private school teacher preferred to focus attention on the practice of problem solving procedures. It was common for the teacher to say: ‘Watch me while I show you how to solve this problem’. Students were asked to listen and obey the rules of problem solving for the majority of the time, giving fewer opportunities for student’s independent thinking and exploration. In addition, the teachers in private schools paid more attention to the test and to training for the test mechanically. Teachers spent almost half of the class time on practice of the questions in the exercise-book. The following scenario provides an example in which private school students were asked to recite the sequence of the problem solving repeatedly during the class.

First, the teacher asked the students to read the question, “2x3x4=”, and then began to teach the sequence of the question. Then the teacher explained the sequence of the problem solving, such as “read the question first”, and “the sequence of the solving”. (6 minutes)
Then, the teacher explained the sequence again and asked the students to answer the question by explaining the sequence. “first with...... and then, with ............”, or “from the left to right” (4 minutes)
Students began to use the textbooks to practice the exercises. (4 minutes)
The sequence of the problem solving was repeated. (2 minutes)
5 students were asked to repeat the pattern sequence. (2 minutes)

Teachers’ talk was also investigated and compared in this section, which not only connected students’ background knowledge and identities, but also the contexts of the classroom in multiple ways. Each class lasted for 35 minutes for each teacher. Therefore, the total teaching time in the classroom for each teacher was 140 minutes. Table 38 displays the total duration of teacher’s talk in each type of school. On average, 103.75 minutes was spent on teacher’s talk in public schools while less time was spent in private schools (74.58 minutes). This means there was longer duration of teacher’s talk in public schools (74.1%) than in private school (53.3%).
Table 38 Duration of Teacher’s Talk in Mathematics Classroom (Minutes)

<table>
<thead>
<tr>
<th>Private school</th>
<th>m1</th>
<th>m2</th>
<th>m3</th>
<th>m4</th>
<th>Mean (percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>116.8</td>
<td>49</td>
<td>58.5</td>
<td>74</td>
<td>74.58 (53.3%)</td>
</tr>
<tr>
<td>Public school</td>
<td>p1</td>
<td>p2</td>
<td>p3</td>
<td>p4</td>
<td>103.75 (74.1%)</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>99.5</td>
<td>100</td>
<td>95.5</td>
<td></td>
</tr>
</tbody>
</table>

The contexts of the classroom with regard to teachers’ talk were related to teaching content, organization, regulations and test strategies. Curriculum-related—any talk about the actual content or skills to be taught; Organisational—talk to organise activities and participation patterns, to frame activities, provide general instructions, to set up, to move bodies; to manage time, space, to tell students what is coming next, to manage transitions, etc.; Regulatory—disciplining, behaviour management, class and student control by teacher. Generally with a negative connotation (organizational); Test-strategy—explicit reference to testing, exams or test requirements; and may include advice on how to take tests.

In both public and private schools, the majority of the time was spent on curriculum talk by teachers, with the total percentage of talk 61.43% in private schools and 82.95% in public schools (Table 39). The low incidence of regulatory talk in both private schools and public schools indicates that Chinese urban schools do not have serious discipline related issues. In addition, despite the test-orientation of the Chinese school system, the incidence of test strategy talk was low in public schools (7.34%). In contrast, private schools addressed test strategy for a much higher percentage of time (22.34%).

Table 39 Types of Teacher’s Talk in Mathematics Classroom

<table>
<thead>
<tr>
<th>Type of talk</th>
<th>Private schools</th>
<th>Public schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curriculum-related</td>
<td>40.63%</td>
<td>63.18%</td>
</tr>
<tr>
<td>Organisational talk</td>
<td>32.49%</td>
<td>20.92%</td>
</tr>
<tr>
<td>Regulatory talk</td>
<td>4.54%</td>
<td>8.56%</td>
</tr>
<tr>
<td>Test strategy talk</td>
<td>22.34%</td>
<td>7.34%</td>
</tr>
</tbody>
</table>
Appropriate teacher’s talk was helpful in enhancing knowledge integration and connectedness. In public schools, some meaningful connections were made between topics or subject areas by the teachers during the lesson. However, despite both types of schools attempting to connect what is being learned to the world beyond the classroom, the connection and integration was weak and superficial. For example, teachers used narrative talk at several points in the lesson to enhance the significance of the substance of the lesson in public schools.

In summary, this section has described the elements of the Significance dimension in the teaching observed in both public and private schools. The scores for each element in private schools were lower than public schools indicating that teachers in public schools generally made learning more meaningful and important to students. Teachers in public schools provided more opportunity for classroom interactions (e.g., ask and answer question frequency) for students. In the more interactive learning environment, both migrant and non-migrant students in public schools participated and engaged in more effective teacher-students and student-student interactions.

6.4 Summary and conclusion

This chapter has detailed the classroom observation component of this study with the purpose of determining the current practices and quality of classroom teaching in Chinese urban classrooms at the primary school level. The classroom observation protocol was based on the framework of teaching quality of classroom employed from ‘Quality teaching in NSW public schools: A classroom practice guide’. The results of the classroom practice analysis, based on the three dimensions of Intellectual quality; Quality learning environment; and Significance, were discussed.

The findings indicate generally that, according to the coding scales of the Quality Teaching model, teaching quality in public schools is higher than that in private schools. The three dimensions of Intellectual Quality, Quality Learning Environment, and Significance in public schools were all found to be higher than in private schools. A statistically significant difference in the observed teaching quality between public and private schools was found.
The first dimension of ‘Intellectual Quality’ refers to pedagogy focused on producing deep understanding of important, substantive concepts, skills and ideas. The scores on each element in private schools were lower than in public schools, indicating that the intellectual quality of the teaching in public schools was better in general than in private schools.

The second dimension of teaching quality is ‘Quality Learning Environment’ which refers to pedagogy that creates classrooms where students and teachers work productively in an environment clearly focused on learning. Generally, the scores on each element in private schools were lower than in public schools, indicating that the quality of the learning environment in public schools was better in general than in private schools. The teachers in public schools held higher expectations for students’ education than private school teachers. In private schools, most teachers provided little challenging work for students. When teachers did provide challenging work, few students were interested in participating in the activity, while most students in the classroom were indifferent (keeping silent) to teachers’ materials and appeared to stop thinking, turning their attention to the few students with high academic achievement, or doing other things irrelevant to teaching content. In public schools, the opportunity to provide challenging work for students was found to be greater than in private schools. The majority of the teachers provided at least one challenging question at the end of class and asked students to think about the question after class.

The third dimension of teaching quality, ‘Significance’, refers to pedagogy that helps make learning more meaningful and important to students. Generally, the scores on each element in private schools were lower than in public schools, indicating that the significance dimension in public schools was better in general than in private schools. The inclusivity of migrant students was lower in private schools than in public schools.

From the above findings, it can be concluded that the teaching quality in private schools was lower than in public schools. Students of both migrant and non-migrant backgrounds in public schools participated in more effective teacher-student and
student-student interactions. The findings of this chapter confirm the findings from Chapter Five that teachers had different perceptions towards migrant children, and therefore, their teaching practices with migrant children were found to be different. In the next chapter one classroom of each school type will be explored in detail, with a particular focus on the learning experiences of two migrant students.
Chapter 7

A Case Study of Migrant Students’ Learning Experiences in Urban Schools

7.1 Chapter overview

In the previous chapter the differences in teaching quality between public and private urban schools was investigated. As measured by the ‘Quality teaching in NSW public schools: A classroom practice guide’ (2003), results generally showed that the teaching quality in private schools was lower than in public schools. In this chapter, based on the findings from the previous chapter, an analysis of the qualitative data is presented in a case study after observations of classrooms in one public and one private school. Two participant schools (Xiwang migrant and Hangxing public) are selected as typical schools that represent the average educational situation for migrant students in the city of Shanghai (more details of the sample will be elaborated in the following section). Further, one classroom was selected from each school in order to compare the classroom environment and interactions for migrant children. Based on the comparison of classrooms, one migrant student was selected from each classroom to describe their learning experiences in a typical school day.

This chapter is divided into five major sections. The first section describes the background of the two participant schools. The second section examines the question of how school teachers create the classroom environment both physically and affectively for migrant students. The third section investigates how teachers interact with all students with regard to teacher questioning, students responses and teacher feedback. In the fourth section one migrant child from each classroom is selected and followed through a school day. The two students’ learning experiences in the classroom are then described. The final section summarises the classroom analysis findings.
7.2 School background

7.2.1 Xiwang migrant school

Xiwang migrant school, located in a suburb district of Shanghai city, was originally a private school that was established by a company in 1998 for their workers’ children. After the year 2000, because of the sharp increase in the number of migrant workers in this company, this school began to increase the number of classrooms and therefore, admit many more migrant children. In 2003, the school registered as a formal migrant children’s school that was managed by the local government. However, despite the opportunities provided for migrant children, the school curtailed funding for improvement of quality of teaching due to their pursuit of maximum profit (Goodburn, 2008). In 2010, the Shanghai government made efforts to reorganise this school. The main changes included: 1) that the local government bought the ownership of this school from the company; 2) that the school was now to be overseen by school boards that were made up of directors and officers from the local administration office; 3) that the school principals were invited from local public schools; and 4) that this migrant school was responsible for its own profitability.

After these reforms by local government in 2010, migrant children in this school were not required to pay a tuition fee, which aligned with the national policy of free compulsory education. Admission to the school required a series of documents detailing: (1) former education experiences; (2) former school evaluation; (3) Shanghai social security insurance receipt (at least one year medical, unemployment and housing insurance and pension), (4) household registration card; and (5) temporary residence certification. In addition, the expenses required by this school included lunch (5 Chinese dollars per lunch), school uniform (132 Chinese dollars), activities (spring and autumn tour) and textbooks (132 Chinese dollars).

The school has two buildings in total. Each building has two floors. Between the two buildings there is a small playground that provides the outdoor space for all of the students after class. The kitchen and toilets are in the corner of the school. There is no dining room for teachers and students, so they eat lunch in the classroom. Three
offices are provided for use by all of the teachers, meaning that more than 10 teachers are allocated to use each office. There are a total of 15 classrooms and more than 1000 migrant students, all from different areas of China. Most students had migrated from the Anhui and Henan province and no urban children study in this school. The capacity of each classroom is 25-30 students, but in fact more than 60 students on average are organised within one room. As a result, the front row of desks almost reaches to the front wall of the classroom. The crowded classroom allows almost no space for students to move between desks.

Teachers in this school can be placed in two categories: young migrant teachers and retired teachers. The young teachers are mostly under 30 and have not settled down to live permanently in Shanghai. This means that these young teachers will most likely leave Shanghai, due to the high cost of living in the city. The other teacher demographic consisted of old teachers who had retired but were reemployed in a migrant school. These teachers were often experienced in teaching but, more importantly, the private school was not required to pay for their welfare and other social tax fees. As a result, the reciprocal benefits between private school and retired teachers made it a popular phenomenon that retired teachers were often employed by migrant children’s schools. The distribution of teacher’s age can be seen from Figure 8. More than half the teachers were aged below 30, and a quarter of the teachers were more than 60 years old (Note: In China, 60 years old is the retirement age for teachers).

![Figure 10 Participant Teacher’s Age Distribution](image-url)
Teacher educational qualifications were low in general (Figure 11). Among 36 teachers, only seven of them had obtained a bachelor’s degree. It is a common phenomenon that some teachers who teach Chinese graduate with a Chinese literature major, while the English teachers graduate with an English business major. Teacher’s educational backgrounds revealed that many teachers had not received professional education related to children’s education. In addition, other teachers had only obtained three years of vocational training after junior school, while the majority of the teachers held a diploma from a three-year college.

![Figure 11 Teacher Educational Qualifications](image)

7.2.2 Hangxing public school

In the same district of Shanghai city, Hangxing primary school is a public school that was established in 1905. It represents a typical Shanghai public school, in terms of school admission, classroom size, staff quality and other aspects. Previously, this school provided educational opportunities for urban children who held the non-agricultural household registration. Since 2010 this public school has gradually provided more education for migrant students and urban children so that the percentage of migrant children in 2013 was 41.4%. However, the school is generally only accessible to a proportion of migrant students who have a relatively high socioeconomic status (Lu & Zhou, 2013). This can be seen from the strict limits on school admission set for migrant children. For migrant children, their parents must own a house in the school district if they want to study in this school, as well as demonstrate sufficient years of social insurance and taxes for this city. Moreover,
migrant parents are also required to pay higher tuition fees than local parents.

The school is equipped with standard facilities, including special activity rooms for sports, computers and reading. There are 84 teachers in total and teachers’ qualifications are much higher than those of teachers in the private school, with 96% of teachers holding a bachelor degree or postgraduate degree.

Table 40 Teacher’s Educational Degree

<table>
<thead>
<tr>
<th>Degree</th>
<th>%</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diploma</td>
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<td>4</td>
</tr>
<tr>
<td>Bachelor</td>
<td>85%</td>
<td>71</td>
</tr>
<tr>
<td>Postgraduate degree</td>
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</table>

In order to compare the classroom experiences of migrant children in detail, one classroom was selected from each school. The classroom environment and interactions are investigated in the following sections.

7.3 Classroom environment

In this section, the classroom environment within two classrooms (Xiwang and Hangxing classroom) was compared. Each class was observed five times. The classroom environment in this study consisted of both the physical and affective environment. Based on the framework described by the ‘Singapore Pedagogy Coding Scheme’, the physical environment refers to students’ seating arrangement, classroom layout, teaching and learning materials and tools. The affective environment mainly investigates whether teacher and students’ interactions and behaviours are positive or negative.

7.3.1 Physical environment

Generally, the quality of the physical environment of the selected classroom in Xiwang private school is lower than the classroom selected from Hangxing public school. The classroom layout in the private school can be seen from Figure 12, where there were generally more than 50 students in one class. In the selected classroom, the class size was 51. Therefore, the limited space resulted in some students sitting very
close to the front platform. The majority of the desks were arranged into a square shape and each pair of seats held one boy and one girl. In addition, it can be seen that most of the corner seats as well as the seats next to the teachers’ platform were filled by boys. The teachers explained that the male migrant children often broke the classroom rules and interrupted other students. As a result, they were placed at the tables against the wall, so that they had less opportunity to talk with classmates. The seating arrangement would be changed from left to right fortnightly. However, most ‘naughty’ boys in the ‘special seats’ seldom changed their seating positions. Also, the last two or three rows of students were those with low academic achievement, often referred to as ‘left-behind children’. According to the participant teachers, these migrant students often neglected classroom interactions with teachers and students, due to their poor learning skills and lack of capacity of basic knowledge. In contrast, most students whose achievement was higher were normally arranged in seats in the front rows.

In terms of teaching and learning tools, the teacher mainly used the blackboard, textbooks, and a few types of mathematics apparatus. Similarly, students’ tools were the blackboard, textbook and exercise books. Modern technology, such as the computer and other electronic devices, were not employed in Xiwang private school.

In contrast, in Hangxing public school the spacious classroom allowed a layout and seat arrangement different from the private school (Figure 13). The class size was 30 students. Desks were movable so that students could work together, or were organised
in a circle for group discussion. Each group was made up of male and female students, including both urban children and migrant children, and was comprised of students with both high achievement and low achievement, in order to balance the learning levels between groups. The group leader was the student whose academic achievement was higher, regardless of whether the student’s background was migrant or non-migrant.

In addition, the classroom had a large space and established reading corner at the back of the classroom, providing a lot of books for students. The classroom was equipped with computers and the teacher used the Internet and power-point as a teaching facility. The teacher and students mainly used the blackboard, textbooks, and various mathematics apparatus, power-point and the Internet. Similarly, students interacted with the teacher through blackboard, textbook, computers, Internet and exercise books.

Note: X refers to girl; and Y refers to boy
Figure 13 Seating Arrangement in the Classroom of Hangxing Public School

7.3.2 Affective environment

In this section, the classroom environment will be discussed in terms of the social and behavioural teacher and student (T-S) interactions within the two classrooms (Xiwang classroom and Hangxing classroom). Each class was observed five times. The
teacher’s supportive and positive interactions with students through a series of affirmation, praise, verbal support and encouragement were recorded.

7.3.2.1 Xiwang classroom: Affective environment

In the Xiwang classroom, patterns of classroom interactions, both between the teacher and students and among students, were generally appropriate but did reflect occasional inconsistencies and favouritism. Overall, the net result of the interactions was neutral, conveying neither warmth nor conflict.

While standards of conduct appear to have been established, their implementation was inconsistent, despite the teacher trying to monitor student behaviour and occasionally respond to student misbehaviour. Students often attended passively to the teacher, but tended to talk, leave their seats, read storybooks and pass notes when other students were talking. For example, one student in the class made a ‘weird noise’ to his deskmates. When the teacher noticed, she merely said: “Don’t talk that way to your classmates.” The student shrugged his shoulders and ignored the teacher warning. After that, several students imitated the weird noise and the whole class became noisy. Another example occurred when a boy smashed chalk to hit another student’s head during the class; this made other students laugh, but the teacher ignored this disrespectful behaviour.

In addition, the teacher preferred to use verbal warnings such as repeatedly asking students to take their seats and stop talking. For example, the teacher stood directly next to the boy who had talked with other students but did not complete the exercises and blamed the students in front of all the other students. After repeating the regulations several times, the teacher still did not correct the students’ misbehaviours. Finally, the teacher told the boy to go to the teachers’ office after class. In comparison to the Hangxing classroom, the Xiwang classroom demonstrated less positive and less effective interactions between the teacher and students. The following scenario B1 describes how teachers responded to students’ behaviours negatively:

*T: What do you find from this question, Rin?*
S: I find....
T: All right. I will ask other students to help you. Keep standing there.
After another student answered the question correctly ……
T: Can you say it again, Rin?
S: It should be calculated from the bottom (wrong answer)
T: Is that right? Say it again.
S: It should be calculated from the left (wrong answer)
T: Oh, you see. I have found someone to help you, but you still make mistakes. I realise why you do not understand, because in class, you are … (waiting for other students to criticise the student)
Others: You don’t listen to teacher carefully.
T: Yes. Where is your ear? Why cannot you focus!

The scenario B1 demonstrates how the teacher regulated the classroom with explicit quality criteria so that students were required to listen in class. When some students broke the rules, the teacher criticised and warned others who may do similar things.

<table>
<thead>
<tr>
<th>Y</th>
<th>Teacher</th>
<th>Platform</th>
<th>Y</th>
<th>Teacher</th>
</tr>
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<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

Figure 14 Interaction Map of Scenario B1

Secondly, students sometimes demonstrated disrespect to their classmates. From the observations made, it can be seen that undisciplined behaviours among students were common. The whole classroom was filled with various noises when the teacher was teaching at the platform. For example, the students smashed chalk to one another during class; some students turned around and talked with students seated nearby; one student mocked another student’s voice when answering a question; and some
students used inappropriate words to laugh at other students who could not solve problems in class. These behaviours seldom occurred in the public school classroom. Above all, the teacher attempted nothing to stop these behaviours which aggravated students’ misbehaviours. It not only affected the teacher’s normal teaching, but also played a prohibiting role for other students against behaving well.

Thirdly, some students did not engage with others in the classroom. One example from the classroom showed that when the teacher taught the curriculum related content in front of the platform, in general, many students did not face the teacher and instead were involved in different kinds of distraction. Students’ behaviours were documented as follows (see Figure 15 of scenario B2): The boy in the middle of the classroom turned around and talked with the girl whose seat was just behind him. Their conversation also attracted another girl’s attention and she turned right to listen to their talk. One boy who sat near the window turned to the right and it seemed that he was attracted by what was happening outside of the classroom. In the middle of the classroom, a girl turned back to talk with another girl, sniggering and without focusing on the teacher’s talk. The teacher continued to teach, but did not correct these students’ behaviours.

Moreover, unlike the students in the Hangxing classroom where each student was eager to participate and express their ability to answer challenging questions, many
students were indifferent to the exploration of the topic and discussion, even when put together into small groups, leading to group discussions in the Xiwang classroom being less effective. As discussed in the section on the physical environment of the classroom, the last two or three rows of students in the Xiwang classroom were normally arranged for students whose achievement was low. As a result, these students were indifferent, or at least unwilling to participate in the exploration of the discussion. Their negative behaviours towards the group discussion included actively talking about something irrelevant to the discussion topic with group members; doing other things such as reading storybooks and drawing pictures; or just keeping silent and staring at each other in the group.

7.3.2.2 Hangxing Classroom: Affective environment

In the Hangxing classroom, teacher-student interactions were friendly in that the teacher demonstrated general caring and respect. Overall, the result of the interactions between teacher and students and between students was polite and respectful. This section illustrates several examples displaying the positive interactions in the selected classroom of the public school.

Firstly, the teacher often used polite words such as ‘please’ (n=42), ‘thank you’ (n=8) and ‘excuse me’ (n=4) across the five observed classes. Rather than the teacher having an absolute authoritative status in the class, it seemed that the teacher considered the relationship between students and teacher as equal. Moreover, student behaviour in the Hangxing classroom was generally appropriate and students also exhibited respect for the teacher. Almost all of the students followed the teacher’s instructions and obeyed the established standards of conduct in the classroom. Students responded to the teacher actively with respect to their participation, when answering questions and many students put their hands up eagerly to have the opportunity to answer. It was common to see students in the Hangxing classroom put their hands up high to attract the teacher’s attention.

Secondly, when focused on managing student behaviours, the teacher demonstrated general caring and respect. The teacher monitored student behaviour against
established standards of conduct and normally used nonverbal signals to warn students to correct their behaviour, rather than verbal or physical punishment. In the Hangxing classroom, the teacher was observed to move to every section of the classroom and to keep a close eye on students whose behaviour was not good. For example, the teacher gave students a hard look, or moved nearer to their seats when they were talking. Without a word, the student stopped talking to his/her neighbour immediately. For the majority of the time, the teacher responded successfully to undisciplined behaviour among students. For example, one male student was always sleepy during the mathematics class. The teacher never blamed this student in the classroom, instead, asking him often to answer simple questions when the teacher noticed he was sleeping. In addition, whenever this student behaved well (e.g., not sleepy or answered the question correctly), the teacher never hesitated to give him praise in public.

Even though there were some conflicts between students, the teacher tried to calm the problem discreetly. For example, there was an ‘ask and answer question’ activity where students were provided with several challenging questions in Scenario B3:

_The teacher asked a difficult question of the students. Two minutes later, several students put up their hands. The teacher asked one of the students to answer the question. The student answered the question correctly. However, some students who also worked out the problem but were not asked by the teacher felt disappointed. One of the students even shouted: “He ‘steals’ my answer'. At this time, the whole class became quiet. All of the students stared at the teacher. The teacher did not blame this student, but said: “I know you also got the right answer. Congratulations to you.” Then, the teacher turned to other students and said: “There are many students whose performance was excellent as well. Congratulations to you all.” The majority of the students showed a smile on their face as if they realised that the teacher understood them. The teacher continued to look at the boy and said: “However, we cannot say ‘he steals my answer’. Instead, we should be happy that we share the same correct answer, right?” The student seemed to calm down. Finally, the teacher let all of the students applaud the student who answered the question correctly and to all of the other students who were eager to answer the question._
The ‘special moment’ above in the classroom was settled down effectively by this teacher. The teacher not only understood the student’s feelings but also the student’s eagerness to attract teacher and peer attention to prove himself. As a result, the teacher did not blame the student for his inappropriate behaviour of shouting unexpectedly in the class, but comforted the student through demonstrating reasonable care and respect. From our observation, the students in this classroom also respected their classmates and showed positive interaction between students. This was displayed when students applauded wholeheartedly following a classmate’s presentation to the class and moreover, students tried to follow the example set by students who performed well in words and behaviours.

Thirdly, Hangxing classroom was often arranged with activities for students’ exploration and discussion so that students were encouraged to express their personal opinions within groups. This was seen when students were asked to have a group discussion, most students participated in the discussion topics and produced different effective solutions. The teacher developed students’ awareness of group work so that each student had a responsibility to make a contribution to their group. In Hangxing classroom, the teacher also encouraged students to work hard and provided individual care, attention and help. For the majority of the time, many students were able to solve the problems and meet the teachers’ high expectations. Scenario B4 was selected to describe the typical classroom when the teacher provided an encouraging environment for students.

Teacher: Based on the ‘Multiplication Table’ we have learned today, now we have four numbers: 1,2,5,8. How to use them once and get 24? Students discuss in groups for about 1 minute.
Teacher: Can anyone work it out? (Stop for 5 seconds) If not, I will give you one of the answers.
Students: No. No. We can do it by ourselves.
Some students raise hand.
Teacher: Ming, you answer it, please.
Student: 5+1=6, 8/2=4, 6*4=24.
Other students: Wow, he is amazing.
Teacher: Yes, let us give him applause. Does anyone have another solution? I believe
you guys can do it. Think a bit more.

Student Li: 8-2=6, 5-1=4, 4*6=24

Teacher: Good. You win a star for your group. Congratulations.

Student Hong: 2*5=10, 10+1=11, 11+8=19, 19+5=24.

Other students: No, she is wrong. She used ‘5’ twice.

Teachers: Yes, that is right. You guys did a good job. Could we have another way to work it out?

Students: Yes, I can. Let me think.

Students began to have group discussion again.

From this scenario, it can be seen that the teacher used encouraging words and phrases to students several times, and therefore, students were learning in a stimulating environment solving challenging questions with less pressure.

Besides an analysis of the classroom environment, the interactions between teachers and students were investigated in the Hangxing and Xiwang classrooms. The next section will introduce and describe the learning experiences of students in the two classrooms in detail.

7.4 Classroom interaction

This section elaborates on teacher and students’ interactions from the perspectives of the process of questioning, response and feedback. Classroom interaction is addressed in terms of the types of initiation, response and feedback (IRF) occurring between the teacher and students. In the Hangxing classroom, although the teacher used some low-level questions, she asked the students questions designed to promote thinking and understanding. The teacher often initiated the questioning of students with low-level questions, but after students answered correctly, the teacher continued, reinitiating another higher-order question to ask students to explain their problem solving procedures. Scenario B5 describes how a teacher promoted students’ thinking in relation to the patterns in the Multiplication Table.
Figure 16 Interaction Map of Scenario B5

Teacher: What is the pattern if you read from left to right (of the Table)?
Student A: It ranges from 1-9 gradually.
Teacher: Yes, you are right. Can you find the pattern from the top to the bottom?
Student B: Ah, it also ranges from 1-9 gradually.
Teacher: What about read it in a diagonal line?
Student: ……
Then the teacher asked students to discuss in groups.

In scenario B5, the teacher used open-ended questions, inviting students to think and/or offer multiple possible answers, in particular to the last question of challenging work. At the end of the scenario, the teacher initiated a genuine discussion among students, providing adequate time for students to respond and stepping aside when appropriate. Besides asking each of the students to write a brief response and then share it within the group, the teacher invited some students to offer their ideas to the entire class. The learning tasks and activities were designed to challenge students’ thinking, the result being that most students displayed active intellectual engagement with important and challenging content and were supported in that engagement by
teacher scaffolding. During this discussion process in the Hangxing classroom, the teacher also walked to every position in the classroom, and gave responses and support to students in different groups.

In contrast, in the Xiwang classroom, many questions were of the ‘recitation’ type, such as ‘What is the definition of percentage?’ Interestingly, the teacher preferred students to read the definition of the concept many times during the class, as if the mathematics class was a reading class. The teacher even asked all of the students to read aloud together the questions in the textbook. The interactions between teacher and students were also predominantly recitation style, with the teacher mediating all questions and answers. In addition, the teacher’s questions were of low cognitive challenge, requiring single correct responses, and were asked in rapid succession. Alternatively, the teacher did attempt to frame some questions designed to promote student thinking and understanding, but only a few students were involved. Some students chatted or talked about matters that were irrelevant to the discussion topic; other students kept silent and did not respond to others. Only a few students participated in effective discussion. After the discussion, the teacher called upon only the students who had their hands up, and these were the few students who were good at mathematics. The teacher gave them several opportunities while more than half of the students never put their hands up to answer any question. This situation is starkly different from the Hangxing classroom, where the distribution of opportunity for question asking and answering was relatively even. Many times, the Hangxing teacher asked students who did not put their hands up to answer simple questions, understanding that these students were too shy to express their answers, based on an understanding of students’ characteristics.

Due to the different ways in which teachers initiated questions for students, the students’ responses to teachers differed between the two classrooms. In the Xiwang classroom, most students just answered the questions and followed the teacher’s instructions. Few students asked questions about the teacher’s instructions. In contrast, in the Hangxing classroom, students asked for more opportunities for self-managed
time, and these students were more prone to negotiate with the teacher to make decisions on aspects of tasks, group discussion and exploration of topics. The teacher and students played an ‘obtain the ball’ game to learn the concept of ‘probability’. Balls of two colours (red and green) were provided. The conversation between students and teacher is described in scenario B6 as follows:

_Teacher: Let us play the game and compete between boys and girls. First of all, we will ask the girls to fetch a ball from the box._  
_Students: Why ask the girls first?_  
_Teacher: ‘Ladies first’._  
_Students: We will lose the game if the girls come first._  
_Teacher: What should we do?_  
_Students: In the first round we will ask the girls first, but in the second we will ask the boys first. That is fair._  
_Teacher: All right._

The teacher’s feedback was one of the key aspects influencing teacher and student interaction in the classroom. In the Hangxing class, the teacher often created a positive environment and encouraged student’s related behaviours such as students’ initiation of questions or suggestions for teaching content or teacher’s instruction. The comparison of the affective environment between the two schools has been discussed in the previous section revealing that the teacher in the Hangxing classroom was more positive with regard to verbal behaviours. Due to the encouraging environment from the teacher, students’ capacity for independence with problem identification and problem solving were positively developed and improved.

However, in the Xiwang classroom, the teacher often ignored students’ questions and just followed the pre-plan of the curriculum, leading to the whole class being stable but unalterable in terms of teaching methods and procedures. The typical teaching pattern was that the teacher dominated the whole class, whilst students received the knowledge passively. For students, teachers were the absolute authority in determining the group discussion, tasking, and other arrangements related to mathematics class. Hence, pupils were likely to expect teacher utterances, including
questions, to function as directives, i.e., ‘Do what I tell you to do’, ‘Go where I want you to go’, and ‘Think within the limits of what I want you to think’. One example from the Xiwang classroom, scenario B7, illustrates this point as follows.

Teacher: Now you guys begin to complete the homework.
Student: Yes, madam.
Teacher: You must obey the rules of homework.
Student A: Miss, do we need to start from a new page?
Teacher: I have described the rules of the homework. You did not listen to me, did you?
Student A: ......(silent)
Teacher: I told you to listen carefully when I provide instruction. Why does someone always ask a second time?
All of the students keep silent.

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<thead>
<tr>
<th>Y</th>
<th>Teacher</th>
<th>Platform</th>
<th>Y</th>
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<tbody>
<tr>
<td>Y</td>
<td>x</td>
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Figure 17 Interaction Map of Scenario B7

In response to students, teacher’s effective feedback guaranteed the quality of their participation in terms of facilitating an interactive learning environment. However, in the migrant classroom, the unpredictable pupil responses, which lay outside the teacher’s comfort zone, were particularly troublesome for teachers, possibly due to their lack of confidence in their own subject knowledge. Scenario B8 provides an example as follows:
Figure 18 Excerpt of Multiplication Table

**Teacher:** What do you find from this ‘Multiplication Table’?
**Student A:** I find it is the shape of triangle.
**Teacher:** No, I mean the pattern of the table, not the shape.
**Student B:** This must be only half of the Table, because the other half is missing.
**Teacher:** I do not know what you are talking about. Here I want to ask you about the pattern of this table. For example, the numbers from 1-9 descending from left to right, and from the top to bottom.
**Students:** Oh, it all starts from the number 1.
**Students:** Oh, then 2, 3, 4...9
**Teacher:** Yep. That is the pattern of this table. Remember it.

![Figure 19 Interaction Map of Scenario B8](image)

In scenario B8, the teacher’s intention in questioning was to ask students to find the regular change of numbers from 1-9. However, the students’ responses to the teacher did not fit the teacher’s expected answers. Therefore, when a student was initially interested in finding the shape of the Multiplication Table, the teacher denied the
student’s findings, rather than extending the knowledge into ‘why the Multiplication Table was organised into the triangle shape’. Furthermore, the second student who extended the shape topic and found that the other half of the table was missing, was also ignored by the teacher. Either because she was not prepared for the related knowledge, or believing it was not important to her teaching topic, the teacher lost an opportunity to inspire students’ motivation to explore the organization of the Multiplication Table more deeply. In fact, the other missing half of the table has the same content as that which exists in the half of the table displayed. However, the teacher did not proceed that way.

In contrast, in the Hangxing classroom, the teacher’s feedback of ‘accepting more than one answer’ to a question even when it requires speculative or imaginative answers, may result in students’ broad participation. In order to break free from the recitation script, teachers must be released from the burden of having to ask all of the questions and to have to know and evaluate all of the answers. The findings from this study suggest that teachers create such an environment through feedback moves which encourage peer–peer feedback, cue extended responses, demonstrate authentic engagement in pupil responses, and use pupils’ ideas to direct, and in some cases change, the course of a lesson. The study shows how the teacher can demonstrate a more flexible approach to unpredictable pupil responses. For example, they sometimes turned the feedback move into another question, asking for clarification, thereby ratifying the importance of the pupil’s original response, whilst also creating an opportunity for the pupil to expand upon their original response. The discussion of percentage between the teacher and students in the Hangxing classroom provides a good example (Scenario B9):

*Teacher: How could we choose the best basketball player from these data?*
*Student A: The one who scores the most goals.*
*Teacher: The most goals? You think it should be Peter, right?*
*Student A: Yes. Peter’s goal score is 20 times.*
*Student B: No, Peter shot for goal 30 times, but scored 20 times. John only shot 20 times but scored 16 times.*
*Student C: It should be Peter. He scored 20 times and had the highest score.*
*Student B: But Peter shot 30 times in total.*
Teacher: So what do you think, student B?
Student B: I do not know exactly, but I do not think it is Peter.
Student D: Yep. I think we need to calculate the percentage.
Teacher: The percentage?
Student D: Yes. The percentage for Peter is 20/30, for John it is 16/20.
Student E: John has a higher percentage of (...) than Peter.
Teacher: The percentage of goals.

Figure 20 Interaction Map of Scenario B9

In scenario B9, the recordings reveal that in order to encourage students’ initiation and peer–peer feedback, the teacher opened this possibility as ‘allowable’ within the discourse. One of the key strategies the teacher used to achieve this was by inviting peer-peer responses and feedback. The teacher did so by explicitly asking pupils to review one another’s contributions.

This section has concentrated on the whole classroom environment and interactions in each type of classroom. The next section will describe the school experience of one migrant student selected from each classroom. A typical mathematics class of a school day was observed and analysed to show the school activity and migrant
student’s classroom involvement.

7.5 A typical school day: Performance of Lily and Lucy in mathematics class

The results of the data analysis for this section are displayed according to the framework of the Singapore Pedagogy Coding Scheme, including the classroom environment, and classroom interaction in both quantitative and qualitative terms.

7.5.1 Classroom environment

In the public classroom, Lily (see Figure 21) was the participant chosen for observation, while for comparison Lucy was the participant for observation (see Figure 22) in the private school. The class size is about 30 students in the public classroom, whereas there were more than 50 students in the private classroom. The seating arrangement in the public classroom (round table group) is different from the private classroom (rows and column).

![Figure 21 Participant in Public Classroom: Lily](image)

![Figure 22 Participant in Migrant Classroom: Lucy](image)

In addition, the teacher’s walking routes in the migrant classroom and public classroom were mapped in Figure 23 and Figure 24 respectively. In the migrant classroom, the teacher mainly walked around the area of the teacher’s platform in
front of the classroom, and sometimes walked across rows. Similarly in the public classroom, for most of the time the teacher walked in front of the classroom, while sometimes walking around the classroom among groups.

Figure 23 Teacher’s Walking Route in Migrant Classroom

Figure 24 Teacher’s Walking Route in Public Classroom

7.5.2 The frequency of classroom interaction

Table 41 displays the frequency of classroom interactions with the two migrant students in a typical school day. In the observed mathematics class, Lily in the public school raised her hand eight times and was asked to answer the question three times, whereas Lucy in the migrant school neither raised her hand nor was ever asked to answer a question. Moreover, Lily also had a higher frequency of interaction times with her classmates than Lucy.
Table 41 Frequency of Classroom Interactions

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Lily (Public school)</th>
<th>Lucy (Private school)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hands up</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Being Asked</td>
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<tr>
<td>Interaction with students</td>
<td>7</td>
<td>3</td>
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</table>

7.5.3 The description of classroom interaction

The typical scenario of classroom interactions in mathematics class is described in this section. Table 42 displays the conversation that followed, based on the Singapore Pedagogy Coding Scheme (2004).

Table 42 Example 1 of Excerpt of Classroom Interaction in Public School (Lily)

<table>
<thead>
<tr>
<th>Turn</th>
<th>Speaker</th>
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<th>Move</th>
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<tr>
<td>1</td>
<td>T</td>
<td>What did we learn yesterday? I will ask some students to answer it.</td>
<td>I</td>
</tr>
<tr>
<td>2</td>
<td>Lily</td>
<td>Some students raised hands.</td>
<td>R</td>
</tr>
<tr>
<td>3</td>
<td>T</td>
<td>Okay, I will ask students to come to the front to complete the questions on the blackboard.</td>
<td>F-I</td>
</tr>
<tr>
<td>4</td>
<td>Lily</td>
<td>More than ten students put up hands.</td>
<td>R</td>
</tr>
<tr>
<td>5</td>
<td>T</td>
<td>Lily, can you correct the answer?</td>
<td>I</td>
</tr>
<tr>
<td>6</td>
<td>Lily</td>
<td>Lily stood up and answered the question.</td>
<td>R</td>
</tr>
<tr>
<td>7</td>
<td>P</td>
<td>Other students criticised Lily’s wrong answer immediately.</td>
<td>F</td>
</tr>
<tr>
<td>8</td>
<td>Lily</td>
<td>She blushed, as if she felt embarrassed.</td>
<td>R</td>
</tr>
<tr>
<td>9</td>
<td>T</td>
<td>No worries, Lily. What do you think is the next step to solve the problem?</td>
<td>F-I</td>
</tr>
<tr>
<td>10</td>
<td>Lily</td>
<td>Lily got the correct answer.</td>
<td>R</td>
</tr>
<tr>
<td>11</td>
<td>T</td>
<td>Well done, Lily. Sit down please.</td>
<td>F-I</td>
</tr>
<tr>
<td>12</td>
<td>Lily</td>
<td>Lily smiled a little.</td>
<td>R</td>
</tr>
</tbody>
</table>
In this excerpt, the teacher reviewed the teaching content with students, by asking questions such as ‘What did we learn yesterday?’ It appeared that Lily did not want to answer this question, lowering her head and avoiding eye contact with the teacher. The teacher gave the opportunity to one of the students who had raised their hand, and then asked Lily to correct the answer. When Lily gave a wrong answer, the teacher did not blame her, but gave feedback to Lily by continuing to ask her a question ‘What do you think is the next step to solve the problem?’ Lily answered again and got the correct answer this time. During the conversation described, the teacher encouraged the migrant student’s performance by giving her the opportunity to answer the question, even if she was not confident enough to put up her hand. In addition, the teacher affirmed the responses with positive feedback such as “Well done”.

Table 43 Example 2 of Excerpt of Classroom Interaction in Public School (Lily)

<table>
<thead>
<tr>
<th>Turn</th>
<th>Speaker</th>
<th>Utterance</th>
<th>Move</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T</td>
<td>You think about it for 30 seconds, and then write down your answer on the paper. Finally discuss it within your group.</td>
<td>I</td>
</tr>
<tr>
<td>2</td>
<td>Lily</td>
<td>Lily stood up and showed her answer to the group. She read the answer loudly in the group. After that, she began to compare the answer with other students and share different answers within the group.</td>
<td>R</td>
</tr>
<tr>
<td>3</td>
<td>T</td>
<td>The teacher walked around and finally came to Lily’s group. What is the solving procedure?</td>
<td>R-I</td>
</tr>
<tr>
<td>4</td>
<td>P</td>
<td>One of the students in their group responded to the teacher. Lily listened, but did not speak.</td>
<td>R</td>
</tr>
<tr>
<td>5</td>
<td>P</td>
<td>Lily’s deskmate talked to her in a very low voice.</td>
<td>I</td>
</tr>
<tr>
<td>6</td>
<td>Lily</td>
<td>Lily responded to him quickly (2 seconds).</td>
<td>R</td>
</tr>
<tr>
<td>7</td>
<td>T</td>
<td>All right. I will ask each group to report their findings.</td>
<td>F-I</td>
</tr>
<tr>
<td>8</td>
<td>Lily</td>
<td>Lily turned to see who raised their hand and who did not, but she did not put up her hand.</td>
<td>R</td>
</tr>
</tbody>
</table>
In the second example from the excerpt (Table 43), the teacher organised a group discussion for students. A clear description of the discussion procedure was introduced by the teacher at the beginning of the activity. During the excerpt, Lily actively participated in the discussion and performed a series of positive interactions with group members. The teacher encouraged students’ participation by checking the results of the solving procedures group by group.

By way of contrast, excerpts of the interactions related to Lucy in the private school classroom are now examined. Generally, there was little positive interaction between Lucy and the teacher, and between Lucy and her classmates. In example 1 of the excerpt, it appears that Lucy did not pay attention to the teacher’s instructions carefully (Table 44). Lucy yawned three times in the mathematics class, and followed other students by opening her mouth a little bit when other students responded to the teacher together. However, the teacher neither noticed Lucy’s distraction, nor responded to Lucy’s negative behaviours.

Table 44 Example 1 of Excerpt of Classroom Interaction in Migrant School (Lucy)

<table>
<thead>
<tr>
<th>Turn</th>
<th>Speaker</th>
<th>Utterance</th>
<th>Move</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T</td>
<td>All of you review the question in the textbook.</td>
<td>I</td>
</tr>
<tr>
<td>2</td>
<td>Lucy</td>
<td>Lucy followed the instruction and opened the book, while her attention was still focused on her deskmate.</td>
<td>R</td>
</tr>
<tr>
<td>3</td>
<td>T</td>
<td>The teacher asked one of the students who were talking to answer the question. Ling, you answer the question.</td>
<td>F-I</td>
</tr>
<tr>
<td>4</td>
<td>Lucy</td>
<td>Lucy started to yawn, and then followed other students to read. While she read, she continued to turn around and glance at other students on her right.</td>
<td>R</td>
</tr>
</tbody>
</table>

In example 2 of the excerpt from the migrant classroom (Table 45), the teacher initiated an activity for students’ interaction by asking students to check the answer with their deskmates. Lucy did not follow the teacher’s instruction of checking answers with classmates. There was no interaction between Lucy and her classmates.
The teacher noticed the problem, and further extended the interaction with Lucy by asking ‘Do you understand this question?’ Lucy did not give the teacher a clear response, but kept silent. The teacher identified her difficulties and asked other students to help Lucy. After that, Lucy followed the teacher’s instruction and ‘turned to her deskmate several times to check if she had the same format of the answer as him’.

### Table 45 Example 2 of Excerpt of Classroom Interaction in Migrant School (Lucy)

<table>
<thead>
<tr>
<th>Turn</th>
<th>Speaker</th>
<th>Utterance</th>
<th>Move</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T</td>
<td>All of you, please check the answer to the question with your deskmate.</td>
<td>I</td>
</tr>
<tr>
<td>2</td>
<td>Lucy</td>
<td>Most students participated in the discussion actively. Lucy just looked at her deskmate and did not say anything.</td>
<td>R</td>
</tr>
<tr>
<td>3</td>
<td>T</td>
<td>The teacher came close to her desk and asked: Do you understand this question?</td>
<td>I</td>
</tr>
<tr>
<td>4</td>
<td>Lucy</td>
<td>Lucy nodded and lowered her head, but did not speak any words.</td>
<td>R</td>
</tr>
<tr>
<td>5</td>
<td>T</td>
<td>Peng (Lucy’s deskmate), helped her to complete the questions in the textbook.</td>
<td>I</td>
</tr>
<tr>
<td>6</td>
<td>Lucy</td>
<td>Lucy turned to her deskmate several times to check if she had the same format and speed as him, but without speaking any words.</td>
<td>R</td>
</tr>
</tbody>
</table>

During the conversation described in example 2, there was no interaction between students, despite the teacher creating the opportunity for Lucy and her classmates. Furthermore, example 3 of the excerpt displays that there were several problems in the peer relationships in this classroom (Table 46). The classmates laughed at Lucy when she could not answer the question. In response to these attitudes from her classmates, Lucy adopted an indifferent attitude towards these students.
Table 46 Example 3 of Excerpt of Classroom Interaction in Migrant School (Lucy)

<table>
<thead>
<tr>
<th>Turn</th>
<th>Speaker</th>
<th>Utterance</th>
<th>Move</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T</td>
<td>The teacher walked around the classroom, and noticed that Lucy had not finished. The teacher asked: Do you know how to solve it?</td>
<td>I</td>
</tr>
<tr>
<td>2</td>
<td>Lucy</td>
<td>Lucy did not speak any words, but shook her head.</td>
<td>R</td>
</tr>
<tr>
<td>3</td>
<td>P</td>
<td>The boy who sat in the front row finished the questions quickly and showed off to students around him, including Lucy.</td>
<td>F-I</td>
</tr>
<tr>
<td>4</td>
<td>Lucy</td>
<td>Lucy ignored him and focused on her task again.</td>
<td>R</td>
</tr>
<tr>
<td>5</td>
<td>P</td>
<td>The boy in the front row turned back to her and said: How can you not solve such a simple question?</td>
<td>I</td>
</tr>
<tr>
<td>6</td>
<td>Lucy</td>
<td>Lucy did not speak.</td>
<td>R</td>
</tr>
<tr>
<td>7</td>
<td>P</td>
<td>The boy gave a despising smile and turned back to his seat.</td>
<td>F</td>
</tr>
<tr>
<td>8</td>
<td>Lucy</td>
<td>Lucy ignored his laughter and continued to complete the questions</td>
<td>R</td>
</tr>
</tbody>
</table>

7.6 Perspectives of urban school life: Lily and Lucy

To provide further insight into the perceptions of these two students the results of their student surveys were analysed and the items with differences were displayed in Table 47. Generally, the two students were happy with their mathematics teachers, responding that their mathematics teacher ‘listens to my question patiently’, ‘treats students fairly’, ‘speaks Mandarin clearly to make me understand’ and ‘encourages me to study harder’. However, differences were found between Lily and Lucy, in terms of their opinions on mathematics class. Lily showed more positive attitudes towards mathematics learning than Lucy. For example, Lucy responded that she was ‘uncertain’ when asked whether ‘My mathematics teacher likes me’, while Lily chose ‘agree’ for this item. Lily in public school agreed that her mathematics teacher often ‘praises students’, ‘gives opportunity to answer the questions’, and ‘believes in my
good learning ability’. Consistent with the findings from our observations, Lily agreed that her ‘mathematics teacher encourages students to cooperate with urban children’ in public school.’

Also, the perceptions of the two migrant children towards their school education were different. Lily was ‘very proud’ of studying in public school, while Lucy disliked studying in the migrant school. Their explanation for this opinion stemmed from their comparison of schools between their rural hometown and the current urban area. Lucy believed that ‘the school where I studied in my hometown was much better than her current migrant school’. In contrast, Lily thought that the ‘urban public school where she studied was better in quality than the former school in the rural hometown’.

Another striking difference between the two migrant students was in relation to their perspective on the importance of education. Lily agreed that ‘Education is vital for my life’, whereas Lucy believed that ‘Education is nothing to my future life’.

In terms of their emotional management, Lily showed more positive emotions toward her school life and study than Lucy. Lily stated that ‘I keep calm and relaxed at school for most of the time’ and was ‘very happy and satisfied’ in public school, although sometimes she ‘feels the pressure from study’. Moreover, Lily responded that ‘Most classmates in public school were friendly to me’ and ‘I like to make friends with them’.

Table 47 Score of Statement with Differences between Lily and Lucy

<table>
<thead>
<tr>
<th>Item</th>
<th>Statement</th>
<th>Lily</th>
<th>Lucy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>My mathematics teacher likes me.</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>My mathematics teacher often asks me to answer questions in the classroom.</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>My mathematics teacher often praises me in the classroom.</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>My mathematics teacher believes I can study mathematics well.</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>My mathematics teacher encourages me to cooperate with urban children.</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>I am proud of studying in this school.</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>I am usually pretty calm and relaxed.</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>I think school is important for my future life.</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>
7.7 Summary and conclusion

This chapter has discussed classroom observations for the purpose of comparing current practices in classrooms between public and migrant schools in Chinese urban schools at the primary level. The classroom observation protocol was based on the framework of teaching quality within classrooms employed from the ‘Framework of Singapore Pedagogy Coding Scheme (2004)’. The qualitative results were presented as case studies of the classrooms and provided the results of observing the classroom environment and learning experiences of migrant students in one public and one private school.

The two students’ experiences in the classrooms in the two types of school were found to be quite different. Difference was found in terms of their teacher’s response to migrant students. The two students’ classroom performances in a typical school day were also different. Obviously, more opportunities were provided by the teacher to Lily in the public school than to Lucy in the migrant school, and moreover, Lily responded to the class more actively in the public school than Lucy in the migrant school. Differences were also found in terms of the teacher’s response to migrant students. In the public school, the migrant student raised her hand several times to answer questions, and correspondingly, the teacher gave her the opportunity to answer. In contrast, the migrant child in the private school never put up her hand, and moreover, the teacher never asked the student to answer a question.

All in all, results in this chapter have shown migrant students’ practice differences in migrant and public schools. These differences confirm findings obtained in Chapter Four, Chapter Five and Chapter Six. In the analysis of students’ achievement levels in Chapter Four, students in private schools were found to have lower achievement levels than students in public schools. School type was found to be one of the factors determining students’ achievement gap. Therefore, the difference between schools in terms of teachers and their teaching quality is discussed further in the next chapter, in order to determine the differences in terms of schools and classrooms that may lead to the students’ achievement gap. In the survey and interview analysis in Chapter Five,
the teachers reported different perceptions and practices towards students between public and private schools. In particular, the difficulties and educational resources in migrant schools may have constrained teachers’ expectations for all migrant students. Public school teachers generally showed more positive attitudes to migrant children’s education than did private school teachers. In particular, teachers in private schools perceived themselves to be teaching in more challenging conditions. In Chapters Six and Seven, results showed that public school teachers generally achieved a higher teaching quality than private school teachers. Therefore, it is concluded that differences in teachers’ perceptions, teaching quality, and classroom interactions were found between public and private schools. In the next chapter, the findings from Chapter Four to Chapter Seven are examined in terms of migrant student’s learning experience through the comparison between public and private schools.
Chapter 8

Discussion, Conclusions and Implications

8.1 Overview

Chapters Four to Seven have examined Chinese migrant students’ learning experiences in urban schools. Differences have been found between public and private schools in terms of students’ achievement levels, teachers’ perceptions, teaching quality and classroom practices. This chapter begins by reviewing the study and summarising its major findings. Further, this chapter outlines some of the limitations that came into play at certain stages of the study. The chapter concludes by offering some recommendations to improve migrant children’s educational experiences in Chinese urban schools. The final section of this chapter identifies some directions for future research in the field of migrant children’s education.

8.2 Summary of the major findings of the study

The goal of this study was to examine the mathematics achievement levels and experiences of Chinese migrant children in primary public and private schools. For this purpose, the study involved an empirical investigation over four stages. In the first stage, the test scores of 1808 students were used to compare mathematics outcomes between students in public and private schools. Also, demographic factors, students’ parental socioeconomic status, and school type were investigated as predictors of migrant students’ educational outcomes.

In the second and third stage, school type, in terms of public and private, was examined with regard to urban teachers’ perceptions of and practices with migrant children’s education in Chinese urban schools. A total of 215 teachers participated in the teachers’ survey in the second stage. Further, in the third stage, this study adopted a purposive sampling approach with a semi-structured interview design with seven participant teachers responding to questions about their teaching experiences with migrant children. In the final stage of the study, classroom observations were conducted in both public and private schools, with the aim of evaluating teaching
quality in each type of school. Also, aspects of the classroom environment, and teachers’ and students’ interactions were examined and compared between public and private schools, with the aim of investigating the learning experiences of migrant students in everyday school life.

8.2.1 The mathematics achievement gap between public and private schools: predictive factors

The first stage of the study investigated migrant children’s mathematics achievement levels, and compared the factors related to this achievement in both public and private schools. Results in Chapter 4 (Section 4.2 and Section 4.3) have confirmed the mathematics achievement gap between the two types of school. Migrant children in private schools achieved at a lower level in mathematics in comparison to students in public schools. Within public schools, migrant children achieved at similar levels to urban students. The analysis of test results and associated factors indicated that significant disparities existed in the demographic backgrounds of migrant students’ parents. Migrant parents of children in public schools had higher SES in terms of occupation and education levels than parents of migrant children in private schools.

With respect to the total sample, five factors pertinent to student achievement outcomes in mathematics were found to be significant (sibling numbers, length of residence in urban areas, preschool attendance, parental socioeconomic status and school type). While these factors figured prominently as significant academic predictors for the migrant school sample, the only significant predictor of mathematics achievement for the public school sample was parental socioeconomic status.

For migrant students in private schools, sibling numbers and length of residence in urban areas were significant negative determinants of mathematics achievement. After controlling for other variables in the model, migrant children in private schools with more siblings and who had migrated to the urban area for a longer length of time were more likely to have lower mathematics achievement. Preschool attendance and parental SES had significant positive weights predicting mathematics achievement.
For both the public and private school samples, parents’ background in terms of education and occupation level, was a significant determinant of migrant children’s mathematics achievement. Migrant children who had parents with higher education levels and a higher occupation level showed higher mathematics achievement than children whose parents had lower education and occupation levels. As Chinese urban public schools recruit migrant children on the premise of extra tuition fees, migrant families with a higher SES were found to be more likely to be enrolled in urban public schools. For migrant children with low SES status, fewer opportunities were available for them to be admitted to urban public schools.

8.2.2 Teachers’ perceptions of migrant students’ education in urban schools

Results in Chapter 5 (Section 5.3) found that Chinese urban teachers’ perceptions of migrant students were positive in general. However, teachers in public schools showed significantly more positive attitudes to educational opportunities provided for migrant students than did private school teachers. A statistically significant difference in teachers’ perceptions towards migrant children’s education was found between public and private schools.

Various challenges were found to have influenced teachers’ perceptions of migrant students’ education in urban schools. Low prior achievement levels of migrant students, the lack of professional support, insufficient parental involvement, as well as teachers’ working conditions were found to be the major influencing factors on teachers’ perceptions of migrant children’s education in urban schools.

Results in Chapter 5 (Section 5.4) also showed that migrant students had an optimistic attitude towards urban schools. The survey results showed that no significant difference of students’ perceptions of urban schools was found between the two types of school. Most migrant children were generally satisfied with urban schools. Moreover, this study indicated that migrant children in primary schools are optimistic, regardless of school type, gender or grade level.

8.2.3 Differences in teaching quality in public and private schools
Results in Chapter 6 (Section 6.3) have demonstrated that a significant difference was found in the quality of teaching between public and private schools. Using the Quality Teaching model scales, teachers observed in public schools generally scored higher than the teachers observed in private schools. The three dimensions of Intellectual Quality, Quality Learning Environment, and Significance in public schools were also found to be higher in public schools than private schools respectively.

In order to understand the impact of these differences in teaching quality on students, two students were chosen for the case study component of the study. The results of the case study in Chapter 7 (Section 7.5) demonstrate that the two students’ experiences in the classroom were significantly different. More opportunities were provided to Lily in the public school than to Lucy in the private school. Public school students responded more actively within the class than did private school students. Differences were also found in terms of teachers’ responses to migrant students. In the public school, Lily, the migrant student, raised her hand several times to answer questions, and correspondingly, the teacher gave her the opportunity to do so. In contrast, Lucy, the migrant child under observation in the private school, never put up her hand, and moreover, the teacher never asked her to answer any question.

Through the comparison of classroom interactions between the two classrooms, Chapter 7 has detailed how the classroom performance of migrant students in public and private schools differs significantly. Migrant students in public schools displayed more positive reactions to the teacher and to their classmates than did private school students. These findings provide further evidence of the difference in current classroom practices in public and private schools at the primary education level as mentioned earlier in Chapter 6.

8.3 Discussion of findings

This section discusses the results of the study by elaborating on the major findings in relation to previous studies of migrant children’s education, as well as the contributions of this empirical investigation.
8.3.1 Equity perspectives in relation to the Chinese policy of segregation for internal migrant children

This study investigated migrant children’s school performance in both public and private schools. Overall, the results pointed to the inequitable and adverse consequences of school segregation by examining the disparities which arise for migrant children in these different types of schools. Chinese society is diverse and segmented, comprising a large portion of rural-urban migrant families in urban areas (Lu & Zhou, 2013). This study found that the children in these migrant families generally have poor academic performance outcomes if they are unable to access urban public schools which have better physical and human resources than the private schools which many of them must attend.

It is evident that most migrant children in private schools were far behind in mathematics test scores, when compared with migrant students in public schools. Consistent with the growing scholarly literature on this topic, the students in private schools, with low socioeconomic status, generally performed significantly lower in mathematics achievement than their counterparts in public schools with higher socioeconomic status (Lai et al., 2012). In contrast, migrant students who were integrated with local children in public schools obtained similar outcomes in mathematics achievement to their resident peers in these schools. Importantly, this study revealed that migrant students are, in principle, capable of achieving the same sort of results in mathematics as urban school children, as long as equivalent educational resources are provided (Chen & Feng, 2013; Guo, 2011; Lai et al., 2012; Xiong, 2010; Yuan & Hou, 2012).

The problem of migrant school students’ underperformance sheds light on the drawbacks of the inflexible household registration system in the Chinese educational context (Goodburn, 2009; Wang, 2009; Wei & Hou, 2010). This system not only serves as an impediment to the school performance of migrant children, but it also divides Chinese society into two groups, one of which is urban and the other of which is rural. Despite the latest policy for household registration reform, which has allowed
some migrants to be classified as urban residents, there are still estimated to be 200 million migrant people, roughly two-thirds of whom would be excluded from city-resident status by 2020 (Li & Shi, 2014). The resulting shortage of educational funds provided to local urban governments undermines the capacity of these educational authorities to accommodate all students, migrant and non-migrant.

The participant city of this study, Shanghai, is one of China's largest metropolitan cities. It has been portrayed as having a ‘high quality’ school system, because of its participation in the Program for International Student Assessment (PISA) where it achieved top world ranking results (Sellar & Lingard, 2013). However, the large populations of migrant students which exist in Shanghai have been segregated from the urban educational system, so that migrant test results were not included in the program sampling (Loveless, 2014). The assessments of the program's success, which do not include the test results of migrant students, are intrinsically misleading in relation to the reality of China's educational success. Given its huge numbers of migrant children, the local government of Shanghai has not yet demonstrated the capability of accommodating all of these children with public educational resources (Xiong, 2012).

It is evident that the current situation for migrant students in private schools exposes them to disadvantage (Chen, Wang, & Wang, 2009; Wang, 2009). In contrast, migrant students who attend public schools have access to social networks and personal friendships that are likely to have beneficial socioeconomic influence on their lives (Li et al., 2009; Liu, Holmes, & Albright, 2015a). This finding is also confirmed by Segmented Assimilation Theory that there is a natural process by which migrant groups come to share a common culture and gain equal access to social opportunity (Zhou, 1997). Integration of migrant students into public schools is one of the most effective routes to attaining educational resource equity for all migrant children (Wei & Hou, 2010).

8.3.2 Factors related to the mathematics outcomes of migrant children

In an effort to identify factors related to mathematics achievement for migrant
children, this study was designed to be a comparative study of Chinese public and private schools. Consistent with previous findings, this study has shown that migrant children in private schools are far behind in mathematics test scores in comparison to migrant students in public schools (Chen & Feng, 2013; Guo, 2011; Lai et al., 2009; Xiong, 2010; Yuan & Hou, 2012). Moreover, similar to Lai’s (2012, 2014) model, this study found that students’ individual characteristics, parents’ background and school type are significant predictors of mathematics achievement for migrant children. Differences were found, however, in the relationship among selected predictors and mathematics achievement between migrant children who attended public schools and those who attended private schools. With respect to the migrant school sample, four factors pertinent to student achievement outcomes in mathematics were significant (sibling numbers, length of residence in urban areas, preschool attendance, parental socioeconomic status), while the only significant predictor of mathematics achievement for the public school sample was parental socioeconomic status.

For both the public and private school samples, parents’ background in terms of education and occupation level, was a significant determinant of migrant children’s mathematics achievement. Migrant children who have parents with higher education and occupation levels had higher mathematics achievement levels than children whose parents had lower education and occupation levels. As suggested by previous studies, a higher educational background of migrant parents could indicate a higher likelihood of parental involvement in educating their children, contributing to students’ academic success (Altschul, 2012; Davis-Kean, 2005). The finding also confirmed the strong relationship found between segregation by socioeconomic status and test scores in other countries (e.g. US). Lower SES children in segregated schools were normally labelled as failures in academic achievement (Dronkers & Levels, 2007; Orfield & Lee, 2005). One further possible reason for this consistent observation was that Chinese rural-urban migrants form different SES groups. Low SES migrant children are segregated from urban public schools (Lu & Zhou, 2013). Chinese urban public schools recruit migrant children on the premise of extra tuition
fees (Goodburn, 2009). Correspondingly, higher SES migrant families are more likely to be enrolled in urban public schools.

Furthermore, this study found that migrant parental SES was negatively associated with children’s sibling numbers. Families with more economic resources and where parents have higher education levels are more likely to have fewer children. In the migrant school sample, migrant student’s sibling numbers was a powerful indicator of mathematics achievement. The finding aligned with other studies which found that children from households with fewer siblings have higher academic achievement (Lu, 2007; Van Eijck & de Graaf, 1995).

The effect of the length of a migrant child’s residence in an urban area on achievement was also significant for the private school sample. It did not appear to be related to the mathematics achievement levels of the public school sample. This finding challenges previous studies which indicate that a longer residence in urban areas benefits children with better mathematics achievement (Nielsen et al., 2006). This study found, in fact, that private school children who have migrated to an urban area for a longer length of time were more likely to have lower mathematics achievement levels than those who have migrated for a shorter length of time. A possible explanation might be that, controlling for parents’ background variables, the poorer educational resources in private schools may have a cumulative negative effect on student’s mathematics performance as their length of urban residence increases (Lai et al., 2012, 2014). As a result, it may explain why children in poorly resourced private schools may experience a widening achievement gap in relation to their public school counterparts.

The results with the private school sample in this study also indicated that preschool attendance of migrant children predicts mathematics achievement, confirming that education in kindergarten contributes positively to later mathematics achievement in comparison to those who have not had this experience (Hemmings, Grootenboer, & Kay, 2011; Templea & Reynolds, 2007).

Contrary to the findings for the private school sample, the length of urban residence,
preschool education and sibling numbers were not significant predictors of mathematics achievement among the public school sample. An explanation may be that most migrant students in public schools had similar backgrounds in terms of related variables such as having preschool education, being the only child in the family, and having migrated to urban areas before preschool education. As a result, in comparison to the diverse backgrounds of migrant students in private schools, the relatively homogenous backgrounds of migrant children in public schools may statistically mask the contribution of the related variables (sibling numbers, preschool attendance, and length of residence in urban areas) in predicting mathematics achievement.

When comparing the mathematics achievement levels explained by the predictors in the model between samples, the amount of variance explained was very high for migrant schools (59%) in comparison to the public schools (7%). This means that the variables of observable factors in this study were able to capture a large part of the school selection effects which explain the academic achievement of migrant children in private schools. However, the observable factors only explain a small part of the variation in the school achievement levels for migrant children in public schools, indicating that further investigation is required to understand the factors related to achievement for these children.

8.3.3 Segmented assimilation patterns of Chinese migrant students

By examining the mathematics achievement disparities which arise for migrant children in public and private schools this study has been able to document the adverse consequences of school segregation. Segmented assimilation has also been observed in western countries, where children of non-white migrants may not be afforded equal opportunities for gaining access to the benefits of middle class white society (Condron, 2009; Hausmann et al., 2009; Zhou, 1997). By parity of reasoning, this study has similarly applied the mechanism of segmented assimilation theory in the context of Chinese internal migration to explain the same sort of educational inequities in the Chinese situation. This study has endeavoured to show that there are
similar problems facing migrant students in China, with regard to their diminished academic outcomes resulting predominantly from their inability to gain access to urban public schools. Chinese society is now diverse and segmented, with an underclass residing in urban areas comprising a large portion of rural-urban migrant families.

The results have highlighted the negative aspects of school segregation in the context of Chinese internal migration. With an increased duration of residence in cities, migrant children in public schools rapidly moved upward, achieving similar outcomes to local children over time. This study has indicated that migrant children from educationally disadvantaged places of origin can benefit significantly from exposure to richer cultural environments. Therefore, for migrant students in public schools, the equal access to quality educational resources provided in the city has the potential to impact beneficially on migrant children (Markose & Hellstén, 2009). Similarly, migrant children in poorly resourced private schools may experience a widening in the achievement gap, in relation to their public school counterparts as their length of residence in urban areas increases (Lai et al., 2014).

There exist divergent assimilation paths for these new migrant groups in China with high SES disposed towards upward assimilation and low SES towards downward assimilation (Lu & Zhou, 2013). During their period of segregated education within urban mainstream schools, migrant students in urban areas become integrated into urban society (Alba & Nee, 2009; Markose & Hellstén, 2009). As witnessed in this study, migrant students in public schools achieve similar test results to urban children. In itself this finding is sufficient to demonstrate that migrant children have the capacity and motivation to adapt effectively to urban culture. This study has indicated that given access to public school education, students in private schools should in principle be sufficiently able to improve their mathematics performance to a commensurable level of achievement with urban children.

8.3.4 Teachers’ perceptions of the educational situation of migrant children

In an effort to identify teachers’ perceptions of migrant children’s education and
challenges during educational practice, this study also included a comparative study
between teachers in Chinese urban public and private schools. Results showed that
urban teachers in both types of schools generally hold positive perceptions towards
migrant children’s education in urban schools. However, in terms of teachers’
perceptions of migrant children’s education, a statistically significant difference was
found between school types. Private school teachers had less positive perceptions
regarding migrant students’ education. This finding confirms that teachers working
with migrant students hold different perceptions of the value of social inclusion (Cho
& Reich, 2008; Devine, 2005). The majority of the teachers in both public and private
schools agreed with the principle of educational inclusion. In addition, this study
found that teachers in public schools clearly indicated their enthusiasm about current
classroom settings which include both migrant and urban children. It seems that in
recent years public school teachers have gained a growing awareness and
understanding of the importance of migrant children’s education for a sustainable
urbanisation process in China (Liu, Holmes, & Albright, 2015b; Wei & Hou, 2010).

In contrast, this study showed that private school teachers held a less positive attitude
to migrant children’s education compared to teachers in public schools. These
teachers mainly believed that the poor learning skills and low achievement levels of
migrant school students impeded their educational outcomes. Also, the majority of
these teachers believed that the government should play the most important role in
being responsible for the improvement of migrant children’s education in urban
schools. Private school teachers had less positive perceptions of migrant children’s
current educational situation. They believed that the financial resources contribution
made by the government is insufficient to guarantee education rights and teaching
quality for migrant children in private schools, despite the reform of institutional
barriers and regulations which have been implemented (Wei & Hou, 2010). It is
inferred, therefore, that the disparity in educational opportunities for migrant children
between public and private schools has made private school teachers less ambitious
than public school teachers regarding education for migrant students in urban schools.
The findings also confirm previous studies that indicate that teachers’ perceptions towards students are closely related to their teaching practices in coping with the challenges in a classroom of diverse students (Jussim & Harber, 2005; Song, 2006). The study showed that teachers in the two types of schools reacted to migrant children’s education differently in terms of their educational practice. In public schools, most teachers maintained high expectations (Xie, 2007). In contrast, teachers in private schools often neglected a number of migrant children who performed poorly with respect to academic achievement. These students with low achievement levels were evaluated as being less intelligent and having less promising prospects for school careers (Dunne & Gazeley, 2008).

Despite some positive signs, various difficulties impede urban teachers’ educational practices in the two types of school, including insufficient professional support, lack of parental cooperation and involvement, and employment insecurity. Differences were found, however, between the challenges pertaining to the type of school that teachers work in. Firstly, the stark differences in teachers’ working conditions between public and private schools has been found to have a significant impact on the educational quality that urban teachers perceive can be provided for migrant students (Lai et al., 2012; Liu & Jacob, 2013). These findings confirm that for public school teachers, in dealing with migrant children’s education, their feelings of doubt and helplessness often result in frustration about themselves and migrant students’ learning ability in order to keep up with the same grade-level content as non-migrant students (Cho & Reich, 2008; Theodorou, 2011). For teachers in migrant schools, they also showed fewer opportunities to access courses required to accomplish professional teaching practice successfully (Tschannen-Moran, Hoy, & Hoy, 1998). Therefore, aligned with other literature, urban teachers’ capacity to balance the requirements for all children, both migrant and non-migrant, is often constrained by the typical collective teaching pedagogy used within the Chinese public educational system (Liu & Jacob, 2013). For public school teachers, teaching students with highly diverse
learning backgrounds requires these teachers to have a higher capacity to develop curriculum (Qian & Walker, 2013; Zhao, 2011).

As reported earlier, this study also addressed the contention that migrant parents’ neglect of students’ education was one of the main perceived challenges to urban teachers. As other studies have found, the negative impact of migrant parents with respect to the effort they put into their children’s education brought out difficulties for urban teachers to provide effective support to migrant students (Liu & Jacob, 2013; Vezzali, Giovannini, & Capozza, 2012). Urban teachers often attributed the academic failure of migrant children to their parents’ lack of cooperation with teachers, as well as less time spent on their child’s homework after school (Xie, 2007). This could be explained by migrant parents’ low literacy, limiting their understanding of the importance to be placed on their children’s education (Liu & Jacob, 2013). As a result, teachers perceived that many migrant parents indicated a clear-cut division of responsibility between school teachers and themselves (Lam, Ho, & Wong, 2012). Parents of migrant school students were perceived by urban teachers to have less school involvement than urban parents. The findings of this study also supported this idea of the stereotype of migrant parents’ ‘low quality’ that has been revealed in other studies (Goodburn, 2009).

In the final analysis of the challenges for urban teachers, differences in the working conditions of urban teachers between the two types of school were confirmed as a lack of employment security and stability for teachers in private schools in comparison to teachers in public schools (Liu et al., 2009). For private school teachers, this study has also revealed that the inferior school resources and insufficient professional support have become problems for them in providing migrant students’ education (Goodburn, 2009). As temporary teachers in private schools, these teachers are often teaching subjects irrelevant to their college majors. Therefore, some of these teachers indicated a lack of pedagogical content knowledge and professional development to assist with the implementation of the curriculum as reported in other studies (Ingvarson, Meiers, & Beavis, 2005). It is evident that despite the
government's efforts toward improving migrant students’ education in urban areas, the current situation for migrant students and teachers in private schools still exposes them to disadvantage (Wei & Hou, 2010). In particular, the differential system between school types inevitably has a negative influence on teachers’ motivation for working with migrant children (Fu & Ren, 2010; Wei & Hou, 2010).

With increased numbers of rural-urban migrant children moving to urban schools, urban teachers are faced with various educational challenges in terms of a lack of professional development, their capacity to enact education for both migrant and non-migrant students, and migrant parents’ educational beliefs and behaviours. All of these difficulties have affected urban teachers’ perceptions of and practice with migrant children’s education. The insufficient levels of social support for teachers are urgent issues to be resolved by Chinese educational authorities.

8.3.5 The disparity of teaching quality between public and private schools

This study included classroom observations for the purpose of determining any disparities in the quality of current pedagogic practices. This study employed the framework described in ‘Quality teaching in NSW public schools: A classroom practice guide’ (NSW DET, 2003). Three basic dimensions were used to measure instructional quality for mathematics teaching in public and private schools. This is a new application of the Quality Teaching Model in a Chinese setting. The findings systematically revealed that the score ratings for teaching quality in public schools were generally higher than in private schools. Moreover, the teaching scores on all three dimensions of 'Intellectual Quality', 'Quality Learning Environment', and 'Significance' in public schools proved to be higher than in private schools respectively.

The first dimension of ‘Intellectual Quality’ focuses on teaching practices that produce deep understanding of important, substantive concepts, skills and ideas. The scores on each element within this dimension were lower in private schools than in public schools. In both types of schools, some key concepts and ideas were mentioned or covered by the teacher or students, but the majority of the concepts and problem
solving in migrant schools occurred at a superficial level. In public schools, mathematics instruction that promoted conceptual understanding attended explicitly to concepts and specified the connections among mathematical facts, procedures, ideas, and representations (Hiebert & Grouws, 2007). Moreover, conceptual instruction encouraged students to discover and understand the meaning of underlying procedures, to discuss the relationships between concepts, to compare different solution strategies, and to solve non-routine problems (Brophy, 2000). In private school classrooms, the discourse was limited to rapidly paced recitation that elicits short answers to miscellaneous questions, and therefore, new concepts were introduced without building on students’ ideas, experiences, and prior knowledge (Meyer & Land, 2013).

In contrast, public school teachers used questions to stimulate students to process and reflect on content, recognise conceptual relationships, while also exploring their implications and key ideas. Public schools were more effective at encouraging students to think critically about what they are learning and to use what they have learned in the service of problem solving, decision making, or other higher-order applications (Greeno, 2006).

In cognitively activating instruction, public school teachers stimulated the students to disclose, explain, share, and compare their thoughts, concepts, and solution methods. In contrast, this study has found that students in private schools were generally requested to solve mathematical problems and tasks in a standard manner previously demonstrated by the teachers. Moreover, many of the questions set were at a low cognitive level, and teachers relied on the naive belief that learning mathematics is tantamount to the transmission of subject-matter knowledge. This study reinforced the findings of previous studies which suggest that by presenting students with challenging tasks, cognitive conflicts, and differing ideas, positions, interpretations, and solutions, the pedagogic process fosters student perspicacity and critical reflection (Klieme et al., 2009). It has been found that the likelihood of cognitive activation increases when the teacher calls students’ attention to connections between different concepts and ideas. When students reflect on their learning and make explicit the
underlying presumptions imbibed with what they learn, the teacher’s role of connecting and integrating new content with prior knowledge was facilitated (Klieme et al., 2009) Conversely, the likelihood of cognitive activation decreases, when these pedagogic processes are absent.

The dimension of ‘Quality Learning Environment’, which refers to a supportive classroom climate, has been linked to academic outcomes (Brophy, 2000). Students in classes with a more supportive climate are more engaged and show more involvement with their learning than do students in classes with a less supportive climate (Turner et al., 1998). Consistently, in public school classrooms in this study, interactions including supportive teacher-student relationships, positive and constructive teacher feedback, a positive approach to student errors and misconceptions, individual learner support, and caring teacher behaviours featured prominently. In addition, other empirical studies have found that a respectful and appreciative climate (both of which foster the experience of relatedness and belonging), figures significantly as an important precondition for successful learning (Assor, Kaplan, Kanat-Maymon, & Roth, 2005). The supportive climate has beneficial and direct effects on student motivation, while also having other more indirect effects on academic achievement (Klieme et al., 2009).

In the public schools various means were observed for developing and sustaining an orderly classroom atmosphere: preventing disruptions and minimising the likelihood of disciplinary problems, on the one hand, and dealing with misbehaviour, disruptions and conflicts, on the other (Borich, 2013). In public schools, teachers established clear rules and procedures, managed transitions between lesson segments smoothly, kept track of students’ work, planned and organised their lessons well, managed minor disciplinary problems and disruptions, stopped inappropriate behaviour, and kept a whole-group focus. The analysis of the observations provided strong evidence of effective classroom management, which in turn can be seen as a critical prerequisite for students’ cognitive engagement. Good classroom management provides them with sufficient time and an orderly atmosphere in which to engage in content-related
activities (Hill, Rowan, & Ball, 2005). Numerous empirical studies have also found that effective classroom management has positive effects on student learning (Seidel & Shavelson, 2007). In the private schools in this study, however, little was found to establish signs of effective classroom management, as illustrated by the ever-increasing episodes of student misbehaviour. These in turn served as irrelevant distractions from the goal of quality mathematics education. In the public school classrooms, students were able to spend more time on task analysis and therefore had more opportunities to engage with learning content than did the students in the private school classrooms.

This study found that the teaching quality in public schools was of a higher level than in private schools, indicating that the learning experiences of migrant children in private school classes was inequitable, needing amelioration. To some degree, this discrepancy may also explain why the achievement gap between these two types of schools engenders substantial inequalities in educational outcomes (Lai et al., 2014; Yang et al., 2014). The public schools themselves were likely to be an important contributor to the superior academic performance of migrant students attending those schools. Adequate academic progress better prepares migrant children for the demands of the future labour market, which, in turn, is central to China’s future social stability and sustainable economic development. However, this study found that private schools, which are the main venue for the education of migrant children, have been relatively unsuccessful in delivering quality education to these students. Urban public schools have been unable to accommodate many migrant children, the number of which is growing rapidly (Liu & Jacob, 2013). Therefore, implications are suggested in Section 8.5 of this chapter for Chinese policy makers, schools and educators.

8.3.6 Learning experiences of migrant students in public and private schools

This study has described the learning experiences of migrant children in Chinese urban schools through a comparative case study between public and private school classrooms. In alignment with the results of the survey, differences were found
between public and private schools, as the migrant students had different perceptions of their urban school experience and performed differently in response to urban school life, based on the results of classroom observation. Migrant students in public schools displayed a higher frequency of positive reactions to the class than migrant students in the private schools. The results of this study confirm the differences in the learning experiences of students in the two types of school (Lai et al., 2014; Lu & Zhou, 2013). In addition, it was revealed that the teachers’ provision of learning opportunities for migrant students was found to be different between classrooms in public and private schools. Teachers in the two types of schools displayed different behaviours towards migrant students, with teachers in public classrooms providing more feedback to the migrant child than did teachers in private classrooms. In public classrooms, migrant students were more likely to engage in classroom activities, and to perceive teachers as creating a caring, well-structured learning environment (Klem & Connell, 2004; Ding & Hall, 2007; Diseth, 2007). Also, migrant students in public schools were found to have more positive interactions with teachers and classmates than the students in the private school classroom.

The results of this study also found that two migrant students selected for detailed observation responded to their teachers differently, despite both participants sharing similar backgrounds in terms of SES and academic achievement. Teacher-student relations are an influential predictor of students’ school performance (Currie et al., 2008; Ding & Hall, 2007; Samdal et al., 1999). Results showed that the teacher and the migrant student in the public school had a good relationship. These findings are also confirmed by the student’s survey in Section 5.4 of Chapter 5, that migrant students in public schools displayed more positive perceptions of school environment (e.g., being more engaged, and having less strain).

Results of the student survey from the two typical students showed that the relationship scores between the teacher and the students in private school were lower than in the public school (Section 7.6, Chapter 7). This finding is confirmed by classroom interaction results (Section 7.5.3, Chapter 7) which noted that the teacher dominated the whole class. Students were only required to follow the teacher’s
instruction and to obey the rules. This type of relationship between the teacher and the student in the private school may in part explain the fact that the migrant students show less effective reactions to their teachers and classmates.

Results of the typical mathematics class (Section 7.5, Chapter 7) demonstrated that the migrant student in the private school did not have a good relationship with her fellow students. When the participant student in the private school made mistakes, many students in the classroom offered little help to the student. Moreover, these negative reactions from peers in the private school were often neglected by their teacher. For example, in the selected classroom, the teacher took no steps to remedy the problem of peer relationships.

Effective classroom teaching has positive effects on student learning and performance (Hiebert & Grouws, 2007; Seidel & Shavelson, 2007). As differences in classroom interactions between teachers and students in both types of school have been found, this may explain part of the students’ achievement gap and disparity in school outcomes between public and private schools. It can be seen from the data on interaction frequency that migrant students in public schools had more opportunity to be engaged in interaction with the teacher and classmates than migrant children in private schools (Section 7.5.2, Chapter 7).

Previous studies have shown that age, gender, socioeconomic background, and academic achievement are important determinants of a student’s satisfaction with school (Liinamo & Kannas, 1995; Samdal, Nutbeam, Wold, & Kannas, 1998). In this study, the demographic information of the two migrant students selected for detailed observation was controlled for with respect to background: both of the participant students had a similar level of academic achievement which was at the median range of the whole class; and the students’ socioeconomic status was very similar in terms of parents’ salary and occupation. After controlling for these variables, the results showed that the migrant student in the public school demonstrated more positive behaviours with regards to the teacher’s instruction and more effective engagement in classroom activity. In contrast, the student in the private school had less effective engagement, and suffered from negative influences such as problematic peer
relationships. To some degree, this discrepancy may also explain why the achievement gap between these two types of school engenders substantial inequalities in educational outcomes, yet remains, despite some measure of sustainable educational opportunities for migrants (Lai et al., 2014; Yang et al., 2014). The public school itself is likely to be an important contributor to the superior academic performance of migrant students attending these schools.

In summary, this study has investigated migrant students’ learning experiences by comparing mathematics achievement between public and private schools. In addition, the difference in achievement of migrant students is addressed from the perspective of teachers’ perceptions of the migrant students’ educational situation, and their classroom practice with these children. Results indicate that there are significant differences in the mathematics achievement levels, teachers’ perceptions and practices, and students’ learning experiences between public and private schools. Private school teachers have less positive perceptions of the migrant students’ educational situation than teachers in public schools. Moreover, the findings systematically revealed that the score ratings for teaching quality in public schools are generally higher than in private schools, as measured by the Quality Teaching Model. These findings indicate that private schools, which are the main venue for the education of migrant children, have been less successful in delivering quality education to migrant children than public schools. Therefore, this study implies that interventions which enhance the students’ positive learning experience with school are likely to improve their achievement levels. Further implications are explored in Section 8.5 of this chapter.

8.4 Limitations of the study

In this section the major limitations that were encountered during the course of the study are summarised.

It should be noted at the outset that the data are restricted to Shanghai City, which represents one of the largest primary migration destination cities in China, affecting a huge population of migrant children. Despite the fact that the situation in Shanghai exhibits a considerable array of similarities to other large Chinese cities with a high
concentration of migrants, the generalizability of certain aspects of the results could arguably be regarded as problematic. This being so, this study suggests that conclusions can reliably be restricted to the context of the Shanghai analysis provided, and given its massive migrant population, the conclusions should nevertheless be regarded as significant.

Although the sampling procedure yields a probability sample up to the class level, it does not provide a strict probability sample for all children. Nonetheless, this study has explicitly been designed to address the equity achievement issue by reference to mathematics performance, and has for this reason, not ventured to comment on other important subjects in primary schools such as science, and Chinese reading/literacy. A venture of the envisaged magnitude described here would obviously require a comprehensive investigation of monumental resources, time, and space, so must thus remain a research task for yet another occasion.

Meanwhile, another limitation of this study is that there is presently no national standardised test across grade levels in Chinese primary schools, as mathematics test scores are provided by participant schools in one district only. Therefore, the generalizability of certain aspects of the conclusion could arguably be regarded as problematic. Furthermore, this study employs parents’ occupation and education levels as the primary indicators of the family’s socioeconomic status. This conclusion is to some extent limited by the fact that it has yet to be determined whether other indicators involved in predicting school selection and the subsequent mathematics achievement gap deserve to be considered.

While ambitious in scope, there are limitations in relation to classroom observations in this study. Although this study identified gaps in the quality of school teaching between urban public and private schools, the observational data do not allow us to definitively prove that the differences are causal in nature. Moreover, although this study seeks to control for self-selection, there still may be a number of unobservable factors that cannot be fully accounted.

8.5 Implications of the study
This study suggests a number of implications and recommendations for policy makers, schools, teachers, migrant families, policy makers in China; and for future researchers in the field of migrant children’s education.

First, this study reveals that the Chinese government's current policy of migrant segregation does not effectively deliver high quality mathematics education to all migrant children in comparison to the delivery available in urban public schools. The disparities in the present segregated school structure remain an especially formidable barrier to the advancement of educational outcomes for migrant students. In order to better support social integration for migrant children, this study suggests that a focus is needed on the amelioration of the growing problem of inequity and the improvement of migrant students’ academic achievement levels. In particular, improvements in mathematics achievement levels could be brought to fruition simply by enlarging the opportunities for migrants to study in urban public schools, although it should be recognised that this would require an enormous injection of public funding into the public school system.

Second, this study does not deny the value of private schools, as this system has implicitly facilitated the rapid increase in the population of migrant children within urban schools over a relatively short time frame. However, the deeper point made by this study is that the educational quality of private schools should be improved to balance more effectively the distribution of educational resources amongst urban schools equally, be they migrant, or public. One way for policymakers to improve infrastructure and teaching resources in private schools would be to invest public resources into these schools, with the aim of improving facilities and teacher quality. More importantly, in order to improve the educational performance of migrant students, urban school systems should commit themselves to an ambitious expansion program that would allow any student in China’s cities to receive a public education. Although this is an expensive proposition, the importance of providing migrant students with a high quality education should make it a priority.

Third, in order to better support social integration for migrant children through
education, service providers should be aware of the predictors such as parental SES, sibling numbers, preschool education, length of residence and school factors. This study suggests that it is possible, and certainly feasible, to improve the background profile for migrant students by shortening the length of residency studying in private schools, while also facilitating the provision of preschool attendance for migrant students in low SES. Parental SES in terms of educational levels and occupation is a proven factor in mathematics achievement among migrant samples. However, the central and local government funding specifically targeting migrant parents is quite limited (Xiong, 2012).

Fourth, the study suggests that there is a need to enhance migrant students’ parental SES by legislative reform which more equitably determines the pathway opportunities for migrant students in private schools and improved mathematics achievement. Intervention programs for migrant parents, who may be at different levels of educational background and occupation, can provide support to assist them in advocating for their children, leading to successful school outcomes among migrant children, especially private school students. Furthermore, migrant parents’ school involvement is a vital issue challenging urban teachers for better implementation of integrated education of migrant children. As many urban teachers suggest, migrant parents should be given support to develop their awareness of the importance of educating migrant children so that they can become more actively involved in their children’s education, leading to better educational outcomes.

Fifth, recommendations are also made to support educators in order to better improve migrant children’s education. To begin with, the current teacher’s employment system plays an inhibiting role in achieving educational equity between schools. Thus, specific strategies are required to guarantee teachers equal rights between public and private schools. In addition, more funding is required to support teachers in private schools (e.g. improving teachers’ salaries and reforming urban household registration), so that all teachers have a secure and stable position in urban educational systems. In addition, professional development related to integrated education of migrant children
for urban teachers is required. For public schools, teachers require more training related to the rural-urban gap in education, so that urban teachers can develop the capacity to better integrate migrant and urban students within the classroom.

Sixth, this study proposes some future trends in the field of migrant children’s education for future researchers to investigate. For one thing, migrant children’s education is the most critical issue in the process of China’s drastic social transformation in recent decades. This study only focuses on migrant students in migrant and public schools. As for other groups (e.g., urban-urban migrant students), a future study may consider these students in order to gain a better understanding of the internal Chinese migrant population. For another, there remains plenty of room for investigating more factors (e.g., family parenting, students’ learning approach) other than the tested perspectives of teacher indicators in the current study. School segregation of Chinese migrant students exhibits inequitable outcomes, one of which enables some groups to gravitate towards mainstream lifestyles, while others find themselves segregated in poverty. Therefore, future research could examine the factors that determine migrant children’s upward mobility, based on the notion that current society has been stratified so that some rural-urban migrant children in urban settings remain segregated predominantly in private schools, while migrant students with high socioeconomic status have mainly become integrated with urban students in public schools.

8.6 Conclusion

This study has examined teachers’ teaching practices related to migrant children in urban China. The predictors of migrant children’s mathematics achievement exhibit notable differences for migrant children in public and private schools. Results also show that in general teachers’ perceptions of the current educational situation for migrant students are generally positive. However, a statistically significant difference was found, in terms of teachers’ perceptions of migrant children’s education between school types. Private school teachers have less positive perceptions of the migrant students’ educational situation than teachers in public schools. Moreover, the findings
systematically reveal that the score ratings for teaching quality in public schools are generally higher than in private schools, as measured by the Quality Teaching Model. With a higher level of teaching quality, students of both migrant and non-migrant backgrounds engage in more effective teacher-student and student-student interactions than their counterparts in private schools.

The results of this study indicate that the influence of current school education policies towards segregation of the migrant population has been negative. This study reveals that the Chinese government's current policy of migrant segregation does not effectively deliver high quality education to migrant children in private schools in comparison to public schools. The disparities in the present private school structure remain a formidable barrier to the advancement of educational outcomes for migrant students. Therefore, this study submits that the goal of school integration, not school segregation, should become one of the most important policies of the Chinese government, if progress is to be made towards improving the quality of education nationwide.
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Appendices

Appendix 1: Information Statement and Consent Form: Ministry of Education

Mathematics achievement levels and learning experiences of migrant children: Perspectives of teachers and teaching in Chinese urban schools

Your organization is invited to participate in the research project identified above. The project is being undertaken by Ting Liu for her PhD at the University of Newcastle, and is supervised by Associate Professor Kathryn Holmes and Professor James Albright from the School of Education of the University of Newcastle.

Why is the research being done?
A large population of migrant workers have migrated into urban areas in China, but their children’s’ academic achievement levels in urban schools have been largely unknown. The Chinese government has promulgated many regulations to improve the academic achievements of these Migrant Workers’ Children (MWC). In order to respond to Chinese government policy, this research aims to examine the mathematics achievement levels of migrant children in China in comparison to urban children. By investigating the mathematics achievement levels of migrant children in relation to other factors, such as teachers’ expectation and practice, this study will make recommendations to narrow the gap between migrant children and urban students in the future.

Who can participate in the research?
This study will access de-identified student test scores from potential participant schools in your district. The test scores of all urban children and migrant children will be included. It is expected that the schools in your district will represent three types: (1) schools with a majority of migrant children; (2) schools with approximately even numbers of migrant children and urban children; and (3) schools with a majority of urban children.

Migrant children in this study are defined as Chinese children who were born in rural areas but were brought into urban areas for compulsory education and their Household Registration system designation is agricultural. Urban children are defined as those who were born and have grown up in urban areas, and their Household Registration System designation is non-agricultural.
What choice do you have?

Participation in this research is entirely the choice of your organization. Collection of de-identified students’ test scores and recruitment of potential participant schools will occur only after consent has obtained from your organization. Participation in this study is entirely voluntary, and your organization can withdraw from the research at any time.

What would your organization be asked to do?

The de-identified data of students’ mathematics test scores will be requested from your organization, including student’s demographic information in relation to their Household Registration System designation (either Agricultural or non-Agricultural). Moreover, the contact information of potential participant schools will be sought for the invitation of school principals to participate in next stage of the study. Based on the contact information your organization provides, potential participant teachers in these schools will be invited to participate in a teacher survey.

Depending on your preference, your organization may email the test score database to the researcher electronically or you may prefer to post the hard copy of the de-identified database in an envelope (envelop and stamp will be prepared by the researchers).

What are the risks and benefits of participating?

There are no known risks associated with participation in this study. The anticipated benefit of the research is that it will provide the Ministry of Education with an overview of migrant children’s academic achievement levels in different types of schools in your district. Moreover, it will reveal a picture of comparison between urban children and migrant children in terms of their mathematics achievement. This information will provide the Ministry of Education with evidence for the allocation of future educational resources.

How will your privacy be protected?

Any information collected by the researchers will be stored securely and only accessed by Ting Liu and her supervisors. The research data will be kept secure in a password protected computer file with
external hard-drive backup, while all the hard copy of data will be kept in lockable file cabinets in the Academic Office Block (AOB) office in the campus of Callaghan at the University of Newcastle. All database information will be stored for a minimum of 5 years.

**How will the information collected be used?**

The research data will be reported in a thesis to be submitted for Ting Liu’s PhD studies. In addition, the data may be reported in peer reviewed journal articles and presented at academic conferences. Individual participants and schools will not be identified in any reports. You can request a summary of the results of the research by providing your e-mail address on the attached consent form.

**What do you need to do to participate?**

Please read this Information Statement and be sure you understand its contents before you consent to participate. If there is anything you do not understand, or if you have questions about the project please contact one of the researchers named below.

If you would like to participate, please reply by email to Ting.Liu@uon.edu.au.

**Further information**

If you would like further information please contact

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<tr>
<td>Fax: +61 (02) 4921 7887</td>
<td>Phone: +86 15121041348</td>
</tr>
<tr>
<td>Email: <a href="mailto:Kathryn.Holmes@newcastle.edu.au">Kathryn.Holmes@newcastle.edu.au</a></td>
<td>Email: <a href="mailto:Ting.liu@uon.edu.au">Ting.liu@uon.edu.au</a></td>
</tr>
</tbody>
</table>

Position: Principal Supervisor

Position: PhD student

Thank you for considering this invitation.

**Complaints about this research**

This project has been approved by the University’s Human Research Ethics Committee, Approval No. H-2012-0355

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researchers, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email Human-Ethics@newcastle.edu.au.
Consent Form: Ministry of Education

Mathematics achievement levels and learning experiences of migrant children: Perspectives of teachers and teaching in Chinese urban schools

Associate Professor Kathryn Holmes (Principal Supervisor); Professor James Albright (Co-Supervisor); Miss Ting Liu (PhD student)

On behalf of the Ministry of Education in _____________ District, China:

I consent for our organization to participate in the research project above and I give my consent freely.

I understand that the project will be conducted as described in the Information Statement, a copy of which I have retained.

I understand our organization can withdraw from the project at any time and do not have to give any reason for withdrawing.

I consent to providing a de-identified database of students' mathematics test scores and demographic information.

I consent to providing the contact information of potential participant schools in our district so that they can be invited to participate in the next stage of this study.

I understand that a summary of the findings will be available as detailed in the information statement.

Name: ____________________________________ Position: ____________________________

Signature: ________________________________ Date: ______________________________

Please email research results to:
___________________________________________________
___________________________________________________

If you would like further information please contact

<table>
<thead>
<tr>
<th>Name: Associate Professor Kathryn Holmes</th>
<th>Name: Miss Ting Liu</th>
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<tr>
<td>Phone: +61 (02) 4985 4948</td>
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<td>Email: <a href="mailto:Ting.Liu@uon.edu.au">Ting.Liu@uon.edu.au</a></td>
</tr>
<tr>
<td>Position: Principal Supervisor</td>
<td>Position: PhD student</td>
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</tbody>
</table>
Appendix 2: Information Statement and Consent Form: School Principal

Research Project: Mathematics achievement levels and learning experiences of migrant children: Perspectives of teachers and teaching in Chinese urban schools

Your school is invited to participate in the research project identified above. The project is being undertaken by Ting Liu for her PhD at the University of Newcastle, and is supervised by Associate Professor Kathryn Holmes and Professor James Albright from the School of Education of the University of Newcastle.

**Why is the research being done?**

Teachers may change their practices with students by adapting their curriculum and pedagogy in line with high/low expectations. Teachers’ expectations may affect their classroom interactions with students as well as students’ perceptions of themselves. Therefore, it is important to explore teacher’s expectations and instructional practices with students. It is anticipated that this study will be helpful for educators to understand and support Migrant Workers Children’s (MWC) school performance and to help educators set appropriate expectations of migrant children’s academic achievements.

**Who can participate in the research?**

In the stage of the study, we are seeking to invite all of the mathematics teachers from your primary school who have teaching experience with migrant children to participate by completing a teacher survey. In the next stage of the research (which includes interviews and observations), potential participants will be selected from teachers who have participated in the survey and have also expressed interest in taking part in the second stage of the research.

**What choice do you have?**

Participation in this research is entirely your choice and the choice of your organization. If your organization decides to participate, it may withdraw from the project at any time. The participation of individual teachers is entirely voluntary and they can also withdraw at any time, even if their organization consents.
**What will the research involve?**

Firstly, a teachers’ survey will be conducted in your school. Individual teachers will be invited to voluntarily participate in the survey. All of the mathematics teachers in your school will be invited to participate in the survey. At the end of the survey, participants will be invited to express interest in the second stage of the study and to do so they will be invited to provide their contact information such as email address or phone number for further contact.

In the second stage, participant teachers will be selected purposively to represent schools with different proportions of migrant children. These teachers will be invited to participate in an interview with the researcher. After the interview, the participant teachers’ will be invited to participate in classroom observations, with the intention of investigating the relationship between their beliefs and practices towards migrant children. The interview and the classroom observations will be audio/video recorded in order to provide an accurate record for analysis. After the classroom observations, selected migrant children will be invited to complete a survey. The student survey will be conducted only if consent has been received from both the student and their parents.

**What would you be asked to do?**

If your organization agrees to participate, you will be asked to arrange the distribution of hard copies of survey, information statements and consent forms to all of the potential participant teachers in your organization. The researcher will supply the school with a specific mail box for teachers to submit their signed consent forms and completed surveys.

In the second stage of the study, the student researcher requests your permission to enter into your school to conduct teacher interviews and classroom observations. One school administrator is required in your school to distribute the invitation to eligible parents of the selected migrant children in order to gain consent for their children to participate in the study. The school administrator will be required to advise the migrant children that participation is not compulsory. After gaining students’ and their parents’ permission, the school administrator will also be required to distribute and collect the surveys of student participants.
After consent is granted the researcher will liaise with selected classroom teachers to arrange a time and place for teacher interviews, classroom observations and for the selected migrant children to complete the survey.

**What are the risks and benefits of participating?**

There is no known risk associated with participation in this research. The anticipated benefit of the research is that it will provide each school principal with an overview of their teachers’ expectations of Migrant Worker Children in their school. Moreover, the insights into migrant children’s classroom interactions with teachers, in comparison to their classroom interactions with urban children will help school principals to understand teacher’s expectations and practice.

**How will your privacy be protected?**

Any information collected by the researchers will be stored securely and only accessed by Ting Liu and her supervisors. The research data will be kept secure in a password protected computer file with external hard-drive backup while all the hard copy of data will be kept in lockable file cabinets in the Academic Office Block (AOB) office in the campus of Callaghan at the University of Newcastle. The collected data will be stored for a minimum of 5 years.

**How will the information collected be used?**

The research data will be reported in a thesis to be submitted for Ting Liu’s PhD studies. In addition, the data will be reported in peer reviewed journal articles and presented at academic conferences. Individual participants will not be identified in any reports. You can request a summary of the results of the research by providing your e-mail address on the attached consent form.

**What do you need to do to participate?**

Please read this Information Statement closely. If there is anything you do not understand, or if you have questions about the project, please contact one of the researchers named below.

If you agree to your organization to participate in this research, please complete the attached consent form and return it by email to Ting.Liu@uon.edu.au.
Further information

If you would like further information please contact

Name: Associate Professor Kathryn Holmes  
Phone: +61 (02) 4985 4948  
Fax: +61 (02) 4921 7887  
Email: Kathryn.Holmes@newcastle.edu.au  
Position: Principal Supervisor  
Signature:

Name: Ting Liu  
Phone: +61 0450914944  
Phone: +86 15121041348  
Email: Ting.liu@uon.edu.au  
Position: PhD student  
Signature:

Thank you for considering this invitation.

Complaints about this research

This project has been approved by the University’s Human Research Ethics Committee, Approval No. H-2012-0355

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researchers, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email Human-Ethics@newcastle.edu.au.
Consent Form: School Principal

Mathematics achievement levels and learning experiences of migrant children: Perspectives of teachers and teaching in Chinese urban schools

Associate Professor Kathryn Holmes (Principal Supervisor); Professor James Albright (Co-Supervisor); Miss Ting Liu (PhD student)

I agree for our school to participate in the research project above and give my consent freely.

I understand that the project will be conducted as described in the Information Statement, a copy of which I have retained.

I understand our school can withdraw from the project at any time and you do not have to give any reason for withdrawing.

I consent to arranging the distribution of invitations to teachers and to inviting them to participate in the survey.

I consent to the researcher entering into our school for teacher interviews, classroom observations with audio/video recording, and for conducting student surveys.

I consent to arranging the distribution of invitations to students’ parents and to inviting their children to participate in the student survey and classroom observations.

I understand that a summary of the findings will be available at the close of the project as detailed in the information statement.

Name: ____________________________
Signature: __________________________ Date: __________________________

Please email the research findings to:

If you would like further information please contact

| Name: Associate Professor Kathryn Holmes | Name: Miss Ting Liu |
| Phone: +61 (02) 4985 4948 | Phone: +61 0450914944 |
| Fax: +61 (02) 4921 7887 | Phone: +86 15121041348 |
| Email: Kathryn.Holmes@newcastle.edu.au | Email: Ting.Liu@uon.edu.au |
| Position: Principal Supervisor | Position: PhD student |
Appendix 3: Information Statement and Consent Form: School Teacher

Research Project: Mathematics achievement levels and learning experiences of migrant children: Perspectives of teachers and teaching in Chinese urban schools
Phase 1: Teacher Survey

You are invited to participate in the research project identified above. The project is being undertaken by Ting Liu for her PhD at the University of Newcastle, and is supervised by Associate Professor Kathryn Holmes and Professor James Albright from the School of Education of the University of Newcastle.

Why is the research being done?
Teachers may change their practices with students by adapting their curriculum and pedagogy in line with high/low expectations. Teachers’ expectations may affect their classroom interactions with students as well as students’ perceptions of themselves. Therefore, it is important to explore teacher’s expectations and instructional practices with students.

This study aims to explore teachers’ expectations and practices with migrant workers’ children (MWC) in relation to mathematics achievement. It is anticipated that the study will be helpful for teachers to understand their expectations and support for migrant children. In addition, this study will help educators to set appropriate expectations of migrant children and to consider the needs of migrant children.

Who can participate in the research?
We are seeking to invite mathematics teachers in primary schools who have teaching experience with migrant children. Potential teachers will be chosen purposively based on three types of schools: (1) schools with the majority of migrant children; (2) schools with approximately even numbers of migrant children and urban children; and (3) schools with a majority of urban children.

What choice do you have?
Participation in this research is entirely your choice. Only those people who give their signed consent...
will be included in the project. Individual teachers can withdraw at any time even if their organization consents. If you do decide to participate, you may withdraw from the project at any time without giving a reason.

**What would you be asked to do?**

If you agree to participate, you will be asked to complete a survey about your experiences and expectations of teaching the children of migrant workers. The survey will take approximately 30 minutes to complete. Depending on your preference, the survey may be completed at school or at home. After completing the survey, you are required to submit it to the collection box provided at school. At the end of survey, you will be invited to express interest in the second stage of the study. Further information about this component will be provided in a subsequent invitation letter. If you agree to participate, contact information such as your email address or phone number will be required for further contact.

**What are the risks and benefits of participating?**

There is no known risk associated with participation in this research. The anticipated benefit of the research is that it will provide the school teacher with an overview of teachers’ expectations of migrant children in their school. Moreover, the survey results will be helpful for school teachers to understand teachers’ expectations and practices with migrant children in comparison to urban children.

**How will your privacy be protected?**

Any information collected by the researchers will be stored securely and only accessed by Ting Liu and her supervisors. The research data will be kept secure in a password protected computer file with external hard-drive backup while all the hard copy of data will be kept in lockable file cabinets in the Academic Office Block (AOB) office in the campus of Callaghan at the University of Newcastle. The collected data will be stored for a minimum of 5 years.

**How will the information collected be used?**

The research data will be reported in a thesis to be submitted for Ting Liu’s PhD studies. In addition, the data will be reported in peer reviewed journal articles and presented at academic conferences.
Individual participants will not be identified in any reports. You can request a summary of the results of the research by providing your e-mail address on the attached consent form.

*What do you need to do to participate?*

Please read this Information Statement and be sure you understand its contents before you consent to participate. If there is anything you do not understand, or if you have questions about the project please contact one of the researchers named below. If you would like to participate, please complete the consent form and submit it into the collection box.

*Further information*

If you would like further information please contact

<table>
<thead>
<tr>
<th>Name: Associate Professor Kathryn Holmes</th>
<th>Name: Ting Liu</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>Position: Principal Supervisor</td>
<td>Position: PhD student</td>
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<tr>
<td>Signature: ..................................</td>
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</table>

Thank you for considering this invitation.

*Complaints about this research*

This project has been approved by the University’s Human Research Ethics Committee, Approval No. H-2012-0355

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researchers, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email Human-Ethics@newcastle.edu.au.

*Information Statement: School Teacher*
Research Project: Mathematics achievement levels and learning experiences of migrant children: Perspectives of teachers and teaching in Chinese urban schools

Phase 2: Teacher Interview and Observation

Firstly, thank you for your involvement in the survey component of this study and for expressing interest in taking part in the second stage of the study. This project is being undertaken by Ting Liu for her PhD at the University of Newcastle, and is supervised by Associate Professor Kathryn Holmes and Professor James Albright from the School of Education of the University of Newcastle.

Why is the research being done?

Teachers may change their practices with students by adapting their curriculum and pedagogy in line with high/low expectations. Teachers’ expectations may affect their classroom interactions with students as well as students’ perceptions of themselves. Therefore, it is important to explore teacher’s expectations and instructional practices with students.

This study aims to explore teachers’ expectations and practices with migrant workers’ children (MWC) in relation to mathematics achievement. It is anticipated that the study will be helpful for teachers to understand their expectations and support for migrant children. In addition, this study will help educators to set appropriate expectations of migrant children and to consider the needs of migrant children.

Who can participate in the research?

If you are a mathematics teacher in primary school who has participated in our earlier survey, and who has experience in teaching children of migrant workers, then you are eligible to participate in this component of the research.

What choice do you have?

Participation in this study is entirely voluntary. If you do decide to participate, you may withdraw from the project at any time without giving a reason.
What would you be asked to do?

In this phase, you will be invited to participate in an interview and classroom observations with the researcher. The student researcher will liaise with you to ensure the best time and place for the interview and the classroom observations.

1. For the interview, if you agree to participate, you will be asked to respond to questions about your expectations and experiences of teaching the children of migrant workers. The interview should last for approximately 45 minutes. The interview session will be conducted face to face at school by the student researcher, Ting Liu, who is a PhD student at the University of Newcastle. The interview session will be audio-recorded and participants will be invited to review the interview transcripts.

2. For the classroom observations, participants will be required to conduct their normal mathematics lessons. The lessons will be conducted in the classroom and all interactions between students and the teacher will be video-recorded (including student and teacher verbal and non-verbal information). In addition, it should be noted that the video camera is a small, hand-held model placed in the corner of classroom, so as to cause minimal disruption. The observation time is from the lesson starting to the lesson ending, which is approximately 45 minutes. The observation will be conducted 3-5 times in each classroom over the period of one week.

You are invited to leave your email address on the attached consent form if you would like to see the results of the interviews and observations.

What are the risks and benefits of participating?

The anticipated benefit of the research is that the interview and observation results of this study will provide participating teachers with insights into understanding their expectations and practice when working with Migrant Worker Children in comparison to urban children. It may provide the basis for school teachers to conduct a reflection and adaption of their teaching in the future.

There may be a small risk of classroom disruption during the classroom observation components,
however the student researcher will liaise with teachers to minimize any risks. It is possible to reduce classroom disruption through a process of gradual familiarization by recording a number of teaching sessions prior to the ones which are of interest for the research.

_How will your privacy be protected?_

Any information collected by the researchers will be stored securely and only accessed by Ting Liu and her supervisors. The research data will be kept secure in a password protected computer file with external hard-drive backup while all the hard copy of data will be kept in lockable file cabinets in the Academic Office Block (AOB) office in the campus of Callaghan at the University of Newcastle. The collected data will be stored for a minimum of 5 years.

In addition, reporting the results of the classroom observations will use de-identified data only, so that participant privacy will be secured. The observation video will only be used by the student researcher to analyze classroom interactions, and it will not be used in the reporting of the research.

_How will the information collected be used?_

The research data will be reported in a thesis to be submitted for Ting Liu’s PhD studies. In addition, the data will be reported in peer reviewed journal articles and presented at academic conferences. Individual participants will not be identified in any reports. The observation video used in this study is to improve and assure the accuracy of researchers, so it does not form as part of the data set for analysis. You can request a summary of the results of the research by providing your e-mail address on the attached consent form.

_What do you need to do to participate?_

Please read this Information Statement and be sure you understand its contents before you consent to participate. If there is anything you do not understand, or if you have questions about the project please contact one of the researchers named below.

_Further information_

If you would like further information please contact
Thank you for considering this invitation.

Complaints about this research

This project has been approved by the University’s Human Research Ethics Committee, Approval No. H-2012-0355

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researchers, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email Human-Ethics@newcastle.edu.au.
Appendix 4: Information Statement and Consent Form: Student’s Parent

Research Project: Mathematics achievement levels and learning experiences of migrant children: Perspectives of teachers and teaching in Chinese urban schools

Phase 2: Student Survey and Observation

Your child is invited to participate in the research project identified above. The project is being undertaken by Ting Liu for her PhD at the University of Newcastle, and is supervised by Associate Professor Kathryn Holmes and Professor James Albright from the School of Education of the University of Newcastle.

Why is the research being done?
Students’ perceptions of teachers’ expectations and instructional practices are significant because students may respond to teachers’ expectations positively or negatively according to the instructional treatment from teachers. Therefore, it is important to explore students’ perceptions of teachers’ expectations and students’ classroom interactions with teachers.

It is anticipated that this study will contribute to new knowledge about students’ perceptions of teachers’ expectations and classroom interactions. This study will also be helpful for educators to set appropriate expectations of students’ school performance and to better support Migrant Workers Children’s (MWC) studies in urban schools.

Who can participate in the research?
We are seeking migrant children in this study who were brought into urban areas for compulsory education but their Household Residence Registration System designation is agricultural. Children who were born and grew up in the city are excluded from this component of the study.

Participant students will be selected purposively based on three types of schools: (1) school with the majority of migrant children; (2) school with approximately even numbers of migrant children and
urban children; and (3) school with a majority of urban children. Two migrant children will be chosen from each type of schools.

*What choice do you have?*

Participation in this research is entirely your choice. Only the migrant children of those parents who sign their consent form will be included in the project. If you do decide to participate, you may withdraw from the project at any time without giving a reason. Whether or not you decide to participate, your decision will not disadvantage you. Your child’s participation is entirely voluntary, and they can also withdraw from the research at any time.

*What would you be asked to do?*

You will be required to discuss the research with your child and to ensure that you are both willing to participate before completing the consent form. In this section of the research project, your child will be invited to complete a short survey and to participate in their usual mathematics classes.

Firstly, participant students will be invited to complete a survey about their perceptions and experiences of study at school. The distribution of invitations to student participants and the administration of the survey will be conducted by a school administrator. If you agree to participate, your child will be required to voluntarily respond to questions in a survey at school that may last for approximately 30 minutes.

Secondly, your child will be invited to be observed in mathematics classes. The observation session will be conducted in the classroom so that all of the interactions between students and their teacher will be video-recorded (including student and teacher verbal and non-verbal information). In addition, it should be noted that the video camera is small hand-held model, placed in the corner of classroom, so as to cause minimal disruption. The time of observation will be from the start to the end of lesson, which is approximately 45 minutes. The observation will be conducted 3-5 times in each classroom over the period of one week. Ting Liu, who is a PhD student at the University of Newcastle, will conduct the observation of the whole classroom.
What are the risks and benefits of participating?

The anticipated benefit of the research is that the survey results will provide students and their parents with an overview of migrant Children’s perceptions and experiences of school and of their teachers in their school. Moreover, the findings of the classroom observation analysis will give students and their parents the new insights into teachers’ expectations and practices with migrant children in comparison to urban children. This may be helpful for improving the education of migrant children in urban schools.

The risks of participating are minimal and the student researcher will liaise with the classroom teacher to minimize any risks. The researcher will liaise with the classroom teachers in each school to determine the best time and place for the migrant children to complete the survey. There may be a small risk of classroom disruption during the classroom observation component. However, it is possible to reduce classroom disruption through a process of gradual familiarization by recording a number of teaching sessions prior to the ones which are of interest for the research.

How will your privacy be protected?

Any information collected by the researchers will be stored securely and only accessed by Ting Liu and her supervisors. The research data will be kept secure in a password protected computer file with external hard-drive backup while all the hard copy of data will be kept in lockable file cabinets in the Academic Office Block (AOB) office in the campus of Callaghan at the University of Newcastle. The collected data will be stored for a minimum of 5 years.

In addition, reporting the results of classroom observation will use de-identified form that the participant privacy will be secured. The video will only be used by the student researcher to analyze classroom interactions, and it will not be used in the reporting of the research.

How will the information collected be used?

The research data will be reported in a thesis to be submitted for Ting Liu’s PhD studies. In addition, the data will be reported in peer reviewed journal articles and presented in conferences. Individual participants will not be identified in any reports. You can request a summary of the results of the
research by providing your e-mail address on the attached consent form.

**What do you need to do to participate?**

Please read this Information Statement and be sure you understand its contents before you consent your child to participating. You are requested to discuss the research with your child and to ensure that you are both willing to participate before completing the consent form. If there is anything you do not understand, or if you have questions about the project please contact one of the researchers named below. If you would like to participate, please complete the consent form and submit it to the school administrator.

**Further information**

If you would like further information please contact

<table>
<thead>
<tr>
<th>Name: Associate Professor Kathryn Holmes</th>
<th>Name: Ting Liu</th>
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</thead>
<tbody>
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</tr>
<tr>
<td>Position: Principal Supervisor</td>
<td>Position: PhD student</td>
</tr>
<tr>
<td>Signature: ..........................</td>
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</tbody>
</table>

Thank you for considering this invitation.

**Complaints about this research**

This project has been approved by the University’s Human Research Ethics Committee, Approval No. H-2012-0355

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researchers, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email Human-Ethics@newcastle.edu.au.
Consent Form: Student’s Parent

Mathematics achievement levels and learning experiences of migrant children: Perspectives of teachers and teaching in Chinese urban schools

Phase 2: Survey and Observation

Associate Professor Kathryn Holmes (Principal Supervisor); Professor James Albright (Co-Supervisor);
Miss Ting Liu (PhD student)

I agree for my child to participate in the above research project and give my consent freely.
I understand that the project will be conducted as described in the Information Statement, a copy of which I have retained.
I understand my child can withdraw from the project at any time and do not have to give any reason for withdrawing.
I consent my child to completing a survey.
I consent my child to participating in a classroom observation and having it recorded.
I understand that my child’s personal information will remain confidential.
My child has the opportunity to have questions answered to his/her satisfaction.

Participant’s parent’s Name: ____________________
Signature: __________________________________
Date: _________________________

Consent of child / young person < 18 years:

Participant’s Name: __________________________________
Signature: ___________________________ Date: _________________________

Please email publication to: __________________________________
If you would like further information please contact

| Name: Associate Professor Kathryn Holmes | Name: Miss Ting Liu |
| Phone: +61 (02) 4985 4948 | Phone: +61 0450914944 |
| Fax: +61 (02) 4921 7887 | Phone: +86 15121041348 |
| Email: Kathryn.Holmes@newcastle.edu.au | Email: Ting.Liu@uon.edu.au |
| Position: Principal Supervisor | Position: PhD student |
Appendix 5: Teacher Survey
Mathematics achievement levels and learning experiences of migrant children: Perspectives of teachers and teaching in Chinese urban schools

Introduction
Thank you for taking the time to participate in a survey conducted by the School of Education of the University of Newcastle, Australia, to better understand the personal expectations and practices of Chinese primary mathematics teachers. This survey is not a test, so there are no “right” or “wrong” answers. We are interested in your personal opinions. Your experience and knowledge will be used to build a developing understanding of how teachers expect of migrant workers’ children (MWC) in China. If you really cannot make up your mind, please leave the question out.

Migrant children in this study is defined as children who were brought into urban areas for compulsory education (usually refer to children come to live in city after 5 years old), but their Household Residence Registration (Hukou) System designation is agricultural. Children who were born and grow up in the city were excluded from the group of migrant children.

Part I Demographic Information

1. Your gender:
   □ Female □ Male

2. Your School:
   □ Public school □ migrant school

3. Your classroom type is with:
   □ the majority of migrant children
   □ approximately even numbers of migrant and urban children
   □ a majority of urban children

4. Your Hukou system is:
   □ Agricultural □ Non-agricultural
   □ Transfer from agricultural to non-agricultural

5. Please indicate which age category you fit into with a tick in the appropriate box
   □ Under 20 □ 20-29 □ 30-39 □ 40-49 □ 50+

6. Please identify the highest qualifications you currently hold:
1. What is your opinion about the current situation of migrant children’s education in urban areas?
   □ Unsatisfactory
   □ Poor
   □ Good
   □ Very good
   □ Excellent

2. What is your opinion about the efforts made by the whole society for migrant children?
   □ Absolutely inadequate
   □ Inadequate
   □ Barely adequate
   □ Adequate
   □ More than adequate

3. Can you order the importance of the following items responsible for migrant children in school achievement? Please write down the numbers on the line.
   a. ☐ Government
   b. ☐ Parents
   c. ☐ teachers
   d. ☐ Community
   e. ☐ migrant children
   f. ☐ peers

4. Are there any indicators listed below related to migrant children’s school achievements? Please indicate your preference with a tick (✓).

<table>
<thead>
<tr>
<th>Items</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Government policy</td>
<td></td>
</tr>
<tr>
<td>b. Father’s education background</td>
<td></td>
</tr>
<tr>
<td>c. Mother’s education background</td>
<td></td>
</tr>
<tr>
<td>d. Time spent by parents</td>
<td></td>
</tr>
<tr>
<td>e. Family socio-economic status</td>
<td></td>
</tr>
<tr>
<td>f. Money spent for education</td>
<td></td>
</tr>
<tr>
<td>g. School type</td>
<td></td>
</tr>
<tr>
<td>h. Teacher’s expectation</td>
<td></td>
</tr>
<tr>
<td>i. Teacher’s teaching experience</td>
<td></td>
</tr>
<tr>
<td>j. Community atmosphere</td>
<td></td>
</tr>
<tr>
<td>k. migrant children’s gender</td>
<td></td>
</tr>
<tr>
<td>l. migrant children’s length of urban residence</td>
<td></td>
</tr>
<tr>
<td>m. migrant children’s learning ability</td>
<td></td>
</tr>
<tr>
<td>n. peer’s influence</td>
<td></td>
</tr>
<tr>
<td>Others (please specify):</td>
<td></td>
</tr>
</tbody>
</table>

**Part III**

Below you will find a series of statements relating to your opinions. Please indicate on the five-point scale (1=Agree, 2 =Mostly agree, 3=Undecided, 4=Mostly Disagree, 5= Disagree) that you agree or disagree with the statement by ticking (√) in the table.

<table>
<thead>
<tr>
<th>Agree (A)</th>
<th>Mostly Agree (MA)</th>
<th>Undecided (U)</th>
<th>Mostly Disagree (MD)</th>
<th>Disagree (D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Below are statements of teachers’ attitudes about migrant children. Please tick (√) the best description of migrant children in your opinion.

<table>
<thead>
<tr>
<th>NO.</th>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Migrant children should receive education with urban children in urban public schools.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Migrant children should be taught in a controlled environment removed from the regular classroom.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Migrant children need to focus on acquiring basic knowledge and skills.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Migrant children are less likely to have the capacity to learn intellectually challenging material.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>There are many discipline problems in settings with higher concentrations of migrant children.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>Academic achievements of migrant children are not adversely impacted by their diverse backgrounds (e.g. language, or culture).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>Migrant students who do not have basic skills and content knowledge cannot succeed academically in future.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>My pre-service teacher education has prepared me to work in the education environment.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>I have the necessary classroom management skills to support the school education setting.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>I have participated in professional training for teaching migrant children such as lectures or conferences in the past three years.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11</td>
<td>I would like to help migrant children to better adjust to urban life (e.g. language or urban culture).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12</td>
<td>I would like to communicate and cooperate with migrant parents.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13</td>
<td>I treat every student the same in my class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14</td>
<td>It is difficult to modify my teaching to meet the needs of migrant students with diverse backgrounds.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>Migrant students are helpless because of their low socioeconomic status.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16</td>
<td>I am comfortable working with migrant students in urban schools.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>17</td>
<td>My school implements a good education programme for migrant children.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>18</td>
<td>I would like to observe migrant children’s performance in classrooms.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>19</td>
<td>I would like to encourage migrant children to cooperate with urban children in groups.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>20</td>
<td>I would like to give the opportunity to migrant children to ask and answer questions in my classroom.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>21</td>
<td>Most migrant children get along well with urban children in an educational environment.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>22</td>
<td>The current academic curriculum makes it difficult to implement education for migrant children in urban schools.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Do you have any other comments about the migrant children’s mathematics education in primary schools that have not been covered?

____________________________________________________________________

____________________________________________________________________

Part IV

Thank you for completing the survey. This is Phase 1 of a two-phase study. Phase 2 involves classroom observation of teacher practices and two interviews. It will involve approximately 5 hours of researcher time in your classroom for observation and 1 hours of your time for interviews. If you are interested in participating in Phase 2, please provide your details below.

☐ Yes    ☐ No    ☐ Possible, if you provide me with more details

Please provide contact information:

Your name:_______________________________________________________

Address: _________________________________________________________

Telephone:_______________________________________________________

Email:___________________________________________________________

Thank you for participating in this research. Your time is valuable, and appreciated. Your response will be used to help inform improvements in primary education.
Appendix 6: Student Survey
Mathematics achievement levels and learning experiences of migrant children: Perspectives of teachers and teaching in Chinese urban schools

PLEASE READ THESE INSTRUCTIONS FIRST

This is not a test - there is no right or wrong answer.

This is a chance for you to consider how you think and feel about yourself. The purpose of this study is to determine how people describe themselves and what characteristics are most important to how people feel about themselves and their relationship with others.

There are five possible answers for each question - “Agree” to “Disagree”. The numbers 1 to 5 are next to each sentence, for each of the answers. All information supplied will be kept strictly confidential.

Part I

Demographic Information

1. Your gender:
   □ Female    □ Male

2. Your School:
   □ Public school    □ migrant school

3. Your migrant time to city:
   □ Before grade 1    □ grade 1-3    □ After grade 3

4. Your Grade:
   □ Grade 4    □ Grade 5

5. Your primary language used at school: ____________________________

6. Your primary language used at home: ____________________________
7. Your Age: \\

8. Your birth place: \\

---

**Part II**

<table>
<thead>
<tr>
<th>NO.</th>
<th>Please circle the number which is the most correct statement about you.</th>
<th>Agree</th>
<th>Mostly Agree</th>
<th>Undecided</th>
<th>Mostly Disagree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mathematics</td>
<td>A</td>
<td>MA</td>
<td>U</td>
<td>MD</td>
<td>D</td>
</tr>
<tr>
<td>01</td>
<td>Mathematics is one of my best subjects.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>02</td>
<td>It is not necessary to study mathematics.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>03</td>
<td>I have trouble in understanding anything of mathematics.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>04</td>
<td>I spend a lot of time in mathematics after class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>05</td>
<td>I am gifted in mathematics.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>06</td>
<td>I have never been very excited about mathematics.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>07</td>
<td>Mathematics is important for my future employment.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>08</td>
<td>I could never achieve academic honors in mathematics, even if I worked harder.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>09</td>
<td>I have to develop the basic skills in mathematics.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>I will succeed in mathematics.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Parents</td>
<td>A</td>
<td>MA</td>
<td>U</td>
<td>MD</td>
<td>D</td>
</tr>
<tr>
<td>11</td>
<td>My parents often participate in school activity.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12</td>
<td>My parents discuss my achievement in mathematics test with teachers.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13</td>
<td>My parents help me to complete mathematics homework.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14</td>
<td>My parents pay for extra coach in mathematics for me after school.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>My parents often buy books related to mathematics for me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16</td>
<td>My parents would punish me if I fail in school tests.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>17</td>
<td>My parents expect me to enter into college.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>My parents would praise for my good achievements.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>19</td>
<td>My parents often ask me to work harder.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>20</td>
<td>My parents tell me mathematics is one of the most important subjects.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**Emotion**

<table>
<thead>
<tr>
<th></th>
<th>I am usually pretty calm and relaxed.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>I worry a lot in academic achievements after I move to city for education.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>22</td>
<td>I am happy most of the time to live in urban areas.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>23</td>
<td>I hardly ever feel depressed before I enter into cities.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>24</td>
<td>I tend to be highly-strung, tense, and restless after I come to city.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**School**

<table>
<thead>
<tr>
<th></th>
<th>I am proud of studying in this school.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>I do not want to speak mandarin Chinese at school.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>27</td>
<td>I think my school is better than those in my hometown.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>28</td>
<td>I want to drop out before high school.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>29</td>
<td>I don’t think school is important for my future life.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**Teacher relations**

<table>
<thead>
<tr>
<th></th>
<th>My mathematics teacher likes me.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>My mathematics teacher often praises me in the classroom.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>32</td>
<td>My mathematics teacher believes I can study mathematics well.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>33</td>
<td>Mathematics teacher often asks me to answer questions in the classroom.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>34</td>
<td>Mathematics teacher is patient to my question.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>35</td>
<td>Mathematics teacher has disappointed with my study.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>36</td>
<td>Mathematics teacher often speaks dialect that I can’t understand.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>37</td>
<td>Mathematics teacher often punishes me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>38</td>
<td>My mathematics teacher treats everyone fairly in the classroom.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>39</td>
<td>My mathematics teacher encourages me to cooperate with</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>My mathematics teacher often praises other students in the classroom.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>My mathematics teacher expects everyone to work hard.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>My mathematics teacher often encourages me to catch up when I am behind.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>My mathematics teacher notices if I have trouble learning something.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>My mathematics teacher invites my parents to participate in school activity.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Peer relation</th>
<th>A</th>
<th>MA</th>
<th>U</th>
<th>MD</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
<td>I have few friends that I can really count on at school.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>I prefer to make friends who are also migrant children.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>I never seem to have much in common with urban children.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>I enjoy making friends with urban children.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>Most of my classmates are friendly to me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Thanks for your participation in this study. Do you have other comments related to this study?
Appendix 7: Teacher Interview Protocol

Mathematics achievement levels and learning experiences of migrant children: Perspectives of teachers and teaching in Chinese urban schools

The interview is going to be conducted in primary school. The following questions are considered as main topics that will be used as the direction of the interview.

A. Teacher’s expectation of migrant children’s academic achievement

1. As a teacher, can you describe your teaching experience with migrant children?
2. Can you describe migrant children in your class?
3. What do you expect from your student academically?
4. How do you let your student know what your expectations are?
5. What do you think is your student’s perception of your expectations?
6. How would you describe your student’s overall academic performance?
7. What would academic achievement look like for your student?
8. How do you think your expectations affect your student’s academic success?
9. In what ways do you think the student’s migrant status affect your academic expectations?

B. Teachers’ practices with migrant children’ compositions in classroom

10. Do you think that migrant workers’ children should be study with urban children in the same classroom? Why? In what way?
11. Compared to urban children, what do you think the differences between migrant and urban children in your class?
12. How do you prepare before class for migrant children and urban children?
13. What do you think of the performance of female/male migrant children in your classroom?
14. Compared to urban male and female children, what is your opinion of male and female migrant children?
15. How do you prepare for gender issues between migrant children and urban children?

C. Teachers’ practices with migrant children’s length of residence

16. Does the performance of migrant children vary depending on the length of time that they have been living in the city? If yes, how?

17. How do you prepare for different length of residence of migrant children and urban children?

D. Challenges of teachers’ practices with migrant children in the classroom

18. In your opinion, what are migrant children’s needs in their study?

19. How do you consider and meet migrant children’s needs when you prepare for classroom instruction? What are their needs in your opinion?

20. What are the most challenging things when you teach migrant children? How do you deal with these challenges?

21. Can you describe the classroom interaction between you and migrant children, compared to urban children?

22. What support do you think is helpful for teachers to teach migrant children in future?

Thanks for your participation in this study.

Do you have other comments related to this study?
Appendix 8: Classroom Observation Protocol

Mathematics achievement levels and learning experiences of migrant children:
Perspectives of teachers and teaching in Chinese urban schools
Part I

1. Observation Date: __________
2. Time (from/to): __________
3. School: ____________________
4. Teacher: ____________________
5. Teacher gender: ______________
6. Teacher teaching years: __________
7. Lesson topic: ____________________
8. Student number in class:
   Male ________ ; Female: __________
   Migrant workers’ children number:
   Male_________ ; Female:_________
9. Classroom layout (migrant children and urban children)
   Single column/Double column/Clusters/table rows

10. Teacher preparation and usage of exemplary curriculum materials

11. Teacher’s tool
   Blackboard/power-point/worksheet/Textbook/Internet/mathematics apparatus/others
12. Student’s tool
Blackboard/power-point/worksheet/Textbook/Internet/mathematics apparatus/others

13. Duration of the phase (please indicate the amount of time in percentage taken for each category)

<table>
<thead>
<tr>
<th>Talk Category</th>
<th>Percentages (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational Talk</td>
<td></td>
</tr>
<tr>
<td>Regulatory Talk</td>
<td></td>
</tr>
<tr>
<td>Curriculum content Talk</td>
<td></td>
</tr>
<tr>
<td>S-T Interaction Talk</td>
<td></td>
</tr>
<tr>
<td>Student discussion Talk</td>
<td></td>
</tr>
</tbody>
</table>

**Part II**

1. Cognitive teacher and student (T-S) interaction

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiation times</td>
<td></td>
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<td>Response times</td>
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<td>Response types</td>
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<td>Feedback times</td>
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<td>Feedback types</td>
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</tbody>
</table>
2. Social and behavioral teacher and student (T-S) interaction

(1) Overall grading of Social and behavioral T-S interaction

Teacher is supportive and positive to students through affirmation, praise, verbal support and encouragement. Explicit is verbal, implicit is behavioral, affective and gestural. Circle one through overall evaluation.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explicitly discouraging</td>
<td></td>
<td></td>
<td>Explicitly encouraging</td>
</tr>
</tbody>
</table>

(2) Observation of behavioral and social T-S interaction

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<th>S4</th>
<th>S5</th>
<th>S6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Punishment</td>
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<tr>
<td>Received</td>
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<td>Rewards</td>
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<td>preventive</td>
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<td>Positive</td>
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<td>Reactive</td>
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<tr>
<td>Negative reactive</td>
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</table>
Are there any other comments or notes related to the classroom observation?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Appendix 9: Ethics Approval

HUMAN RESEARCH ETHICS COMMITTEE

Notification of Expedited Approval

To Chief Investigator or Project Supervisor: Doctor Kathryn Holmes

Re Protocol: Mathematics achievement levels and experiences of Chinese migrant workers' children in primary schools: Teachers' expectations and practices

Date: 30-Oct-2012
Reference No: H-2012-0355
Date of Initial Approval: 30-Oct-2012

Thank you for your Response to Conditional Approval submission to the Human Research Ethics Committee (HREC) seeking approval in relation to the above protocol.

Your submission was considered under Expedited review by the Chair/Deputy Chair.

I am pleased to advise that the decision on your submission is Approved effective 30-Oct-2012.

For noting: Within the Participant Information Statements for the School Principal and Parents/Guardians, please extend the sentence 'All information collected by the researchers will be stored securely and only accessed by Ting Liu and her supervisors' by adding the words '...except as required by law.'

In approving this protocol, the Human Research Ethics Committee (HREC) is of the opinion that the project complies with the provisions contained in the National Statement on Ethical Conduct in Human Research, 2007, and the requirements within this University relating to human research.

Approval will remain valid subject to the submission, and satisfactory assessment, of annual progress reports. If the approval of an External HREC has been "noted" the approval period is as determined by that HREC.

The full Committee will be asked to ratify this decision at its next scheduled meeting. A formal Certificate of Approval will be available upon request. Your approval number is H-2012-0355.

If the research requires the use of an Information Statement, ensure this number is inserted at the relevant point in the Complaints paragraph prior to distribution to
Appendix 10: Translation of Chinese Version

研究课题介绍书——教育局

中国农民工子女数学学习经验与发展水平：教师的期望和教学实践研究

我们邀请您的机构参与上述的研究课题。此课题应用于澳大利亚纽卡斯尔大学刘婷的博士论文，由导师——纽卡斯尔大学教育学院的 Kathryn Holmes 副教授和 James Albright 教授指导。

为什么研究这个课题？
自上世纪 90 年代以来，大量的农民工进城务工，他们的子女（本文称为农民工子女）也随之就读于城市的学校。政府在农民工儿童的教育上已经做了很大的努力，以缩小城乡儿童之间的学业成绩差距。但是，目前有关农民工儿童数学发展水平的研究却很少。为了响应政府的号召，本文对于农民工子女的学习状态和数学发展水平进行研究，以更好地帮助农民工儿童提高教育水平和适应城市生活。通过考察农民工儿童的数学学习水平，以及与农民工子女的性别，学校类型和进城读书时间长短之间的关系，本研究的预期结果将会对中国农民工儿童的数学发展状况有新的认识和了解。

谁可以参加这个研究？
在您所属的区域，本研究有目的的选取参与的学校，包括城市公立小学和农民工子女学校。农民工子女在本研究中的界定为：户籍是农业户口，出生在农村，到了义务教育的入学年龄，跟随打工的父母到城市读书。与之对应的是城市儿童，他们被定义为出生并生活在城市的非农业户口的儿童。

你有哪些权利？
您的机构自愿参与本研究。只有您填写了同意书，我们才会从您的机构获取匿名的学生成绩数据和参与学校的联系方式。如果您的机构愿意参与，可以在任何时间或者任何情况下无理由的退出。

您需要做的是什么？
如果您的机构同意参加本研究，我们将要求您提供匿名的学生成绩数据，包括学生的性别和户籍信息。另外，我们还需要您提供学校的联系方式，如电子邮件，电话号码，或者邮寄地址等，用于下一个阶段的研究。根据您的机构提供的学校联系方式，我们将进行第二阶段的问卷调查研究。
出于您的方便，学生成绩数据和学校的联系方式信息可以以电子版的形式发送给研究者，也可以打印成纸质版，邮寄给研究者（信封和邮票我们将为您提供）。

参与的益处与风险是什么？
本研究对于参与者没有任何风险。本研究将会为您的机构提供研究分析结果。我们预期您可以了解在您的区域内参与学校的农民工子女的数学发展水平，以及不同学校类型之间的差异。此外，通过比较农民工子女与城市儿童的数学水平，教育局可以建立在此基础之上分配教育资源。
您的隐私如何被保护？
在本研究中，研究者收集的所有数据和信息将由研究者本人（刘婷）和她的两位导师保存。所有收集的数据将保存在纽卡斯尔大学学术办公楼的办公室内。电子版的数据将存在有密码的文件夹中，纸质版的数据将保存在带锁的柜子里。以上所有的数据将保存至少5年。

收集的信息将用于何处？
所有的收集数据将用于刘婷的博士毕业论文中。此外，数据和分析结果可能会用在发表的学术期刊中和会议中。参与者个人和机构的信息在任何报告中都不会被泄露。如果您想知道研究结果，请在同意书中留下您的电子邮件，我们将会免费为您提供。

您需要如何参与？
请仔细阅读这个研究课题的介绍，确认您已经理解所有的内容。如果您有任何疑问或者不理解的内容，请使用提供的研究者的联系信息。

如果您愿意参加，请填写知情同意书，然后将其以电子版本的形式发送到邮箱：Ting.Liu@uon.edu.au。研究者将会与您取得联系，并安排研究的相关事宜。

联系信息：

| 姓名：Kathryn Holmes 副教授 | 姓名：刘婷       |
| 联系电话：+61 (02) 4985 4948 | 联系电话：+61 0450914944 |
| 传真：+61 (02) 4921 7887     | 联系电话：+86 15121041348 |
| 电子邮箱：Kathryn.Holmes@newcastle.edu.au | 电子邮箱：Ting.liu@uon.edu.au |
| 职位：第一导师                | 职位：博士学生          |

签名

感谢您考虑参与本研究。

研究的意见
本研究已经通过纽卡斯尔大学人文研究道德委员会的批准，批准号码为：H-2012-0355。

如果您有对本研究的任何疑惑，或者对研究实施者的实施方式有不满意的内容，您可以联系人文研究伦理委员会的任何一位成员。联系地址为：Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, 电话：(02) 49216333, 邮箱：Human-Ethics@newcastle.edu.au。
知情同意书

中国农民工子女数学学习经验与发展水平：教师的期望和教学实践研究

研究人员：Kathryn Holmes 副教授，James Albright 教授，刘婷博士

我代表中国盐城______________教育局：

我已经阅读这份知情同意书，并且同意我的机构参加本研究。

我将得到这份知情同意书的副本，上面包含我和研究者的签名。

我知道我的机构可以选择不参加此项研究，或在研究期间的任何时候无需任何理由退出本研究。

我同意提供研究者：

- 匿名的小学数学儿童数学考试成绩数据，包括学生的背景信息。
- 参与学校的联系信息，为研究者下一阶段的调查问卷使用。

我有足够的机会对我可能持有的疑问进行提问，问题的答复我很满意。

姓名__________________________ 职位：__________________________

签字__________________________ 日期：__________________________

请将研究结果发送到邮箱：

__________________________

如果您有与本研究相关的任何问题，请联系：

姓名：Kathryn Holmes 副教授
电话：+61 (02) 4985 4948
传真：+61 (02) 4921 7887
电子邮箱：Kathryn.Holmes@newcastle.edu.au
职位：第一导师

姓名：刘婷
联系电话：+61 0450914944
联系电话：+86 15121041348
电子邮箱：Ting.liu@uon.edu.au
职位：博士学生

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研究课题介绍书——学校校长

中国农民工子女数学学习经验与发展水平：教师的期望和教学实践研究

我们邀请您的机构参与上述的研究课题。此课题应用于澳大利亚纽卡斯尔大学刘婷的博士论文，由导师——纽卡斯尔大学教育学院的 Kathryn Holmes 副教授和 James Albright 教授指导。

为什么研究这个课题？
教师根据自己对学生的期望和实践调整课程的实施和教学方法。教师的期望一方面影响自己的课堂教学方式，另一方面又影响学生自身的期望。因此，本研究重点考察教师对学生的态度和期望。我们预期本次调查问卷的结果将有助于教育者更好的理解农民工儿童的在校表现和教师的教学态度，以设立适宜的教学期望。

谁可以参加这个研究？
我们需要问卷的参与者为具有农民工儿童教学经验，并且教授数学学科的教师。如果您的学校愿意参加，本校所有符合条件的数学教师将会受到邀请。在下一个阶段（包括访谈和观察），参与的教师将从问卷调查中选取。所有参与的教师都要求自愿参加。

你有哪些权利？
您的学校参与本研究完全是出于自愿。只有您的学校愿意参与并填写了同意书，我们才会邀请可能的数学老师参与。如果您的机构愿意参与，可以在任何时间或者任何情况下无理由的退出。请注意：即使您的学校愿意参加，贵校的教师也自愿参加并可以在任何情况下退出该研究。

这个研究包括哪些内容？
首先，本研究在您的学校实施教师问卷调查。我们首先邀请符合条件的所有数学教师参与。在问卷中，我们将邀请教师参加下一阶段的研究，同意参加的教师则要求留下联系信息。

其次，研究的第二阶段目的是考察教师的期望和教学实践的关系。在同意参与本研究的教师中，我们有目的性的选择教师参与访谈和课堂观察。访谈和观察将会被录音/录像，目的是为了本研究的分析过程可以依据准确的记录。最后，我们将选取农民工子女参与问卷调查，只有得到学生和学生家长的同意后，我们才会实施问卷研究。

您需要做的是什么？
如果您的学校同意参加本研究，我们将要求学校领导安排发放研究介绍书，知情同意书，以及纸质的问卷给符合条件的教师。研究者将会为您的学校提供问卷收集箱，教师完成问卷后，将其放入收集箱。

在下一阶段的研究中，研究者需要得到您的批准进入学校实施教师访谈和课堂观察。同时，我们还需要您安排一位学校工作人员，给学生家长发放邀请书。该工作人员还要告诉学生，参与这项研究完全是自愿的。在学生家长同意后，该工作人员将收集家长同意书，并实施学生问卷。
在得到同意后，研究者将会与参与研究的教师商量合适的时间和地点进行访谈和观察，并安排不影响学生学业的情况下，实施学生问卷调查。

参与的好处与风险是什么？
本研究的整个过程中没有风险，对参与者没有任何危害。参与研究可能的好处是：为学校校长提供教师对农民工子女期望的调查信息。此外，通过深入的研究教师的期望和课堂实践，本研究的结果将有助于校长更好的理解教师与农民工儿童的互动情况。

您的隐私如何被保护？
在本研究中，研究者收集的所有数据和信息将由研究者本人（刘婷）和她的两位导师保存。所有收集的数据将保存在纽卡斯尔大学学术办公楼的办公室内。电子版的数据将存放在有密码的文件夹中，纸质版的数据将存放在带锁的柜子里。以上所有的数据将保存至少5年。

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您需要如何参与？
请仔细阅读这个研究课题的介绍，确认您已经理解所有的内容。如果您有任何疑问和问题，请联系下面提供的任何一位研究者。

如果您愿意参加，请填写知情同意书，然后将其以电子版本的形式发送到邮箱：Ting.Liu@uon.edu.au，研究者将会与您联系，并安排研究的相关事宜。

姓名: Kathryn Holmes 副教授
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传真: +61 (02) 4921 7887
电子邮箱: Kathryn.Holmes@newcastle.edu.au
职位: 第一导师
签名

姓名: 刘婷
联系电话: +61 0450914944
联系地址: +86 15121041348
电子邮箱: Ting.liu@uon.edu.au
职位: 博士学生
签名

对研究的意见
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如果您有对本研究的任何疑问，或者对于本研究实施者有任何不满意的实施方案，您可以联系人文研究道德委员会的任何一位成员。联系地址为：Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, 电话: (02) 49216333, 邮箱: Human-Ethics@newcastle.edu.au。
校长知情同意书

中国农民工子女数学学习经验与发展水平：教师的期望和教学实践

研究人员：Kathryn Holmes 副教授，James Albright 教授，刘婷博士

我已经阅读这份知情同意书，并且同意我的学校参加本研究。

我知道研究者将按照介绍书的内容来实施研究，该内容的副本我已经保留。

我知道我的学校可以选择不参加此项研究，或在研究期间的任何时候无需任何理由退出本研究。

我同意安排发放教师邀请信，邀请他们参与问卷研究。

我同意研究者进入学校进行教师访谈，课堂观察，并录音/录像，以及实施学生问卷。

我同意安排发放学生家长邀请信，邀请他们参与问卷调查以及课堂观察。

我知道研究者可以按照课题介绍书中的内容，为我们的学校提供研究的结果。

姓名：__________________________

签字：__________________________ 日期：__________________________

我要求将研究结果发送到我的邮箱：____________________________________

如果您有与本研究相关的任何问题，请联系：

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研究课题介绍书——学校教师

中国农民工子女数学学习经验与发展水平：教师的期望和教学实践研究

第一阶段：问卷调查

我们邀请您的机构参与上述的课题。此课题应用于澳大利亚纽卡斯尔大学刘婷的博士论文，由导师——纽卡斯尔大学教育学院的Kathryn Holmes副教授和James Albright教授指导。

为什么研究这个课题？

教师根据自己对学生的期望和实践调整课程的实施和教学方法。教师的期望一方面影响自己的课堂教学方式，一方面又影响着学生自身的期望。因此，本研究重点考察教师对学生的态度和期望。本阶段的研究目的是考察教师对农民工儿童的数学成绩和课堂表现的看法。我们预期本次调查问卷的结果将有助于教育者更好的理解农民工儿童的在校表现和教师的教学态度。此外，该研究将帮助教师对农民工子女设立适宜的期望并满足儿童的教学需求。

谁可以参加这个研究？

我们需要问卷的参与者具有农民工儿童教学经验，并且教授数学学科的小学教师。参与者来自以下三种类型的学校任何一种：（1）学校里大部分是农民工儿童，少部分的是城市儿童；学校里农民工儿童和城市儿童数量相近；（3）学校里大部分是城市儿童，少部分是农民工儿童。

你有哪些权利？

您参与本研究完全是出于自愿。只有您填写了同意书，我们才会要求您填写问卷。如果您愿意参与，可以在任何时间或者任何情况下无理由的退出。即使您的学校校长同意，你也有权利不参加该研究。

您需要做的是什么？

如果您愿意参与的话，请您完成有关您的农民工子女教学经验和期望的问卷，大约 30 分钟。出于参与者的方便，纸质问卷可以在学校完成，也可以带回家完成。完成问卷的教师，将会要求把问卷放入研究者准备好的问卷收集箱。在问卷的最后一部分，参与者被邀请参与本研究的第二阶段。如果愿意参加，参与者需要留下联系方式，如电子邮件或者电话号码，我们将会在下一阶段联系符合条件的参与者。
参与的益处与风险是什么？

在本研究的整个过程中，对于参与者没有任何危害。我们预期研究结果将为您提供教师对农民工子女期望的信息。此外，调查问卷的结果将有助于教师更好的理解教师对农民工子女的期望和教学实践与城市儿童的差异。

您的隐私如何被保护？

在本研究中，研究者收集的所有数据和信息将由研究者本人（刘婷）和她的两位导师保存。所有收集的数据将保存在纽卡斯尔大学学术办公楼的办公室内。电子版的数据将保存在有密码的文件夹中，纸质版的数据将保存在带锁的柜子里。以上所有的数据将保存至少5年。

收集的信息将用于何处？

所有的收集数据将用于刘婷的博士毕业论文中。此外，数据和分析结果可能会用在发表的学术期刊中和会议中。参与者个人和机构信息在任何报告中都不会被泄露。如果您想了解研究结果的信息，请在同意书中留下您的邮箱地址，我们将免费为您提供。

您需要如何参与？

请仔细阅读这个研究课题的介绍，确认您已经理解所有的内容。如果您有任何疑问和问题，请联系下面提供的任何一位研究者。如果您愿意参加，请填写知情同意书，然后将其以电子版本的形式发送到邮箱：Ting.Liu@uon.edu.au

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教师知情同意书

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第一阶段：问卷调查

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我已经阅读这份知情同意书，并且同意参加本研究。

我将得到这份知情同意书的副本，上面包含我和研究者的签名。

我知道我可以选择不参加此项研究，或在研究期间的任何时候无需任何理由退出本研究。

我同意参加本次调查问卷。

我知道我的个人信息不会被泄露。

我有足够机会对我可能持有的疑问进行提问，问题的答复我很满意。

姓名：____________________________________

签字：___________________________________日期：______________________

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如果您有与本研究相关的任何问题，请联系：

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为什么研究这个课题？

教师根据自己对学生的期望和实际调整课程的实施和教学方法。教师的期望一方面影响自己的课堂教学方式，一方面又影响着学生自身的期望。因此，本研究重点考察教师对学生的态度和期望。本阶段的研究目的是考察教师对农民工子女的期望和教学实践。我们预期本阶段的研究结果将有助于更好的理解农民工儿童的在校表现和教师的教学实践情况。

谁可以参加这个研究？

如果您已经参与了上一阶段的问卷研究，并具有农民工子女教学经验和教授数学学科的小学教师，您就具有参与本阶段研究的资格。

你有哪些权利？

您参与本研究完全是出于自愿。如果您愿意参与，可以在任何时间或者任何情况下无理由的退出。即使您的学校校长同意，你也有权利不参加该研究。

您需要做的是什么？

在这个阶段，教师要求完成面对面的访谈和进行数学课堂观察。研究者将会与您协商，以确保最适宜的研究时间和地点。

1. 在访谈部分，如果你同意参加的话，你将需要自愿的回答访谈者的问题，访谈时间大约 45 分
钟。研究者刘婷将实施访谈活动。如果您同意的话，访谈的过程将会录音。在研究者转录访谈录音后，我们将邀请您修正或者点评访谈内容。

2. 在课堂观察部分，参与者要求实施正常的数学课堂教学活动。如果您同意的话，我们将进行拍摄整个课堂互动（包括言语与非言语的信息）。此外，研究使用的是小型的拍摄机，研究者将在教师的后面角落实施拍摄，以减少课堂干预。数学课大约45分钟的时间，从上课开始到结束。研究者将在一周的时间内实施3-5次的课堂观察。

此外，参与者如果想看到分析的结果，请留下联系方式，我们会将研究结果免费发送到您的邮箱。

**参与的益处与风险是什么？**

研究的益处是：访谈和观察的结果将会给参与的教师提供深入的理解农民工子女的教学实践情况，以及与城市儿童的差异比较。研究的结果还可以为教师在以后的教学中提供反思的基础。

此阶段的课堂观察拍摄部分不可避免的会给教师课堂教学带来一些干扰。但是研究者会与参与的教师协商，尽量减少任何风险的存在。通过让班级的学生和教师逐渐的熟悉拍摄的环境，和在正式拍摄前多拍摄几次教学内容，可以将课堂观察的干扰性大大降低。

**您的隐私如何被保护？**

在本研究中，研究者收集的所有数据和信息将由研究者本人（刘婷）和她的两位导师保存。所有收集的数据将保存在纽卡斯尔大学学术办公楼的办公室内。电子版的数据将存在有密码的文件夹中，纸质版的数据将保存在带锁的柜子里。以上所有的数据将保存至少5年。

此外，在课堂观察的结果分析中，我们仅仅使用匿名的数据，确保参与者的个人信息不会泄露。拍摄的课堂教学内容只是用来帮助研究者分析课堂互动，在任何报告中都不会呈现录像内容。

**收集的信息将用于何处？**

所有的收集数据将用于刘婷的博士毕业论文中。此外，数据和分析结果可能会用在发表的学术
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您需要如何参与？
请仔细阅读这个研究课题的介绍，确认您已经理解所有的内容。如果您有任何疑问和问题，请联系下面提供的任何一位研究者。

如果您愿意参加，请填写知情同意书，然后将其以电子版本的形式发送到邮箱：Ting.Liu@uon.edu.au，研究者将会与您取得联系，并安排访谈与观察的相关事宜。

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签名：.................................

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签名：.................................

感谢您考虑参与本研究。

对研究的意见

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教师知情同意书

中国农民工子女数学学习经验与发展水平: 教师的期望和教学实践研究

第二阶段：访谈与课堂观察

研究人员：Kathryn Holmes 副教授，James Albright 教授，刘婷博士

我已经阅读这份知情同意书，并且同意参加本研究。

我将得到这份知情同意书的副本，上面包含我和研究者的签名。

我知道我可以选择不参加此项研究，或在研究期间的任何时候无需任何理由退出本研究。

我同意参加访谈研究并同意录音。

我同意参加课堂观察并同意录像。

我知道我的个人信息不会被泄露。

我有足够的机会对我可能持有的疑问进行提问，问题的答复我很满意。

姓名 __________________________________________

签字 ________________________ 日期: ________________

我要求将研究结果发送到我的邮箱:

____________________________________________________

如果您有与本研究相关的任何问题，请联系:

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研究课题介绍书——学生家长

中国农民工子女数学学习经验与发展水平：教师的期望和教学实践研究

第二阶段：问卷和课堂观察

我们邀请您的机构参与上述的研究课题。此课题应用于澳大利亚纽卡斯尔大学刘婷的博士论文，由导师——纽卡斯尔大学教育学院的 Kathryn Holmes 副教授和 James Albright 教授指导。

为什么研究这个课题？

学生对教师期望和教学实践的认识非常重要，因为学生会根据教师的期望做出积极或者消极的回应。因此，本研究的第二阶段考察学生对教师的期望和教学实践的认识。我们预期本次问卷和课堂观察的结果将有助于更好的理解农民工儿童的教师的教学实践的认识和理解。为了更好的了解和帮助农民工儿童的数学学习，本研究同时给教育者在考虑和满足农民工儿童的学习需求上提供相关的建议。

谁可以参加这个研究？

本研究阶段的参与者为农民工儿童。农民工儿童在本研究被定义为户口是农业户口，从小出生在农村并长在农村，到了义务教育的入学年龄，跟随打工的父母到城市读书。

参与者样本的选择遵循目的性原则，在以下三种类型的学校中选择农民工子女：（1）学校里大部分是农民工儿童，少部分的是城市儿童；学校里农民工儿童和城市儿童数量相近；（3）学校里大部分是城市儿童，少部分是农民工儿童。

你有哪些权利？

您参与本研究完全是出于自愿。只有儿童的父母填写了同意书，我们才会要求儿童进行观察和问卷研究。在儿童参与的过程中，可以在任何时间或者任何情况下无理由的退出。您的孩子完全是自愿参与该研究，并可以在任何情况下退出。

您需要做的是什么？

您首先需要与您的孩子进行商量，确保你们都愿意参与这个阶段的研究。在这个阶段，儿童要求参与问卷研究和课堂教学观察。
首先，学生要求完成有关他们自己对学习的认识和体验的问卷。学校的以为工作人
员将发放邀请信给学生家长。如果你同意参加的话，你的孩子将需要独立的完成问卷问题，问卷时间大约 30 分钟。

其次，您的孩子将参与数学课堂教学。如果您同意的话，我们将进行拍摄整个课堂互动（包括言语与非言语的信息）。此外，研究使用的是小型的拍摄机，研究者将在教师的后面角落实施拍摄，以减少课堂干预。数学课大约 45 分钟的时间，从上课开始到结束。研究者将在一周的时间内实施 3-5 次的课堂观察。研究者刘婷——纽卡斯尔大学的博士生，将进行课堂观察和拍摄工作。

参与的益处与风险是什么？

研究的益处是：问卷和观察的结果将会给参与的儿童家长提供深入的理解农民工子女的教学实践情况，以及与城市儿童的差异比较。研究的结果还有助于提高农民工子女在城市学校的学习和生活。

此阶段的课堂观察拍摄部分不可避免的会给课堂教学带来一些干扰。但是研究者会与参与的教师协商，尽量减少任何风险的存在。通过让班级的学生和教师逐渐的熟悉拍摄的环境，和在正式拍摄前多拍摄几次教学内容，可以将课堂观察的干扰性大大降低。

您的隐私如何被保护？

在本次研究中，研究者收集的所有数据和信息将由研究者本人（刘婷）和她的两位导师保存。所有收集的数据将保存在纽卡斯尔大学学术办公楼的办公室内。电子版的数据将存在有密码的文件夹中，纸质版的数据将保存在带锁的柜子里。以上所有的数据将保存至少 5 年。

此外，在课堂观察的结果分析中，我们仅仅使用匿名的数据，确保参与者的个人信息不会泄露。拍摄的课堂教学内容只是用来帮助研究者分析课堂互动，在任何报告中都不会呈现录像内容。
收集的信息将用于何处?
所有的收集数据将用于刘婷的博士毕业论文中。此外，数据和分析结果可能会用在发表的学术期刊中和会议中。参与者个人和机构信息在任何报告中都不会被泄露。如果您愿意了解研究结果的信息，请在同意书中留下您的邮箱地址，我们将免费为您提供。

您需要如何参与?
请仔细阅读这个研究课题的介绍，确认您已经理解所有的内容。如果您有任何疑问和问题，请联系下面提供的任何一位研究者。在填写同意书之前，您还需要与您的孩子商量，确保双方都愿意参与该研究。如果您愿意参加，请学生家长填写知情同意书，然后将纸质版的同意书交给学校工作人员。

姓名: Kathryn Holmes 副教授  电话: +61 (02) 4985 4948
传真: +61 (02) 4921 7887
电子邮箱: Kathryn.Holmes@newcastle.edu.au
职位: 第一导师

姓名: 刘婷  电话: +61 0450914944
电子邮箱: Ting.liu@uon.edu.au
职位: 博士学生

对研究的意见
本研究已经通过纽卡斯尔大学人文研究道德委员会的批准，批准号码为: H-2012-0355

如果您有对本研究的任何疑惑，或者对于本研究实施者有任何不满意的实施方式，您可以联系人文研究道德委员会的任何一位成员。联系地址为: Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, 电话: (02) 49216333, 邮箱: Human-Ethics@newcastle.edu.au。
学生家长知情同意书

中国农民工子女数学学习经验与发展水平：教师的期望和教学实践研究

第二阶段：问卷与课堂观察

研究人员：Kathryn Holmes 副教授，James Albright 教授，刘婷博士

我已经阅读这份知情同意书，并且同意我的孩子参加本研究。

我将得到这份知情同意书的副本，上面包含我和研究者的签名。

我知道我的孩子可以选择不参加此项研究，或在研究期间的任何时候无需任何理由退出本研究。

我同意我的孩子参加问卷调查。

我同意我的孩子参加课堂观察并同意录像。

我知道我的孩子个人信息不会被泄露。

我有足够的机会对我可能持有的疑问进行提问，问题的答复我很满意。

家长姓名：____________________________________

家长签字：____________________________________ 日期：__________________

儿童< 18 岁：儿童姓名：____________________________________

儿童签字：____________________________________ 日期：__________________

我要求将研究结果发送到我的邮箱：

________________________________

如果您有与本研究相关的任何问题，请联系：

<table>
<thead>
<tr>
<th>姓名</th>
<th>Kathryn Holmes</th>
<th>姓名</th>
<th>刘婷</th>
</tr>
</thead>
<tbody>
<tr>
<td>电话</td>
<td>+61 (02) 4985 4948</td>
<td>联系电话</td>
<td>+61 0450914944</td>
</tr>
<tr>
<td>传真</td>
<td>+61 (02) 4921 7887</td>
<td>电子邮箱</td>
<td><a href="mailto:Ting.liu@uon.edu.au">Ting.liu@uon.edu.au</a></td>
</tr>
<tr>
<td>电子邮箱</td>
<td><a href="mailto:Kathryn.Holmes@newcastle.edu.au">Kathryn.Holmes@newcastle.edu.au</a></td>
<td>电子邮箱</td>
<td></td>
</tr>
<tr>
<td>职位</td>
<td>第一导师</td>
<td>职位</td>
<td>博士学生</td>
</tr>
</tbody>
</table>
附件: 教师问卷

中国农民工子女数学学习经验与发展水平：教师的期望和教学实践研究

介绍

为了更好地理解数学教师对中国农民工儿童的认识，我们邀请您参与澳大利亚纽卡斯尔大学教育学院实施的研究计划。本问卷不是测试，所以没有“对”与“错”之分，我们只是了解您的个人看法。您参与本次调查可以帮助我们更好地理解教师对农民工子女的看法和意见。

农民工子女在本研究中主要是指出生在农村并长在农村，被父母带到城市读书的儿童（通常是6岁以后带入城市接受教育的儿童），但是他们的户口仍然是农业户口。在城市出生和成长的儿童不在农民工子女的范围之内。

第一部分: 基本信息

1. 你的性别:
   □ 女    □ 男

2. 您所在的学校:
   □ 公立小学    □ 农民工子女学校

3. 您目前的班级组成:
   □ 大部分是农民工子女
   □ 一半农民工子女，一半城市儿童
   □ 大部分是城市儿童

4. 您的户口是:
   □ 农业户口    □ 非农业户口
   □ 已从农业户口转为非农业户口

5. 您的年龄:
   □ 20 以下    □ 20-29    □ 30-39    □ 40-49    □ 50+

6. 您目前获得的最高教育学历:
   □ 专科
   □ 本科
   □ 研究生
   □ 其他：_________________________

7. 您的教学年龄:

260
第二部分

1. 您对目前农民工子女教育情况的看法是:
   - □ 非常不好
   - □ 不尽人意
   - □ 一般
   - □ 好
   - □ 非常满意

2. 您对整个社会对农民工子女教育所做的努力的看法是:
   - □ 显然不够
   - □ 不够
   - □ 有点不够
   - □ 足够
   - □ 完全足够

3. 在帮助农民工子女教育方面，请您对以下六个选项的重要性排序，将编码写在横线上(从最重要到最不重要排序)。
   a. 政府
   b. 家长
   c. 教师
   d. 社区
   e. 农民工子女自己
   f. 同伴

4. 以下列举出可能与农民工而成绩相关的因素，请在有相关的项目中打√。

<table>
<thead>
<tr>
<th>可能的因素</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 国家政策</td>
<td></td>
</tr>
<tr>
<td>b. 父亲的教育背景</td>
<td></td>
</tr>
<tr>
<td>c. 母亲的教育背景</td>
<td></td>
</tr>
<tr>
<td>d. 父母陪伴儿童的时间</td>
<td></td>
</tr>
<tr>
<td>e. 家庭社会经济状况</td>
<td></td>
</tr>
<tr>
<td>f. 家庭教育经费</td>
<td></td>
</tr>
<tr>
<td>g. 学校类型</td>
<td></td>
</tr>
<tr>
<td>h. 教师期望</td>
<td></td>
</tr>
<tr>
<td>i. 教师的教学经验</td>
<td></td>
</tr>
<tr>
<td>j. 社区环境</td>
<td></td>
</tr>
</tbody>
</table>
### 第三部分

以下内容是有关农民工儿童的陈述，使用了五个等级选项（1=同意，2=大部分同意，
3=不确定，4=大部分不同意，5=不同意）。请您就自己的看法，选择您认同的选项，并在数字上打 (√)。

<table>
<thead>
<tr>
<th>号码</th>
<th>以下内容是有关教师对农民工儿童的态度的陈述，请在您认同的选项上打 (√)。</th>
<th>同意</th>
<th>大部分同意</th>
<th>不确定</th>
<th>大部分不同意</th>
<th>不同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>农民工儿童应该与城市儿童一样，在城市公立学校学习。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>农民工儿童应该从正常班级分出，放在更严格环境的班级学习。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>农民工儿童应该集中在学习基础知识和基本技能上。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>农民工儿童与城市儿童相比，很少具有能力学习富有挑战性的知识。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>农民工儿童集中的学校和班级，纪律问题会很多。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>农民工儿童不会因为自己背景（如语言，或文化）的不同，而影响自己的数学成绩。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>农民工儿童中没有掌握基本的技能和知识的学生，应该按照能力分成不同的班级。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>我的专业背景知识可以让我很好的与农民工儿童共处。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>我具有必要的班级管理技能来支持农民工儿童的学习。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>在过去的三年里，我参加过有关农民工儿童教学的培训（如讲座，会议等）。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11</td>
<td>我帮助农民工儿童更好的适应城市生活（如在语言和城市习俗方面）。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12</td>
<td>我与农民工儿童的父母交流与合作。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13</td>
<td>我对待班级的每个学生都是一样的。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14</td>
<td>我很难调整自己的教学方式来满足农民工儿童的不同背景的需要。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>农民工儿童因为自己的家庭背景条件不好，而无法得到帮助。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16</td>
<td>给农民工儿童教学，我觉得很惬意。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>17</td>
<td>我工作的学校实施很好的农民工儿童教学。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>18</td>
<td>我观察农民工儿童的课堂表现。</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
第四部分

感谢您参加本次调查问卷。本研究的下一阶段是有关教师访谈和课堂观察，大约需要1小时的访谈与5小时左右的课堂观察。如果您有兴趣参与的话，请留下您的信息，我们将会联系您。

□ 愿意 □ 不愿意 □ 可能，如果你给我提供具体的细节。

请留下您的联系方式

您的姓名:_______________________________________________________

地址: _________________________________________________________

电话: _________________________________________________________

电子邮箱:___________________________________________________________

非常感谢您的参与。您的参与答复将会对我们研究小学教学教育与农民工儿童的教育提供帮助。
附件: 教师访谈提纲

中国农民工子女数学学习经验与发展水平：教师的期望和教学实践研究

本次访谈将在小学进行。下面的访谈问题将会作为主要的话题，在访谈中实施。

A. 教师对农民工儿童的期望

1. 作为教师，你能谈谈您教过的农民工儿童的经验吗？

2. 你能谈谈您现在班级的农民工儿童吗？

3. 您对他们的学业成绩方面有何期望？

4. 你如何让您的学生了解您的期望？

5. 您觉得您的学生对您的期望是如何理解的？

6. 您认为您的期望是如何影响学生的学业成绩的？

7. 学生的农民工儿童身份如何影响您对他们的学业期望的？

B. 教师的教学实践（农民工儿童与城市儿童混合）

8. 你认为农民工儿童与城市儿童应该混合在一起吗？为什么？怎么混合？

9. 农民工儿童与城市儿童有何不同？

10. 您在课前准备教案时，如何考虑农民工儿童与城市儿童的需求？

C. 教师的教学实践（学生性别方面）

11. 您是如何看待男生和女生农民工儿童的学习成绩的？

12. 相比城市的男女生，您是如何看待农民工儿童的男女生的？

13. 根据性别的因素，您是如何准备教学的？

D. 教师的教学实践（学生进城时间）
14. 你认为农民工儿童进城时间长短和他们的成绩之间有关系吗？如果有，是怎样的？

15. 你在准备教学的过程中，如何考虑农民工儿童进城时间长短的？

E. 教学挑战

16. 您认为农民工儿童有哪些学业上的需求？

17. 在教学中，你是如何满足他们的这些需求的？

18. 你觉得与农民工儿童教学时，最具有挑战性的是什么？你是如何解决的？

19. 您觉得与城市儿童相比，农民工儿童与教师的课堂互动质量如何？

20. 您觉得在与农民工儿童教学上，教师们需要哪些帮助？

感谢您的参与，您还有其它要补充的吗？
附件: 课堂观察

研究计划名称: 中国农民工子女数学学习经验与发展水平: 教师的期望和教学实践研究

第一部分

1. 观察日期: 

2. 起始时间和结束时间: 

3. 学校: 

4. 教师: 

5. 教师性别: 

6. 教学年数: 

7. 课程名称: 

8. 班级学生人数
   男: ; 女: 
   农民工儿童人数
   男: ; 女: 

9. 教室布局 (农民工儿童与城市儿童)
   单排, 双排, 椭圆形, 课桌摆放

10. 教师准备的课程材料及其使用的材料

11. 教师使用的工具
   黑板, 幻灯片, 记录表, 教科书, 网络多媒体, 数学器材, 其他

12. 学生使用的工具
13. 每种谈话的时间（时间百分比）

<table>
<thead>
<tr>
<th>谈话种类</th>
<th>百分比 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>组织性的谈话</td>
<td></td>
</tr>
<tr>
<td>维持纪律的谈话</td>
<td></td>
</tr>
<tr>
<td>课程内容的谈话</td>
<td></td>
</tr>
<tr>
<td>师生互动的谈话</td>
<td></td>
</tr>
<tr>
<td>学生讨论的谈话</td>
<td></td>
</tr>
</tbody>
</table>

第二部分

表1. 认知性内容的师生互动

<table>
<thead>
<tr>
<th></th>
<th>学生 1</th>
<th>学生 2</th>
<th>学生 3</th>
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2. 社会性行为的师生互动

(1) 总体的评价师生互动

教师支持性和有效性的与学生互动，包括：肯定，表扬，语言支持和鼓励。显性的是口头语言，隐性的由行为，情感和姿势。
表2. 社会性行为的师生互动观察

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还有其他与课堂观察相关的内容吗？

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________
附件: 学生问卷

研究计划名称：中国农民工子女数学学习经验与发展水平：教师的期望和教学实践研究

请先阅读本次问卷的介绍

这不是测验，所以您的答案没有对错之分。

本问卷的目的主要是关于你对自己的情况的认识，以及与他人的关系的看法。当你准备开始，请认真阅读每个陈述，选择自己满意的答案。每个句子后面有 5 个选项（同意到不同意）。我们承诺你的所有的信息将会保密。

第一部分
基本信息

1. 你的性别：
   □ 女 □ 男

2. 你所在的学校：
   □ 公立小学 □ 农民工儿童小学

3. 你进城读书的时间：
   □ 1 年级之前 □ 1 年级到 3 年级之间 □ 3 年级之后

4. 您的年级：
   □ 4 年级 □ 5 年级

5. 你在学校使用的主要语言：

6. 你在家主要是使用的语言：

7. 你的年龄：

8. 你的出生地：
第二部分

下面的每个陈述，请在你认同的选项上打√

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22. 我到城市读书后，常常感到学习压力。 1 2 3 4 5
23. 我在城市的大多数时间是快乐的。 1 2 3 4 5
24. 我进城读书之前，从来没感到有压力。 1 2 3 4 5
25. 我进城读书后，经常很紧张，强迫自己好好学习。 1 2 3 4 5

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感谢你参与本次研究，你还有要补充的吗？