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## **A student thesis & a minor field study**

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# **“The natural law of education”- Homework assignments in mathematics, a Chinese perspective**

“En naturlig del i skolan” -  
Matematikläxan ur kinesiskt perspektiv

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# Preface

This study is written as a minor field study and a thesis at the department of Science, Environment, Society at Malmö University. It has granted me the opportunity to observe how mathematics education is conducted in China and, in the process, has also given me a more critical view on homework.

I am very grateful for this experience and will remember it for the rest of my life. I would like to thank all the respondents in this study for agreeing to be interviewed and for allowing me to observe their lessons. I would also like to thank Wei Ouyang, Sun Ying, Celine, Lilly and Li Fang from Yunnan Normal University for helping me during my stay in China. I would like to send a big thank you to SIDA and Malmö University for awarding me the MFS scholarship that made this study possible. Finally, I would also like to thank my supervisor, Anna Jobér, for her support during this journey.

# Abstract

The purpose of this study is to describe and analyze the attitudes of several mathematics teachers towards homework as part of the workload of 10-11 year old students at a school in Yunnan Province, China. The focus is to describe and analyze their reasons for assigning homework as well as the nature of that homework. This study also describes their perspectives on how homework can contribute to improving a student's knowledge of mathematics and what kind of homework they assign. Furthermore, it presents how the teachers describe the ability of the students to assimilate the mathematics homework. The main concepts and theoretical frameworks used to analyze the data are the "two basics", the five elements, cultural capital, habitus, the behaviorist learning theory and sociocultural learning theory. To fulfill my purpose I carried out four interviews and four observations. The results show that the reasons for the teachers assigning homework are "that it is the law of education" and "that practice makes perfect". The teachers also think that homework helps the students to review and consolidate what they have learned in school that day. In addition, the analysis shows that homework gives students the opportunity to assess whether or not they have understood everything and if they have not, they can practice it. All of the teachers believe homework to be an important part of mathematics education. They assign two principal types of homework: oral and written. Two of the teachers also assign a third type: practical homework. According to the teachers, the students' ability to assimilate the mathematics homework is affected by their parents' learning habits, which they themselves have learned from their parents before them. The students are reflections of their parents. If parents have a good learning habit, they will teach their child how to successfully assimilate homework. The teachers agree that the parents' lack of mathematical knowledge or mandarin can affect their ability to help their child with homework.

Keywords: Behaviorism, China, Cultural capital, Habitus, Homework, Mathematics, Sociocultural, Suzhi Jiaoyu, "two basics".

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# 1. Introduction

An ongoing internal debate in China since the 1990's seems to challenge the traditional theory of learning and the way in which mathematics is taught. One focus of the debate is the extreme pressure that students in China are subjected to. They attend school full-time and are then overloaded with homework. The Chinese education system is very exam focused at different school levels. Only about 50% will gain a place at a senior secondary school. Among them the quality varies and what is important is a place at the most respectable of these schools. The pressure on the student is intense. A study in 2002 by Zhang (Dello-lacovo 2009), showed that about 21% of primary students and about 32% of secondary students suffered from psychological problems.

For over 1000 years formal education revolved around a series of centralized government examinations. These were the first steps towards status and power. The content of the examinations covered history, literature and Confucian classics as well as poetry, essay writing and calligraphy (Dello-lacovo 2009). The standard teaching methods were memorization and recitation. Many reforms have attempted to change the intense focus on examinations but the examination-oriented "regular-system" has endured nevertheless (ibid). One perspective is that of Assistant Professor Wei Ouyang of the School of Mathematics at Yunnan Normal University, who was interviewed during my field study. According to her there is an examination in each subject every semester from grade one up to the third year of high school. In addition to the final examinations it is up to the school or the teacher to decide the number of tests set during the semester and it is the school or the teacher that designs these tests. When the students sit the mathematics examinations they do so independently and in writing. Ouyang stresses that ten years ago, if a student did not pass the examination, he or she did not move up to the next grade. However, now all students continue to the next grade regardless without any extra support from the school. If a student is in need of extra support is up to their parents to help them or to employ a tutor. Ouyang also states that among schools in China there is a huge variety in the number of tests administered during a semester. What she has observed is that the higher rated schools administer more tests. The high school that she attended during her childhood was the premier high school in that province; they had more tests than any other school. Ouyang also states

that girls usually perform better in school than boys. It is the tradition in China that a boy will take care of his parents when they are old and that the man in a relationship is the main income earner. According to Ouyang, boys are more likely to question why they have to study such a variety of subjects in school when they are more focused on what they can do to earn as much money as they possibly can. This pressure to generate income, she said, might be the reason why boys do not perform as well as girls. Ouyang stresses that students who graduate from high school with low grades have two choices; either live off their parents or get a job. She says that it is easy to find work as long as you are willing to take any kind of job. Since most parents in China have only one child, they use their contacts to fight for their child to access the best education or to get a good job. If the parents have no money and no contacts their child has very few opportunities. China has no social support for its citizens; if you are unemployed or are fired you receive no financial support from the government. According to Ouyang (ibid), no one cares if you have a job or not; it is up to you to ensure that you have one.

In summary, the Chinese education system is extremely focused on examinations at different school levels and the pressure on students is intense. Many reforms have attempted to change this intense focus on examinations but have failed to do so (Dello-lacovo 2009).

## **1.1 Learning environment**

In the articles I have had access to, there seems not to be a standout theory of learning. However, there is a commonly used description of what is, to my understanding, a learning strategy in mathematics known as the “two basics”. The “two basics” consist of memorizing basic knowledge and mastering basic skills, and summarizes the Chinese teaching method (Xu 2010). Without a solid foundation and basic knowledge, individual development and creativity are impossible to achieve (ibid). Since the 1990’s, Chinese students in Shanghai have performed outstandingly in TIMSS (Trends in International Mathematics and Science Study) and PISA (Programme for International Student Assessment). It is generally believed in western countries that Chinese students are passive learners with only the experience of memorizing and drilling data, but in addition to achieving very good results in these international

assessments, they also score highly in creative assignments. This phenomenon is known as the “Paradox of Chinese learners” (ibid). The learning environment is described as the combination of teacher authority and student-centeredness. Students follow directions and direct their energy towards the learning activity. Then the students and teacher continue the discussion after class (ibid). According to Dello-lacovo (2009), western researchers describe it as a teacher-oriented model based on the behaviorist theory of learning. If that is the case, then learning mathematics becomes a question of acquiring mathematical behaviour. There is no need to apply any cognitive abilities that involve reflection, understanding and insight. As Säljö (2012) describes this theory, learning takes place through the transfer of knowledge from teacher to students.

Some of the fundamentals in Confucian Heritage Cultures (CHC), a philosophy of ethics and morality, are obedience and diligence within hierarchies. According to Xu (2010), CHC has unique aspects that impact upon student learning behaviors in China, “...such as the orientation of societal achievement (as opposed to the orientation of personal achievement in the West), the emphasis on working hard, the tendency of attributing success to personal effort, persistence and the belief of practice making perfect” (ibid, p 132).

According to Ouyang, she has tried to involve students in discussions at her university in an attempt to make them active learners. She stresses that it does not work because the students do not like it. They are afraid to speak their mind because they are accustomed to being passive learners and only to listen to the teacher, having been so conditioned over their previous 18 years of schooling. She said the students feel very uncomfortable when asked to offer an opinion or encouraged to be creative.

In conclusion, the Chinese learning environment is believed to be one where students are passive learners and teachers have a behavioristic view of teaching. However, there is a learning strategy influencing the education system that summarizes the Chinese teaching method. It is commonly known as the “two basics” and consists of memorizing basic knowledge and mastering basic skills.



## 1.2 Students workload and *suzhi jiaoyu*

The Chinese education system is examination focused. The outcome of examinations has lifelong consequences, therefore the pressure to succeed is substantial (Dello-lacovo 2009). “Students are weighed down by excessive homework and examination” (ibid, p. 242). At 15-16 years of age, about 50% of students gain the opportunity to study further at senior secondary schools. Those who do not are consigned to China’s lower classes, their only options being either employment in menial jobs or unemployment. These pressures have intensified the focus on examinations, which has led to Chinese students having little free time to enjoy their childhood. According to Dello-Lacovo (ibid), 21,6% of the primary students and 32% of secondary students suffer from psychological problems attributed to the pressure of examinations. Dello-lacovo (ibid) also refers to an ongoing internal debate in China, which began in the 1990’s, over reforms to the education system. The general idea behind the curricular reforms are “...a more holistic style of education which centers on the whole person” (ibid p. 241) known as *suzhi jiaoyu*, and are relevant to China’s modernization. It refers more to the person rather than the method of education, whereby an individual is regarded as a “high quality” person: nationalistic, moral and skilled in many areas. In this current discourse the purpose of cultivating these “high quality” people is to meet the needs of the nation (ibid). The Chinese government has identified the need of its workforce for practical skills and innovative ability. These views were reinforced in a survey by McKinsey Global Institute (Kundu 2006 through Dello-lacovo 2009), which found that only 10% of Chinese job candidates were suitable to work in a foreign company. One of the reasons given was the lack of practical skills (ibid). Dello-lacovo (2009) also states that many media articles mention the relatively low creative ability amongst Chinese students. As a result of *suzhi jiaoyu* the Ministry of Education has ordered reductions in student workload and the number of books to be purchased as well as limiting school hours and mandating 12 weeks of holiday per year. The content of textbooks will be more oriented towards students’ lives and personal interests, and the global world. However, a province wide survey of primary and secondary schools conducted by the Shandong Education Department in 2007 showed an increase in student workload compared to the previous five years and also a lack of improvement in student health. The importance of examinations is responsible for the student workload and should be

reduced. The traditional examination-oriented teaching should be changed to a more modern approach with a holistic view on a student's life and experiences. The curricular reforms should encourage new teaching approaches. A major reform, the Keli model, was enacted and included teacher training, school-based training, and seminar and teacher research (Huang & Bao 2006). The Beijing survey of 2006 (Dello-lacovo 2009) found that the new lesson guides did not help teachers to develop their personal skills as professional teachers but instead undermined their independence.

In conclusion, the *suzhi jiaoyu* reforms are an attempt by the government to decrease the student workload while increasing their ability to compete with foreign candidates. This reform should be transpire in the mathematical teaching in primary school. The focus of my study will be to see if the reforms are apparent during the lesson itself and in the interviewed teachers' answers to my research questions about homework.

### **1.3 Aim and research questions**

Given the above description of the Chinese education system, this study aims to focus on one part of it, i.e. mathematics homework. There are many different perspectives and questions that can be elaborated upon when researching mathematics education. However, the purpose of this particular study is to describe and analyze the attitudes of several mathematics teachers towards homework as part of the workload of 10-11 year old students at a school in Yunnan Province, China. It is, therefore, an empirical-based study with the aim of exploring their viewpoint. The research questions are:

- How do several teachers describe their reasons for assigning homework?
- How do several teachers describe the way in which homework can contribute to improving the students' knowledge of mathematics?
- What kind of mathematics homework do a few teachers assign?
- How do several teachers describe students' ability to assimilate mathematics homework?

## 2. Previous research

This chapter presents some research findings about homework with a special focus on China.

### 2.1 Search process

To find previous studies I used search engines such as Summon, Google Scholar and ERIC. In the beginning, my focus was to find studies on mathematics homework in China. I used the keywords “*mathematics teaching China*”. Those that I found, and that were relevant, are presented in this thesis. I also wanted to locate studies that were done by western researchers and that were not connected to a specific western country. I used keywords such as “*mathematical homework*”. Again, the relevant studies that I found are presented in this thesis. I also searched Google Dissertations with the keywords “*mathematics teaching China*” and found one dissertation titled *Teaching systems of linear equations in Sweden and China: what is made possible to learn?* The dissertation is written from the perspective of a student in the classroom and aims to describe which of the learning objectives were made possible to learn. I was hoping to find more information about homework in China. However, the dissertation did not include an investigation of homework. The following section gives a brief overview of my literature review.

### 2.2 Homework

Belinda Dello-lacovo (2009) writes in her overview, *Curriculum reform and ‘Quality Education’ in China: An overview*, that if teachers followed *suzhi jiaoyu* and assigned less homework or none at all, parents would employ a tutor or purchase extension and practice books in the fear that their child would not perform well in the examinations. International research on homework, such as Harris Cooper’s overview *The battle over homework, Common ground for administrators, teachers and parents* (2007) and Joyce Epstein’s overview *Homework practice, achievements and behaviors of elementary school students* (1983), show that homework is an important component of education.

One of the main reasons teachers assign homework in western societies is to teach students to take responsibility for their education. Another minor international study is Kaur Berinderjeet's *Mathematics homework: a study of three grade eight classroom in Singapore* (2011), in which three mathematics teachers in Singapore were interviewed about their view on homework. Quigley (2003) interviewed 25 future high school teachers at the National Institute of Education in Singapore about their view on homework. The two studies show that teachers assign homework for the same reason as shown in Cooper's and Epstein's overviews: it teaches the students to take responsibility for their own education. This differs from the description in CHC of the Chinese learning environment and the essence of mathematics learning in China. According to Xu (2010), Zhang & Tang (2005 through Xu 2010), and Shao & Gu (2006 through Xu 2010), homework assignments are part of the five elements in a standard lesson in China and is included in the "two basics". It seems that in China the purpose of homework is to prepare students for examinations rather than to teach students to take personal responsibility for their education.

In the overview by Dello-lacovo (2009) studies show that students are burdened with excessive homework. However, other studies (ibid) show that if teachers try to decrease the students' workload, parents will employ a tutor in the fear that their child will not be prepared for the examinations. According to the western researchers Cooper (2007) and Epstein (1983), homework allows students to practice their mathematics skills. They also mention that they have to practice the mathematics that they learned during the lesson by way of repetition. Cooper (ibid) stresses that homework can also be a way for students to assess whether they have understood the mathematics they have learned during class. It can also allow the teacher to assess whether students have understood the subject matter. Berinderjeets (2011) found that many teachers assign homework because they think that practice makes perfect and that the student, through homework, can develop and consolidate their mathematical knowledge by practicing the new knowledge and reviewing previously learned knowledge. Epstein (1983) also found in her study that mathematics homework is assigned in order for the parents to open discussions with their child about school and the value of learning. This means that parents can affect a child's views on school and learning through mathematics homework. Quigley (2003) describes that homework is also a way to please parents. They expect homework as a part of learning and want teachers to assign homework in

order to keep their child at home and to occupy their time.

## **2.3 Limitations**

What is apparent from the available literature is that in western countries there have been studies written in English about homework. However, in China there have been very few studies written in English. There is a need for research in this area in China, and more of it needs to be published in English. Considerations have to be made for the fact that the literature review was done in English with little time to spare.

### **3. Theoretical frameworks**

This study will describe and analyze the attitudes of several mathematics teachers towards the homework of 10-11 year old students. The results will be discussed and analyzed according to theoretical frameworks. These frameworks include the "two basics", the five elements, cultural capital, habitus, the behaviorist learning theory and the sociocultural learning theory.

I am aware that these theoretical frameworks are very different and could be constructed in some way on different analytical levels. The reason why I chose behaviorism and the "two basics" to analyze the data is that they closely fit the description of how the Chinese education system is very focused on examinations. The reason why I chose the sociocultural theory of learning is because that seems to be more in line with the new *suzhi jiaoyu* reforms. Both focus on the whole person and are more holistic styles of education. Using these theories will help me to understand what is happening in the classroom as well as the teachers view on learning.

Cultural capital and the concept of habitus are closely related to each other. They will be used to analyze how the family backgrounds of the students affect their way of assimilating the homework, and to understand the hidden curriculum in the classroom. Cultural capital and habitus are not connected to the other theoretical frameworks, even if it could be related to the sociocultural theory of learning, because they both have a focus on culture and how our background affects the way in which we interpret the world. The following sections give brief overviews of the concepts and theories that are used in this study.

#### **3.1 The "two basics" & the five elements**

The "two basics" consist of memorizing basic knowledge and mastering basic skills, and can summarize the Chinese teaching method. According to the "two basics", memorization leads to understanding which in turn leads to speed, efficiency and precision in reasoning; variation also complements repetition (Xu 2010). This principle was developed from Confucianism and the system of civil examinations, which

influence all Chinese mathematics education (ibid). Xu (ibid), Zhang & Tang (2005 through Xu 2010) and Shaou & Gu (2006 through Xu 2010) described and analyzed both external and internal teaching. They found that the "two basics" has a relatively stable structure within teaching. A standard lesson involves five elements "...going over prior knowledge that is relevant to the new topic, introducing the new topic, analyzing and lecturing on the new topic, applying the new topic to situations, summary and homework assignments" (ibid, p. 133). Every lesson also has specific objectives and instructional tasks which the teacher needs to cover. It includes the objective's for the lesson, basic training, the students' objectives, and to what extent these objectives are achieved. The teacher organizes the lessons and they control the activities around these specific objectives (ibid). Studies by Chinese scholars have analyzed the basic features of the mathematics classroom and found them effective. However, some researchers have found that when teaching large classes, lecturing takes up the majority of the lesson and this type of teaching may not be the most effective. The biggest challenge in the Chinese mathematics classroom is to maintain the beneficial features and promote student participation (Liang 2005 through ibid). The learning environment is described as the combination of teacher authority and student-centeredness. Students follow directions and direct their energy towards the learning activity. The students and teacher continue the discussion after class, which is also a part of the Confucian Heritage Cultures (CHC). In these cultures the students share unique learning behaviors. Individuals are not necessary born intelligent but are hardworking (ibid).

### **3.2 Cultural capital**

Cultural capital, known commonly as a Bourdieu notion, is described by Mehan (2008) as cultural knowledge. This can include skills, manner, norms, knowledge, style of interaction and styles of dress. According to Mehan (ibid), these are "transmitted by the families of each social class" (p. 59). According to Turmo (2004), one of the main aspects of cultural capital is language. If the student has received the cultural capital, in language for example, and feels familiar and confident with the school culture, the student will have advantages in school since they understand the codes and rules (Mehan 2008). Through this inherited familiarity with cultural knowledge, activities and habits, some students might have a greater chance in succeeding in school. This means that, if the student has inherited the values, habits, and cultural knowledge to understand

what the teacher says in a mathematics classroom, they will feel more confident in the classroom. In other words, “those with the appropriate cultural capital are reinforced with ‘success’, while others are not” (Harker 1990, p. 118).

### **3.3 Habitus**

A concept very similar to and related to cultural capital is habitus. Bourdieu describes habitus as “a system of dispositions common to all products of the same conditionings” (Bourdieu 1990, p. 59). Bourdieu states, “the effect of the habitus is that agents who are equipped with it will behave in a certain way in certain circumstances” (Bourdieu 1990, p. 77). Cultural capital and habitus are closely connected to each other. According to Harker (1990), school takes the dominant habitus and transforms it into “a form of cultural capital that the schools take for granted, and which acts as a most effective filter in the reproductive processes of hierarchical society” ( ibid p. 87). This means that a student’s habitus could be transformed into a cultural capital, which the student may use in school. For example, if the student knows how to act, walk, talk or play in the appropriate way in a certain situation, then the student behaves like a “fish in water” (Bourdieu et al, 1992; Bourdieu 2010).

These two theoretical concepts, habitus and cultural capital, can be put to good use in the analysis for this study. It can work well with the hidden curricula, as well as why some students tend to execute the homework better than others and how their family background can affect this. The hidden curriculum is described by Bernstein (1983) as a setting in which the visible and invisible pedagogy exists in the classroom. The setting indicates the relationships in the classroom and what is expected of the students. The hidden curriculum is the implicit standards in the classroom.

In the next part of this chapter I will briefly present two different views on teaching and learning.

### **3.4 Behaviorist learning theory**

According to behaviorism, learning takes place through the transfer of knowledge from teacher to students. The students also learn by repetition, listening and through positive



reinforcement (Skolverket 2012 and Phillips & Soltis 2010). The behaviorist approach to learning is based on BF Skinner and his thoughts that "... one should understand the behavior as a function of previous reinforcements in the environment" (Säljö 2012, p.149). What Skinner means is that you can reinforce a behavior using positive reinforcement. For example, learning mathematics becomes a question of acquiring mathematical behaviors. There is no need to apply cognitive abilities that involve reflection, understanding and insight (ibid). The pupil is seen as an object that is supposed to learn knowledge from the outside.

According to this perspective, the teacher possesses both the knowledge and the language, which is transmitted through a one-way process (Skolverket 2012 and Phillips. & Soltis 2010). The students are expected to develop their knowledge by listening to and repeating what the teacher has said. The learning process is a mechanical process in which the students themselves cannot contribute with any new knowledge. Their background and previous knowledge is not taken into account. The learning process is supposed to take place in the students' own minds by repeating, memorizing and thinking independently using calculation exercises. The students are expected to learn the same knowledge at the same speed and are left alone in their learning progress (ibid).

### **3.5 Sociocultural learning theory**

The sociocultural approach to learning is based on Lev S. Vygotskij and is known as learning by participating. Vygotskij was the first to recognize the importance of the culture and the environment for learning. He said that all the thinking and the intellectual development of the individual are based on social activity. It basically means that students learn by participating in a social context and where the student's activity is the center of learning and development (Säljö 2012 and Skott et al 2010). There are two specific concepts mentioned in the field of sociocultural development. The first one is the mediation, which is described as a tool or tools that humans use to understand the world. Humans use two different kinds of tools: linguistic and physical. The linguistic tool, which can be referred to as an intellectual or mental tool, is based on numbers, letters or symbols. The linguistic tool has its origins in cultural development,

which involves the use of cultural tools to understand and analyze the world. The physical tool can be a pen or a keyboard. The physical tools are tightly connected with the linguistic tools. A book is both a physical and a linguistic tool and in itself it is also a cultural tool (Säljö 2012). The second concept mentioned in sociocultural development is the Zone of proximal development (ZPD). This zone refers to when people have mastered a concept or a skill and they are also mastering something new. In this zone of proximal development people are receptive to instructions and explanations. In this zone a teacher or a knowledgeable student can guide and advise a student in how to use cultural tools (ibid). Vygotskijs development concept comes down to qualitative changes in interaction with higher mental functions. Here, Vygotsky talks about different levels of development. Between these levels, there are periods of crisis when the relationships between the higher mental functions are being reshaped (Skott et al 2010).

The different concepts and notions that are presented will be used to describe and analyze the results in chapter five and six.

## 4. Method

The purpose of this study is to describe and analyze the attitudes of several mathematics teachers towards homework as part of the workload of 10-11 year old students. This is, therefore, an empirical-based study with the aim of exploring their viewpoint. Qualitative methods are applicable in this kind of research approach (Bryman 2008). The design has a deductive qualitative approach and data was based on four interviews with mathematics teachers and four classroom observations. According to Alvehus (2013), ethnographic research observations in classrooms are usually made over a longer period of time. I was unable to do that; my research process instead has an ethnographic approach (ibid). The descriptive result has been discussed and analyzed according to a theoretical framework (ibid). It contains the “two basics”, the five elements, cultural capital, habitus, the behaviorist learning theory and the sociocultural learning theory, all of which are described in chapter three. The data has been collected with the support of an interpreter.

### 4.1 Data production

Observations are one way to understand what people really do, rather than what they say they do (Denscombe, 2000). It was not possible to have a simultaneous translation and we were placed at the back in the classroom. The observations should also help me to prepare for the interviews by raising further thematic issues about homework (ibid). I was placed in the back of the classroom together with my interpreter. My goal was to blend in and be as invisible as possible. Some researchers such as Denscombe (ibid) say that the observer should avoid interacting and socializing with the participants. It will preserve the natural environment of the classroom. In my case it was quite difficult to blend in and be invisible due to my western appearance. Chinese people found my appearance very different and they noticed me. However, I tried as much as possible to avoid interaction with the students and teachers, which was quite easy during the lessons since all the students focused on the teacher. It was mostly when I entered the classroom and in the hallway when the students looked at me and talked about me. During my observations, I asked the interpreter to take notes on how the teacher follows up on previous homework, and how the teacher presents new homework.

Data in this study also consist of interviews with four teachers. I chose semi-structured interviews since it gave me the opportunity to ask follow-up questions and ask the teacher to give concrete examples. A semi-structured interview is based on themes (ibid). One advantage of thematic semi-structured interviews is that the interviewee has the opportunity to introduce new themes during the interview that I had not thought of. My goal was to conduct the interviews in English. If that was not possible, an interpreter would have to translate. I have interviewed the teachers after observing them in the classroom. The interviews were carried out in locations in primary schools. They were recorded and then translated and transcribed. The interpreter was present during the interviews and the translations of the interviews.

A pilot study was conducted in Malmö as a preparation for this study. According to Bryman (2008), a pilot study based on the interview guide, which was used during the actual investigation, can give the interviewers practice on how to ask questions and how to behave while doing so. I conducted a minor pilot study by interviewing a Swedish mathematics teacher. Afterwards, I received feedback on how he perceived the questions and me. He said that everything was very clear and that I was calm, showed interested in what he was saying and so on. This interview took place in a Swedish context, whereas my interview in this study must be understood in a Chinese context. I had to use a Chinese student interpreter. I had to keep in mind that the Chinese mathematics teacher as well as the interpreter might have interpreted my questions differently because of cultural differences. Therefore, to minimize any misunderstanding, I went through the questions together with the interpreter before the interviews. To make sure that any cultural aspects had been taken into consideration, we translated them from English into Chinese and discussed aspects of possible misunderstandings as well as appropriate follow-up questions.

To gain a better understanding of China's school system, what kind of examinations they conduct and how Chinese society is designed, I interviewed my Chinese contact person at Yunnan Normal University. When searching for further information about the Chinese educational system, I found only Chinese language (Mandarin) material.

### **4.1.1 Selections of participants**

Since I conducted my investigation in China I was unable to influence the process of selecting participants. The vice director of Yunnan Normal University helped me to get in contact with a school. The school he chose has a close connection to the university. I tried to influence the selections of participants as much as I could. I wanted to do a strategic selection for research participants with specific work experience (Alvehus 2013). According to Bryman (2008), it is important in a qualitative method to have participants who are relevant to the research questions. My participants needed to be teachers of grade five and six mathematics. As my research is about the views of primary school mathematics teachers towards mathematics homework, it was natural for me to ask the vice president of Yunnan Normal University to contact mathematics teachers in primary schools. The school that I got in contact with is a school in the middle of Kunming with about 3000 students. Four mathematics teachers at this school were asked to participate in my research, through interviews and also allowing me to attend and observe their mathematics lessons. The teachers who participated in my study all appear to have the highest titles at the school. The school principal might have handpicked the teachers in order for the school to make a good impression in the study.

Kunming is a city of 7 million inhabitants and is the capital of the province of Yunnan. In Yunnan, there are 26 of the 56 minority groups that exists in China. They all have different languages, cultures and costumes, but in school the lessons are conducted in mandarin (Ouyang). The school where I conducted my research has a unique school uniform that is influenced by the costumes of minority groups. The teachers who took part in my interviews and observations work at the same primary school in Kunming and were educated at the same university. All the respondents are women who have worked as teachers for between 5 to 21 years and teach in grade five and six. Their different work experiences, age and the fact that they were educated during different time-periods give the selection a wide range. In the thesis, I call the teachers Ann, Lilly, Li and Celine.

## **4.2 Considerations**

The data consists of descriptions given by the teachers in interviews, the interpreter's translation and my understanding of the translated and transcribed interviews.

There are many important aspects to bear in mind while working with an interpreter. Firstly, the interpreter needs to both speak and understand English very well, but also the language that the interviewee speaks. Secondly, the interpreter needs to behave professionally, be aware of professional secrecy, and radiate security and trust to those being interviewed. Thirdly, I need to keep in mind that linguistic misunderstandings can occur and that the interpreter might not have the specific terminology for the current theme. Fourthly, an interpreter can affect the interviews since the data needs to go through one more line that needs to interpret the data. Finally, it is difficult for me as the interviewer to develop a rapport with the interviewees (Dalen 2007). My interpreter is a student at Yunnan Normal University and she has English as her major: MTI (Interpretation).

To avoid misunderstandings between the interpreter and me, I transcribed what she had translated and went through and checked the text several times. I marked uncertainties in the text. Afterwards, I had a meeting with the interpreter and together we examined the recordings and the translated texts. If there was a specific terminology that she did not know in English, she described the word to me.

### **4.2.1 Perspectives**

A researcher is never “blank”, i.e. considers behavior, surroundings, expectations etc. (Alvesson & Deetz 2000). Our experiences form our perspectives, i.e. what we notice and how we understand it. It was especially important for me to have that in mind since I have conducted my study in China. The culture in China is very different from the Swedish culture, both inside the classroom and outside. As a student teacher from Malmö, I needed to be aware of the cultural differences and try not to let my own experiences form my perspectives. I was careful and curious, since my perspective is formed in a different context. On the other hand, when an outsider asks questions it

could give a possibility to arise new content. The interview is never a dialogue between two equal parts. It is presented by the researcher, who needs to critically monitor the interview while maintaining a reflective approach (Kvale 1997). There may also be specific reasons why the interviewee decided to participate in the interview, for example peer pressure or persuasion. The answers during an interview can also be influenced by the willingness to “look good” in front of others. There may be a positive distortion (Alvesson & Deetz 2000). I do not have any knowledge about if or how these different aspects might have influenced data in this study.

#### **4.2.2 Ethical principles**

The advice from the Swedish science council (Vetenskapsrådet 2002) has been followed. The study focuses only on the informants’ profession as teachers. The informants have been given oral as well as written information about the study. The letter included a description of the purpose of the study and explained that they were free to take part in the study and did not have to answer any questions they were not comfortable with. They were also informed that their names would not appear in the thesis. They were informed that the data would be handled confidentially and that informants cited in the thesis would not be named but instead given a number in the thesis.

#### **4.2.3 Trustworthiness**

Since this is a study with a qualitative approach, reliability and validity will be reflected on to design the implementation of the study (Bryman 2008). In order to increase its credibility, the final report must be transparent. The researcher must carefully describe how the study was conducted. The reader should be given a clear opportunity to understand how the *whole* study is conducted including the process of analysis and how the results might be understood. The descriptions from teachers must be clarified and be accompanied by quotations from interviews. It is a minor study; four teachers have been interviewed and descriptions about homework are from their subjective perspectives. Also, four observations have been conducted. Therefore, the results in the study will not be generalizable, but a result of this study alone. The possibility cannot be excluded that

there might be misunderstandings during an interview due to limitations of the interpreter. The interpreter can misunderstand both the interviewee and me, the interviewee can misunderstand the interpreter and I can misunderstand the interpreter. However, since I have both observations and interviews from the same teachers it increases my trustworthiness.

### **4.3 Method discussion**

The reason why I choose to conduct qualitative research was to gain a deeper understanding; it was also better suited to my research questions. I also choose observations and qualitative interviews because it gives me a broader and deeper understanding of how the mathematics lessons are conducted and the role of mathematics homework in the teacher's teaching. It was not possible to carry out a questionnaire at the school and a qualitative study would give me more information from the informants than if I had done a questionnaire. It would have been very interesting to follow some teachers for a couple of weeks, but it was not possible to arrange.

I understand that there are a lot of difficulties working with an interpreter; there are many things that can affect the outcome. But I had no choice other than to do so because I was not able to carry out the interviews without her since I do not speak Chinese and the teachers do not speak English. During this study I have used semi-structured interviews to produce data, even though it was my interpreter who asked the questions and not me due to time pressure. However, they are still semi-structured interviews because I asked her to ask follow up questions if something was unclear, which I explained to her before entering the interviews. It is possible that I would have got a different result if I were the one to ask the follow up questions due to my different point of view. The interviewed teachers might have been specially selected by the principal of the school to make sure that the school would appear in a good light, or the teachers might have also chosen to participate. This could have had an effect on how the teachers answered the questions. Furthermore, since they got the questions before the interview, they might have discussed them together or perhaps thought of how to answer the questions in the best political way. On the other hand, they might also be teachers who



are especially interested in their work and therefore willing to participate in the study and keen to read the final report.

Since this is a study with a qualitative approach the design of the study, including the analyze, is based on my pre-understanding on e.g. teaching, learning, and homework, out of my own experiences and knowledge from a western perspective (Bryman 2008). The study is constructed from my subjective view even though I have tried to be neutral, careful and curious. My pre-knowledge may have been a resource but also may have made it difficult for me to understand the Chinese way of thinking. I might not have been able to be neutral in my analysis, which can affect the way the data has been analyzed. My cultural capital may have influenced my interpretation of the data. But I have been very thorough; I have carefully read all the interpreted texts and asked my interpreter if I have understood everything correctly. I might have had a different result if I were able to have followed one class for a longer time or perhaps if I had interviewed and observed more teachers in order to gain a broader view. But I think this would have been quite difficult to do since it was difficult enough to be allowed just these four observations. I think it would probably be even more difficult to do observations and interviews in smaller villages.

This research might help teachers to start a discussion about homework and student workload. If they in some way can change their teaching approach in order to decrease the mathematical homework even more.

## **4.4 Implementation**

Two days prior to my interviews, the school wanted me to send them the questionnaire. I decided that it was ok. The interviews were conducted in a quiet and separate room. Before the interview started a letter of introduction from me in Chinese was handed out to the respondent (Appendix C and E). In this letter there is a short introduction of me and what my research is about. It also says that they will be anonymous and they do not need to answer any questions that they feel uncomfortable with. Due to a misunderstanding between the university and the primary school, I was granted only 30 minutes per interview. To be able to ask all the questions that I had prepared I decided that my interpreter should ask the questions. I told her that if there is something that is

unclear then she may ask them to specify. Since the teachers had received the questions beforehand, they had already prepared some answers. The interview in Chinese took 15-20 minutes and I was able to ask some follow up questions. It was quite difficult since I do not speak Chinese and I did not know what they had already answered.

I have made four observations in four different mathematics lessons. Each lesson was 40 minutes long and I met the teachers and students for the first time when I made the observation. My focus in the classroom was on how the teachers communicate with their students and what kind of activities the teachers have in the classroom. I have taken clear and thorough notes while having this focus in mind (Appendix A). I also took some other general notes on what I saw and when anything was different from my perspective. After the observations, I used a recorder to record what I saw and what I had written down as notes. In this way my notes could come alive and all of my impressions could be easily preserved (Bryman 2008).

## **4.5 Processing the data**

The transcribed interviews have been analyzed using thematic analysis, which means to structure the material under different themes and summarize the results based on the research questions (Bryman 2008). The individual descriptions have been read carefully and treated as individual statements, categorized and themed. They have then been compared to search for recurrent themes that form patterns, and also variations in the teachers' descriptions. The observations have been described and analyzed by looking for similarities and differences.

After taking notes during the observations of the four mathematics classes, I recorded the rest of my thoughts to air all the impressions that I had and also to make my notes come alive. After that I used my notes to write and describe the observations. When I analyzed the observations, I looked for similarities and differences and connected these to the theoretical frameworks.

After conducting the interviews, my interpreter translated them. I then transcribed the interviews and questioned my interpreter as to whether there was anything that I did not

understand. When processing the data, I followed the six phases of thematic analysis as described by Brauns and Clarkes (2006). The first phase is familiarization with the data where I carefully read through the transcriptions over and over again. The second phase is *Coding*,

This involves generating pithy labels for important features of the data of relevance to the (broad) research question guiding the analysis. Coding is not simply a method of data reduction, it is also an analytic process, so codes capture both a semantic and conceptual reading of the data (Brauns and Clarkes 2006, p. 18).

For the second phase I decided to use my research questions as rubrics to more easily select data for analysis. The third and fourth phases are *Searching for themes* and *reviewing themes*. Here I choose to color code the different teacher's statements and then search for similarities and differences using my theoretical framework. I used concepts such as reinforcement, mediation, zone of proximal development, cultural capital, memorization and repetition to look for similarities and differences in what the teachers said in the interview and what was observed during the observations. The fifth phase is *defining and naming themes*, "identifying the 'essence' of each theme and constructing a concise, punchy and informative name for each theme" (Brauns and Clarkes 2006, p. 22). The different concepts I used to analyze were to be transformed in to and put together to the six different themes in chapter six. The sixth phase is *writing up*, where I have presented my data in the context of the theoretical frameworks (ibid).

In the next chapter I will describe the observations where the theoretical frameworks are applied in order to analyze the observations.

## **5. Setting the scene - observations**

In this chapter, I have described the observations one by one, followed by a short analysis where I have looked for similarities and differences using the theoretical frameworks. The reason for this type of design is for you as a reader to get an understanding on how the lessons were conducted based on my description. It also gives you as a reader a better understanding of how the teachers design their lessons and what part homework takes. This part is the groundwork to chapter six; it is a way to “set the scene” in a typical Chinese classroom. It will also aim to show how teachers use reinforcement and what cultural capital the students have.

### **5.1 Classroom observation - teacher Ann**

The time is 8.40 am and I am entering my first observation, which will be in the classroom of who is said to be the best mathematics teacher in the school. She is the director of mathematics teaching and has worked as a teacher for 21 years. Before we enter the classroom, I could say a quick “hello” to the teacher. The interpreter and I are shown to our chairs, which are placed in the back of the classroom. The classroom is narrow and there are about 56 students who sit boy/girl. There is a TV, a lecturer’s desk, a blackboard and some other boards with a reward board with stickers.

When the teacher greets the students, the students are standing and they return the greeting in a chorus. After greeting the teacher, the students turn around and say “hello” to me. After that, all focus is on the teacher. Now the lesson begins. The teacher starts by using a deck of cards. She asks some questions and the students answer her in chorus. I ask my interpreter what she is doing, and she explains that this is some kind of game to repeat what they did in the previous lesson. After this short activity, the teacher uses the TV as a “smart board” to present different texts. The teacher reads it and the students repeat after her. She also asks some questions and all of the students answer her in chorus. After about 10 minutes of this, the students are now using three paper cups and four pens. The activity is now to work in pairs and discuss how they can place the pens in the paper cups. The discussions amongst the students are lively but they all stop talking after about two minutes. The teacher asks one group to come up to the lecturer’s

desk and present their answer. The teacher continues with two more short group discussions like this. After that, the lesson shifts from having short group discussions to being guided by the teacher. The teacher explains and asks questions, and the students answer either one-by-one or in chorus. Sometimes they also repeat what the teacher has said. At one point, two students explain and say something that the teacher is very pleased to hear, and they are rewarded by with a sticker to put on the wall. When there is about ten minutes left of the lesson, the students get to work. After two minutes, the teacher wants to hear some answers on how they have solved the problem. Then the students once again work for two minutes using the textbook, and so it continues for the rest of the class. The students appear to know exactly what is expected of them, how to behave, and how to answer.

When the teacher asks a question, the student can raise their hand in different ways: (1) not raise their hand – I don't know the answer; (2) raise their hand but with a clenched fist – I can answer the question but I am not one hundred percent sure about the answer; (3) raise their hand with a flat hand – I know the answer and I am quite sure, (4) raise their hand with a flat hand and a straight arm – I am one hundred percent sure.

The class finished at 9.20 am.

## **5.2 Classroom observation – teacher Lilly**

The time is now 9.25 am and I am entering my second observation, which will be in the classroom of the most senior mathematics teacher in the primary school, and who has worked as a teacher for 18 years. Before we enter the classroom, I could say a quick “hello” to the teacher. After that, we are shown to our chairs, which are placed in the back of the classroom. The classroom is narrow and there are about 57 students who sit in various pairs, either boy/boy, girl/girl, or boy/girl. There is a TV, a black board, and a lecturer's desk. There is also a reward schedule on the blackboard where the different rows in the classroom get rewarded when they behave or perform well in class.

The teacher starts by greeting the students and the students stand up and great her back in chorus. After greeting the teacher, the students turn around and say “hello” to me. After that, all focus is back on the teacher. The lesson starts with a short discussion in

pairs. The students are talking about how to use the mathematical formula on the board; they also have the geometrical figure in front of them. After this short discussion, the teacher asks the students to tell her what they think. At one point there is a student who in some way says something wrong and the rest of the class turn towards him and start laughing; so does the teacher. When she has let three different students answer the questions, she explains on the blackboard the right way to think and the students repeat after her. Then the students form groups of three and discuss with each other how to use the mathematical formula. After 25 minutes from the starting point, the students may open their textbook. They are now going to practice problem solving in the book by using the formula. After one question the teacher wants to hear what their conclusion is and how they solved the problem. Then the students continue their work in the textbook. The students appear to know exactly what is expected of them, how to behave and how to answer. The class finished at 10.05 am.

### **5.3 Classroom observation– teacher Li**

The time is now 10.45 am and I am entering my third observation, which will be in the classroom of the leader of the preparation work in grade five and six, and who has worked as a teacher for 17 years. Before we enter the classroom, I could say a quick “hello” to the teacher. After that we are shown to our chairs, which are placed in the back of the classroom. When I enter the classroom, all the students applaud me. The classroom is narrow and there are about 60 students who sit mixed boy/boy, girl/girl and boy/girl. There is a TV, a black board, a lecturer’s desk and some other boards where there is a reward board with stickers.

The school clock is ringing and all the students stand up. After that, the teacher greets the students and the students greet her by saying something verbal. They bow and sit down on the bench with their backs straight and their arms crossed in front of them. After greeting the teacher, the students turn around and say “hello” to me. After that, all focus is back on the teacher. The teacher starts the lesson by reviewing the mathematical rules they had done as homework the previous day. The teacher asks questions and the students answer one-by-one or in chorus. At one point there is a student who says something good and the whole class applauds him three times in

synchrony. The teacher presents some new information on the blackboard and the students read in chorus what is written. She also says something and the students repeat after her. After explaining and repeating the rules, the teacher gives the students a couple of problems to solve. One student tells the rest of the class what the first problem is about. After that they calculate the problem and then a new student has to answer what result he had got. Then they continue to the next problem and it is the same procedure as the first one. At the end of the lesson, the students tell the teacher what they have learned. The students appear to know exactly what is expected of them, how to behave and how to answer. After about four problems, it is time to end the class at 11.25 am.

## **5.4 Classroom observation - teacher Celine**

The time is now 11.35 am and I am entering my fourth observation, which will be in the classroom of the teacher of that class, who has worked as teacher for five and a half years. Before we enter the classroom I could say a quick “hello” to the teacher. After that we are shown to our chairs, which are placed in the back of the classroom. When I enter, all the children say “hello” to me. The classroom is narrow and there are 58 students and they sit mixed boy/boy, girl/girl and boy/girl. There is a TV, a black board, a lecturer’s desk. There is also a reward schedule on the blackboard where the different rows in the classroom get rewarded when they behave or perform well in class.

There is one girl and one boy who stand together with the teacher next to the lecturer’s desk at the front of the class. Before the lesson starts, the students can rest on their desks until the clock rings. The school clock is ringing and all the students stand up. After that the teacher greets the students and the students greet her by saying something verbal. They bow and sit down on the bench with their backs straight and their arms crossed in front of them. The teacher tells the students how they should think and writes it on the blackboard. She asks the students to read out loud in chorus what is written on the blackboard. If the teacher ask any questions, the students answer one-by-one or in chorus. The rest of the lesson looks like this: (1) the teacher explains something on the board; (2) the students read about the same thing by themselves in the textbook; (3) the students practice by themselves; (4) the teacher asks what conclusion they have made and corrects them; (5) the process is repeated. In the end of the lesson, the students have

to listen, follow, and repeat how the teacher thinks and how she would solve a problem. The students appear to know exactly what is expected of them, how to behave and how to answer. The lesson ends at 12.05 pm.

## **5.5 Observation of homework in classroom**

During the observations, my interpreter should observe if the teacher mentioned anything about homework. According to my interpreter, none of the teachers mentioned anything about assigning homework during the lessons. She also said that the teachers do not have to mention homework because the students already know what is expected of them with regard to homework. However, during observation two, my interpreter tells me that they have a couple of exercises that they have to do during the lesson. If they do not finish them during class they will *also* have to do this as homework. During observation three, the teacher starts the lesson by repeating the mathematical rule that they had for homework the previous day. The only teacher who mentioned the new homework is Li. She had written the instructions on the blackboard, but she did not mention it orally.

## **5.6 Conclusion**

These four observed lessons have some factors that are very similar and some that are different. The first factor that is similar is that the teacher guides the main parts of the lessons. The teacher tells the student how to think and to repeat after her. This can be understood from a behavioristic teaching point of view since the student are expected to learn and develop knowledge by repeating after the teacher. Since the main part of the lesson is teacher-led, it appears that the teacher also believes that learning take place through the transfer of knowledge from teacher to student (Säljö 2012 and Phillips. & Soltis 2010). However, the size of the class might also have influenced their way of teaching. In a small classroom with about 60 students, the easiest way to teach all of these students could be by a teacher-led lecture were the students listen to the teacher and learn the knowledge presented by being a passive learner. It is a behavioristic view on learning but the classroom environment might be the factor that sets the teaching possibilities. The second factor is that they all had some kind of reward system (Phillips.



& Soltis 2010). This is another factor that demonstrates a behavioristic view of teaching; the teacher gives positive reinforcement by giving a reward of some kind (ibid). The third similarity is that none of the teachers talked about the new homework. The students, according to my interpreter, already know what they have to do as homework is assigned every single day. Since they already know the homework that they have to do for the next day, it may prove that the teachers' use the five elements to plan the lesson where the fifth element is homework. They repeat the same exercises as they did in the classroom (Zhang & Tang 2005; Shaou & Gu 2006 through Xu 2010). By their behaviour in the classroom and the unspoken requirement of homework, the students appear to know exactly what was expected of them. Thus, the students appear to understand the hidden curriculum that includes the cultural capital (Mehan 2008). This shows that they have cultural capital that can be used and exchanged in the classroom.

My descriptions of the lessons all start the same: the teacher greets the students and greet her back in chorus. I have chosen to describe the observations in this way to emphasize how similar the lessons are at some points. The students appear to understand the hidden curriculum since they know how to behave in the classroom at the right moment. They know how to greet the teacher, how to sit, when to answer a question, and when they can talk to each other and when to be quiet. This means that they might have inherited the values, habits, and cultural knowledge to understand how the teacher communicates in a mathematics classroom and what behaviour is expected of them (Harker 1990). In other words, the students have cultural capital. Most often, the concept cultural capital is used to show how individuals can position themselves against other hierarchically using the cultural capital. When those who have the most capital, in this context, the teacher, reward a student he or she grant this student cultural capital and positioned higher than others in the hierarchy. The same applies to the student who was laughed at, at that time the student was positioned lower in the hierarchy. Further, this rewarding and punitive relates to behavioral grounds.

During these four observations I also observed some differences between the lessons. I will illustrate with four examples. The first example is that two of the teachers (Ann and Lilly) used practical mathematics with group discussions. According to Säljö (2012), the sociocultural view is known as learning by participating. During the discussion

activity in the classroom, the teachers allowed the students to discuss how they can solve the problem, which shows a sociocultural view of teaching. The teacher might even have chosen the students places in the classroom, so that the group discussions were amongst students in a different but quite similar zone of proximal development (ibid). The students can learn from each other; they can guide and advise each other in how to use cultural tools (ibid). However, this is something that I do not know for sure; it might be there or not. The second example is that one of the teachers repeats the previous homework and then moves on to the new knowledge. Zhang (2005) and Shaou & Gu (2006) describe the standard lesson, which involves five elements. This lesson followed that standard lesson. It is explaining prior knowledge (in this case the homework), introducing the new topic, analyzing and lecturing on the new topic (in this case using the textbook), applying the new topic to situations, summarizing (the students tells the teacher what they have learned) and homework assignments. The only part that is unspoken is assigning homework. However, the students already know what homework they have. This lesson was the only one that showed these five elements clearly. The third example is that in one class (Celines lesson), the homework was already on the board but the teacher did not mention it during the class.

During my observations, where it comes to using practical mathematics and for the students to discuss mathematics, I saw a clear difference between the first teacher and the third and fourth teachers,. According to Dello-lacovo (2009), the curriculum reform, *suzhi jiaoyu*, is "...a more holistic style of education which centers on the whole person" (ibid p. 241), and is relevant to China's modern drive. *Suzhi jiaoyu* could have influenced the first observation that I attended and not the last two. Instead of just absorbing knowledge from the teacher, the students could discuss with each other and use practical things to make the mathematics more concrete.

## **6. Result and analyze**

The previous chapter showed glimpses of how the four teachers designed their lessons and what part homework played in that design. In this chapter, I will present my analysis of the teachers' answers in the interviews, and give an overall analysis of my empirics using the theoretical frameworks. This chapter mainly answers and relates to the research questions of this study. The themes that I found in my analysis is as follows: homework as part of the five elements, learning is a process, homework assignment differences, homework and pressure, and family background. To emphasize the themes, I used these as headings in this chapter.

### **6.1 Homework as a part of the five elements**

According to Zhang & Tang (2005) and Shao & Gu (2006) through Xu (2010), homework is part of the five elements of a standard lesson, which are connected to the "two basics". The interviewed teachers all assign homework. According to them, the reason for doing so is that the students need to review the new knowledge, which will help them to truly understand and consolidate the knowledge they have learned in class that same day. This might also help students, who think they understand everything in the classroom, to understand it better. Li describes the homework as "a stretch-out of the teaching in class...all the homework is about finishing their assignment of learning". Although I observed all of the five elements in only teacher Li's lesson, there appears to be one of the five elements common to them all: homework. It seems that they all treat homework as part of the lesson and an important part of acquiring knowledge. Since they all believe in the importance of homework, it could be that they all do indeed follow the five elements, but without it being as clearly evident in their lessons as it is in that of teacher Li. This could be the reason why the teachers think that homework is a stretch-out of the lesson, because they always plan their lessons according to the five elements of a standard lesson. The teachers all say that students need to practice their abilities. Ann says that homework "is the natural law of education". Ann's statement shows that she believes that homework is very important and that it is the natural way of teaching, that it is part of the five elements of a standard lesson.

## 6.2 Learning is a process

The teachers do not only talk about learning as transfer of knowledge from teacher to student. They all say that homework is a part of the students learning process and it can promote the students learning, which can help them to review and truly understand the knowledge. The “two basics” emphasizes memorization. However, the interviewed teachers describe a different approach to learning. The teachers also say that the students have to think independently and homework will help them to do so. All the teachers say that when students use a pen they are in a thinking process. They can use their knowledge and mind in a practical way. Homework helps the students to understand and think by themselves. When they think by themselves, they can use their knowledge and what they have learned. This helps the students not to forget what they have learned. Ann says, “Students don’t understand everything in school, homework will help them to understand”. The view on leaving the students by themselves in their learning process can be said to have a behavioristic tendency. The students are supposed to listen to what the teachers say, and after that practice independently. There is no communication with other students; you are left alone in your learning process (Säljö 2012). During the observations, all of the teachers showed at some point a behavioristic view of learning, which means that learning takes place through the transfer of knowledge from teacher to students. In other words, the students learn by repetition and listening (ibid). Since the students repeated what the teacher had said, it seems that they try to and are expected to memorize by repeating after the teacher. This could indicate that teacher uses the “two basics” (memorizing basic knowledge and mastering basic skills (Xu 2010)), and a behavioristic view (memorizing what the teachers says by repetition (Säljö 2012 and Phillips. & Soltis 2010)).

According to Ann, the teacher should “avoid giving students those mechanical exercises... homework should be very specific”. Since the teacher wants to avoid the mechanical exercises, which are normally used for repetition, the teacher shows a non-behavioristic view. They want the students to have more specific exercises (Skolverket 2012). Li says “If you review it in a proper time, you will forget less from the knowledge. So it is necessary to learn and to review what you have learned today”. This statement does not show any evidence of a behavioristic view of learning. However, it

might be a sign of mediation, using the linguistic tool, which is part of a sociocultural view. Mediation are tools that are used to understand the world around you. One such tool is the linguistic tool, which has its origins in the cultural development and is used to understand the world. If you review what you have learned and understand that you actually have learned something that day, it can help you to continue to understand the world. In this case, the book that the students use to review the new knowledge is used as mediation (Säljö 2012 and Phillips. & Soltis 2010).

Celine talks about the role of homework in promoting the students learning and thinking habits. According to her, there are five parts to forming a good habit,

- (1) Forming their habits in finishing their homework positively and just in time
- (2) basically and carefully understand the question itself
- (3) finish their homework independently and thinking independently
- (4) carefully doing a draft
- (5) checking their homework by themselves.

The learning habits that Celine talks about involve developing the students cultural capital. In other words, to teach them the hidden curricula so that they can successfully assimilate mathematics homework. Students who did not receive the cultural knowledge from their parents have the possibility to learn it at school (Mehan 2008). Celine talks about how to promote this. It means also that she sees a need in school to make up for any deficiencies in a pupil's background. She did not appear to have the approach that it is the individual's own responsibility.

Even if homework is included as one of the five elements, the teacher can reward students by not having homework. Lilly rewards her students if they have done their homework correctly for ten days and with nice handwriting. The students are then exempt from having to do homework on the eleventh day. This reward can be interpreted as positive reinforcement, which is part of a behavioristic view of learning (Skolverket 2012 and Phillips. & Soltis 2010). It also shows that the teacher reads the homework that the students have handed in, since she knows if the handwriting is good or not. During the observations, the teachers used positive reinforcement. At one point, one of the students answered the teacher's question very well and this student got a sticker, which he could put on the rewarding board. This rewarding system shows a

behavioristic view of learning, where positive reinforcement is used (Säljö 2012 and Phillips. & Soltis 2010). Positive reinforcement can also be used in other views of learning, but it is not a rewarding system such as this.

### **6.3 Homework assignment differences**

The teachers do not only describe homework assignments as part of training to solve mathematics problems, repetition and memorization. All of the interviewed teachers describe two different kinds of homework, the written and the oral. The written homework is exercises and calculations, which are based on the textbook and the mathematical knowledge that they have learned during the day. They assign this kind of homework everyday to help the students to review their mathematical knowledge. According to Celine the students need this written homework “Because they need to practice. Practice makes perfect. They need some calculating homework”. This kind of homework fits in “the two basics”, which emphasizes memorization by repetition. The second kind of homework is the oral homework, which is about reading the homework. This seems to be, at least partly, another approach to learning theory that stresses students understanding and not memorizing. The student can open their textbook and read mathematics laws and also what they have learned that day. Celine also describes the oral homework as a way for the students to “read and to tell what it is the meaning of the question. And also which method they should use to solve this question”. Li says that the oral homework helps the students to “get better understanding and understand the terms of math”. The oral homework can be analyzed as a way of having a conversation with yourself and memorizing mathematical methods. It can be understood that the student is still alone in their learning process, which is part of a behavioristic view (Säljö 2012 and Phillips. & Soltis 2010). On the other hand, it can also show a way to support a student’s understanding of mathematics, and then perhaps be linked to a sociocultural view of learning.

Ann and Lilly describes a third kind of homework, which is the practical homework. This homework is an assignment that is connected to the students’ daily life. For example, it could be about interviewing their parents about their incomes and outcomes during that month, and then the students need to take notes. Another example is when

they go sightseeing in spring and the students' can calculate how much money they have used during that time. Ann says that "through such kind of practical homework, it can help students to established valued views towards money and math". This kind of homework can be part of the reform, *suzhi jiaoyu*, which is a more holistic approach to education that should center on the whole person (Dello-lacovo 2009). These two teachers are the same teachers who do partly concrete mathematical activities during their lessons. This is one more factor that proves that they have taken *suzhi jiaoyu* into account when they have designed the homework.

According to the teachers, homework is also a way for the teachers to get an overview of what the students have understood or not. As Celine describes it, "For teachers homework is a way for teachers to understand or know what exactly the students have understood". According to Lilly, it is "necessary to assign homework to make sure that the students practice on the right things in other wise it is just a waste of time for the students". These statements do not show a specific perspective on learning but it shows that the teachers read what the students had for homework.

## **6.4 Homework and pressure**

The Dello-lacovo (2009) overview about research on students' workload showed high pressure on students and that parents paid tutors to prepare their child for examinations. In the interview, Lilly describes that the pressure gets higher on the students prior to sitting the entrance examinations to middle school. They are sometimes assigned more homework during this period, not from their teachers but from the school or from private tutors that their families have hired. She says that she wants the students to understand that "it is not the amount that is important, it is the understanding". This statement speaks against a behavioristic view on learning since it focuses on the understanding and not memorization (Säljö 2012 and Phillips. & Soltis 2010). The teachers can all decide by themselves if they want to assign homework or not, but there are some regulations on how much homework they may assign. From grade one until grade two, they have no written homework, only oral. For grades three and four, the total length of the homework should not exceed 40 minutes, and for grades five and six it should not exceed 60 minutes. The time regulations are, to my understanding, a part

of the reform *suzhi jiaoyu*. Even though the teachers have these regulations, they mention that the parents hire tutors who assign more homework when it is time for the final examinations, just as Dello-Iacovo (2009) research study showed. Lilly says that she wants to control the amount of homework for the students. She teaches in grade five and the students never get more homework than 40 minutes. She says, “I also hope that the students can do other things, the things that they like and not just focus on their homework”. Celine speaks about the students’ difficulties in the classroom. She says:

In class there is one teacher that are teaching many students but at home there are parents and one student. There it is more specific, [...] in general in the primary school there are no such huge difficulties to learn knowledge. Basically if the students learn to focus in class they don’t have many difficulties in finishing homework. (Celine)

The teacher says that if the students learn to focus in class they do not have any problems in finishing their homework. The students habitus might help them to be able to focus in class, whether they have learned it from their parents or not. During my observations, I found that the students all understood the hidden curricula; they all seemed to have understood the cultural capital, how to behave and what to do. This could be their habitus that has been transformed in school to cultural capital (Harker 1990).

I think the environment of their family will influence their homework. For example if the parents will play mahjong or games or invite their friends to home and talk loudly when the students are doing their homework. It will definitely influence them when they are doing their homework. (Ann)

They all talk about how important it is that there is peace and quiet around the students when they do their homework, which is not connected to any of the theoretical frameworks. It could, however, be understood from a behavioristic point of view, that the teachers believe that the noise might distract the transfer of knowledge from the book to the student (Skolverket 2012 and Phillips. & Soltis 2010).



## 6.5 Family background

Bourdieu states, “the effect of the habitus is that agents who are equipped with it will behave in a certain way in certain circumstances” (Bourdieu 1990, p. 77). Harker (1990) mentioned how school takes the dominant habitus and transforms it into a cultural capital that the schools takes for granted. Cultural capital is described by Mehan (2008) as cultural knowledge; this can include skills, norms and knowledge, which is “transmitted by the families of each social class” (ibid p. 59). The teachers believe that the students reach this habitus from their parents. They say that it is up to the parents to help them form good learning habits.

So the family environment might influence the student’s homework. Especially for the students parents that not have a good learning habit. There is a Chinese saying, like father like son. When the parents have not got a good learning habit the students can not get one either. The children are just like magnificent glass of their parents, if the parents got a good habit then their children will show it. (Lilly)

This means that the inherited familiarity with habitus and cultural capital affect the students’ chance in succeeding in school (Mehan 2008). However, during my observations, it seems like the students have learned how to follow the hidden curricula in the classroom. They know exactly what is expected of them; they know when to speak one by one, when to speak in a chorus, and when not to speak. The teacher does not even have to mention the mathematics homework for the students because they already know what it is. The students might have inherited some cultural capital from their parents, so they know exactly how to act in this situation. When it come to learning habits, it is difficult to say, because even if the student acts in the way that the teacher wants, you do not know what is happening inside the student’s head. If the student understands the teacher or if he or she just follows the other students, however, the student still understands that he or she should follow the others.

Li says that she assigns homework on a level, which is about average and are basic problems. There are more difficult ones but these are not mandatory. If there are some

students that need help with their homework and with these basic problems, they will have to get help from their parents. The teacher might assign homework in different levels that are close to a specific student's Zone of proximal development (Säljö 2012). However, the homework does not seem to be individualized. She does not seem to assign specific students specific homework. It seems as if she assigns the same to everyone, but it is just on an average and basic level. Therefore, she has not taken the student's ZPD in account.

Regarding the parents' difficulties in helping their child, Li says "for parents who have good knowledge of math they can help the student but if there are some parents who have not this knowledge they can not help the student." Ann also talks about the parents' lack of mathematical knowledge; she says, "A second struggle is that they can not get help from their parents. It is like when their parents cannot give positive encourage to the students or the parents cannot understand the mathematical problems". To my understanding, the parents are used as mediation, which is a tool that is used in order to understand the world, and is connected to a sociocultural view of learning. There are two different mediations that are used to understand the world around you. The first is the linguistic tool that has its origins in the cultural development, and which is used to understand the world; in this case, the parents can contribute to this. The second is the physical tool that consists of things that you use while understanding the world; it could be, for example, a pen. Ann used physical tools in her lesson to mediate; she used pens and cans to show mathematics in a more concrete way. A book is both a physical and a linguistic tool, and in itself it is also a cultural tool (Säljö 2012). In this case, the book that is used for homework is used as mediation, and just as Säljö (2012) says, it is both a physical and a linguistic tool.

Ann also talks about another problem, which can appear while the students do their homework at home with their parents. If the students do not understand the question itself due to lack of language knowledge, he or she cannot assimilate the homework. She describes it as the ability to understand the question and the language. To my understanding, this kind of difficulty might be specific to minority groups. The only time that they speak mandarin is in school; during the rest of the day they speak their own language (their first language), which I connected to their minority group. They start learning mandarin when they start school at the age of six. Then everything is in

mandarin (Ouyang). The reason why some students struggle with the mathematics could be because they learn mandarin at the age of six, and at that point the minority children are already behind in comparison to the native mandarin speaking children.

Celine describes a different difficulty; she says that if there is a student who has difficulties in listening or concentrating, the teacher will ask the student to come to the office. There, the teacher will explain it one more time. When I ask about learning disabilities, they do not really understand what I am asking about. However, Lilly recognizes what I am asking about and says “But there are few students that have this disability. Basically the main reason for struggling with homework is the students learning habits, these habits come from their family environment”. All these statements from the teachers can be analyzed as meaning that the teachers believe it is the parents’ lack of ‘good learning habits or ability to help their children that has influenced the students’ difficulties in executing the homework in different ways. It could be the parents lack of language, mathematical skills, learning habits or just to give the students positive encouragement. According to Turmo (2004), one of the main aspects of cultural capital is language, which can help the students to understand the codes and rules in the classroom. If the student has received the cultural capital from their parents, the student will have advantages in school since they understand the codes and rules (Mehan 2008).

## **7. Discussion**

In this chapter, I will discuss the result of this study in relation to previous research conducted using the main research questions. These are: (1) How do teachers describe their reasons for assigning homework? (2) According to the teachers' perspective, how does homework contribute to improving the students' knowledge of mathematics? (3) What kind of mathematics homework do several particular teachers assign? (4) How do these teachers describe the students' ability to assimilate the mathematics homework? I will also present the conclusion of this study.

### **7.1 Result discussion**

When starting this study, I believed that I would find a different view of homework in China than other western researchers had found. I also thought that I would find that Chinese education would be all about memorization. But that is not entirely what I have found.

#### **7.1.1 How do several teachers describe their reason for homework assignments?**

The reasons that the interviewed teachers gave for assigning homework were because “it is the law of education” and “that practice makes perfect”. To my understanding, this view of homework can be interpreted as a behavioristic view of learning since they mean that practice makes perfect (Säljö 2012 and Phillips. & Soltis 2010). The teachers also say that homework is the law of education. This can be interpreted as when assigning homework, the fifth of the five elements in a standard lesson is duly followed (Zhang & Tang 2005 and Shao & Gu 2006 through Xu 2010). The didactics is connected to this pedagogic view of learning. It is teacher-controlled and the strategy they use is to follow “the five elements”.

The teachers also mention another reason to assign homework; it is to receive knowledge about the students' learning situation. In other words, what they understand. This will give feedback to the teacher. They also say it will benefit the students since

they will notice what they have or have not understood. This could show partly a student-centered view, and that the teachers do not have an entirely behavioristic view of learning, but it could also still be part of such a view. The homework is also a feedback to the student. When the students notice that they have not understood everything, they have to practice more to be perfect. The system in China is examination-focused. According to Dello-lacovo (2009), if the teachers followed *suzhi jiaoyu* and less homework or no homework at all, the parents would take it upon themselves to employ a tutor because they are afraid that the child will not perform well enough. The teachers in my study mention this same problem, that when it is close to final examinations, the school or a tutor will assign extra homework. It seems that it is not only the parents but also the school itself that lays heavy burdens on the child. Good examination results do perhaps mean that the school will be higher ranked. Even though the teachers try to explain to the students that it is not the amount of homework but the specific problems that will help them to gain more knowledge, their parents do not see it in this way. Their purpose with homework and additional homework seems to be to help their child to pass the examinations with as high a score as possible, and hopefully even a perfect score. The fifth element in the standard lesson is homework, and the reason is that the students themselves should think and practice what the teacher has taught them in school. When a tutor is hired this is not the case. A tutor is mainly another teacher and the student does not sit alone, thinking and practicing.

This also constructs unequal learning and exam situations. The children who struggle and whose parents who cannot afford to hire a tutor, try to manage by themselves. They have less of chance to keep up with the students who do have other possibilities. This is a very individual view. I believe if the schools provided free homework support in different subjects, for example mathematics, the students could get help with their homework, and then there would not be the imbalance between the student who has a private tutor and the one who does not. What I wonder is why parents do not trust the school to know what is best for their child's education, that lessons and homework are enough for the student to assimilate in order to pass the examinations. The parents disregard the new regulations and school reforms and hire tutors anyway. Even if they do not, the extreme competition for a place at the best schools compel to act. Even if the Chinese government has implemented reforms to decrease the student workload, it seems not to have made a successful impact on student life.

### **7.1.2 How do several teachers' describe how homework can contribute to improve students' knowledge of mathematics?**

According to the interviewed teacher, homework helps the students to review and consolidate what they have learned in school that day. Homework will also give the students the opportunity to see if they have understood everything and if they do not, they can practice it. All of the teachers believe that homework is an important part of the mathematics education, that homework is the law of education because practice makes perfect. Perhaps they have this view because China is part of a Confucian Heritage Culture, in which you should work hard and that practice makes perfect (Xu 2010); this could still be influencing the Chinese education. Berinderjeets (2011) in a Singapore study also found that many teachers assign homework because they think that practice makes perfect. They also say that the student can develop and consolidate their mathematical knowledge by practicing the new knowledge and repeating the previous mathematical knowledge. However, if the students need to practice what they have learned and they do not have access to a tutor or knowledgeable member of the family, they are left alone in their learning process if they do not understand. If their parents cannot help them and they do not know how to calculate, they are lost. They can ask the teacher the day after, but then the whole point of the homework is gone. They are not able to practice their knowledge, and in the end the students' self-confidence might be reduced as well as their mathematical knowledge. If the teachers explain to the students why they assign homework, that it is up to them to see what they do not understand, then the homework can contribute meaning for the students. One of the teachers said that she taught the students how to work with their homework. In Coopers (2007) overview, he found that teachers in the West assign homework because it helps the students to review and see if they have understood the mathematics that the teacher had taught that day. But if there is a huge amount of methods or exercises that the student cannot understand, I believe that the students' self-confidence will still decrease and then they perhaps think that they are incapable of learning mathematics.

### **7.1.3 What kind of mathematics homework do a few the teachers assign?**

The teachers in the study assign two different kinds of homework, oral and written. In the oral homework, the students can read mathematics laws, read mathematics problems, and say what method they will use to solve it. They can also review orally what they have learned the same day. The written homework is calculations. Two of the teachers assign practical homework, which are connected to the students' daily life. According to the analysis, the teachers have a behavioristic view of learning since the homework is assigned for the students to review and repeat what they have learned during that day. On the other hand a sociocultural view can be recognized since the parents appear to be used as a mediation tool (Säljö 2012). They are expected to help the students to mediate using language and their cultural knowledge as tools. The homework itself may be in the students' Zone of proximal development (ibid). However, most of the homework is on a basic level and so is not specially formed for each student. The amount of homework that is assigned by the teachers is controlled by government regulations; this might show signs of the curricular reform. However, the school itself might assign additional homework.

There might be a contradiction in the data. During the interviews, the teachers say that they assign homework. However, during my observations, the teachers did not explicitly assigned any homework. I kept asking the interpreter over and over again what kind of homework they have. The interpreter just told me, they already know. I wonder how the students know implicitly what kind of homework they have. I have not been able to get more information about this; the information that I have might be insufficient. It might be that homework is what they have talked about during class and that they have the same exercises for homework.

### **7.1.4 How do several teachers describe students' ability to assimilate the mathematics homework?**

According to the teachers, the learning habits of the parents, which they have learned from their parents in turn, affect the students' ability to assimilate the mathematics homework. The students are reflections of their parents. If the parents have a good

learning habit, they will teach the child how to successfully assimilate the homework. The teachers all say that the parents' lack of mathematical knowledge or mandarin can affect their ability to help the students with their homework. Parents could be seen as mediation tools (Säljö 2012) and it is very unfair for the students if there is no one to help them. It is not only the parents cultural capital that can affect the students but also their lack of cultural capital when it comes to their knowledge in mathematics and mandarin. All teaching in China is conducted in Mandarin. This can affect the children who are from one of the 56 minority groups in China that speak other Chinese languages (Ouyang). According to Berinderjeet (2011), Epstein (1983), Quigley (2003), and Cooper (2007), one of the main reasons for teachers to assign homework in western societies is to teach students to take responsibility for their education. This differs from the Chinese teachers answers; however, it can be related to learning habits. If the student take responsibility for their education, he or she has a good learning habit. According to the teachers, the aspect of family background that most affects the students' ability to do their homework is their learning habits, which they learned from their parents.

During this study, I have also seen how the reform might have started to change the way teachers teach. Even though the curricular reform implemented in the 1990's, Ouyang has seen that students still prefer to be passive during her lessons at the university. She says that it is almost impossible to activate them; the students do not like it. The students are afraid to speak their mind; they are used to being passive learners and to just listen to the teacher. That is what they have been conditioned to do over their preceding 18 years. There are two teachers in my study who use a different teaching approach, which could be the effect of *suzhi jiaoyu*. However, it is not something that is used by the other two teachers, and obviously not by a lot of other teachers since Ouyang (ibid) does not see it at the university. A reform always takes time to break through, especially in a country as large and populous as China. The pressure that the students are subjected to might not only be due to workload of homework, but also from their culture. Ouyang talks about the pressure of finding a "good job" in order to support their future child, and also their parents when they grow old. If the students do not study hard and get a "good job", it will then be their fault if they cannot support their parents when they are old.



## 7.2 Conclusion

The conclusion of this study is that the teachers assign homework as a part of the lesson and the education, because the students do not understand everything in school and homework helps them to do so. They believe that the students will gain more mathematical knowledge by assigning them homework. They believe that the students will acquire this mathematical knowledge by reviewing and consolidating what they have learned during the day. Homework will also help the students to see if they have misunderstood something. By assigning these two or three different types of mathematics homework (oral, written, and practical), the students will get a better understanding of mathematics. The mathematics homework has special time regulations. What I wonder is how they know that it will take, for example, one hour to do a specific homework. They probably focus on what an average student can manage. I think there is a larger workload on the student who struggles with mathematics. The teachers all state that the main reason for students failing the mathematics homework is due to a lack of a good learning habit as part of their cultural capital. There are a few other struggles that they mention, such as the ability to understand the question itself and if the parents are not able to help them with the mathematics problem, which can be part of the cultural capital. The parents use as a knowledge resource, which is incorporated by students or the loss of such a resource. I think the students are then left alone in their learning without any guidance from their teacher. It seems that the homework is used as a stretch-out from the lesson whereby they are supposed to learn and understand the knowledge that the teacher has presented that day. For me, this is more or less a different view on what school is. In mathematics lessons, you are presented with new knowledge, and then you learn it and practice it by yourself. You are supposed to manage without any guidance when you do your homework. This is not the case since parents help them with their homework if they are able to or, if they can afford it, employ a tutor to do so. The school could provide help with homework to compensate for the advantages that students from wealthier families have. The students could have a supporter during this “homework help”, so they would not be alone in their learning process. In one way, there is an individualist view that it is up to you to be

perfect. However, the students are treated as a collective. The teaching is not individualized and unequal family backgrounds are not taken in account.

The teachers' perspective on learning differs as well. During the observations and interviews, the clearest view on learning is behaviorism with small hints of the sociocultural learning theory. I think that it is a huge struggle for the teachers to teach a class of 57 students and to use a different teaching style to behaviorism. However, two of the teachers manage to use different activities that are closely connected to sociocultural theory, so it might be possible nevertheless. It is more up to the teachers to design different activities, but they might just prefer the behavioristic way because it is easier. It is also the traditional way of teaching and when they were young they were taught in the same way.

During my observations and interviews, I observed that the teachers give positive reinforcement in class by giving the students stickers to put on the reward board. One of the teachers also gives positive reinforcement by giving students a day off from homework when they have managed to assimilate the homework correctly and with nice handwriting for ten days. If the homework is a stretch-out from the lesson and part of the five elements of a standard lesson, it is strange to give that kind of positive reinforcement. The student will then not gain the same knowledge as the rest of the students; he or she will miss the fifth element. The only way for a teacher to know if the students has done their homework correctly and with nice handwriting is to read it. In that way the teacher receives knowledge about the students learning situation. The teachers say that this is also one of the reasons for assigning homework: to see what the students understand and what they do not understand.

The teacher's perspective on homework is that it is embedded in "the law of education", a view that could mean the end for Chinese children's spare time. Even if the teachers have regulations on how much homework they are allowed to assign, tutors and schools give students homework that is not included in the regulations that the teachers have to follow. The parents hire tutors because they are afraid that their children will not pass the examinations (Dello-lacovo 2009). There is also a great weight of expectation placed upon children by their parents because their children are the ones who will take care of them when they grow old (Ouyang). This will not benefit the students' health.

They will still, despite regulations, have a huge workload and they may not have enough spare time to actually learn other important things in life, such as social skills. In other words, since they are always working alone and they are supposed to think independently, their ability to talk to other people and to work together in a group might be affected. However, in China independently might mean separate from school but to think and act as the teacher want you to do. The students are separate from the school when they assimilate the homework by reviewing, memorizing and repeating the knowledge. Since the Chinese students appear to always do what they are told, their workload will probably never change unless the school system will be less examination focused. Finally, this study was made possible by SIDA. The intension was not to make a comparison to the Swedish school. However, I wish to make a few personal comments. It seems important, particularly for politicians, educators and researchers, to consider and examine how the workload situations are described by students, not only in China but also in Swedish schools. Reports of stress-related health problems have been noted in Sweden, especially for girls. To what extent is this associated with the increased focus on ratings and the increased amount of national tests in more subjects and in even lower grades in Sweden? Since the Chinese students have performed very well in the international tests, the Swedish school system may want to take over their way on teaching. What will happen in Sweden if we have more examinations, heavier workload and a more behavioristic view on learning?

## 8. Future research

This is a small minor field study and does not generalize the perspectives of all mathematics teachers in China, but it goes give a sample. I have always been very interested in why teachers assign homework and this study has given me more knowledge on why they do, both in China and in western societies. In my future role as a teacher, I need to decide whether I will assign or not assign mathematics homework.

For future research I think it would be very interesting to do a similar study on a larger scale, to get a broader view of the different villages, cities, and provinces of China. The research design could be the same, but the data itself would be more substantial. It would also be very interesting to conduct research, both in China as well as elsewhere in the world, on the students' perspective on homework and how it affects their mental and physical health. Some of the main research questions could be:

- What is the students' view on mathematics homework as part of their workload and learning process?
- How does the mathematics homework affect the students' mental and physical health?

# References

- Alvehus, Johan (2013). *Skriva uppsats med kvalitativ metod: en handbok*. 1. uppl.1 Stockholm: Liber.
- Alvesson, Mats & Deetz, Stanley (2000). *Kritisk samhällsvetenskaplig metod*. Lund: Studentlitteratur
- Braun, Virginia and Clarke, Victoria (2006) Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3 (2). pp. 77-101. ISSN 1478-0887
- Bryman, Alan. (2008). *Samhällsvetenskapliga metoder*. Malmö: Liber.
- Berinderjeet, Kaur (2011). Mathematics homework: a study of three grade eight classroom in Singapore. *International Journal of Science and Mathematics Education*, 9(1), pp. 187-206.
- Bernstein, Basil (1983). Om samhällsklass och den osynliga pedagogiken. In Basil Bernstein & Ulf Lundgren (Red.), *Makt kontroll och pedagogik*. Stockholm: Liber (pp. 22-65).
- Bourdieu, Pierre (1990). *In other words: essays towards a reflexive sociology*. Oxford: Polity Press.
- Bourdieu, Pierre & Wacquant, Loïc (1992). *An invitation to reflexive sociology*. Chicago: University of Chicago Press.
- Bourdieu, Pierre (2010). *Distinction: a social critique of the judgment of taste*. London: Routledge
- Cooper, M. Harris (2007). *The battle over homework, Common ground for administrators, teachers and parents*. Thousand Oaks, Calif: Corwin press, inc.
- Dalen, Monica (2007). *Intervju som metod*. Malmö: Gleerups Utbildning AB
- Dello-lacovo, Belinda (2009). Curriculum reform and 'Quality Education' in China: An overview. *International Journal of Education Development*, (29), pp. 241-249.
- Denscombe, Martyn (2009). *Forskningshandboken: för småskaliga forskningsprojekt inom samhällsvetenskaperna*. 2. uppl. Lund: Studentlitteratur.
- Epstein, L. Joyce (1983). *Homework practice, achievements and behaviors of elementary schoolstudents*. Report No 26. Baltimore, MD: Center for Research on Elementary and Middle Schools.

Harker, Richard (1990). Bourdieu- education and reproduction. In R. Harker, C. Mahar & C. Wilkes (Eds.) *An introduction to the work of Pierre Bourdieu: The practice of theory* (pp. 86-108). Basingstoke: Macmillan.

Huang, Rongjin & Bao, Jiansheng (2006). Towards a model for teacher professional development in China: Introducing Keli. *Journal of Mathematics Teacher Education*, (9), pp. 279-298.

Hägström, Johan (2008). *Teaching systems of linear equations in Sweden and China: what is made possible to learn?* Diss. Göteborg : Göteborgs universitet.  
E-published version available at <http://hdl.handle.net/2077/17286>

Kundu, S.L. (2006). China's impending talent shortage. *Asia Times Online*.  
[http://www.atimes.com/atimes/China\\_Business/HG06Cb05.html](http://www.atimes.com/atimes/China_Business/HG06Cb05.html) (Retrieved 2016-03-26).

Kvale, Steinar (1997). *Den kvalitativa forskningsintervjun*. Lund: Studentlitteratur

Liang, G. (2005). Implications of the Third International Mathematics and Science Study for mathematics curriculum reforms in Chinese communities. *Journal of Mathematics Education*, 14(1), pp. 7-11.

Mehan, Hugh. (2008). A sociological perspective on opportunity to learn and assessment. In P. Moss, D. C. Pullin & J. P. Gee (Eds.). *Assessment, equity, and opportunity to learn*. (pp. 42-75). Cambridge: Cambridge University Press.

Ouyang, Wei. Assistant Professor at school of mathematics, Yunnan Normal University. Interviewed 2016-03-31.

Phillips, D. Charles. & Soltis, F. Jonas (2010). *Perspektiv på lärande*. Stockholm: Norstedt.

Shao, G., & Gu, L. (2006). Theoretical study on teaching the "two basics" in China. *Theory and Practice of Education*, 26(2), 48-52.

Skolverket (2012). *Greppa språket: ämnesdidaktiska perspektiv på flerspråkighet*. 2. uppl. Stockholm: Skolverket

Skott, Jeppe., Jess, Kristine., Hansen, Hans Christian & Lundin, Sverker (2010). *Matematik för lärare. Delta, Didaktik*. Malmö: Gleerups Utbildning.

Säljö, Roger. (2012). Den lärande människan: teoretiska traditioner. I Liberg, Caroline (Red.), *Lärande skola bildning: [grundbok för lärare]* (s. 139-197). 3., [rev. och uppdaterade] utg. Stockholm: Natur & kultur.

Turmo, Are (2004). Scientific literacy and socio-economic background among 15-years-old: A nordic perspective. *Scandinavian Journal of Educational Research*, 48(3), pp. 287-305.

Vetenskapsrådet. (2002). *Forskningsetiska principer inom humanistisk-samhällsvetenskaplig forskning*. Stockholm: Vetenskapsrådet

Quigley, Martin (2003). Educational baggage: The case of homework. *REACT*, 22(1), pp. 1–15.

Xu, Binyan (2010). Research on Mathematics Education in China in the last decade: a review of journal articles. *Frontiers of Education in China*, 5(1), pp. 130-155.

Zhang, D., Li, S., & Tang, R. (2005). The “two basics” in the math instruction in the mainland of China. In Fan, L. H., Wong, Ngai-Ying, Cai, J. F., & Li, S. Q (Eds.), *How Chinese Learn Mathematics* (pp. 153–168). Nanjing: Jiangsu Educational Publishing House.

# Appendix

## Appendix A Observation scheme and observation guide

Lärare:			
Datum:		Tid:	
Klassrumsaktivitet:			
Kommunikation:			
Material:			
Explicit läxa:			
Implicit läxa:			
Möblering:			

### Observations guide

#### Klassrumsaktivitet

Är det läraren som leder klassen eller får eleverna prova sig fram och ta reda på saker själv? Används praktiskt material? Används matematik bok?

#### Kommunikation

Vilken sorts kommunikation sker i klassrummet? Lärare-elev? Elev-elev?

#### Läxa (tolkens uppgift)

Går läraren igenom den gamla eller den nya läxan? Vad innehåller läxan? Eller vet eleverna redan vad som förväntas av dem?



## **Appendix B Interview guide English version**

This guide is inspired by Bryman (2008).

### **Main research questions**

- How do several teachers describe their reason for homework assignments?
- How do several teachers describe how homework can contribute to improve the students' knowledge of mathematics?
- What kind of mathematics homework do a few teachers assign?
- How do several teachers describe students' ability to assimilate the mathematics homework?

### **Background information**

- Age?
- Title?
- How many years have you worked as a teacher?
- Different schools? City or village?
- What university did you educate yourself in?

## **Questions**

### **Mathematics teaching**

- Can you tell me a little bit about your mathematics teaching?
- Can you tell me about your view of teaching?
- How do you plan your mathematics lessons? Can you describe the different elements that involve your lessons?

### **Homework**

- How do you define homework? What is homework according to you?
- Can you tell me about your view of homework?
- What kind of mathematics homework do you assign?
- Why do you assign homework? What are your reasons for assigning homework?
- Do all students do their homework?

- Can you decide if you want to assign homework or do the municipality decide it for you?
- What does it say in the policy documents about homework?

### **Mathematics knowledge**

- According to you, how do homework contribute to improve the students' knowledge of mathematics?

### **Family and homework**

- Do the school provide help with homework?
- According to you, in what ways might students' family background affect students' ability to assimilate the homework assignment?
- What are the main struggles that the students have with their homework?

### **Follow-up questions**

- What do you mean with that?
- Can you tell me some more about that?
- Is this also your opinion?
- Do you mean that.....?
- How did that make you feel?
- Can you give me some examples?

# Appendix C Interview guide Chinese version

## 采访提纲及主要问题

### 个人信息

年龄：

职位（头衔）：

任教年龄：

历年任教学校：

任教学校为城市还是农村：

毕业院校：

### 问题

#### 数学教学

- 可以跟我谈谈您自己的数学教学吗？
- 您怎样看待教学？
- 您是怎样备课的？请描述一下课堂里用到的各种类型的教具。

#### 家庭作业

- 您对家庭作业的定义是什么？
- 您怎样看待家庭作业？
- 您通常布置什么类型的作业？
- 为什么布置作业呢？请列举说明。
- 所有的学生都要做作业吗？
- 是您自己决定布置作业还是上级的要求？
- 有没有关于家庭作业的政策规定？

#### 数学知识

- 在您看来，家庭作业怎样促进学生学习数学？

#### 家庭与家庭作业

- 学校会为学生完成家庭作业提供什么样的帮助？
- 在您看来，家庭环境怎样影响学生完成家庭作业呢？
- 学生自己对于家庭作业有哪些主要的困难？

#### 其他

- 您能再说清楚一些吗？
- 可以再说点什么吗？
- 您也是这样想的吗？
- 那个时候您会有怎样的想法？
- 可以举例说说吗？

## **Appendix D Letter to the interviewed English version**

Dear teacher,

Thank you very much for your participation in this study. My name is Amanda Cederberg and I am conducting a minor field study as my final exam at the Faculty of Education and Society at Malmö University, Sweden.

The purpose of this study is to describe and analyze some teachers in mathematics' view of 10-11 year old students homework as part of their workload. The aim then is to explore their view and the study is an empirical based research. The interviewed teachers and schools will be anonymous by name in the thesis. The interviewed teachers will answer the questions that they feel comfortable to answer.

## Appendix E Letter to the interviewed Chinese version

### 感谢与声明

尊敬的各位老师:

感谢您参与本次研究调查。我叫阿曼达·塞德贝里，我正在作一个小的田野调查，这将作为我在瑞典 马尔默大学教育与社会学院毕业论文。

有看法认为，10-11 岁学生的家庭作业作为他们学习的一部分。这份研究的主要目的在于描述和分析部分教师对这个观点的看法。这份研究旨在探索老师的观点，是一份基于经验的调查。被采访的教师与学校将不会出现在论文中。如果采访当中遇到不愿意回答的问题，各位教师可不回答。